International Conference on Advancing Knowledge from Multidisciplinary Perspectives in Engineering & Technology

(ICAKMPET-19)

Visakhapatnam, Andhra Pradesh

5th- 6th April' 19

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PREFACE

We cordially invite you to attend the ***International Conference on Advancing Knowledge from Multidisciplinary Perspectives in Engineering & Technology*** which will be held at ***Ambica Sea Green HOTEL, Visakhapatnam*** on ***April 5th -6th, 2019***. The main objective of ***ICAKMPET-19*** is to provide a platform for researchers, engineers, academicians as well as industrial professionals from all over the world to present their research results and development activities in relevant fields of Multidisciplinary Perspectives in Engineering & Technology. This conference will provide opportunities for the delegates to exchange new ideas and experience face to face, to establish business or research relationship and to find global partners for future collaboration.

These proceedings collect the up-to-date, comprehensive and worldwide state-of-art knowledge on cutting edge development of academia as well as industries. All accepted papers were subjected to strict peer-reviewing by a panel of expert referees. The papers have been selected for these proceedings because of their quality and the relevance to the conference. We hope these proceedings will not only provide the readers a broad overview of the latest research results but also will provide the readers a valuable summary and reference in these fields.

The conference is supported by many universities, research institutes and colleges. Many professors played an important role in the successful holding of the conference, so we would like to take this opportunity to express our sincere gratitude and highest respects to them. They have worked very hard in reviewing papers and making valuable suggestions for the authors to improve their work. We also would like to express our gratitude to the external reviewers, for providing extra help in the review process, and to the authors for contributing their research result to the conference.

Since February 2019, the Organizing Committees have received more than 78 manuscript papers, and the papers cover all the aspects in Civil, Mechanical, Electrical, Electronics & Communication Engineering, Computer Science Engineering and Management. Finally, after review, about 30 papers were included to the proceedings of ***ICAKMPET-19***

We would like to extend our appreciation to all participants in the conference for their great contribution to the success of ***ICAKMPET-19*** We would like to thank the keynote and individual speakers and all participating authors for their hard work and time. We also sincerely appreciate the work by the technical program committee and all reviewers, whose contributions made this conference possible. We would like to extend our thanks to all the referees for their constructive comments on all papers; especially, we would like to thank to organizing committee for their hard work.

Acknowledgement

IFERP is hosting the ***International Conference on Advancing Knowledge from Multidisciplinary Perspectives in Engineering & Technology (ICAKMPET-19)*** this year in month of April. The main objective of ICAKMPET is to grant the amazing opportunity to learn about groundbreaking developments in modern industry, talk through difficult workplace scenarios with peers who experience the same pain points, and experience enormous growth and development as a professional. There will be no shortage of continuous networking opportunities and informational sessions. The sessions serve as an excellent opportunity to soak up information from widely respected experts. Connecting with fellow professionals and sharing the success stories of your firm is an excellent way to build relations and become known as a thought leader.

I express my hearty gratitude to all my Colleagues, staffs, Professors, reviewers and members of organizing committee for their hearty and dedicated support to make this conference successful. I am also thankful to all our delegates for their pain staking effort to travel such a long distance to attain this conference.

Ankit Rath
Chief Scientific Officer
Institute for Engineering Research and Publication (IFERP)

Keynote Speaker

Dr.C.V.GOPINATH

Principal, BITS, Visakhapatnam, India

Dr.C.V.Gopinath educated in GITAM and Andhra Universities and an expert in Solid Modeling and Reverse Engineering. On these topics he published research papers in International/National Journals/Conferences. He published books, conducted programs, delivered lectures in various National and International forums. He conducted two AICTE sponsored Staff Development Programs on CAD/CAM. His vast experience includes 16 years teaching in GITAM and Alliance Universities and 12 years as Principal of reputed institutes of AP and Odisha. He was instrumental in NBA accreditation for all the departments of JITM (Now Centurion University of Technology and Management), Paralakhemundi, Odisha and Chaitanya Engineering College, Visakhapatnam.

Currently he is with BITS Visakhapatnam as Principal

ICAKMPET-19

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A New Innovative Prepaid Energy Meter Using Arduino and IOT

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Abstract:-- **In present generation technology has been developed to a large extent. Smart phones play the major role in everyone's life. By using best technology I am designing a prepaid electricity bill using arduino and IOT module for domestic and commercial purpose. Generally the electricity reading is done by human beings. Humans are going to each and every house for electric reading. Sometimes it is not possible for them to go to some places because of bad weather conditions or floods etc. Sometimes the electric meter is not accessible for the human operator. So, by using this we can avoid such problems.**

Index Terms: Arduino Kit, IOT module, Energy Meter, Current sensor, etc

1. INTRODUCTION

Prepaid Electricity card is a good concept in which we can recharge the balance because like, we do recharge in our phones. In this project we are designing a system by using Arduino and IOT module. We can recharge the prepaid card by using the RFID card. In this project we are using an app called blink. If the balance is low or zero then it can automatically cutoff the power supply connection and intimates to the user by sending a message to their phone.

The system will read the recharge card and automatically sends the updates to the user like low balance alert, cutoff alert and recharge alert. We can recharge the prepaid card in various ranges like Rs.50, Rs.150 etc. According to the power consumption, the amount will be reduced. We are using a relay system which shutdown or disconnect the power supply when the recharge amount is over. Here we are using a buzzer which acts like alarm when it reaches to minimum balance.

Why Prepayment- From supplier point of view?

- Pay before use
- Keep customers on supply
- No bill production
- No bill distribution
- No need to chase payments
- Customer responsible for disconnection
- Social acceptability
- Load and demand side management

1.1Why prepayment – From customer point of view?

- >80% mobile phones used in India are prepaid Flexible payment solution
- Pay to suit your income status
- Daily, weekly, monthly budgeting
- Show true cost of consumption and money left

2. LITERATURE REVIEW

Electricity meter reading is done by human operator, this requires more number of time for billing. Due to the development of number residential buildings and commercial buildings the electricity meter task can be done by more number of human operators. It should be clear that such type of methods will take long time and doesn't complete the work within the time. In addition to this we can get large number of errors incorporated in the reading process and this type of system can't provide transparency.

3. COMPONENTS USED

- ARDUINO(ATMEGA328P-PU)
- ANALOGUE ENERGY METER
- OPTOCOUPLER(4n35)
- CURRENT SENSOR(ACS712)
- RELAY DRIVER(ULN2003)
- LCD 16*2

3.1 ARDUINO (ATMEGA 328P-PU):-

The ATMEGA328 is a single chip microcontroller created by “ATMEL” in the mega AVR family. It has a modified “HARDVARD” Architecture 8-bit RISC processor code.

Features:

- The ATMEL 8-bit AVR RISC based microcontroller combines 32KB and 1SP flash memory with read-write capabilities
- 1KB EEPROM
- 2KB SRAM
- 23 general purpose I/O lines
- 32 general purpose working registers

- 3 flexible timer/counters with modes internal and external interrupts
- serial programmable USART
- A byte-oriented 2 wire serial interference
- SP1 serial port
- 6-channel 10-bit A to D converter
- Programmable watchdog with internal oscillator and with 5 software selectable power saving modes
- The device operates between 1.8-5.5 Volts. The device achieves throughput approaching 1MIPS per MHZ.
- A common alternative to the ATMEGA328 is the "PICOPOWER".

Fig.1. Arduino (ATMEGA 328P-UP)

3.2 ANALOGUE ENERGY METER:-

Analogue or Analog meter is also known as electromechanical. The simple meter spins or moves forward when you are using electricity. The number of times the disc moves forward or backward determines how much electricity you are using to the electric grid.

Features:

- Cost-effective and flexible single-phase Energy Meter
- Detects signals and continues to measure accurately under at least 20 different tamper conditions
- Secure and reprogrammable Flash memory
- One-time, quick and accurate digital calibration
- Active power, voltage and current measurements are easily accessible
- USART interface
- Low-power AVR Microcontroller allows operation down to 1.8V

Fig.2. Analogue Energy Meter

3.3 Opto-coupler (4n35):-

An Opt coupler is a semi conductor device that uses a short optical transmission path to transfer an electrical signal between circuits or elements of a circuits, while keeping them electrically isolated from each other. Opt coupler prevent high voltages from effecting the system receiving the signal.

Opt coupler or Opt isolator means the control signal is used purely as a differential signal between Vcc and the control signal both sourced from the controlled circuit. Ground potential difference won't affect the operation.

Features:

- Isolation test voltage 5000 VRMS
- Interface with common logic families
- Input-output coupling capacitance<0.5pF
- Industry standard dual-in-line 6 pin package

Applications

- AC mains detection
- Reed relay driving
- Telephone ring detection
- Logic ground isolation

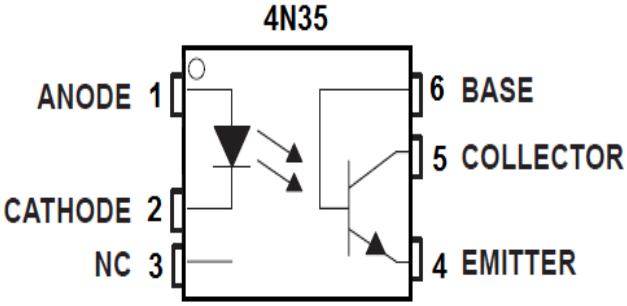

Fig.3. Opto-coupler (4n35)

3.4 Current Sensor (ACS712):-

A Current sensor is a device that detects electric current in a wire, and generates a signal is proportional to that current. The generated signal will be analog voltage or current or even a digital output. A current carrying wire produces a magnetic field. Current sensing resistors are used when the current is directly measured in the circuit.

Features and Benefits:

- Low-noise analog signal path
- Device bandwidth is set via the new filter pin
- 80 KHZ bandwidth
- Small footprint, low-profile SOIC8 package
- 66 to 185 mV/A output sensitivity
- Output voltage proportional to AC or DC currents
- Factory-trimmed for accuracy
- Nearly zero magnetic hysteresis

Fig.4 Current Sensor (ACS712)

3.5 Relay Driver (ULN2003):-

A Relay driver IC is an electro-magnetic switch that will be used whenever we want to use a low voltage circuit to switch a light bulb ON and OFF which is connected to 220V mains supply. The ULN2003 is an array of 7 NPN Darlington transistor capable of 500MA, 50V output. It features common-cathode fly back diodes for switching inductive loads. It can come in PDIP, SOIC, SOP (or) TSSOP packaging.

Features:

- 500-mA-Rated Collector current
- High-voltage outputs:50 V
- Output clamp diodes
- Relay drivers
- Stepper and DC Brushed Motor Drivers
- Lamp Drivers
- Display Drivers
- Line Drivers

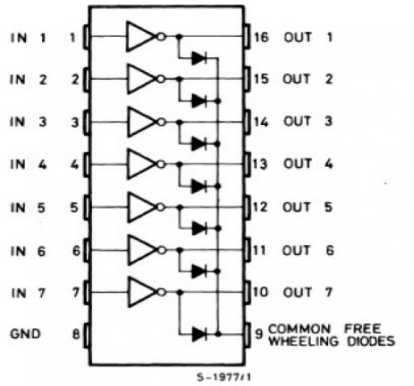

Fig.5. Relay Driver

3.6 LCD Display (16*2):-

LCD stands for LIQUID CRYSTAL DISPLAY.LCD is the technology used for displays in notebooks and other smaller computers like light emitting diode (LED) and gas-plasma technologies, LCD allows displays to be thinner than cathode ray tube (CRT) technology. A 16*2 LCD display is basic module and is commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segments LED's. In 16*2 alphanumeric LCD there are 2 rows and 16 columns. There are 8 data lines from pin number 7 to pin number 14 in an LCD. In this LCD each character is displayed in 5*7 pixel matrix and it has two registers namely, command and data.

Fig.6. LCD Display

4. WORKING PRINCIPLE

Here we have interfaced electricity energy meter with arduino using the pulse LED.

When we switch on the system then it reads the previous values stored in the EEPROM and then it checks the available balance with the predefined value and work according to them. If available balance is greater than Rs 20 then arduino automatically turns on and provide power supply to the home. If the balance is less than Rs 20 then it sends the alert message to the user phone. If the balance is less than Rs 5 then the arduino turns off and the connection will lost and sends the message to user phone. We can get all the messages in a app called blynk.

We need to recharge the prepaid card by placing the card in front of the RFID reader then it scans the card and automatically recharges the amount. We are using a current sensor for calculating the total power consumption of the system.

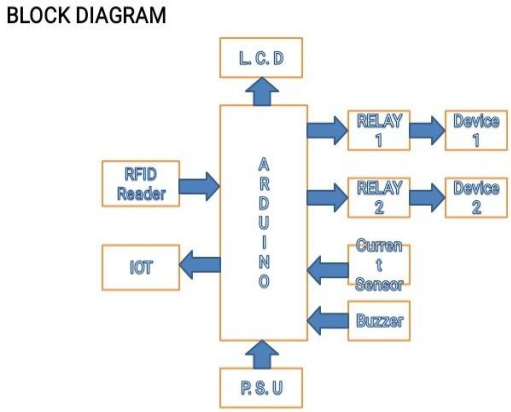

Fig.7 Block Diagram

Working Flow Chart:

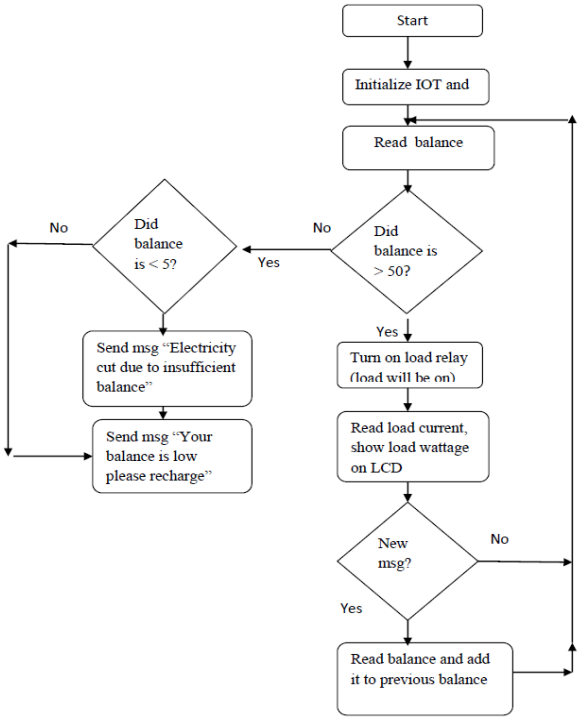

Fig.8 .Flow chart

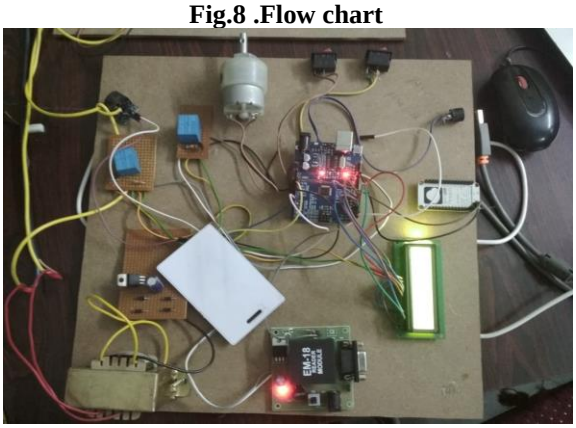

Fig.8. Energy Meter Using Arduino and IOT

5. RESULT

When the supply is provided to the meter, initially the LCD will turn on. We have set the recharge amount up to Rs 999. The costumers can recharge according to their requirement. Whenever they switch on the supply the power will consume and reading are updated in the app .If the customer wants to know how much amount used how much amount left then they can see the LCD display or they can check the app also. If the balance is low then the customer will get the alert message and the buzzer also sounds.

6. CONCLUSION

In present situation all customers are using manual communication. To reduce the manual efforts and human efforts we are implementing a automated system which monitors all the parameters and functionality between the customer and electricity board. Also, by implementing this system we can control the usage of electricity and avoid wastage of power. By using this system we can save the customer and human operator time and customers can easily monitor their usage of current. An attempt is made in which interfaced with static electronic energy meter is avoided where in complexity of the circuit is reduced and cost also gets reduced.

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Design of Efficient Single Precision Floating Point Multiplier using Urdhva Triyagbhyam Sutra of Vedic Mathematics

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Abstract:-- **Multiplication of floating point(FP) numbers is greatly significant in many DSP applications. The performance of the DSP's is substantially decided by the speed of the multipliers used. This paper proposes the design and implementation of IEEE 754 standard single precision FP multiplier using Verilog, synthesized and simulated in Xilinx ISE10.1. Urdhva Triyagbhyam Sutra of Vedic mathematics is used for the unsigned mantissa calculation. The design implements floating point multiplication with sign bit and exponent calculations. The proposed design is achieved high speed with minimum delay of 3.997ns.**

Index Terms: Floating point numbers, Single precision, IEEE 754, Urdhva Triyagbhyam Sutra, Vedic mathematics.

1. INTRODUCTION

Multiplication of floating point binary numbers is the most important operation in DSP applications. IEEE 754 standard provides formats for the FP numbers. IEEE 754 standard format for single precision(32-bit) FP number consist of a Sign unit(1-bit), Exponent unit(8-bits) and Mantissa unit(8-bits) as shown in fig.1.

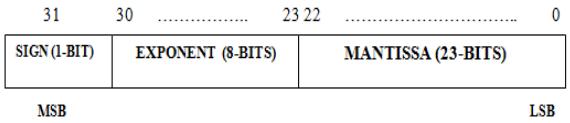

Fig.1: IEEE 754 Single Precision Format

MSB's of two 32-bit numbers are XORed to generate sign bit of the product. Exponent of the product is calculated by adding exponents of the inputs using Carry Look Ahead(CLA) adder and biasing to -127. Mantissa multiplication unit is designed using Urdhva Triyagbhyam Sutra of Vedic mathematics.

A. Urdhva Triyagbhyam Sutra

The exact meaning of Urdhva Tiryabyham sutra is "Vertically and Crosswise". Urdhva Tiryabyham Sutra can be applied to all the cases of multiplication. In this method, the partial products & their sum is obtained in parallel. The steps involved in 2x2 multiplication[14] using Urdhva Tiryabyham Sutra are shown in fig.2. The same procedure can be extended for 3x3 multiplication[3] as shown in fig.3.

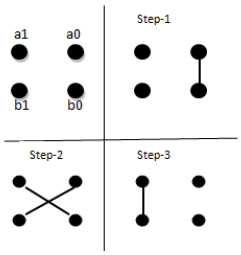

Fig.2. 2x2 Multiplication Using Urdhva Sutra

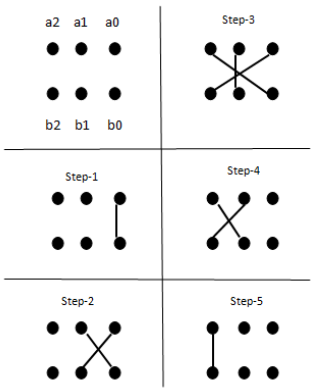

Fig.3. 3x3 Multiplication Using Urdhva Sutra

The 3x3 multiplier can be used for constructing higher order multipliers such as 6x6, 12x12 and 24x24 bit multiplication.

II. PREVIOUS WORKS

Swapnil Suresh Mohite, Sanket Sanjay Nimbalar, Madhav Makarand Bhathande, Rashmi Rahul Kulkarni presented the design of 32-bit FP multiplier using Urdhva Triyagbhyam sutra[1] which reduces the processing delay. Code was written in VHDL using Xilinx ISE series. Overall performance of designed multiplier depends upon the performance of mantissa multiplier unit. Mantissa multiplier was designed using Urdhva Triyagbhyam sutra. 3x3 multiplier was used as basic multiplier. 8-bit CLA is used for adding two 8-bit exponent. Output of the adder was biased to -127 to generate the exponent of output floating point number. The proposed multiplier circuit takes 71.239ns to perform multiplication of two 32-bit floating point binary numbers. This delay is significantly less than Booth multiplier.

Aniruddha kanhe, Shishir Kumar Das, Ankit Kumar Singh described the design and implementation of IEEE 754, 32-bit FP multiplier[3] using vedic mathematics. The Urdhva Triyagbhyam sutra was used for mantissa multiplication. Multiplication was achieved by adding the biased 8-bit exponent, multiplying the normalized 24-bit mantissa and resultant was converted in excess 127 bit format. The exponent calculation unit was implemented using 8-bit RCA. Sign bit was calculated by XORing the MSB's of the inputs. The multiplier was designed in Verilog HDL and simulated using Modelsim simulator. This design was synthesized using Xilinx ISE12.1 tool targeted on the Xilinx Vertex5. The design utilizes lesser number of LUT's, thereby reduces the power consumption.

Soumya Havaldar, K S Gurumurthy[4] proposed the design of multiplier for floating point numbers using vedic mathematics. This design also manages overflow, underflow and rounding. Design was coded in VHDL, simulated and synthesized using ISE14.6 tool targeting the Xilinx VertexVI FPGA. This work concludes that; the proposed design occupies less space and high operating speed due to vertical and crosswise calculation using Urdhva Triyagbhyam sutra.

Pooja Hatwalne, Ameya Deshmukh, Tanmay Paliwal, Krupal Lambat proposed a design and implementation of single precision FP multiplier using VHDL[5]. 24-bit multiplier using Urdhva Triyagbhyam sutra of vedic mathematics was designed for mantissa calculation. 8-bit CLA adder was used for exponent calculation. The design was synthesized and simulated in Xilinx ISE14.7 targeted on Spartan3 device. The proposed floating point multiplier showed optimized and better timing performance with total delay of 36.19ns.

III. SILULATION RESULTS

32-bit floating point multiplier design is implemented in VHDL and simulated using Xilinx ISE10.1. The unsigned mantissa multiplication is achieved by using Urdhva Triyagbhyam Sutra of Vedic mathematics. Fig.4-6 shows the RTL schematics of 32-bit floating point multiplier, mantissa unit and exponent calculation unit respectively.

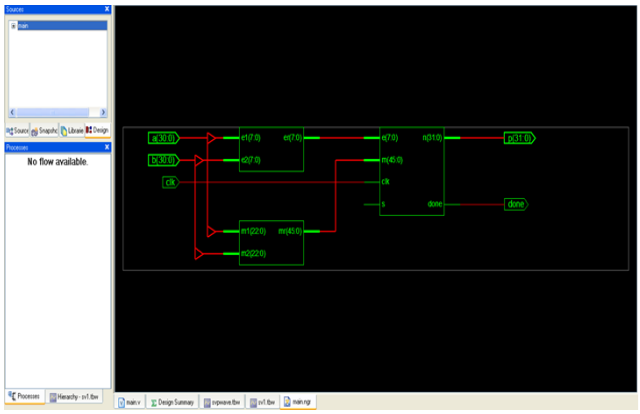

Fig.4: Schematic Of 32-Bit Floating Point Multiplier

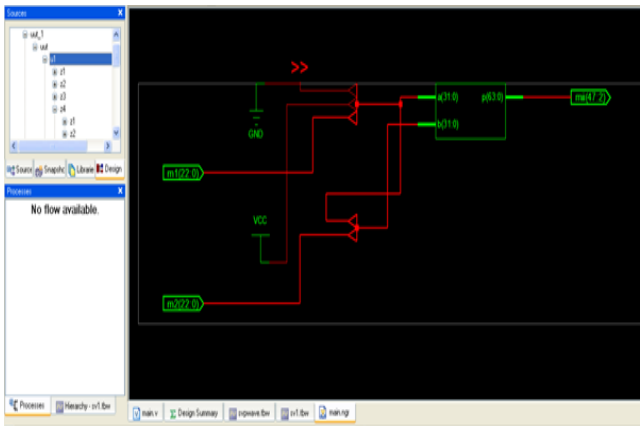

Fig.5: Schematic Of Mantissa Calculation

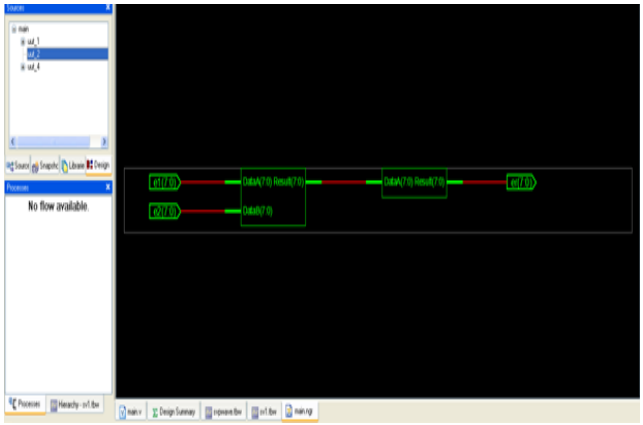

Fig.6: Schematic Of Exponent Calculation

Table 1: Performance Analysis

Parameters	Proposed Urdhva 32X32
NO. SLICES	298
NO. 4 IP LUT	579
NO.OF BONDED IOBs	96
COMBINATIONAL DELAY	3.997ns

Table 1 show the device utilization and combinational delay of the proposed design. Table 2 show the comparison of the proposed design with the designs of the literatures. The proposed design exhibits lesser device utilization and delay.

Table 2: Comparison of Performance Parameters

Paper	Number of Slices	LUT's	Bonded IOB's	Time delay(ns)
[1]	911	1580	96	71.293
[3]	-	966	99	5.246
[4]	-	705	96	21.823
[6]	-	672	96	4.94
[9]	1389	1545	129	13.141
[10]	2041	3317	206	89.374
[11]	-	1032	99	5.246
[12]	999	1819	-	14.17
Proposed design	**298**	**579**	**96**	**3.997**

CONCLUSION

The single precision FP multiplier using Urdhva Triyagbhyam Sutra is designed in VHDL, simulated using Xilinx ISE10.1 and parameters such as number of slices, 4 input LUT's and delay were analyzed and compared with the literatures. The proposed design utilizes lesser number of slices and LUT's thereby reduces the hardware requirement. High speed is also achieved by the use of Urdhva Triyagbhyam Sutra and CLA adder. This proposed work can be extended for the design of double precision(64-bit) FP multiplier using Vedic mathematics.

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$SmFe_{1-y}Co_yO_3$ perovskite type oxides for Soot Oxidation Reaction

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***Abstract:*-- Perovskite Oxides are the novel materials used for the application of soot oxidation reactions. In the current work, Cobalt doped $SmFeO_3$ perovskite-type oxides: $SmFe_{1-y}Co_yO_3$ (y=0.1 to 0.35) were synthesized using EDTA-CA sol-gel combustion method. The influence of Co doping upon soot oxidation reaction was investigated using Thermogravimetric Analysis. All the fabricated catalysts were characterized using XRD, SEM, BET surface area analysis and XPS. XRD analysis confirmed the formation of single phase orthorhombic $SmFe1_{-y}Co_yO_3$ perovskite till x=0.3. All the samples exhibited similar morphology specific surface area of the samples did not impose any effect on the soot oxidation activity. Sm existed in +3 oxidation states; Fe as +3 and Co as +3 in all the samples based on the XPS results. Soot oxidation activity tests, performed using TGA showed that $SmFe_{0.7}Co_{0.3}O_{3-\delta}$ exhibited better catalytic performance (T_{50}- 496°C) when compared to undoped $SmFeO_3$ (T_{50} -560°C).**

Index Terms: Perovskites, $SmFe_{1-y}Co_yO_3$, Doping, Soot Oxidation, Adsorbed oxygen species.

1. INTRODUCTION

Perovskites have a cubic structure with general formula of ABO_3. In this structure, an A-site ion, on the corners of the lattice, is usually an alkaline earth or rare-earth element. B-site ions, on the center of the lattice, could be 3d, 4d, and 5d transition metal elements. Perovskite systems are largely used in catalytic processes due to their . Most of the α-oxygen species would be considered as O^- or O^{2-} species, weakly bounded to the transition metal sites on the surface and desorbing at low-to-intermediate temperature. The second desorption peak (β-O) is characterized by a sharp desorption of oxygen at higher temperature. By contrast with α-oxygens, increasing the calcination temperature of perovskite yields an increase of the amount of β-oxygen released which is very helpful in case of soot oxidation reactions.

Owing to their exceptional redox properties (multiple valence states of the cations) coupled with high oxygen mobility, perovskites can be remarkable oxidation catalysts. Higher stability could be obtained by supporting perovskite on other oxides such as zirconia and alumina. Perovskites have also proven to be excellent supports of metal catalysts, combining the two active materials (perovskite oxide and metal) giving rise to innovative catalysts in many applications. M.Zhao et al., studied the effect of cobalt doping in SmFeO3 perovskite for the application on gas sensing. They concluded that large response and good selectivity to ethanol was showed by the sample when Co dopant level (y) reached 0.3.

Torregrosa et al. synthesized copper doped $BaMnO_3$ perovskite and concluded that $BaMn_{0.7}Cu_{0.3}O_3$ as the most active catalyst for soot oxidation. They also reported that the superior activity was due to the enhancement of the redox properties of the catalyst due to the partial substitution of $Mn^{+3/+4}$ by Cu^{+2} in the perovskite structure.

In the current work Co-substituted perovskite catalysts $SmFe_{1-y}Co_yO_3$ (y=0.1 to 0.35) were prepared by EDTA-Citric Acid sol-gel combustion method. The effect of Co substitution in the perovskite $SmFeO_3$, on the catalytic soot oxidation activity was investigated. The synthesis, characterization, and influence of Co- substitution on the catalytic activity for soot combustion were reported.

2 . MATERIALS AND METHODS

Catalyst Preparation

Cobalt doped perovskite $SmFe_{1-y}Co_yO_3$ (x=0.1 to 0.35) was synthesized using EDTA/Citrate gel based method. EDTA-citrate method has been chosen because of its simplicity, availability of the chemicals and it yields high purity of the materials. Stoichiometric amounts of nitrates of the redox (Fe, Co) and non-redox metals(Sm) are mixed together to form an aqueous solution. The stoichiometric ratio of nitrates, EDTA and citric acid is 1:1:1.5. EDTA is first dissolved in a concentrated NH_4OH for better solubility before it is added to the solution as well. Solid anhydrous citric acid was added under stirring to the resulting mixture and further NH_4OH solution was added until the pH is 10 for the complexation reaction to occur. The solution is then

heated at 250 °C and stirred at 200 rpm until it forms a gel. This gel is then placed in an oven at 150°C for 3-4 hours where the mixtures will combust. The solid precursor was calcined at 800 ^{0}C for 10 h in a muffle furnace to obtain the final perovskite phase powder product. All the samples thus obtained were labeled as SFCy, where x is the % amount of Co doping (y=0, 10, 20, 30 and 35) in all the figures.

Characterization

The Phase-Structural analysis of the materials was done by Rigaku Miniflux 6000, X-ray diffractometer with monochromatized high-intensity Cu Ka radiation (λ=1.54 A˚) at a scanning rate of 1˚/min in the scanning range of 10˚-60˚. SEM micrographs were obtained by Hitachi S-1460 using AC voltage of 15 kV (IIT Guwahati). Specific Surface Area was determined by BET surface area analyzer (Model-SmartSorb 92/93) where all the samples were evacuated at 200˚C to remove the residual moisture. The XPS analysis of the materials was accomplished using a Thermo K-5 Alpha XPS instrument with the X-ray source Mg Kα (1253.6 eV) radiation.

Catalytic Soot Oxidation Activity

The oxidation of soot in the presence of thus synthesized catalysts was evaluated using Thermogravimetric Analyser (TG/DTA 6300) instrument in the presence of air (O_2 21% and N_2 79%) at a flow rate of 100ml/min in the temperature range of 200-700^{0}C at a heating rate of 10 ^{0}C/min. The measurements were performed with soot-catalyst mixtures (ground in an agate mortar) in 1:4 weight ratios wherein PRINTEX-U was the model soot used under 'tight contact' condition. The catalytic performance in the oxidation of soot was quantified in terms of T_{50} ˚C, the temperature at 50% soot conversion.

3. RESULTS AND DISCUSSION

3.1 | Catalyst Characterization

XRD is considered as the most powerful tool to obtain the crystal structure and Fig.1 depicts the diffraction patterns of the samples synthesized. Single phase $SmFeO_3$ with no phase segregation and any other stoichiometry like $Sm_3Fe_5O_{12}$ is successfully obtained at a calcination temperature of 900˚C. Bragg Reflections of undoped $SmFeO_3$ and Co-doped samples found to be in perfect correlation with the Powder Diffraction Standards (JCPDS: 39-1490) assigned to an orthorhombic structure. From the XRD patterns of $SmFe_{1-y}Co_yO_{3-\delta}$ (y=0.1, 0.2, 0.3 and 0.35), it can be concluded that the phase is changed gradually upon increasing the amount of dopant (Co). The absence of respective oxides Sm_2O_3, FeO_x, CoO_x, or any other impurities confirms the formation of $SmFe_{1-y}Co_yO_{3-\delta}$ solid solutions. Furthermore, the diffraction peaks of these samples are shifted to higher angle (2θ) as shown in Fig.1 when compared to the peaks of pure $SmFeO_3$. This could be due to the lattice contraction of $SmFeO_3$ crystal because of the incorporation of lower ionic radii ions Co^{+3} (0.078nm), than the host ions Sm^{+3} (0.096nm). It is interesting to note that the major peak at ≈ 32° was split when the dopant level (*y*) reached 0.35. It could be due to the fact that solubility of nitrates decreases when concentration of either of redox ions is increased and phase formation does not take place as expected.

The crystal sizes and lattice parameters of the respective samples are calculated and presented in Table 2. The crystal size was calculated by means of Scherrer equation. As the Co dopant level increased there is decrease in the average crystal size and also cell volume due to the shrinkage of $SmFeO_3$ lattice. $SmFe_{0.7}Co_{0.3}O_{3-\delta}$ sample is found to have lowest crystal size and cell volume.

Table 2: Crystal size and Lattice parameters (hkl) and Surface Area of the samples

x	FWHM (°)	2θ (°)	Average crystalline size (nm)[a]	h (nm)[b]	k (nm)[b]	l (nm)[b]	V (nm^3)	Surface Area (m^2/g)
0.00	0.2279	32.33	35.89	0.5603	0.7736	0.5443	0.2360	6.57
0.10	0.2460	32.50	33.26	0.5618	0.7721	0.5382	0.2335	2.72
0.20	0.6500	32.58	12.59	0.5588	0.7738	0.5392	0.2331	3.3
0.30	0.7897	32.98	10.37	0.5601	0.7701	0.5393	0.2326	6.33
0.35	0.5522	32.98	14.84	0.5601	0.7703	0.5420	0.2338	4.43

a) Crystal size using scherrer equation = $\frac{0.89\lambda}{\beta cos\theta}$

b) Lattice parameters from XRD = $\left({h^2}/{a^2} + {k^2}/{b^2} + {l^2}/{c^2}\right)^{-1/2}$

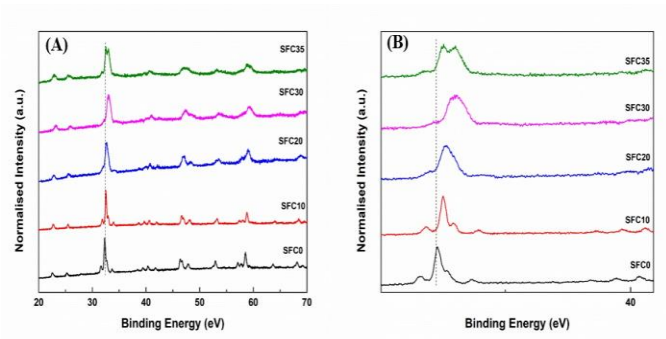

Figure.1 (A) XRD Pattern of all the prepared samples (B): Enlarged XRD peak.

The morphology of the Co-doped SmFeO3 perovskite materials were studied by Scanning Electron Microscopy (SEM). All these perovskite oxides shown in Fig.2 exhibited aggregates with uniform aggregates with pores existing on the surface which is a general morphology of oxides.

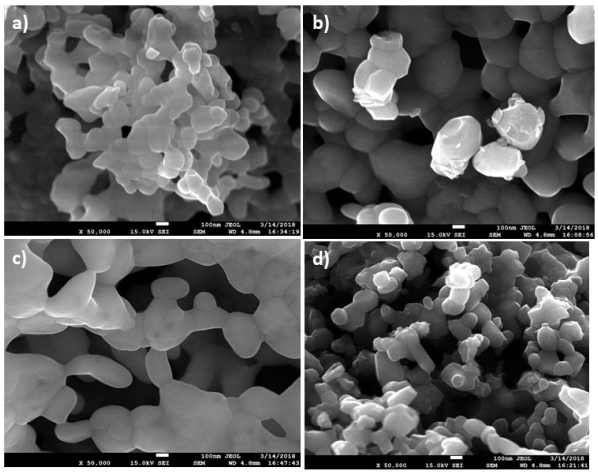

Figure. 2. SEM micrographs of the samples (pure SmFeO3 is not there)

3.2 | XPS Analysis

XPS is used for the quantification and identification of oxidation states with the help of peaks of Sm3d, Fe2p, Co2p and O1s core levels, shown in Figure 3, 4, 5 and 6 respectively. According to literature, the binding energy of Sm 3d is found to be around 1084 eV for Sm^{3+}. The figure depicts peaks around 1082eV and 1112 for $Sm3d_{5/2}$ and $Sm3d_{3/2}$ mutiplets respectively, corresponding to +3 oxidation state of Sm in all the samples. The observed $Fe2p_{3/2}$ peak at 710eV and $Fe2p_{1/2}$ at 722.5eV corresponds to the +3 oxidation state of Fe in all the samples. The chemical state of cobalt in the samples is determined through XPS of Co2p core level region. In Fig.5 Co $2p_{3/2}$ and Co $2p_{1/2}$ are further de-convoluted into two sub-peaks, respectively. The Co $2p_{3/2}$ peak at 780 eV and the Co $2p_{1/2}$ peak at around 795 eV with the spin-orbit splitting difference of 15 eV can be assigned to the Co^{3+} oxidation state.

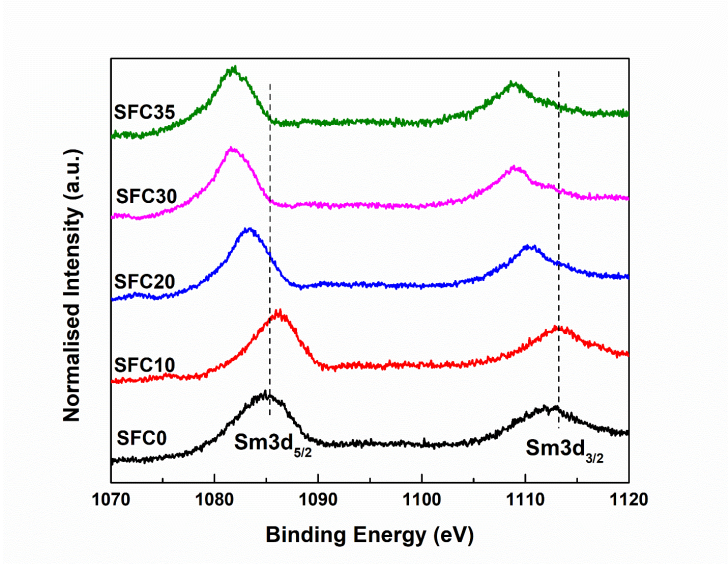

Figure. 3. XPS of Sm3d region of all the samples

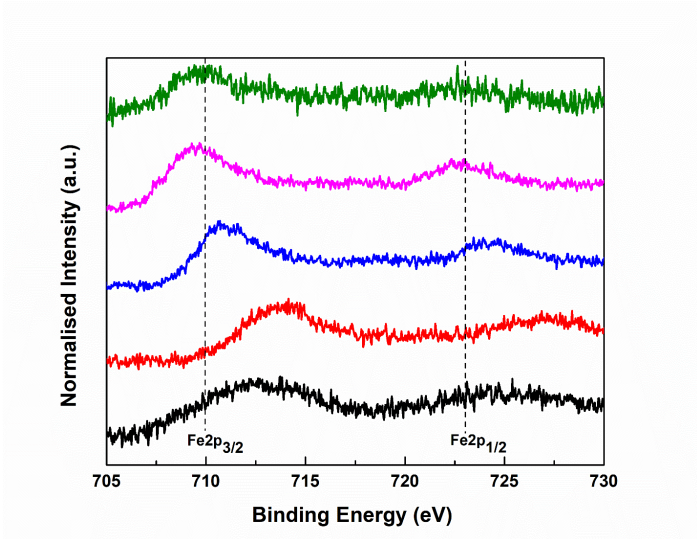

Figure. 4. XPS of Fe2p region of all the samples

Fig.6 represents the O1s region of pure Mn_2O_3 and M-doped samples. The spectrum is well fitted to two peaks at around 529eV and 531eV. The peak with binding energy from 529-530eV can be attributed to lattice oxygen (α) and the peak from 530-532eV correspond to adsorbed oxygen species (β). From the figure O_α and O_β peaks of the sample $SmFe_{0.7}Co_{0.3}O_{3-\delta}$ appears at lowest binding energy signifying the loosely bound oxygen species. It indirectly implies that active oxygen species responsible for soot oxidation are easily available in case of $SmFe_{0.7}Co_{0.3}O_{3-\delta}$ sample.

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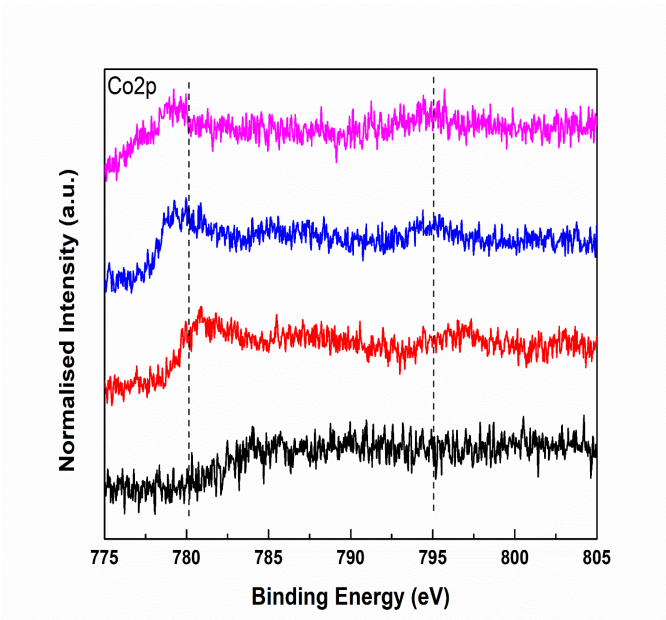

Figure. 5: XPS of Co2p core level in all the samples

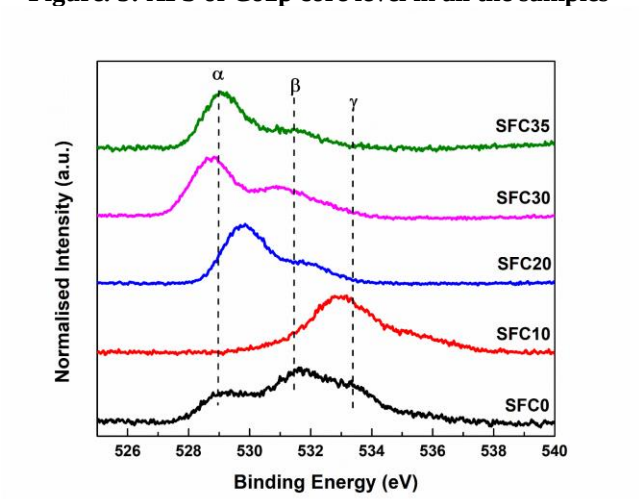

Figure. 6: XPS of O1s region of all the samples

3.3 | Soot Oxidation Activity

Fig.7. represents the % soot conversion profiles of uncatalyzed and catalyzed soot (with $SmFeO_3$ and Co-doped) under tight conditions as a function of temperature. The temperature T_{50}°C i.e, the temperature at which the 50% of the soot is oxidized is summarised in **Table 4.** T_{50}°C values are in the order of $SmFe_{0.7}Co_{0.3}O_{3-\delta}$<$SmFe_{0.8}Co_{0.2}O_{3-\delta}$<$SmFe_{0.9}Co_{0.1}O_{3-\delta}$< $SmFe_{0.65}Co_{0.35}O_{3-\delta}$<$SmFeO_3$<Soot. These results indicate that the Co-doped samples exhibited better catalytic activity of soot oxidation when compared to undoped $SmFeO_3$. Among the doped samples also, $SmFe_{0.7}Co_{0.3}O_{3-\delta}$ showed enhanced catalytic activity. This could be due to loosely bound oxygen species as evidenced from the XPS analysis (Fig.)

Table 4: $T_{1/2}$ temperatures for the soot oxidation

S.No	Sample	T_{50} (°C)
1.	Soot	600
2.	$SmFeO_3$	560
3.	$SmFe_{0.9}Co_{0.1}O_{3-\delta}$	543
4.	$SmFe_{0.8}Co_{0.2}O_{3-\delta}$	521
5.	$SmFe_{0.7}Co_{0.3}O_{3-\delta}$	496
6	$SmFe_{0.65}Co_{0.35}O_{3-\delta}$	545

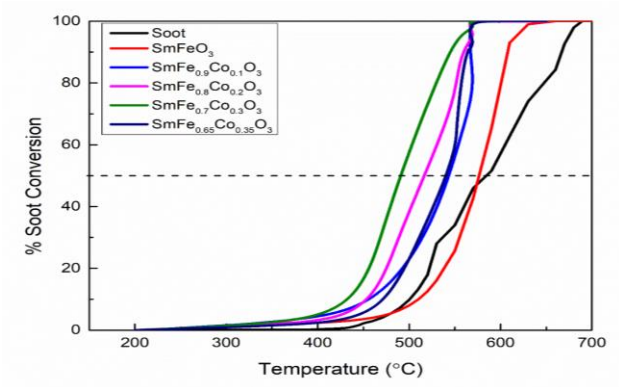

Figure.7. Soot Conversion profiles of Soot

4 . CONCLUSION

The perovskite oxide type materials $SmFe_{1-y}Co_yO_{3-\delta}$ (y=0.1, 0.2, 0.3 and 0.35), synthesized by EDTA-CA method were examined as catalysts for soot oxidation reaction. All the samples possessed single-phase orthogonal perovskite structure. The lattice constant, unit cell volume and the average crystal size decreased with an increase in Co content due to the formation of oxygen vacancies in the samples. SEM analysis revealed that all the samples exhibited similar morphology and specific surface area of the samples did not impose any effect on the soot oxidation activity. Sm existed in +3 oxidation states; Fe as +3 and Co as +3 in all the samples based on the XPS results. Soot oxidation activity tests, performed using TGA showed that $SmFe_{0.7}Co_{0.3}O_{3-\delta}$ exhibited better catalytic performance (T_{50}- 496°C) when compared to

undoped $SmFeO_3$ (T_{50} -560°C) because of the readily available active oxygen species.

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Structural Alteration and Switch Technique Based Novel Compound Reconfigurable Antenna for PCS and WLAN Applications

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***Abstract*:-- The paper describes the design of compound reconfigurable antenna by using structural alteration technique and switch technique. This antenna can reconfigure its frequency as well as radiation pattern. The antenna structure consists of the rectangular slot circular patch and circular slot hexagonal patch; on each patch two PIN diodes are placed. The antenna is designed to change frequency from 1.9 GHz to 2.54GHz by using structural alteration technique and it can also change its radiation pattern to two different directions by using switch technique. This antenna is useful for PCS and WLAN applications.**

Index Terms: Reconfigurable Antenna; Structural Alteration technique; Switch Technique; PIN diode

1. INTRODUCTION

Antenna plays a key role in wireless communication systems, radar systems, satellite communications systems and military surveillance. In many of these systems, there is a requirement to perform various functions across several frequency bands. In most of the cases, single antenna is not enough and it requires usage of multiple antennas for various functions. This results in an increase in the system volume requirement, fabrication cost and resources required to maintain. Reconfigurable antenna is the best candidate for these kind of situations and this antenna can deliver the same throughput as a multi antenna system. Reconfigurable antenna has an ability to change its characteristics with respect to the user requirement.

The reconfigurable antennas are classified into three types. They are frequency reconfigurable antenna, radiation pattern reconfigurable antenna and polarization reconfigurable antenna. The frequency reconfigurable antenna can change its resonant frequency from one frequency to another frequency without changing the other parameters such as radiation pattern direction and polarization. Similarly without changing other parameters the pattern reconfigurable antenna can change its direction of radiation pattern from one direction to another direction and polarization reconfigurable antenna can change its polarization from one type of polarization to another type. The compound reconfigurable antenna is the combination of any two reconfigurable antennas or all three.

A seven shaped antenna consists of a varactor diode for frequency reconfigurability. This antenna can change its operating frequency from one frequency to another frequency by changing the voltage applied across the diode [1]. A rolled monopole antenna can reconfigure its frequency by changing the radius of the rolled monopole. When the radius of the antenna is changed, the structure of the patch that is connected to the feed is changed that will cause changes in the resonant frequency [2]. A pixel antenna consists of 3x3 square shaped metallic patches and PIN diodes are placed between the adjacent patches. When the state of the switch is changed, the geometry of the parasitic surface is changed, which in turn changes the radiation pattern of an antenna [3]. The pattern reconfigurable antenna consists of an array of two microstrip dipoles, the length of the dipole is changed by using PIN diodes and it will leads to different radiation patterns [4]. A square shaped patch antenna consists a loop slots in the ground plane exhibits polarization reconfigurability from LHCP to RHCP. Two diodes are placed on the slot in order to reconfigure its polarization [5]. The polarization reconfigurable antenna can change its polarization from LHCP to RHCP by using patch rotaion techinque, by rotating the patch by 180 degrees, this antenna changes its polarization from LHCP to RHCP because the shape that was connected to the patch is chnged through rotation [6].

A conformal phased array antenna consists of frequency reconfigurable component and another is radiation pattern reconfigurable component. A square microstrip antenna and a coupled strip are used for frequency reconfigurability where as a small square microstrip antenna is used for pattern reconfigurability. Switches are placed on both the structures. By turning the frequency reconfigurability switches to ON state and pattern reconfigurable switches to OFF state, the design exhibits frequency reconfigurability. Similarly by turning ON the pattern reconfigurable

switches and turning OFF the frequency reconfigurable switches, the design exhibits pattern reconfigurability [7]. A semi ring radiator and two monopoles are used to achieve frequency and pattern reconfigurability. The two PIN diodes are used to connect the two monopoles to the ring radiator and the varactor diode is placed on the ring radiator. The design exhibits frequency reconfigurability by changing the state of the varactor diode and by controlling the two PIN diodes, this design exhibits pattern reconfigurability [8]. Two monopoles are placed on side by side. The two ends of the structure. Two switches are placed. At the other side of the switches truncated monopoles are placed. By changing the state of the switches, the design changes its frequency and radiation pattern simultaneously [9]. The pixel reconfigurable antenna consists of uniform grid of small metallic patches. Theses patches are divided into two regions i.e. driven region and parasitic region. Between every pair of adjacent patches switches are connected. By changing the state of the switches which are present in driven region, the design exhibits frequency reconfigurability where as by changing the state of the switches which are present in parasitic region, the design exhibits pattern reconfigurability [10]. The planar monopole antenna is connected to microstrip patch by using five PIN diodes. Three PIN diodes are used to connect the patch and monopole. Other diodes are placed between the monopole and the ground. By controlling the states of the diodes, the antenna operation can be changed [11]. The annular slot antenna consists of a circular slot on a square. To change the direction of radiation pattern two PIN diodes are placed on the circular slot. By changing the diode state, the design changes its operating frequency and direction of radiation pattern [12]. Similarly the dipole antenna used two photo conducting switches for frequency and pattern reconfigurability [13]. The antenna design consists of two parasitic elements, which are placed along the driven element. Switches are placed on both driven patch and parasitic patches. Changing switch state, the design achieves frequency reconfigurability with the change in the radiation pattern [14].

In view of the above discussion, a novel compound reconfigurable antenna is designed and it can reconfigure both frequency and radiation pattern. The structural alteration technique is used for frequency reconfigurability and for pattern reconfigurability switch technique is used. This design is useful for PCS and WLAN applications

2. ANTENNA DESIGN

Techniques used

In structural alteration, different patches are placed on the substrate. At any instant only one of the patches is connected to the feed line. By rotating the patches with certain angle, another patch will be connected to the feed. In this case the shape that is connected to the feed is changed that in turn will change the characteristics of the antenna because, the effective length of the antenna is changed that in turn will change the resonant frequency. In software, the rotation is done mechanically and in fabricated models the stepper motor is used for rotating the patches.

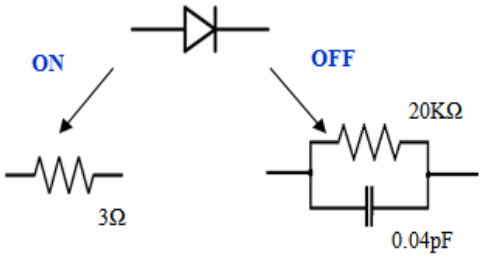

Figure 1: The linear circuit model of the PIN diode.

Switch technique is being used in this design to achieve pattern reconfigurability. In this, switches are placed on the design. The switch can be a PIN diode, varactor diode, photoconductive diode, RFMEMS etc. In this design PIN diodes are used. When pin diode is in ON state, it will act as a short circuit and it allows the current through it. When pin diode is in OFF state, it will act as an open circuit and it doesn't allow the current through it. While designing, the equivalent resistance and capacitance of the pin diode is considered. The linear circuit model of the PIN diode is shown in Fig. 1.

Design concept

The antenna is designed by using Rogers RT duroid substrate with relative permittivity =2.2, substrate length 40mm, substrate width 40mm and substrate thickness 1.6mm. The antenna consists of two structures i.e. the rectangular slot circular patch antenna and the ring slot hexagonal patch. The design is simulated in two different positions.

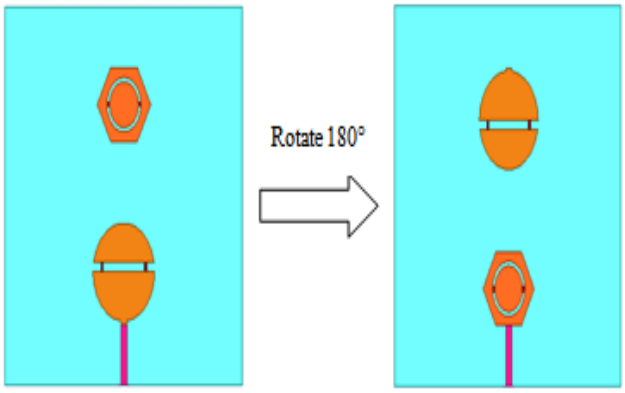

Figure 2: Compound Reconfigurable Antenna.

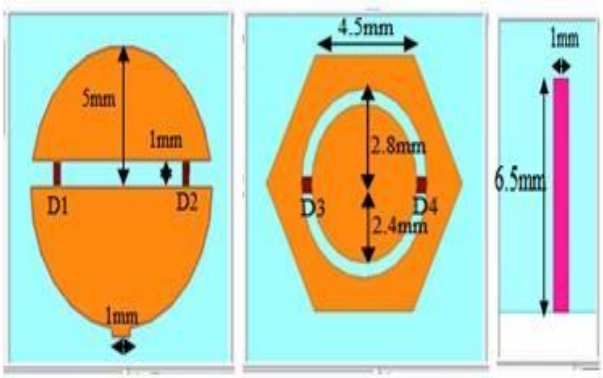

Figure 3: Dimensions of Fig. 2.

When the antenna is in position1, a rectangular slot circular patch is fed to the microstrip line feed and the design resonates at 1.9 GHz frequency. In this case the design is applicable to Personal Communication System (PCS). When the antenna is in position 2 (i.e. after rotating the patches mechanically by 180 degrees) ring slot hexagonal patch is connected to the feed and the design resonates at 2.54 GHz frequency. In this case the design is applicable to Wireless Local Area Network (WLAN). By rotating the patch mechanically this design exhibits frequency reconfigurability by changing its frequency from 1.9GHz to 2.54 GHz. The compound reconfigurable antenna is shown in Fig. 2. and the dimensions of the antenna are shown is Fig. 3.

To change the radiation pattern direction, pin diodes are placed across the slots. Two pin diodes are placed on a rectangular slot circular patch antenna at the two sides of the slot and another two pin diodes are placed on a ring slot hexagonal patch antenna. By changing the state of the diodes the radiation pattern of an antenna is changed from one direction to another direction.

3. RESULTS

The design is simulated in Ansoft HFSS for 4 different cases in order to achieve frequency as well as radiation pattern reconfigurability. When the antenna is in position1, two cases are considered and when the antenna is in position2 another two cases are considered.

Position1

When an antenna is in position1, only rectangular slot circular patch is connected to the feed line. This structure has two pin diodes i.e. D1 and D2. In position1, the design is simulated for two cases. They are

Case1: D1 is in ON state and D2 is in OFF state

In this case the design resonated at 1.9GHz frequency with a return loss of -27.38dB, VSWR value of 1.08 and gain of 4.6dB. The Fig. 4 and Fig. 5 show the plot of return loss and VSWR respectively. The Fig. 6 shows the radiation pattern plot.

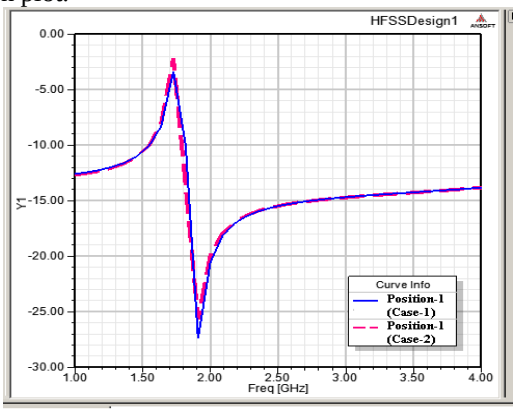

Figure 4: Return loss plot in position-1.

Case2: D1 is in OFF state D2 is in ON state

In this case the design resonated at 1.9GHz frequency with a return loss of -27.53dB, VSWR value of 1.08 and gain of 4.64dB.

The Fig.4 and Fig.5 shows the plot of return loss and VSWR respectively. The Fig. 6 shows the radiation pattern plot and the Fig. 7 shows 3D gain plot in both the cases.

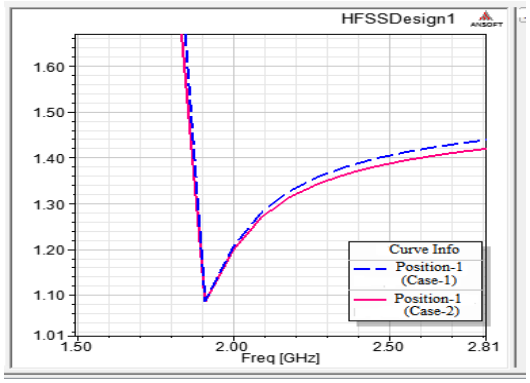

Figure 5: VSWR plot in position-1.

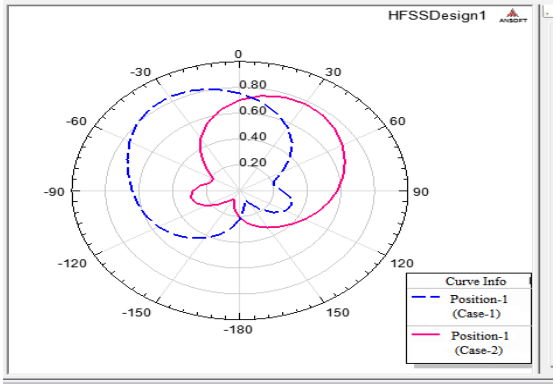

Figure 6: Radiation pattern plot in position-1.

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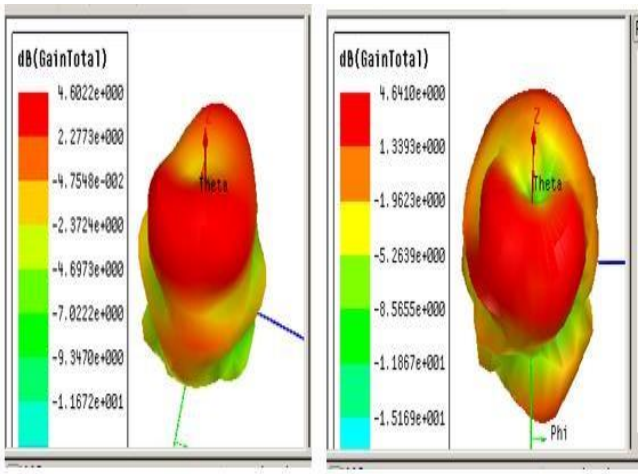


(a)Case-1 (b) Case-2

Figure 7: 3D gain plot in position-1.

3.2. Position2

When an antenna is in position2 (i.e. when the antenna is rotated by 180°), the circular slot hexagonal patch is connected to the feed line. This structure has two pin diodes

i.e. P3 and P4. In position2, the design is simulated for two cases. They are

Case1: D3 is in ON state and D4 is in OFF state

In this case the design resonates at 2.54GHz frequency with a return loss of -29.04dB and VSWR value of 1.07. In this case, it has gain of 4.82dB.

Case2: D3 is in OFF state and D4 is in ON state

In this case the design resonated at 2.54GHz frequency with a return loss of -34.46dB and VSWR value of 1.03 with a gain of 5.05dB

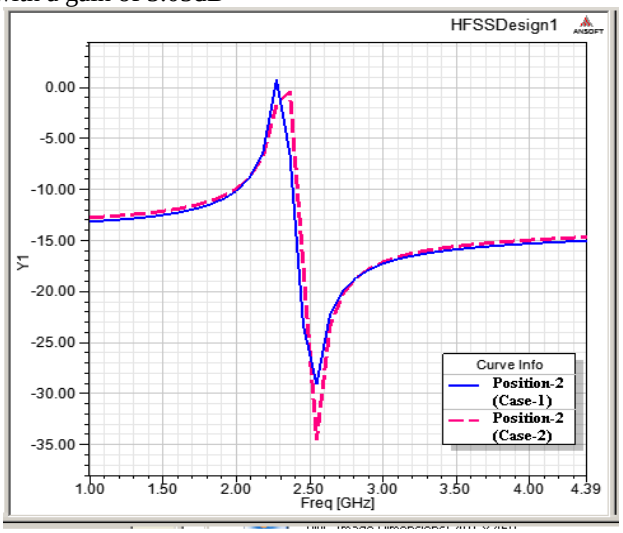


Figure 8: Return loss plot in position-2

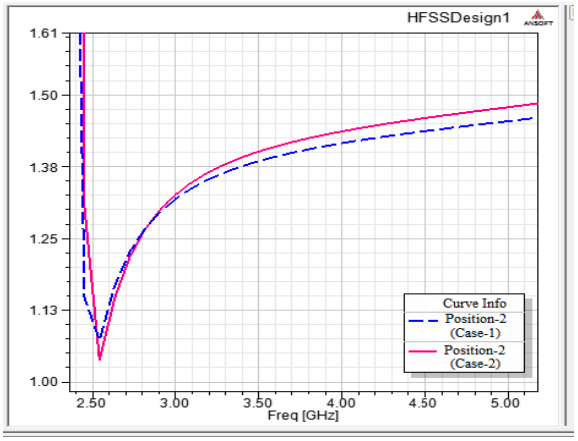


Figure 9: VSWR plot in position-2.

The Fig.8 and Fig.9 shows the plot of return loss and VSWR plot in both the cases respectively. The Fig. 10 and Fig. 11 shows the radiation pattern plot and 3D gain plot respectively.

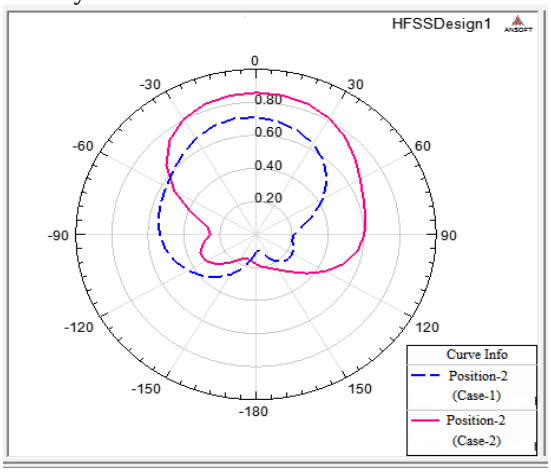
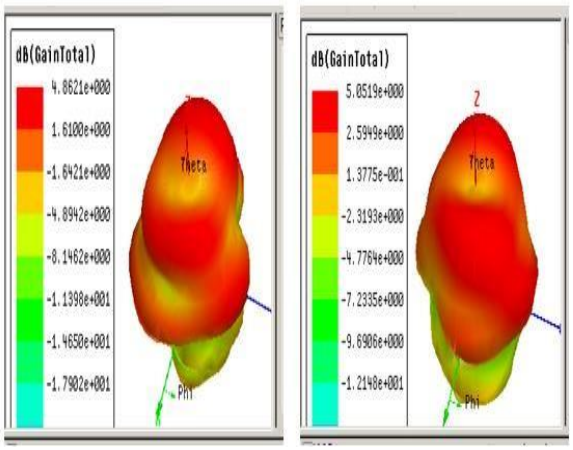


Figure 10: Radiation pattern plot in position-2.



(a)Case-1 (b) Case-2

Figure 11: 3D gain plot in position-2.

The compound reconfigurable antenna can reconfigures its frequency by rotating the patch by 180 degrees and it can changes its radiation pattern by changing the state of the diodes. The summary of the results is shown in Table 1.

Table 1: Summary of the results.

	Return loss	VSWR	Gain
Position-1(Case-1)	-27.38dB	1.08	4.6dB
Position-1(Case-2)	-27.53dB	1.08	4.64dB
Position-2(Case-1)	-29.04dB	1.07	4.86dB
Position-2(Case-2)	-34.46dB	1.03	5.05dB

CONCLUSION

This paper addresses the design of frequency and pattern reconfigurable antenna. By using structural alteration technique, this antenna changed its frequency from 1.9GHz to 2.54GHz and by using switch technique this antenna can change its radiation pattern to two different directions. It has minimum return loss of 27.38dB, VSWR of 1.09 and gain of 4.6dB in all cases and it is suitable for PCS and WLAN applications

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Image Based Password Authentication Using Touch Screen and GSM Module

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Abstract:-- **Technology is playing a vital role in enhancing security. Without cameras, detectors and alarms world would be unable to identify threats and respond appropriately. An approach is to be made where an illiterate can also be benefited by the boons of technology with less cost and more user-friendliness. With this prototype, an interface is made where even an un-educated or a person of any age can use the application with ease. The inputs will be images where it is easy for any person to remember in a sequence. This can serve multiple areas like farms, cattle area, industries. The main aim of this paper is to enhance security to the root levels which is more efficient and low cost. Here in this paper, the password need not be a group of characters rather series of images can be used. With the use of graphical LCD and touch screen, this can be used effortlessly. The touch screen provides an easy interaction of the user with the application as it can be easily operated. Fastness has become a key role in every aspect, with the use of GSM module owner can get the information immediately if any broke out has been happened. A message will be sent to the owner when the door has been opened when a wrong password has been entered or when a fire broke out has occurred then the necessary precautions will be taken immediately. To accomplish this task an onboard computer is used which has input and output ports and is termed as the microcontroller. Advanced RISC Machine (ARM) is the heart of the application and controls all the processes.**

Index Terms: GLCD, Micro-Controller, Fire sensor, Touch screen, GSM module

1. INTRODUCTION

The motto of this paper is to provide security wherein every individual can be able to access it and should be benefited by the boons of the technology. Image based password authentication is a concept where passwords are in form of images. Person of any age can easily remember this password as images can be easily remembered than characters in form of string. Enhancing security can be done through this project as this can be used by any class of the society because of its low cost and accessibility. Using touch screen we can more easily access the project. GSM module will provide the information about the access of the door regularly so if there's any unauthorized person accessing the door then the information will immediately passed to the owner.

Comparing with the existing technology this will be more beneficial as it is more easily used because of touch screen which gives comfort of

Selecting the images easily, GLCD which gives the display of images without using much technology and it is low cost, GSM which instantly provides the information of the access of the door Buzzer is used to intimate surrounding places.

2. LITERATURE REVIEW:

In under developed areas there is no proper security system even there is a lot of advent in the technology nowadays. In especially cattle areas gates are made of small wooden pieces which can be easily damaged by the intruder. As technology is increasing day by day we even have to provide proper security even for these places. With less cost and more user-friendliness a system has to be developed where even an illiterate must find easy to use such an application

3. BLOCK DIAGRAM:

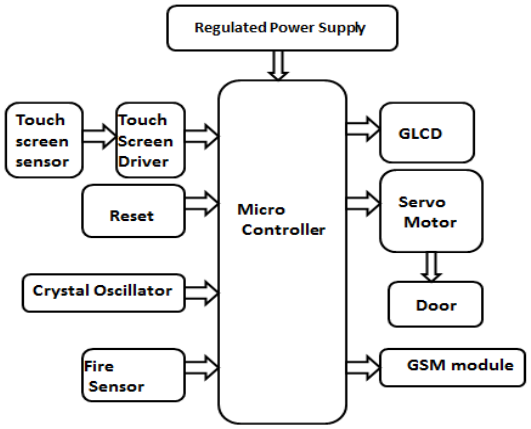

Fig1. Block Diagram of Image Based Password Authentication Using Touch Screen And GSM Module

4. HARDWARE DESCRIPTION:

1. Microcontroller
2. Touch screen Sensor
3. GLCD
4. GSM Module

1. Microcontroller

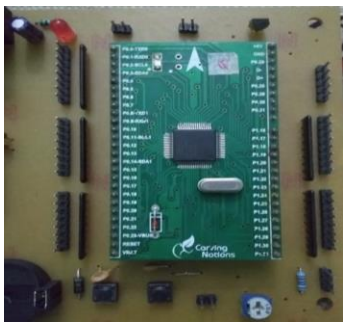

Fig2. ARM-7 Microcontroller

Microcontroller used in this paper is ARM7TDMI-S LPC2148 (Advanced RISC Machine). Some of the

Features Are:

•I6 bit/32 bit thumb micro-controller.
•Consists of 40 kB of on chip static RAM and 512 kB on chip flash memory.
•Two 10-bit ADC which provides 14 analog inputs.
•A 10-bit DAC which gives variable analog outputs.
•A RTC with 32 kHz clock input.
•Power saving mode

2. Touch Screen

Touch screen technology deals with the direct manipulation of gestures into digital data. In 1960s touch screen was first invented by E.A Johnson. The capacitive touch screen was first invented and later in 70's resistive touch screen was invented by Dr G. Samuel Hurst. Nowadays the touch screen has been widely used in every application to ease the complexity of giving the input. Various applications are ATM machines, Cell phones, Video games…etc. The popularity of cell-phone is due to the use of the touch screen as it gives an easy way to control the system. The demand for it is increasing rapidly day-by-day which allows any application to use it. Different types of touch screen technologies are:

1. Resistive
2. Surface acoustic wave
3. Capacitive
4. Surface capacitance
5. Projected capacitance
6. Infrared
7. Strain Gauge
8. Optical imaging.

Here in this paper, we are using a resistive touch screen as it is of low cost and can withstand in any harsh environment. Resistive touch screen consists of different layers such as:

1. Polyester Film
2. Transparent electrode film
3. Insulator
4. Spacer dot
5. Glass

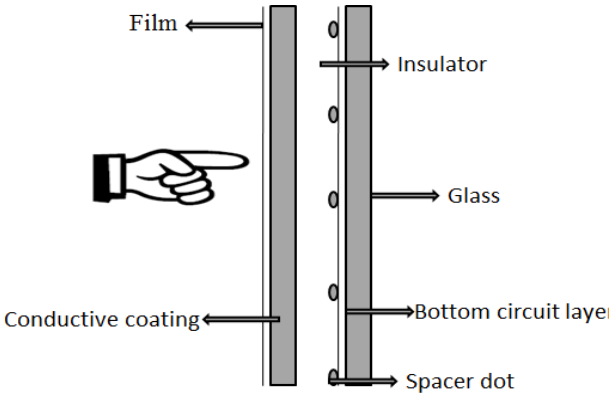

Fig3. Diagram of touch screen working

A little gap exists between glass screen and film screen using this panel is made. Film layer contains electrodes. Whenever the film screen is touched with a finger or any type of object bend occurs. When bending, the two electrode films connect, which generates a current flow. Resistive touch screen have many advantages like highly durableness, cost-effectiveness and in addition it is less sensitive to the scratches on the screen. A 4 wire resistive touch screen has uniformly coated with a resistive material and is separated by an air gap or an insulator. Electrodes are placed on the edges of the layer.

3. Graphical Liquid Crystal Display

Fig4. GLCD

Here JHD12864E GLCD is used in this paper. It is a 128x64 display where it has 1024 pixels. 128x64 is divided into two parts equally and each is controlled by a separate controller. It has 128 columns and 64 rows. Each page has 8x8 bits which form 1 page.8 such pages makes one half and is controlled by a controller called controller selected.GLCD consists of 20 pins. Two power supply pins (VSS), Two Ground pins (GND), Two Controller Select (CS0, CS1), Eight Data pins (D0-D7), Contrast adjust pin, Register Select pin (RS), Read/Write pin, Enable pin (En), Reset pin (RST), Output Voltage pin (Vout).The difference between an LCD and GLCD is that LCD can only display alphanumerical letters but can't display images and can display up to certain dimensions. Graphical Liquid Crystal Display (GLCD) is used to display customized characters and images. It finds many applications in video games, mobile phones, lifts.

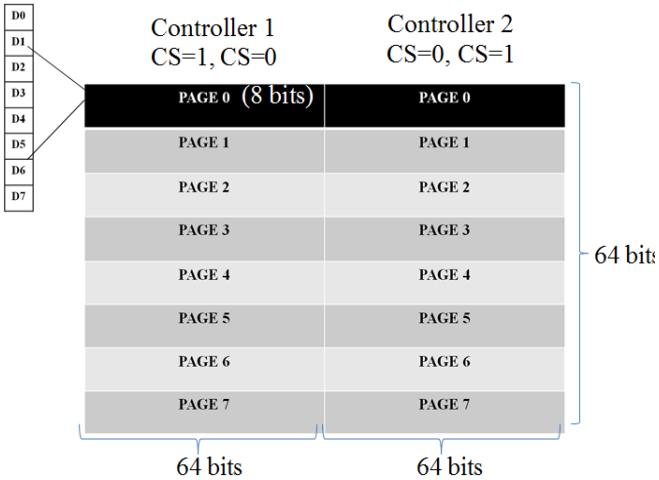

Fig5. Tabular Representation of GLCD Bits assignment

Each half of the display has vertical addresses of 64 pixels which are addressed from 0x40 to 0x7F and is represented as the Y-axis. Horizontal addresses are from 0xB8 to 0xBF and are represented as X-axis.

Left half of the display is controlled by chip select CS1=1, CS0=0.

Right half of the display is controlled by chip select CS1=0, CS=1.

X-axis addresses are used to select a page from page-0 to page-7.

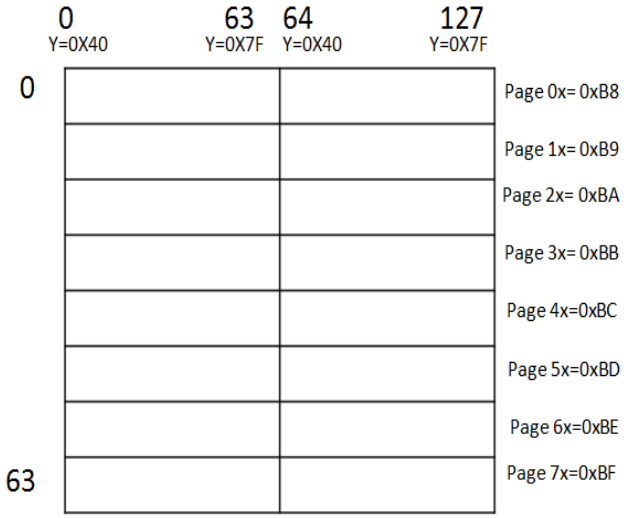

Fig6. Horizontal and Vertical addresses

4. Global System for Mobile Communication:

Fig7. GSM Module

GSM is a cellular network in which the mobile phones connect by searching a cell in the nearby vicinity. Global System for Mobile Communication (GSM) operates in 4 frequency ranges. Mostly it operates in 900MHz or 1800MHz bands. Country like America use 850MHz and 1900MHz as 900MHz and 1800MHz frequency bands were already allocated. The frequency bands of 400 and 450MHz were previously used by first generation is assigned in some of the countries. GSM-900 uses frequencies in the ranges of 890-915 MHz to send the information from the mobile station to the base station (uplink) and the downlink frequencies are in the ranges of 935-960 MHz (base station to mobile station) which provides 124 radio channels. GSM Module has been extended to cover a large frequency ranges which is denoted by "E-GSM" uses uplink frequencies of 880-915 MHz and downlink frequencies of 925-960 MHz, By adding 50 channels. TDMA allows 8-full rate or 16- half rate speech channels per radio frequency channel.

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5. Buzzer:

Fig8. Buzzer

5. WORKING PRINCIPLE:

Here the microcontroller (ARM-7) will be the brain of the system in which it controls and coordinates all the commands. As GLCD can display images, the images to be chosen are displayed over which the user or owner will select the order of his password in which it has been already stored. When the password is chosen is right the door opens and we are using a dc motor for it. Immediately the message will be sent to the owner's number. If the password is chosen to wrong the doors opens not and a message will be sent to the owner. When a fire broke out takes place the doors automatically opens and a message will be sent to the owner. The buzzer is an electronic signaling device used in automobiles, household applications, etc. Pressure variations occur whenever an electric potential is applied across piezo-electric material. When the voltage difference occurred in the push and pull of conductors take place internally. The sharp sound is generated by the continuous push and pull operation. The sound pitch is not dependent on the voltage level, so piezo-electric buzzer is independent on voltage ranges. It generates sound in the ranges of 2-4 KHz.

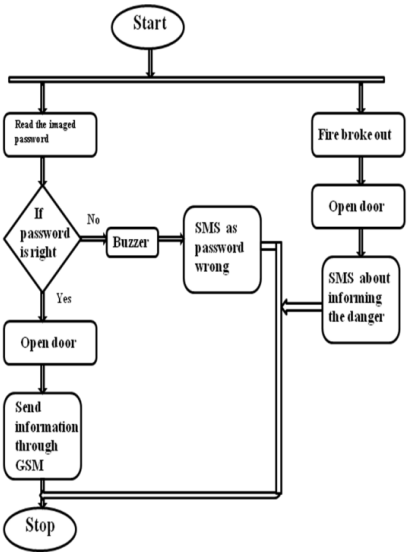

Fig9. Design Flow

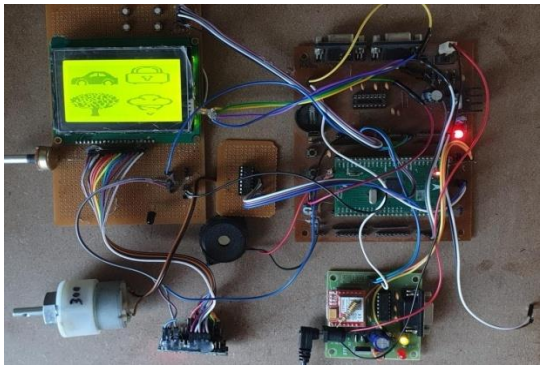

Fig10. Image based password authentication using touch screen and GSM

6. RESULT:

This project provides user a image based password where he can easily interact with the system using touch screen and the security is enhanced using GSM module.

7. CONCLUSION:

This paper "Image Based Password Authentication Using Touch screen and GSM" provides a user friendliness and low cost system which will enhance the security.

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GST in Indian Business: the hits and misses of the 'good simple tax'

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Abstract:-- **Taxation is a backbone of Indian Economy and is the process of collecting Taxes from citizens based on their earnings and property Taxation are of two type Direct Tax and Indirect Tax. Indirect Tax are central sale tax, value added tax, excise duty, customs duty, Service tax, entertainment tax, luxuries tax etc. Around 17 indirect tax and 23 cess is change in GST except customs duty. In India, GST is an indirect tax which was levied by the Central and State Governments. It was introduced by Finance Minister of India – "Arun Jaitley" as the Constitution, 122nd Amendment Bill Act 2016. GST Implementation around 164 countries**

GST is a reform of indirect Tax in India. Amalgamating several Central and State taxes convert in single tax. From the consumer point of view, the biggest advantage would be in the term of reduction in the overall tax burden on goods, which is currently estimated at 25%-30%, free movement of goods from one state to another without stopping at state borders for hours for paying of state tax or entry tax and reduction in paper work to large extend.

The problem facing Indian Businessman on GST implementation are like as the mid-year duration policy change of tax system, online registration of GST, new system analysis in business, new price decide of all product in trade business or non-trade business, online return of GST, Reverse mechanism, E-Bill generate etc.

The GST collection in January was 86,318 crore. It is 385 million less than December. After the continuous decline in October and November tax collection was increased in December. The Finance Ministry has given this information. The Finance Ministry was assumed in December may be next every month GST collection equal to 1, 00,000 cr but in January is decline. The figure of GST collection has crossed Rs 100000 cr for the first time. In April, the government received 1.03 lakh crore rupees from GST and return filled 60.47 lakh.

Since the introduction of GST in the country, the number of traders coming under the indirect tax has increased by 50%. 34 lakh new businessmen have registered in GST. Among them are small businessmen, who have registered for taking input tax credit. Such 17 million businessmen have registered. In December 2017 there were 98 lakh registered businessmen. In April total 1.64 cr tax payer are registered under GST.

Index Terms: Tax, Indirect tax, Goods and Service Tax, India.

INTRODUCTION

GST is the biggest tax reform since Independence. . The GST came into at 1 July 2017 under implementation 122nd amendment by the India. All levels of indirect taxes including central and state level taxes would be levied on GST except custom duty, once it comes into effect and will be summed into CGST, SGST, IGST, UTGST. In this tax system, only charge one-time tax on the product. Tax payer will not pay single money from our pocket i.e. whenever they purchase goods they pay input tax (10 Rs) then whenever they sell the product they charge output tax (14Rs). Then set of output tax to input tax and final amount will be pay to government(4 Rs), this procedure continue going as manufactured to dealer, dealer to customer, the consumer finally bear to pay all GST tax.

India is also referred to as Hub of Taxes, people actually pay 2-3 times more taxes than rest of the world. Presently, the current system has taxes: Tax are of two types Direct Tax or Indirect Tax .In Direct Tax the assesse pay directly to the government in there income where as in Indirect Tax is levied by when good and service supply either in there income or profits In Indirect tax is not directly pay to the government but collected by the mediators and mediators pay to the government

It is a highly requirement tax reform in India because to stop the leakage of tax , stop tax evolution highly sales tax burden .So, it is very important to implementation GST in India. Around 164 countries has already implemented

GST was introduced in the country so that all types of taxes that occurred in the indirect tax system fall under one roof and the consumer has to pay only 1 type of tax. Direct taxes, such as assessment of individual, assessment of HUF, assessment of co-operative society, assessment of company ,assessment of trust and assessment of non-

resident tax will not be affected by GST. Whole indirect tax replaced to GST except customer such as central Sales Tax, Value added tax, Service tax, Excise duty etc. around 17 Indirect Tax and 23 CESS replaced to GST. By this process it certainly increase the GDP of India. It will increase economic growth from 0.7% to 1.9% .In the other hand, exports are expected to growth from 3.2% to 6.3% were as imports raised upto2.4% to 4.7%. Government will thing that it will reduced the current tax system. The present aim of GST is to reduce the cascading effect of taxes which is the primary focus of VAT, but the current system is not that comprehensive. The GST collection distribute under central and state government except inter-state supply of goods. Taxation is the back bone of the every country so taxation system should be powerful.

LITERATURE REVIEW

- Bennett (2017) discuss in their paper "Lok Sabha assent in hand, Modi sarkar races ahead to roll out GST" that GST has replaced more than a dozen central and state taxes or Value Added Tax (VAT) with an aim to create a seamless unified market for the $2 trillion Indian economy. The GST just like demonetization, is a step to help reduce the costs for the common man. There are a lot of grey areas to be covered and rules taxes modified as we move along. The important thing is the first step which the government has taken.

- Haines, Anjana (2016) discuss in their paper "India's tax plans steaming ahead as GST Council gets approval" India's goods and services tax (GST) change is coming to fruition as plans to build up a GST Council and secretariat were endorsed by the Cabinet of Ministers on 2016 September 12, that day that the 122nd Constitutional Bill for GST usage went into compel. The GST Council will be a combined conversation of the selected and state governments furthermore, it will create propositions to the government on crucial problems identified with GST, for example, exceptions, the rule that oversee the place of supply, edge limits, GST rates incorporating the floor rates with groups and different issues.

RESEARCH PROBLEM

After implementation GST in India is beneficial of businessman or not and sales increase or not. Why GST revenue month by month decrease and number of return also decrease

OBJECTIVE OF STUDY

To describe the problem of Indian business on implementation of GST in India.
To analysis the GST collection in India and GST Registration

RESEARCH METHODOLOGY

Being an explanatory research it is based on secondary data of journals, articles, newspapers and magazines. Considering the objectives of study descriptive type research design is adopted to have more accuracy and rigorous analysis of research study. The accessible secondary data is intensively used for research study.

Analysis benefits of GST in Indian business:

1. GST eliminates the cascading effect of tax: GST eliminate the cascading effect of tax that was earlier added. Cascading tax effect can explain as 'Tax on Tax'. In GST only tax calculate cost of product before tax but in old system if excise duty already charge so VAT tax calculate the cost of product after excise duty. In below chart represent it is clearly seen in old system 3000 Rs cost is greater than the GST system.

2. Higher limit for registration: In GST whose businesses more than Rs 20 lakh turnover register under GST except some north east states business man there is 10 lakhs limits, which exempts many small traders and service providers.

Tax	Threshold Limits
Excise	1.5 crores
VAT	5 lakhs in most states
Service Tax	10 lakhs
GST	20 lakhs (10 lakhs for NE states)

3. Composition Scheme: Taxpayer whose turnover is less than Rs 1.5 crore can option for Composition Scheme but North-Eastern states and Himachal is less than Rs 75 lakh. Under this scheme tax rates is reduce.

4. Business gets Simpler Tax System: G.S.T. is replaced 17 indirect tax and 23 cess levies .So the previous system is difficult as compare to GST. In the previous system a

business man pay different tax return like as VAT , CST ,Service tax etc. but now only one Tax pay ie. GST.

It is beneficial to the start-ups as they did not need to register in other only a single platform is to be register.

5. Utilization of input tax credit: When you buy a product/service from a registered dealer you pay input taxes on the purchase. On selling, you collect the output tax. You adjust the taxes paid at the time of purchase with the amount of output tax (tax on sales) and balance liability of tax (tax on sales minus tax on purchase) has to be paid to the government. For example output tax is Rs 20 and input tax is RS 12 so final tax pay to government only RS 8.

6. Improved efficiency of logistics: Checks at state borders slow movement of trucks. In India, they travel 280 km a day?? Compared with 800 km in US reduced the cost of transportation. Multiple warehouses across the state was made by logistics industry in India It will remove the CST and entry tax on inter-state goods transfer. It will increase the operating cost. By coming of the GST it may restriction on interstate movement of goods. By this warehouse operators shows interest towards ecommerce and aggregates them instead of every other city on their delivery route. Now also come E-Bill is also helping easy to move goods.

7. Online taxation system: Business is now a day moves from pen paper to online it main purpose is security, reliability, efficiency. Some of the advantages of online taxation system are:

a) Simple to Registrations in GST by online.

b) Easy to fill the return and make payment through online.

c) Easy to understand the way of taxation system.

d) Always available facilities through online (24*7)

e) Easy to claim on tax return

f) Reducing the tax evaluation because owners need to only upload their invoices for input tax credit. The system verify their invoice and given their appropriate value

8. Uniform platform: In the old direct system the old rates of product or tax system are varies in different states. But after implementation of the GST "One Nation One Tax System" its mean the tax system in all state are same if rate are 5% in any product of any state is also same for other state in a country .So it is easy to understanding for the businessman and customer. It will be efficient and consistent

9. Product price decrease: GST will be charged at the manufacturing cost and collected at the point of sale, which means that the price will come down when GST rates decrease as comparison to previous rates that will benefit for the consumers. Once the prices come down, the consumption of consumers will increase which will benefit to the companies. .Like as

(in %)

Product	Previous effective tax rate*	Current GST rate
Mobile phone	20.02	12
Footwear (below Rs500)	14.41	5
Ready-made garments	18.16	12
Cars for the handicapped	20-22	18
Medicines	11	5
Renewable energy devices	17-18	5
Iron ore	17-18	5
Music instruments (handmade)	0-12.5	0
Contact lenses	18	12
Processed food	14	12

Analysis problem facing through GST in Indian business:

1. Policy change in mid-year duration: The GST was launched at mid night 1 July 2017. In financial year 2017-18 , before 3 months apply old tax system and after 9 months new system apply so businessman really confusion and facing big problem. So it's not possible to over tax system change in one day. Its big problem facing to change accounting system, software change, change price of product etc. Hence businesses will end up running both tax systems in parallel, which might result in confusion and compliance issues.

2. Online Procedure: Online procedure is not possible to every business man. Many small businessman are not know about online technology and do not have the resources for fully computerized compliance. Businesses and Firms are now needed to register for GST in every state they operate. You will have to file returns 3/month for every state in which you work. That involves at least 36 filings/year/state. Suppose you have business even in 25 states in India, the number of times you will file returns is 36 x 25= 900 times. This is no big deal for large companies with the troops of accountants. Small Dealers and growing companies with little supplies will find this uneasy. Online procedure problem like as online registration, error of online return, error of online adjustment in output tax and input tax , error in E-BILL etc.

3. Understand every aspect of New Indirect Tax System: GST is the biggest tax reforms in the Indian history and is probable to game change for economy as well as business. Before GST multiple layers of state and central taxes apply but after only GST apply so its analysis various aspect the new tax system likes as:

- Who does it apply to?
- What is the GST framework as per the new law?
- How to registration in GST?
- What is types of GST?
- What is rates slabs?
- How to file GST return?
- How to adjust input tax credit?
- How to claim for tax return?
- What is rules and policy of GST?
- What is penalty concept?
- What is composition Scheme? Etc.

So its biggest problem to understand the concept of new indirect taxation system.

4. Higher Tax Burden for Manufacturing Business: In the manufacturing sector will not have it easy in the GST system for small businesses. Under the excise laws, only manufacturing business with a turnover exceeding Rs. 1.50 crores had to pay excise duty but under GST the turnover limit has been reduced to Rs. 20 lakh, thus increasing the tax burden for many manufacturing SMEs. However, manufacturing sector with a turnover of up to 1.50 crores can opt for the composition scheme and pay only 1% tax on turnover in lieu of GST and enjoy lesser compliances. It is tough to choose composition scheme for many small multi enterprises. The catch though is these businesses will then not be able to claim any input tax credit. This principle of equal treatment being applied to small and medium enterprises and the resulting lowering of the tax exemption limit for manufacturing units.

5. Increase in operating cost: The GST implementation has stimulated our business both in terms of operating costs and compliance. Our operating costs is expected increase by about 2-3% in financial year 2018 as compared to financial year 17. So that GST impact directly on profit and loss a/c. In terms of compliance, it has increased multi-fold. With the change from old indirect tax regime to GST now, the number of registrations has increased for a multi-state player like us. Earlier we had to file only one return on centralized registration basis, but now we have to file roughly 3-4 returns for every state in which we are registered. And since we are registered in around 20 states, we have to file as many as 80 returns in a month. : Most small businesses in India do not employ tax experts, and have traditionally preferred to pay taxes and file returns on their own to save costs. However, they will require expert assistance to become GST compliant as it is a completely new system. While this will benefit the experts. It will increase the cost of hiring the expert to handle the GST .And also it will need to train their employees in GST

6. Numbers of Return file in GST: The procedure of filling the GST is also facing problem or headache for SME. No one seems to be sure about the appropriate process for filing GST return. In GST, business have to file 3 return every month and 1 annual tax return so total return file 37 return in financial year. For this, you will have to fill GSTR-1 to GSTR-11 forms on GST online portal. If you are not sure about this, it would be wise to take the help of a CA. The following GST Return file are as:

S. No	Form	Description	Due date of filing
1	GSTR-1	Outward supplies made by taxpayer (other than Composition taxpayer & ISD)	10th of the next month
2	GSTR-2	Inward supplies received by a taxpayer (other than Composition taxpayer & ISD)	15th of the next month
3	GSTR-3	Monthly return (other than Composition taxpayer & ISD)	20th of the next month
4	GSTR-4	Quarterly return for Composition taxpayer	18th of the month next to quarter
5	GSTR-5	Periodic return by non-resident foreign taxpayer	Last day of registration
6	GSTR-6	Return for ISD	13th of the next month
7	GSTR-7	Return for TDS	10th of the next month
8	GSTR-8	Return for TCS	10th of the next month
9	GSTR-9	Annual Return (other than ISD, TDS, casual taxable person and non-resident taxable person)	By 31st December of next FY
10	-	First Return in GSTR-3 includes GSTR-1 and 2 for normal taxpayer & GSTR-4 for Composition taxpayer	Similar to GSTR-1, 2, 3 and 4
11	GSTR-10	Final Return	Within 3 months from date of cancellation /order.

7. Taxation on supply free sample and other branch: GST charge whenever goods supply as gift or free samples and input tax credit shall not be allowed for goods stolen, lost, written off, destroyed or supply of by way of gift or free samples. Accordingly, input tax credit is required to be reversed pertaining to goods which have been disposed of by way of free samples. GST charge tax whenever supply goods one branch to other branch, on its input tax shall be allows.

8. E- Way Bill: E-way bill was implement in interstate supply of goods on whole India from 1 April. It is mandatory to have an e-way bill when goods transfer to one state to another. The transfer goods price is more than 50000. Karnataka was the first state that implement the intra e-way bill this on 1 April. After that from April 15 this bill system has been implemented in Uttar Pradesh, Gujarat, Kerala, Andhra Pradesh and Telangana and from 20 April another six states also include i.e. Madhya Pradesh, Haryana, Bihar, Jharkhand, Uttarakhand and Tripura.

So, Businesses facing problem for goods transfer from one place to another first generate bill then Goods has been sent otherwise charged penalty. That is, instead of making 1.2 million bills together, they are making three bills of 40-40 thousand.

9. Input Tax Credit: GSTR-1 is filled for output tax by the supplier which is collected by the purchaser and GSTR-2A is filled for the input tax which is pay by the supplier when purchase the goods. After verification of the Input Credit by the mean of electronic communication then input tax credit will allowed by government.

The new tax system has loose something that is technical problem in the GSTN portal that may delayed the filling of tax return. It may force the government to increase the deadlines to allow more people to fill the return through portal. Exporters, for instance, have been hit hard with Rs 65,000 crore in working capital locked up with the government in the form of pending refunds, which they are

not expected to receive before December. Government GST claims collection averaging Rs 90000 cr. from July and August. Input tax credit is the working capital block exporters are facing as they are required to pay Goods and Services Tax first and thereafter seek refunds.

Report of GST Revenue collection & GST Return filled by India

GST was introduced from July 1, 2017 in the country. In July, where the government has received the highest amount of the Rs 94000 cr and return filled 63 lakh, but in August it was Rs 90663 cr and return filled 67 lakh after, which it increased to Rs 92150 cr in September and return filled 69 lakh, but the October and November, it was steadily falling. In October, the government has received Rs 83346 cr and return filled 65 lakh when in November this figure remained at Rs 80880 cr. and return filled 64 lakh.

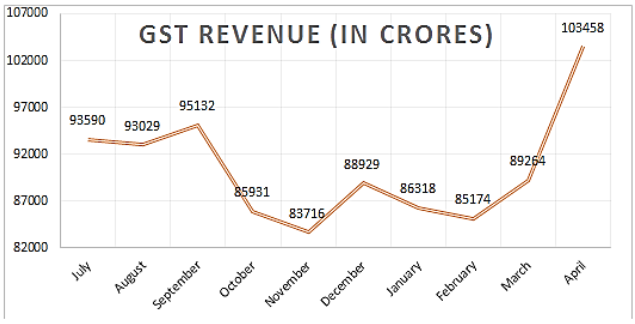
GST collection has increased in December after two consecutive months .In December GST collect was Rs 86703 cr and return filled 63 lakh the financial minister was released this figure on January 24.

In January, GST collection was Rs 86318 cr it is less than 385 cr as compare to December collection and return filled 57.78 lakh in January. After continue decline in October and November, increasing the tax collection in December but again its decline in January. The GST collection also declined in February, but it collection was Rs 85174 cr due to which only 61 % tax payer has to filled return i.e. 59.51 lakh return filled. The figure of GST collection has crossed Rs 100000 cr for the first time. In April, the government received 1.03 lakh crore rupees from GST and return filled 60.47 lakh. This figure was Rs 89,264 crore in March and return filled 55 lakh. In the entire financial year 2017-18, GST collection was 7.41 lakh crores. Total collection of Rs 1,03,458 crores in April 2018 It has collected Rs 18,652 crore CGST, 25,704 crore SGST, 50,548 crore IGST and Rs 8,554 crore from CCE. GST was implemented from July 1, 2017. Increasing GST collection tells the economy faster and better compliance. Generally, people pay the last month's dues at the end of the financial year. In such a way, the April collection cannot be taken as a trend for the future.

Finance Minister Arun Jaitley described the April GST collection as "a great achievement". He said, 'It confirms the speed of economic activity of the country. Economic environment is getting better in the country. GST Companions have been better since the introduction of e-way bills. This is expected to continue to increase the indirect tax collection.

GST Council, headed by Finance Minister, excited with the success of GST, has set a target of Rs 12 lakh crore GST collection in the financial year 2018-19.

Even after hard decisions like demonetization and GST, the government's tax collection in the last financial year has increased by 19%. The most contributed to the sale of vehicles. Vehicle records were sold in the financial year 2017-18.



Since the introduction of GST in the country, the number of traders coming under the indirect tax has increased by 50%. 34 lakh new businessmen have registered in GST. Among them are small businessmen, who have registered for taking input tax credit. Such 17 million businessmen have registered. In December 2017 there were 98 lakh registered businessmen. 1.03 cr taxpayers have been registered under GST so far till 25th Feb, 2018. So far, 17.65 lakh dealers got registered as Composition Dealers," according to Ministry of Finance. Around 1.05 crore taxpayers have been registered under GST so far till March 25, 2018. Out of these, 18.17 lakh are composition dealers, who are required to file returns every quarter. The rest are required to file monthly returns. march 2, a total of 1,03,99,305 taxpayers are registered under GST, which include 64.42 lakh taxpayers who have migrated from the erstwhile tax regimes and 39.56 lakh who have taken new registration under GST, Minister of State for Finance Shiv Pratap Shukla said. In April total 1.64 cr tax payer are registered under GST which is the 0.87 cr registered under GST and 0.193 cr registered under composition dealer.

Research Finding

• In GST system, the number of tax return file is decreasing month by month.

• In the Input tax process the amount of return not come in proper time.

• In the consumer behalf GST is so beneficial. The daily consumption product prices decrease.

• In the manufacture behalf GST is not beneficial. The manufacture business registration limit decreases 1.5 crores to 20 lakhs.

• In GST system, all work are paperless which is helpful for Environment.

CONCLUSION

Taxation is the backbone of any developing Economy. In India the tax is levied by the ancient time. In India the indirect tax structure opted after the Independence was very critical and filled with numerous problems such as tax evasion, irregular tax collection, dual taxation etc. so indirect tax reform in GST. GST is very simple to understand every person , control tax evasion, not charge irregular tax collection and also not charge dual taxation So if the tax structure of any country is simple and understandable by its citizens then the country will grow and people will willingly contribute in taxation and we will get the Progressive GDP and vice versa

In implementation of GST businessman facing many problem that why sale was decrease for some period because they understand many policy in mid-year duration, they change accounting software and product price, many product prices increase and decrease. On reform of indirect tax the revenue tax also effect like as GST collection of India in July maximum revenue collect after next month continue decline but in December was increase then finance ministry assume that may be next month's GST revenue collection around 1, 00,000 cr. but in January again GST collection decline. After implementation GST number registration continue increase in December 98 lakh registered businessmen and small businessman was maximum number of registration. In April, the government received 1.03 lakh crore rupees from GST and total 1.64 cr tax payer are registered under GST. Increasing GST collection tells the economy faster and better compliance. In one word say GST is give benefits for every person.

GST Council, headed by Finance Minister, excited with the success of GST, has set a target of Rs 12 lakh crore GST collection in the financial year 2018-19.

Even after hard decisions like demonetization and GST, the government's tax collection in the last financial year has increased by 19%. The most contributed to the sale of vehicles. Vehicle records were sold in the financial year 2017-18

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A Comparision Analyis Of 2x1 Series Feed Array Antenna for Satellite Applications

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Abstract:-- **This paper presents 2x1 series feed array antenna for satellite applications (8.1GHz-8.35GHz). Initially 2x1 series feed antenna is designed based on specifications, but this design didn't applicable for satellite applications. In order to applicable for desired frequency, slots are placed in the design. Various slots (I slot, Inverted U Slot and Plus Slot) are used to get desired specifications. Finally the designed antenna got better results for plus shaped slotted antenna which is resonating at 8.32GHz frequency with a return loss of -26.83dB, VSWR of 1.09 and gain of 7.27dB.This antenna is applicable for satellite applications.**

Index Terms: Array antenna; Series feed method; slotted design; Return loss; VSWR

INTRODUCTION

The antenna plays a key role in communication systems because based on the antenna performance only signal transmission depends. Now-a-days most of the modern communication system requires high gain, low cost, simple structure, low profile, compact size antennas. The microstrip antennas satisfies such requirement because it has low profileed., low cost. But the limitations of microstrip patch antenna are narrow frequency band, low gain.

In order to increase the gain and bandwidth of microstrip patch antenna, instead of one radiating element , two or more elements are used. All these radiating elements are internally connected and transmits signal in the desired direction. These antennas are called Microstrip patch array antennas. Based on then requirement, radiating elements can be placed in planar,linear or in circular manner. There are three different feeding methods such as series feed, corporate feed, corporate series feed method [1].

There are two ways to design array antenna. They are changing the feed position or placing slots on structure. In [2] a 2x2 array antenna used circular ring shaped slot on antenna elements in order to get broad band and circular polarization operation. In [3] a 4x1 square microstrip patch antenna is designed for wire less applications using series feed. In [4] series feed and parallel methods are used for designing array antenna for C-band applications. Gain enhancement antenna is described in [5], compared slot performance with a regular antenna structure. In [6], the patch array antenna performance interns of radiation pattern is improved by using taper structure. In [7] symmetric and asymmetric feed arrays are designed for radar applications and their performance is compared.

The Proposed 2x1 series feed array antenna is designed for satellite applications. A rectangular and slotted antennas are designed and their performance compared. The antenna is designed by using HFSS software.

ANTENNA DESIGN:

The 2x1 array antenna using series feed is designed in HFSS software is shown in Fig.1.The antenna structure consists of three layers i.e ground plane, substrate and patch elements. The FR4 substrate is used with dielectric constant of 4.4. The dimensions of the 2x1 series feed array antenna is shown in table.1.

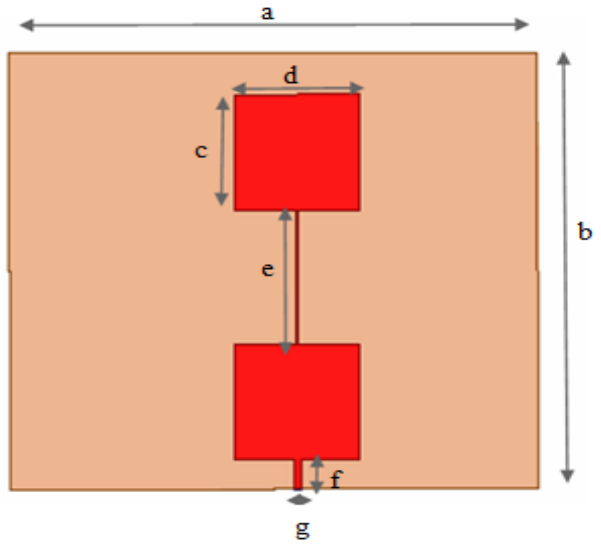


Fig.1:2x1 series feed array antenna

This 2x1 series feed antenna is resonating at a frequency of 8.46GHz with a return loss of -22.34dB and VSWR of 1.13 and gain of 7.3dB. The return loss plot is shown in Fig.2 and VSWR plot is shown in Fig.3.

Table.1: Dimensions of Series feed antenna

Parameter	Description	Value
A	Substrate width	34mm
B	Substrate length	30mm
C	Patch length	8mm
D	Patch width	8mm
E	Patch to Patch Distance	9.14mm
F	Feed line length	2mm
G	Feed line width	0.5mm

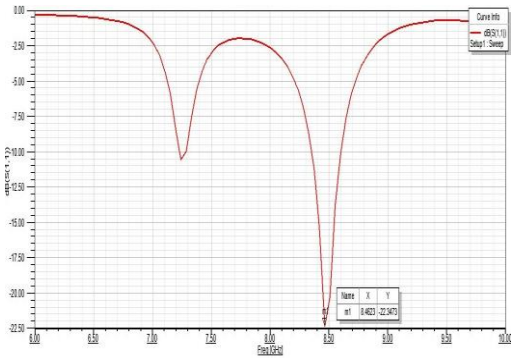


Fig.2: Return loss plot of 2x1 series feed

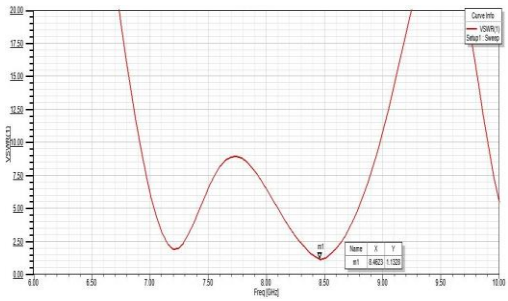


Fig.3: VSWR plot of 2x1 series feed

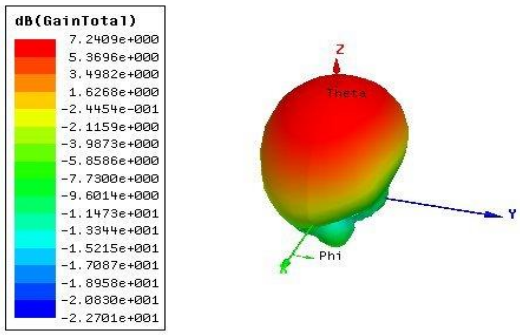
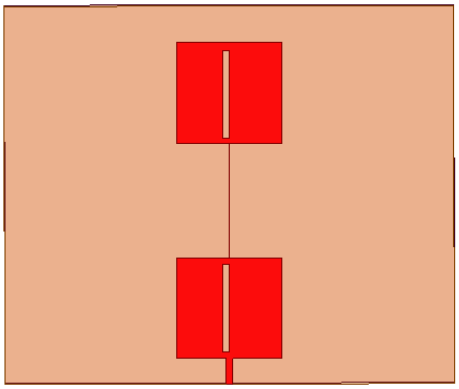
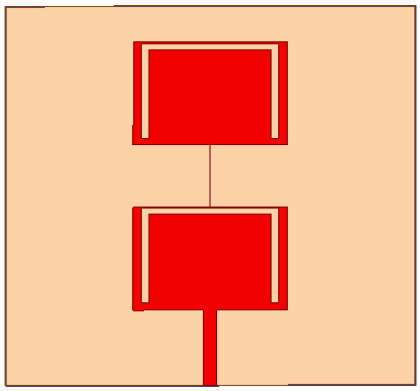


Fig:4. 3D gain plot of 2x1 series feed antenna

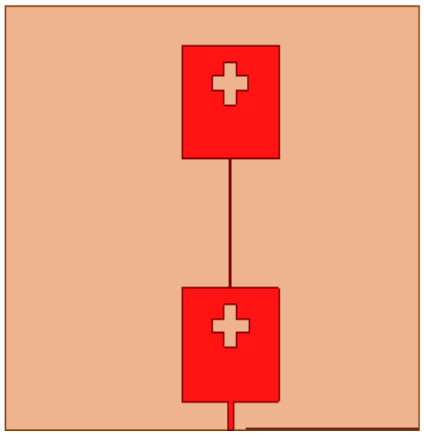
The proposed series feed antenna is not resonating in a desired frequency range. In order to resonate the design in specified frequency range (8.1GHz - 8.32GHz), different slots are placed in the array elements. The antenna is simulated for three different slots i.e I shape, inverted u and plus shaped slot.The Fig.5.shows slotted 2x1 series feed antenna.4



(a) I shaped slotted 2x1 series feed design



(b) Inverted U shaped slotted 2x1 series feed design



(C) Plus shaped slotted 2x1 series feed design

Fig.5: Slotted 2x1 array antenna designs

Initially, I shaped slot is placed in the antenna structure (shown in Fig.5(a)). In this case, the design is resonating at a frequency of 8.46GHz with a return loss of -22.85dB, VSWR of 1.15 and gain of 7.2dB. In this case also, the design is not resonating) in desired frequency range. So, Inverted U shaped slot and Plus shaped slots are placed on structure.

The inverted U shaped slotted 2x1 series feed antenna is shown in Fig.5(b), this design is resonating at a frequency of 9.42GHz with a return loss of -26.26dB, VSWR of 1.1and gain of 5.2 dB.

The Plus shaped slotted 2x1 series feed antenna is shown in Fig.5(c). This design is resonating at frequency of 8.32GHz with a return loss of -27.49dB, VSWR of 1.08 and gain of 7.27dB.

The Plus shaped slotted 2x1 series feed antenna is shown in Fig.5(c). This design is resonating at frequency of 8.32GHz with a return loss of -26.83dB, VSWR of 1.09 and gain of 7.27dB.

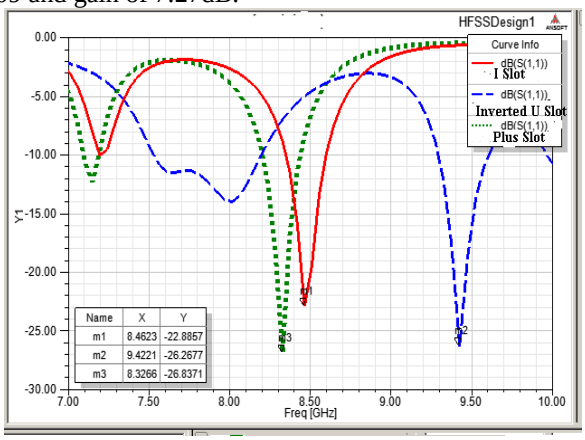


Fig.6. Return loss plot of slotted antennas

The Fig.6 shows the combined return loss plot of I, inverted U and Plus shaped designs and combined VSWR plots of slotted designs are shown in Fig.7.

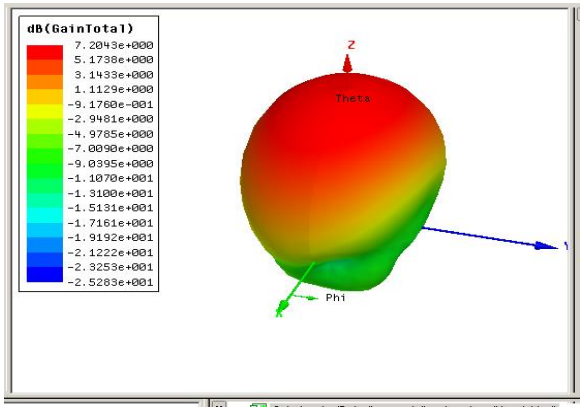
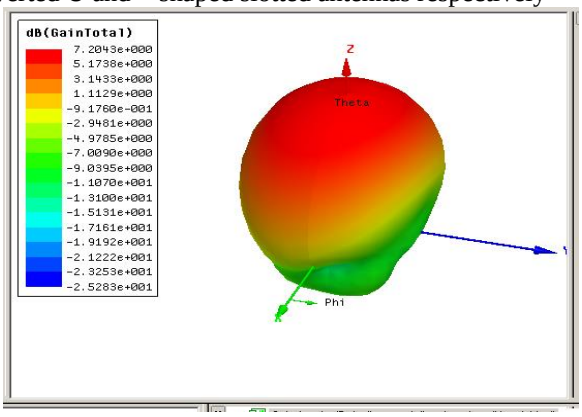
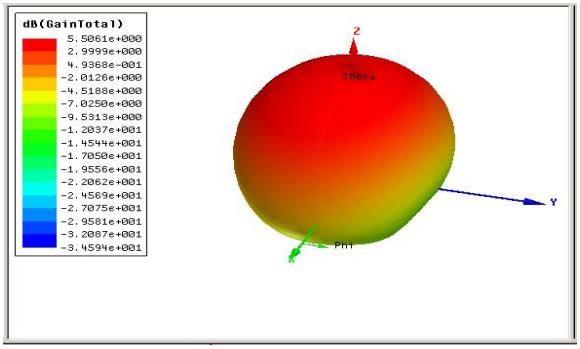


Fig.7. VSWR plot of slotted antennas

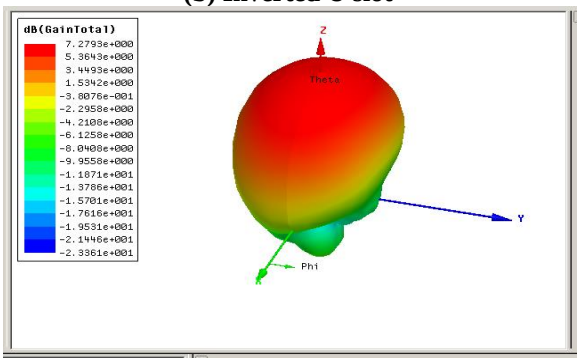
The Fig.8 (a) shows the gain plot of I slotted 2x1 series feed antenna and Fig.8(b) and (c) shows the gain plots of Inverted U and + shaped slotted antennas respectively



(a) I slot



(b) Inverted U slot



(c)Plus slot

Fig.8. 3D gain plots of slotted 2x1 series feed array antenna

The comparison results of slotted antennas are shown in Table.2. From these results, the 2x1 "I and inverted U" slotted designs are resonating at 8.46GHz and 9.42GHz.These designs are not suitable for satellite applications (8.1-8.35GHz). The Plus shaped slotted 2x1 design is resonating at 8.32GHz frequency. This antenna is suitable for satellite applications.

Table.2: Summary of results

Slot/ Parameter	Frequen-cy	Return Loss	VSWR	Gain
I Slot	8.46GHz	-22.88 dB	1.15	7.2dB
Inverted U Slot	9.42GHz	-26.26 dB	1.1	5.2dB
+ Slot	8.32GHz	-26.83 dB	1.09	7.27 dB

CONCLUSION:

2x1 series feed antennas are designed and compared. The plus shaped slotted 2x1 series feed antenna is suitable for satellite application when compared to other designs. The + slot antenna is resonating at 8.32GHs with better return loss i.e -26.83dB and gain 7.27dB values. All antennas are suitable for X-band applications.

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Utilization of waste materials for the strengthening of pavement subgrade-A Review

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Abstract:-- **From a long period in road construction soil is used as subgrade, sub-base, and base material. While constructing a road in the weak soil areas or subgrade has poor strength, in such cases the improvement of soil is necessary. The improvement of the soil is thru by swapping by the stronger soil or stabilization with the waste material. Dispose of these waste materials is essential as these are causing hazardous effects on the environment. With the same intention, the literature review is undertaken on the utilization of waste materials for the stabilization of soils and their performance is discussed. The waste material is one of the best solutions to the improvement of submerged properties in an economical manner. This review paper presents a brief exposure to the stabilization of soil with waste material like agriculture waste, constructional waste, and industrial waste materials.**

Index Terms: Hazardous,Stabilization,Subgradelayers,WasteMaterials.

I. INTRODUCTION

The soil is highly heterogeneous, involutes and capricious material which has been subjected to the vagaries of nature, without any control. The soil properties not only depend on the type of soil, it withal depends on its characteristics at that stratum. In general, Geotechnical Engineers or Civil engineers are forced to construct a structure on the site selected location without considering the soil conditions. The most paramount thing is that engineers should amend the properties of the soil. If unsuitable soil conditions present at that site of a proposed structure the entire poor soil is removed until to get a suitable bearing capacity to achieve it and the poor soil is replaced with another soil that leads to costly to the structure. To overcome this quandary a soil is stabilization with waste materials with suitable techniques to achieve the required properties of the soils. If it's not done in a proper manner soil stabilization lost its favor. The present exercise changes the designing properties of the local tricky soil to meet the expected conditions to the soils. In present days soils like clayey soil, salt contaminated soils and organic soils can be modified to achieve to get a congruous requisite to meet civil engineering properties with the avail of the stabilization methods. Which is one of the sundry methods of soil amelioration In our country in the year of 1970 the modern stabilization of soil is commenced with usages of petroleum and aggregates are integrated to poor properties soil its changes to good engineering properties of the soils [20]. In present days the growth of the industries are rapidly is increased due to these conditions the availability of waste material is rapidly increased. The term industrial waste is included in the form of solid, semisolid and liquid from materials dispatched by industries Infelicitous techniques of solid wastes cause's deleterious effects on the ecology system which may cause epidemics and sickness.

II. LITERATURE REVIEW

Mehmet Saltan et al., (2011) considered pumice which is an obtained in dust form from the volcanic rock with different proportions of 0%, 10%, 20%, 30%, and 40%. From his study it was evident that adding of the pumice waste to clayey subgrade, index properties are decreased and CBR value was found to be increased from 6.78% to 10% by addition of 40% of pumice waste. The resilient modulus increasing of 240Mpa to 250Mpa is evident by adding 40% pumice waste. It has been concluded that the utilization of 40% pumice waste is beneficial for a clayey subgrade.

Chayan Gupta et al., (2014) studied the enrichment properties of expansive soil subgrade by use of Microsilica fume, the replacement size of particle less than micrometer was used. The varies volumes are swapped by micro silica fume at 0%, 5%, 10%, 15%,and 20%. From the compaction test, it's evident that the addition of micro silica to expansive soil will increase the MDD by 20%., OMC is also found to be increased. The maximum CBR is obtained at the 10% replacement of micro silica fume, CBR value in case of a soaked condition the expansive soil increases from 2.69 % to 5.87 %, when unsoaked CBR is increased from 7.34% to 15.56% replacement of 10% micro silica fume. It is concluded that 10% of micro silica

fume is effective for replacement in expansive subgrade layers.

Prakash Chavan et al., (2014) intended to grace the properties of Black cotton soil by the implementation of bagasse ash at 0%, 3%, 6%, 9%, and 12% replacements. From his study, he concluded that the plasticity index of parent soil changes from 24% to 17.40% when 9% of Bagasse ash used. The MDD of parent soil increased from 1.57 to 1.78g/cc and OMC are decreased from 17.20% to 15% at 9% addition. The UCS of soil is increased from 93 KN/m2 to 429 KN/m2, free swell index of soil is decreased by 60% to 40% and soaked CBR value of soil increased from 1.16% to 6.8% for 9% of bagasse ash. He concluded that the usage of 9% bagasse ash is effectively used in the stabilization of black cotton subgrade soil.

Magdi M.E. Zumrawi (2015)Considered fly ash as it is mostly used in the concrete and soil stabilization purposes because the properties of fly ash are similar to the cement properties. It is the waste material obtained from combustion during the process of power generation. By the addition of a 5% fly ash with 5% cement to expansive soil, the swell pressure value is decreased from 175 kpa to 75 kpa and the swell potential value is decreased from 18.7% to 4.5%. Up to 5 % add of fly ash it's decreased by about 60% but later its decreased slowly increases the fly ash content. It was clear that the soaked CBR value increased with increasing of the fly ash content up to 15% mixed with 5% constant cement content and rather it's decreased with the increase of fly ash content, clearly observed that 15% fly ash with 5% cement is significantly greater improvement in strength and reduction in swelling characteristics. So verbally expresses that 15% fly ash with 5% cement can be effectively utilized in soil stabilization with low cost.

Manju Suthar et al., (2015) stated that stabilization of clayey subgrade soil with Polyester staple hollow Recron3s fiber with an effective length of 6mm and 12mm.with mixed quantity of 0.3%, 0.5%, 1%, 2%, and 3%. It has been observed the MDD of the proctor test result for 6mm fiber added to clayey soil is increased from 1.87g/cc to 1.958g/cc and for 0.5% later its gradually decreased with increased its content the OMC varies between 13% to 16.9%. For 12mm the values are 1.87g/cc to 1.965g/cc, for 0.3% later its decreased with increasing of its content the OMC varies between 12.2% to 16.9%.In CBR test under the unsoaked condition, the Values of CBR is increased up to 0.5% for 6mm length fiber the CBR is 29.3% which is 2.8 times more than the untreated soil. for 12mm fiber it's increased up to 0.3% the CBR for 0.3% is 33.2% which is 3.1 times more than untreated soil. In case of a soaked condition the CBR values increase up to 0.5% for 6mm length fiber the CBR is 10.9% which is 3.8 times more than the untreated soil. for 12mm fiber it's increased up to 0.3% the CBR for 0.3% is 11.2% which is 3.9 times more than untreated soil. It has been concluded that the CBR in soaked condition greater than 11% reduces the pavement thickness. The optimum usage of recron3s in clayey subgrade soil for 6mm length fiber is 0.5% and 12mm length fiber is 0.3%.

AltugSaygili et al., (2015)in his work he intended to the utilization of marble dust to improve the engineering properties of kaolinite clayey with disparate proportions of marble dust is 0%, 5%, 10%, 20% and 30% in substitution of kaolinite clay soil. It has been observed from tests that with increases of marble dust the OMC is decreased and dry unit weight is increasing but the max dry unit is 18kN/m3 with OMC of 15.5% is obtained at 30% marble dust added to the soil. The UCS of stabilized soil is increased from 150kpa to 260kpa at 28 days test for 30% marble dust. The free swell properties of soil are decreased from 21% to 13% for 30% marble dust. So it has been concluded that marble dust up to 30% is effectively used in kaolinite clayey subgrade soil to improve its engineering properties soil.

NishanthaBandara et al., (2015) studied the stabilization of silty subgrade soil with different recycled material like Cement kiln dust (6%, 8% and 12%), Limekiln dust (6%), Fly ash (10%, 15% and 25%) and Concrete fines (4%, 12% and 25%) based on the preliminary tests it says that the usage of 8%Cement kiln dust, 6%Lime kiln dust, 15% fly ash, and 4%concrete fines are effectively used. Also, the mix of 5%lime kiln dust and 15%fly ash is used for stabilization purposes.

N.V.Gajera et al., (2015) studied the stabilization of the black cotton soil with groundnuts shell ash with various percentages 0%, 2%, 4%, 6%, 8%, and 10%. Addition of the groundnut shell ash to the black cotton soil the index properties of black cotton soil are improved, with an addition of the 8%ground nut ash shell to the soil the MDD is increased and OMC is decreasing, further increasing content the MDD is decreased and OMC is increased. But the peak CBR value is obtained at 10%addition of groundnut shell ash. It concluded that 10% of groundnut shell ash is effectively used for increasing properties of black cotton soil.

Rathan Raj R et.al., (2016) studied with the waste Rice Husk Ash for the stabilization of clayey soil. The proportion of RHA is integrated to soil in proportion of 5%, 10%, 20%, 30%, 40%, 50% and 80%.The Specific gravity of the chosen RHA is in the range of 2.8 to 3.8. Adding of the 80% of RHA to the clayey soil the index

properties of the soil like the LL is decreased from the 59% to 19.2%, SL is increased from 23.7% to 24.2% and the swelling index of the soil is decreased from 59% to 13.6%. The max dry density of clayey soil is increased from 16.39 KN/m3 to 19.5 kN/m3 with an OMC range is decreased from 17.89% to 13.25%. The undrained cohesive value of mixed RHA clayey soil is decreased from 60N/m2 to 30kN/m2 with an angle of internal friction increased from 17051 to 380. The soaked CBR value of Mixed RHA clayey soil is increased from 2.45 to 4.4% and the unsoaked CBR increased from 3.2% to 9.3%. It has been shown that the RHA is used up to 80% for clayey stabilization.

Ravi et al., (2016) proposed to use of copper slag waste to upgrade the engineering properties of clay soil. This study copper slag in 10%, 20% and 30% of replacement are used. From tests, it had been observed that the dry density of soil of parent soil is increased from 1.597g/cc to 1.752g/cc after adding 30% of copper slag to the soil. But the OMC is incremented from 12% to 18% for 10% and 20% supersession of copper slag in case of 30% supersession OMC comes to 14 %. The CBR value in case of the unsoaked condition is incremented from 7.50% to 28% and in case of soused condition, it's incremented from 5.75% to 14% after adding 30% of copper slag to the soil. By integrating of copper slag more than the dry density is incremented and the same time the OMC is withal increased more rapidly. He concluded that 30% of copper slag is effectively used in clay soil.

Parveen Kumar et al., (2017) used Crumb rubber obtained from automobiles tires.in the process of recycling steel and fluff are separated from the tires and the selected rubber is in the form of granular consistency. This continued process with mills the particle sizes is further is reduced and finally obtained the powder form. In his study, he studied that waste is used as Crumb rubber for the stabilization of Clayey soil. With a proportion of 5%, 10%, and 15%. With the adding of the 15% of crumb rubber to the clay soil the LL is decreased from the 39% to 34.6% and the obtained max dry density is decreased from 16.35kN/m3 to 14.973 KN/m3. By the study its clearly evident that the gap between crumb rubber and clay is an indication of the strength loss process. So the use of crumb rubber in stabilization purposes is reducing the cost and waste disposal of the rubber.

Hussien Aldeeky et.al., (2017) proposed to use of steel slag waste to upgrade the engineering properties of highly plastic soil. This study steel slag in 0%, 5%, 10%, 15%, 20%, and 25% of replacement are used. The fine steel slag aggregate contains the sand content in 96.2% and silt of 3.8% with a Sp.gravity of 3.205. it has been observed that the 20% and 25% of FSSA of IP is 26.3% and 26.155, the free swell index values is 58.3% and 56.65%. With incrementing of the FSSA the plasticity index and free swell index are decremented. But the unconfined compressive vigor for 20% of FSSA is 310.12 kpa and 25% of FSSA is 285.11 kpa, CBR value with 75 blows of compaction for 20% of FSSA is 20% and 25% of FSSA is 19.7%. It has been concluded that the utilization of the FSSA is efficaciously up to 20% it may be elongate to 25% but the vigor of the soil is then decremented. So the optimum content for the FSSA is 20%is efficaciously utilized in high plastic subgrade soil.

Ruqayah Al-Khafaji et al., (2017) Studied with the waste GGBS for the stabilization of soft soil. The proportion of GGBS is integrated to soil in proportion of 0%, 3%, 6%, 9% and 12%. From tests, it's observed that by adding the GGBS the Atterberg's limits are decreases gradually. From compaction test, the soft soil of MDD is increased from 1.51g/cm3 to 1.63g/cm3 and OMC of soft soil is decreased from 20.5% to 19.4% it's achieved at 9% replacement of GGBS. From the UCS test, it's observed that the soft soil is increased from 190kpa to 350kpa. The max UCS of 350kpa is achieved at the 6% replacement of GGBS, 9% replacement of GGBS the UCS is 310kpa.it shows that the usage of 6% of GGBS the strength is increased 80% of parent soil. It concluded that the usage of 6% GGBS in soft soil subgrade to improve its properties.

RajaMurugadoss et al., (2017) Says that Mixing of the Waste rubber and Cement in different proportions are added to the clayey soil. Cement used is OPC53 grade which is acting as the binding agent between soil and rubber. For different mix proportion added to soil, based on CBR values the mix of the 4% cement with 10% rubber is effectively used for the clayey soil to improve its strength.

Nirmala R et al., (2017) Studied with the waste glass for the stabilization of clayey subgrade soil. The waste glass (soda lime glass which is passed through to 300-micron sieve) in 0%, 20%, 25%, 30%, 35%, 40%, and 45% replacements. From Proctor test the maximum dry density of soil is increased from 1.92g/cc to 1.936g/cc, OMC is decreased from 13% to 9% for replacement with 40% waste glass. But the max dry density is 1.938 g/cc and OMC is 11% is obtained at 30% replacement of glass waste. The shear strength of the soil is increased from 6.23N/mm2 to 6.37N/mm2 replacement of 40% waste glass. in addition, of the waste glass to the clayey soil the CBR in both cases like soaked and unsoaked condition its increases, but the max CBR is obtained at a replacement of 40% waste glass. it concluded that a waste glass of 40% is effectively replaced with clayey subgrades.

Divya Patle et al., (2017) Studied with the plastic waste for the stabilization of Black cotton soil. In this study plastic waste in 0%, 2%, 4%, 6% and 8% addition are used. The density of the plastic strips 0.44g/cc is used. From modified proctor test the MDD of the soil is increased from 1.62g/cc to 1.81g/cc and OMC is decreased from the 20.5% to 18.5% is obtained in 4% of plastic waste used. An Increase in the content of plastic the OMC is decreased, but MDD is also decreased. The soaked CBR increased from 1% to 11.70% is obtained at 4% plastic waste used. It concluded that 4% of plastic waste is effectively used in black cotton subgrade soils.

Sooraj P. Sudhakaran et.al., (2018) Studied with the Bottom ash and Areca fiber wastes for the stabilization of clay soil. The varies volumes are substitution of bottom ash in percentages is 0%, 10%, 20%, 30% and 40%, the Areca fiber percentages is 0%, 0.5%, 1%, 1.5% with an addition of 3% cement used. From the test results, it's observed usage of Bottom ash the MDD is increased gradually 1.44g/cc to 1.65g/cc. the max occurs at 30% of bottom ash if adding more than 30% the MDD is decreased. OMC is decreased from 28.7% to 18.5% for the addition of 30% of Bottom Ash. CBR for soil in case of unsoaked condition its increases from 2.25% to 39.45% , soaked condition it's increases from 1.2% to 29.98% a mix of (30% bottom ash + 1.5 areca fiber + 3% cement). It concludes the improve the properties of clayey subgrade soil by use of 30% bottom ash along with 1.5% areca fiber and 3% cement in soil content.

Sharmila KC et al., (2018) Studied with the Cashew nuts shell ash and lime waste for the stabilization of clayey soil. The Cashew nuts shell ash with various percentages like 5%, 10%, 15%, 205 and 25% along with a lime percentage of 5%. With the addition of the Lime and Cashew nuts shell ash to the soil the MDD and OMC are decreased, but the CBR value of the soil is increased, in case of a soaked condition the stabilized CBR is 2.38 times more than untreated soil and the soaked condition is 2.33 times more than untreated soil. It concluded that 20% Cashew nuts shell ash and 5% lime is effectively used in clayey subgrade soil which economical for road construction.

Tao Zhang et al., (2018) Used Lignin is a byproduct obtains from industries likes timber and paper due to perpetual incremented usages of waste material in highway works the lignin is one of the options for the utilization in the subgrade construction. In this study the comparison of Silty soil stabilization with lignin with an optimum content of 12% to the Silty soil with quick lime stabilization an optimum content of 8%. The index properties of the Silty soil is decreases in both cases. in case of lignin stabilization the LL is 31% and PL is 23.2% in case of quicklime stabilization LL is 42.7% and 36.7% those are higher than lignin stabilizer. According to the UCS test results the stabilization values of the lignin 12% is approximately same to the quicklime stabilization with 8% but the CBR values of lignin stabilization are 16.3% at 94% degree of compaction and 22.2% at 96% degree of compaction are higher than the quick lime stabilization. it has been concluded that the stabilization of Silt soil with lignin is giving best result than the quicklime.

CONCLUSION

The following concluded were drawn from a broad overview of the literature review.

1. The waste materials like fly ash, baggage, GGBS, plastic waste, and rice husk ash are easily available in many parts of India and also have a low cost compared to other conventional material.
2. Adding of the waste material to expansive soil like black cotton soil we can control the swelling nature of the soil and increase the properties of the soil.
3. Usages of waste material in the highway field we have not only protect the environment but also to achieve the sustainable development of the country. The utilization of industrial wastes are economical for the local area and it is environmentally friendly.
4. Adding of fiber to waste material we can improve the properties of soil effectively.
5. Stabilization of soil sample with the combination of cement with other material can be effectively used to compare to the combination of lime with other material.

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A Novel Approach for Entity Extraction in Code Mixed Data

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Abstract:-- **In the field of Natural Language Processing (NLP), Named Entity Recognition (NER) is one of the major task. The main challenge in this extraction is to extract Entities that lies in the inadequate information available in a tweet. There has been plenty of work done on this domain of entity extraction but it was mainly focused on popular languages such as English. In general extraction of entities from an informal text makes it difficult and for data that is written in two or more languages (code-mixed) makes it more difficult. In this paper the author has proposed the Machine Learning algorithms like Decision tree, and Conditional Random Field (CRF) with efficiencies of 60% and 76% respectively. The dataset was collected from FIRE-2016.**

Index Terms: Social media text, Entity extraction, Code-mixed data, CRF, BIO format, Decision Tree.

I. INTRODUCTION

Multilingual speakers often switch back and forth between languages when speaking or writing. This language interchange involves complex grammar, and the terms "code-switching" and "code-mixing" are used to describe it. An entity in a text is simply a proper noun such as name, city, place, product, organization and so on. Entity extraction in code mixed data is a process to extract the named entities which are present in the given text that is a code mixed data. Here we mainly concentrate on Hindi-English code mixed language. A significant number of researches are done in this field and some of them are Malayalam-English, Tamil-English so now the main target is on Hindi-English code mixed language. CRF and Decision Tree machine learning algorithms are used in entity extraction in code mixed languages.[Banerjee et al, 2017] Proposed formal as well as informal language-specific features to prepare the classification models and employed four machine learning algorithms (Conditional Random Fields, Margin Infused Relaxed Algorithm, Support Vector Machine and Maximum Entropy Markov Model) for the NE recognition (NER) task. [Gupta et al,2016] Proposed a hybrid approch for entity extraction from code mixed language pair English-Tamil. We use a rich linguistic feature set to train Conditional Random Field (CRF) classifier.

This entity extraction has many domains, some of them are :

1. Entity extraction is useful for those who are supposed to use voice to text conversion techniques such as siri, google assistant. This is used for those who wants to understand foreign phrases or sentences, best example is google translator (converting from one language to another language).
2. Named Entity Recognition can automatically scan entire articles and reveal which are the major people, organizations, and places discussed in them, knowing the relevant tags for each article help in automatically categorizing the articles in defined hierarchies and enable smooth content discovery.

Following is a instance from a Twitter corpus of Hindi-English code-mixed texts also transliterated in English.
NOTE: In the below example, English words are in bold letters and Hindi words are in italics for better understanding.
T1: "agar #notebandi ke time political party bhi #rti ke daayre me aa jati to #sukmath #kashmir me patthar attack na hote"Translation: "At the time of notebandi (Indian banknote demonetisation) if political party came under RTI's scope then in Kashmir stone attack would not have happen"
However, there is complication in social media data itself. First, the shortness of text in tweets makes it difficult to interpret. Second, as these micro text have more than one language in them, they tend to be less grammatical when compared with text in a single language.

Most of the research has, however been focused on resource rich languages, such as English, German, French and Spanish. However entity extraction and recognition from social media text for Indian languages and Code-Mixed text have been introduced a bit late.

2. RELATED WORK :

In recent years, many works were carried out in the field of processing text on code-mixed data. Vyas Y et al,2014 has worked on English-Hindi language social media content POS (Part-of-Speech) tagging was performed. Barman U et al,2014 has worked on code-mixed data of Bengali, Hindi and English a language identification task was carried out for Facebook data. Jamatia A et al,2018 discussed part-of-speech tagging of the corpora using both a coarse-grained and a fine-grained tag set, and compare their complexity to several other code-mixed corpora based on a Code-Mixing Index. Anupam Jamatia et al, 2015 has worked on POS (Part-of-Speech) tagging for Hindi-English code mixed data of Facebook and Twitter was performed with 90% result. Presented a language and POS tagged Hindi-English dataset of 1,489 tweets (33,010 tokens) that closely resembles the topical mode of communication on Twitter. Kushagra Singh et al,2018 has worked on the dataset is more extensive than any existing code-mixed POS tagged dataset and is rich in Twitter specific tokens such as hashtags and mentions, as well as topical and situational information. Three different methodologies are proposed in this paper for extracting entities from Hindi-English and Tamil-English code-mixed data. BIO-tag formatting is done as a pre-processing step. Extraction of trigram embedding is performed during feature extraction. Remmiya Devi G et al,2016 has developed of the system is carried out using Support Vector Machine-based machine learning classifier. Irshad Ahmad Bhat has Presented a simple feed forward neural network for Named Entity Recognition (NER) that use distributed word representations built using word2vec and no other language specific resources but the unlabeled corpora. Deepak Gupta et al,2016 has worked on the problem of code-mixed entity extraction comprises of two sub-problems, viz. entity extraction and entity classification.

3. PROPOSED SYSTEM:

A. Corpus :

The Hindi-English code mixed data taken for this experiment is the data which is collected from tweets that is collected from last 8 years. This data contains of topics like Politics, Sports, Social etc.. related to India(since the data being processed conatins Hindi). Extensive pre-processing is done to the corpus it self where noisy tweets are removed which only contain hashtags and the data which is either only in English or only in Hindi (Devanagari script) is also removed. So the data which will be further considered is based only on Hindi-English code-mixed data.

B. Preprocessing and Annotation: Named Entity Tagging :

Once the data is taken (corpus) then all the stops words are removed and the given input is tokenized sentence wise.

T1: “agar #notebandi ke time political party bhi #rti ke daayre me aa jati to #sukmath #kashmir me patthar attack na hote”

TOKENS: “agar”, “#notebandi”, “ke”, “time”, “political”, “party”, “bhi”, “#rti”, “ke”, “daayre”, “me”, “aa”, “jati”, “to”, “#sukmath”, “#kashmir”, “me”, “patthar”, “attack”, “na” “hote”.

Next the data is tagged based on three named entities that are Person, Location and Organisation. These are tagged in BIO format (Beggining, Intermediate , Other) which result in a total of 7 tags they are:

‘Per’ tag refers to the ‘Person’ entity which is the name of a Person. B-Per Indicates the Beginning of a Person's name. I-Per Indicates the intermediate of a Person's name. ‘Org’ tag refers to the named entity of Organisation that is given to the names of social, political groups like Congress, Bhartiya Jnata Party (BJP),Hindus, Muslims, social media organizations like Instagram, twitter, whatsapp, etc. and also government institutions like State bank of India(SBI), banks, Swiss banks, etc. B-Org Indicates the Beginning of a Organizations's name. I-Org Indicates the intermediate of a Organizations's name. 'Loc’ tag refers to the named entity of location that is given to the names of places for eg. ‘Visakhapatnam’, ‘#India’, ‘Bharath’, etc. B-Loc Indicates the Beginning of a Locations's name. I-Loc Indicates the intermediate of a Locations's name and if it don’t fall in above 6 it is marked as other.

For the example considered the tags identified as follows:

T1 tags : agar/other #notebandi/other ke/other time/other political/B-Org party/ I-Org bhi/other #rti/other ke/other daayre/other me/other aa/other jati/other to/other #sukmath/other #kashmir/ B-Loc me/other patthar/other attack/other na/other hote/other

C. Data statistics:

In the statistics of data after the data is tokenized and Tagged. For each Tag the number of tokens recognised, count is given in table 1.

Table 1. Data Statistics after Tagging

Tag	Count of Tokens
B-Per	795
I-Per	31
B-Org	1528
I-Org	96

B-Loc	2362
I-Loc	571
Total	5383

Initially, the test data is given as an input after a series of steps in preprocessing the data set will be undergoing the BIO format conversion. Then for each word its feature will be tagged which undergoes evaluation metrics using CRF and Decision Tree Algorithms.

D. System Architecture

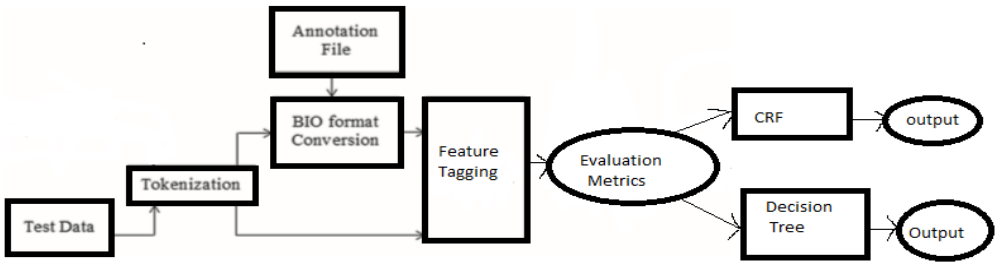

Figure 1. Architecture for Entity extraction in code-mixed data

a) Conditional Random Field (CRF):

CRF is a sophisticated algorithm. It is a class of statistical modelling method often applied in machine learning and used for structured prediction. CRFs fall into the sequence modelling family. Whereas a discrete classifier predicts a label for a single sample without considering "neighbouring" samples, a CRF can take context into account; e.g., the linear chain CRF (which is popular in NLP(Natural Language Processing)) predicts sequences of labels for sequences of input samples.

Below is the formula for CRF where Y is the hidden state (for example, part of speech) and X is the observed variable (in our example this is the entity or other words around it).

$$p(\mathbf{y}|\mathbf{x}) = \underbrace{\frac{1}{Z(\mathbf{x})}}_{\text{Normalization}} \prod_{t=1}^{T} \exp\left\{ \sum_{k=1}^{K} \underbrace{\theta_k}_{\text{Weight}} \underbrace{f_k(y_t, y_{t-1}, \mathbf{x}_t)}_{\text{Feature}} \right\}$$

There are 2 components to the CRF formula:

Normalization: Notice that there are no probabilities on the right side of the equation where we have the weights and features. However, the output is expected to be a probability and hence there is a need for normalization. The normalization constant Z(x) is a sum of all possible state sequences such that the total becomes 1.

Weights and Features: This component can be thought of as the logistic regression formula with weights and the corresponding features. The weight estimation is performed by maximum likelihood estimation and the features are defined by the user.

b) Decision Tree:

A decision tree is a tree where each node represents a feature(attribute), each link(branch) represents a decision(rule) and each leaf represents an outcome(categorical or continues value).

There are two measures:

Entropy: Defining a measure commonly used in information theory is called Entropy. It is given as

$$\text{Entropy}(X) = \sum_{\square \in \square} - p(x)\log(p(x))$$

Where X is collection of examples

Information Gain: It is a effectiveness of classifying an attribute . For an attribute A information gain can be given as Gain(S, A).

$$\text{Gain}(X, A) = \text{Entropy}(X) - \sum_{\square \in \square\,\square\,\square\,\square\,\square(\square)} (|Xv| \,/\, |X|)\ \text{Entropy}(Xv)$$

Where values(A) is the set of all possible values of A.

4. RESULTS AND PERFORMANCE EVALUATION

Precision:

Precision is the evaluation metrics. The ratio of currently predicted positive observations to the total predicted positive observations will become the precision.

Precision= Tp/(Tp+Fp)

Recall:
Recall is called evaluation metrics and also sensitivity hence the ratio of currently predicted positive observations to all observations in actual class becomes recall.
Recall=Tp/(Tp+Fn)

F1-Score:
It is the weighted average of precision and recall.
F-Score=2*(Recall*Precision)/(Recall+Precision)
Where,
TP- True positive means actual class becomes yes and prediction class is yes.
FP- False positive means actual class becomes no and predicted class is yes.
FN- False negative means actual class is yes and predicted class is no.
Support- Number of words identified in given sentences.

Table 2. Output of CRF model

	Precision	recall	F1-score	Support
B-Loc	0.74	0.56	0.64	795
B-Org	0.76	0.43	0.55	1528
B-Per	0.81	0.57	0.67	2362
I-Loc	0.73	0.26	0.38	31
I-ORG	0.62	0.27	0.38	96
I-Per	0.72	0.42	0.53	571
Other	0.96	0.99	0.98	66760
Micro-avg	0.95	0.95	0.95	72143
Macro avg	0.76	0.50	0.59	72143
Weighted-avg	0.95	0.95	0.95	72143

Table 3. Output of Decision Tree model

	precision	recall	F1-score	Support
B-org	0.93	0.28	0.43	250
B-loc	1.00	0.00	0.01	202
I-per	1.00	0.02	0.04	153
I-loc	0.00	0.00	0.00	10
B-per	0.83	0.41	0.54	645
I-org	0.00	0.00	0.00	23
Other	0.94	1.00	0.97	16653
Micro-avg	0.94	0.94	0.94	18036
Macro-avg	0.6	0.24	0.28	18036
Weighted-avg	0.94	0.94	0.92	18036

From table-2 and table -3 we can draw a comparison that CRF model performs better than the Decision Tree which is shown in table-4

Table 4. Comparison between CRF and Decision tree model

	Precision	recall	F1-score
CRF	0.76	0.50	0.59
Decision Tree	0.6	0.24	0.28

5.CONCLUSION AND FUTURE WORK

In this paper, present code-mixed Hindi-English data which is then BIO tagged for Person, Location and Organisation then it is classified based on CRF and

Decision Tree algorithms with efficiencies of 76% and 60% respectively.

As a part of future work the data can be POS(parts of speech) tagged in word level which may give more accurate output. And moreover the data contains limited number of tweets , the tweets considered can be increased . The data considered is Hindi-English in this paper this can be done to other commonly used languages as well and the code-mixed data can be a mix of more than two languages for future work.

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A Study on Cloud Migration Models and Security Issues in Cloud Migration

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Abstract:-- **Cloud migration is the process of transferring the data, applications, operating systems and all other IT resources to cloud or a physical server. Cloud migration can also defined as migration of organizational infrastructure, computing resources, physical storage, Operating Systems, platform services and software are moved to the cloud. It is often involves combining an on-site IT infrastructure with a hybrid cloud, that may be accessed over the Internet for a nominal fee. This paper is to study and understand Different cloud migration Models and all security concerns to be taken into account when the user wants to go for Cloud Migration. Even though the advantages of usage the cloud seems to be attractive, the enterprise decision-makers should also consider the security threats associated with cloud-service migration, thereafter have to take necessary precautions to overcome or to eliminate those security issues and perform a threat free cloud migration to ensure data confidentiality and completeness on the new Virtual Environment.**

Index Terms: Cloud Computing, Cloud migration Models, P2V Migration, V2V Migration, V2P Migration, Security Concerns of Cloud Migration.

I. INTRODUCTION

Cloud computing is not just a server that stores the data, but is something that offers a set of services such as storage, infrastructure, platforms, networks, and many more over the internet irrespective of geographical locations of servers and users as well. So any enterprise decision-maker may choose a CSP(cloud Service Provider) who is trustworthy and offer services at low cost. Here comes the concept of cloud service migration or Virtual to Virtual(V2V) migration. This migration model is referred to as the process of moving the Applications, Programs, software's, OS components and data from one virtual machine or disk partition to another virtual machine or disk partition of another Cloud Service Provider.

There might be different reasons for this kind of virtual to Virtual migration (V2V migration) from the customer's perspective. Customer may not be satisfied by the services provided by the present cloud Service Provider (CSP) and hence may want to move their data, applications, softwares and all IT infrastructure to another CSP. The present CSP seems to be untrustworthy to the customer and hence he may wants to migrate his data to another CSP. Cost might be another key constraint to the customer where a new CSP wants to provide same features with same level of security for lesser cost and/or the new CSP might provide more storage/services at the same cost. Whatever might be the reason once the customer decided to migrate from one Cloud to another cloud the first and foremost thing he has to think of is security concerns while migrating the data from one virtual cloud server to another virtual cloud server.

2 . CLOUD MIGRATION MODELS

Cloud migration is the relocating the existing on-premise data from the physical server to a cloud server which is controlled and monitored by the cloud service provider. The cloud migration methods are classified based on the source from which the data is being flit to the destination where the data is going to be preserved for further operations. The cloud migration is classified into 3 well known methods

1. Physical to Virtual cloud migration
2. Virtual to Virtual cloud migration and
3. Virtual to Physical Migration.

2.2 Physical to Virtual Cloud Migration:

Physical to Virtual Migration can be described as migrating and decoupling of all the data, applications, software and other IT resources from the physical server to a virtual machine hosted on virtual environment created and monitored by a cloud server.

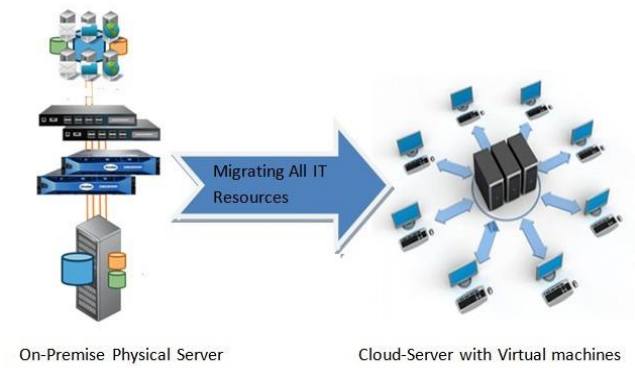

Fig. 1. Physical to Virtual Migration of applications and Organizational private Data

All the It resources, applications, software and data is being created as an online copy and stored it on a virtual disk partition that is created. Now adopt the OS to the virtual hardware from raw virtual disk to the functional virtual disk and connect it to the virtual machine on the cloud server.

2.2 Virtual to Virtual Cloud Migration:

Virtual to Virtual (V2V) migration is a process of moving, transferring or replicating a virtual machine (VM), data or disk partition to another VM. It allows the migrating the data or a machine instance between VMs and/or virtual environment. To centralize the operation, some or all of the transferring data can be carried out necessarily by means of migration tools.

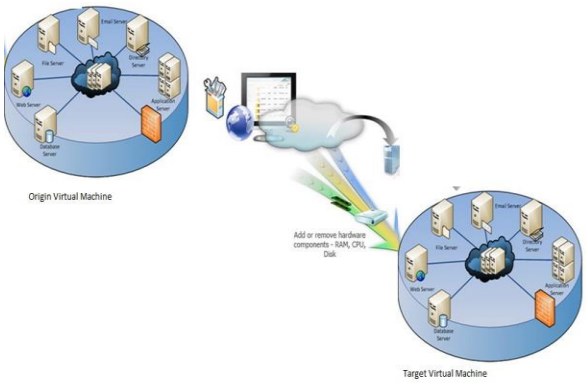

Fig. 2. Virtual to Virtual Migration of applications and Organizational private Data

There are many reasons for migrating data within the virtual/cloud environment. The following is a short list:

Storage upgradation: the existing storage frame is no more sufficient to store all the required data. Hundreds of terabytes of data is to be stored in the new Storage frames.

Consolidation of storage: Moving data from one storage to another in order to consolidate the storage space.

Performance tuning: Moving data from one storage to another in order to balance the distribution of active data onto separate storage spindles or controllers.

Regardless of the reason, VM images must be converted between the compatible virtual disk formats. Any V2V migration must be initialized with an assessment of the computing resource requirements of each original VM to ensure that those resources are available on the destination server. If not, the converted VM may need to be deployed on a different server, or other workloads may be redistributed to free the necessary resources. Migrating virtual machines (and the applications they're running) to the cloud can be cumbersome and complicated unless you use the right tools for the job.

2.3 Virtual to Physical Cloud Migration:

Virtual to physical (V2P) migration is the process of moving all operating system(OS), applications and data from a virtual disk partition to a computer's hard disk. Virtual to physical migration can be carried out manually by defining the target physical server such as a specific hard disk and then setup the applications, OS and data on it from the virtual Machine. This can be a boring and uncertain process, if the Destination server contains different hardware from the existing environment.

V2P can be used to reinforce the content of hard disk of a failed system or server from a backup storage medium such as a floppy or Tape or Disk drive. Virtual to Physical migration may be used, in conjointment with P2V migration, to copy the application programs, OS and data from one system to another virtual computer and from there to other machines. Worrying part of V2P because it could assist the progress of software piracy.

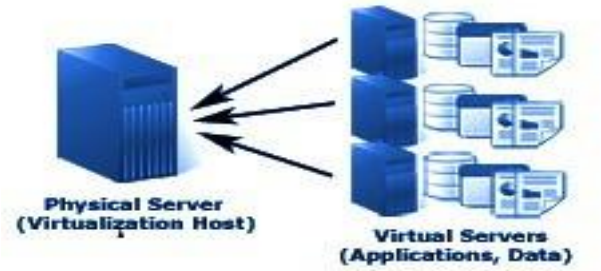

Fig. 3. Virtual to Physical Migration of applications and Organizational private Data

V2P is performed by a third-party tool external to the VM hypervisor and follows a systematic approach for successful migration. This includes verifying the hardware capacity and compatibility with a VM's current configuration. Required V2P tools include an operating system (OS) specific utility, which is used to create a VM image; an image transfer tool and native device drivers for the target physical machine. The OS tool that creates the OS image also facilitates the VM hardware setting configuration in line with the destination machine. The VM image/snapshot is copied exactly and configured by the same software and device drivers installed to complete the V2P migration process.

3. SECURITY CONCERNS FOR CLOUD SERVICE MIGRATION

3.1. Data Breaches

Cloud computing and services has evolved recently, yet data breaches in other forms have existed since long ago. A data breach is a scenario in which protected, secure or confidential data has been viewed, robbed or used by an unauthorized individual to do so. the data breaching might occur more likely for organizations that make use of cloud services than who don't. The outcome is that the cloud comes with a set of typical features that make it more susceptible. While we migrate the data from On-premise to Virtual or V2V migration or Virtual to Physical servers it is possible that some of the sensitive data can be viewed or accessed by unauthorized individuals.

3.2. Hijacking of Accounts

Attackers now have the ability to use organizational login information to remotely access important secure data stored on the cloud. Attackers may falsify and modify information through hijacked references. Other way of hijacking includes bug scripting and rehashing of passwords, that give a chance to attackers to detection steal credentials. during the Cloud migration process the attackers may falsify the data so that the target cloud service provider may not identify the data manipulation.

3.3 Insider Threat

An attack from inside of own company may seem unsimilar, but the insider threat do exist. Employees may use their legitimate access to cloud services provided by organization to exploitation or use information such as financial forms, customer details and other private information. Along with it these insiders need not to have intention to make the data malicious. The cloud migration process may also have insider threat hence it has to be done by trustworthy people.

3.4. Malware Injection

Malware injection is code or piece of program encapsulate into cloud services that resembles valid instances and run as Software as a Service to cloud servers. It means malicious script might be inserted to cloud and reviewed as segment of the s/w or service that runs within the cloud servers. Once an malicious data is executed and the cloud is operating in tandem with it, hackers may eavesdrop, agree with the integrity of secure data, and steal information. During the migration process insertion of malware or malicious code may be done without any being suspected.

3.5. Abuse of Cloud Services

The cloud service expansion has made it comfortable for both small scale and enterprise-level institutions to host large amount of secure data flexibly. However, the cloud's idiosyncratic storage capability has also allowed both authorized and unauthorized users to easily spread malware, software that are illegal, and other digital data. In some cases this becomes a hazard both the CSP(Cloud service Provider) and to their customers as well. During cloud migration process the attackers may them self add as authorized users so that from then onwards they can abuse the cloud services.

3.6. Insecure APIs

Application Programming Interfaces (API) give users the fortuity to personalize their cloud usage However, APIs can be a hazard to cloud security because of its nature. Companies allow the clients to customize features of their cloud services so that it suits their business requirements, but they also authenticate, give access, and performs encryption. As the framework of APIs improved to provide better service, its security risks also increased. APIs give developers the contrivance to develop their software to integrate their applications with similar job-oriented software. During cloud migration process the attackers may add new API's with which they may gain cloud access.

3.7. Insufficient Due Diligence

Many of the challenges we are focused here are technical issues, however particular security gap occurs when an company focus on clear goals, possessions, and policies for the cloud. Insufficient due diligence may cause security risks when an organization moves to the cloud without properly predicting that the services does not match client's assumption. It may interrupt the Migration process or allow the attackers the enter the cloud as authorized users.

3.8. Shared Vulnerabilities

Security in Cloud is a shared accountability between the cloud service provider(CSP) and its customer. The accompaniment between both of them cautions the client to take Preventive measures to protect their private data. The final conclusion is that CSP's and its clients have shared responsibilities, and ignoring your responsibility will result in compromising of personal data. The migration process is not an individual's responsibility and all the people involved are to be very cautious to avoid vulnerabilities.

3.9. Data Loss

Data placed over cloud may be lost through a venomous attack, natural disaster, or a data wipe by the cloud service provider. Losing essential information can be disastrous to those organizations without having recovery plan. Securing our personal data is nothing but carefully reviewing your provider's backup strategies as they relate to physical storage locations, physical access, and physical disasters. Even during the migration process the data may lost hence data validation has to be after completion of the migration to ensure the complete data has been migrated safely.

4. OVERCOME CLOUD MIGRATION CHALLENGES

To move from a virtual data center to the public cloud with a variety of solutions are as follows:

- Control privileged user and super-admin access
- Guard against potential unauthorized copying
- Overcome the lack of visibility
- Mitigate the exposure of raw data
- Maintain ownership of your encryption keys
- Establish standard identity and data protection policies
- Demonstrate definitive proof of access and data control in compliance audits

5. CONCLUSION

Cloud computing is one of the highly thriving data storing and data sharing mechanism in the current computing environment. Cloud migration is the relocating the existing on-premise data from the physical server to a cloud server which is controlled and monitored by the cloud service provider. the different Cloud migration model are classified as P2V, V2V and V2P based on the source and destination data servers. The above mentioned security threats may cause great deprivation to organizational secure data. By being aware of security concerns, the migration team can build a cloud migration strategy to protect your business data, operating systems, application programs and all.

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An Improvement in Estimating the Population Mean By Using Quartiles and Kurtosis

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Abstract:-- **This paper proposes, with justification, some ratio cum median based modified ratio estimators with known quartiles and kurtosis of the auxiliary variable have been proposed. Their biases and mean squared error are derived and compared with simple random sampling without replacement (SRSWOR) sample mean,and ratio estimator proposed class of estimators is assessed with that of simple random sampling without replacement (SRSWOR) sample mean, ratio estimator and modified ratio estimators in terms of variance/mean squared errors. The performance of proposed class of estimators is illustrated with the help of certain natural population available in the literature. The percentage relative efficiency of the proposed class of estimators with respect to SRSWOR sample mean, ratio estimator and some of the existing modified ratio estimators are also obtained.**

Index Terms: Auxiliary variable;Bias;Mean squared error; Natural population; Percentage relative efficiency; Simple random sampling.

I. INTRODUCTION

The main objective of sampling is to estimate the population mean of the study variable on the basis of selecting a random sample of size n from the population of sizeN. In this connection, a finite population U={U_1,U_2,…,U_N } of N distinct and identifiable units has been considered for the estimation of the finite population mean. Let Y(X) denote the study (auxiliary) variable taking values Y_i (X_i),i=1,2,…,N and is measured onU_i. Ratio estimator is used to improve the precision of the estimator based on SRSWOR sample mean by making use of the information of auxiliary variable which is positively correlated with that of the study variable. For a detailed discussion on the ratio estimator and its related problems the readers are referred to the text books by Cochran (1977) and Murthy (1967). The efficiency of the ratio estimator can be improved further with the help of known parameters of the auxiliary variable such as, correlation coefficient, coefficient of variation, Skewness, Kurtosis, Quartiles etc. The resulting estimators are called in literature as modified ratio estimators. See for example Adepoju and Shittu (2013), Das and Tripathi (1978), Diana, Giordan and Perri (2011), Gupta and Shabbir(2008), Kadilar and Cingi (2004), Kadilar and Cingi (2006a, 2006b), Koyuncu (2012), Koyuncu and Kadilar (2009), Shittu and Adepoju (2013), Singh and Agnihotri (2008), Singh and Tailor(2003), Sisodia and Dwivedi (1981), Subramani and Kumarapandiyan (2012a, 2012b) and the references cited there in.

Recently a new median based ratio estimator that uses the population median of the study variableY has been introduced by Subramani (2013). From the median based ratio estimator,themedian based modified ratio estimators are developed by Subramani and Prabavathy (2014a, 2014b, 2015). Recently Jayalakshmi et.al (2016), Srijaet.al.andSubramani et.al (2016) have introduced some ratio cum median based modified ratio estimators for estimation of finite population mean with known parameters of the auxiliary variable such as kurtosis, skewness, coefficient of variation and correlation coefficient and their linear combinations. In this paper, some more ratio cum median based modified ratio estimators with known quartiles and kurtosis of the auxiliary variable and their linear combinations are introduced. Before discussing about the proposed estimators, we present the notations to be used and are as follows:

Notations to be used

- $\mathbf{N}$ **– Population size**
- $\mathbf{n}$ **–Samplesize**
- $\mathbf{f = n/N}$**, Sampling fraction**
- $\bar{\mathbf{X}}, \bar{\mathbf{Y}}$ **–Population means**
- $\bar{\mathbf{x}}, \bar{\mathbf{y}}$ **–Sample means**
- $\boldsymbol{\beta_1 = \frac{\mu_3^2}{\mu_2^3}}$**, Skewness of the auxiliary variable**
- $\boldsymbol{\beta_2 = \frac{\mu_4}{\mu_2^2}}$**, Kurtosis of the auxiliary variable where** $\boldsymbol{\mu_r = \frac{1}{N}\sum_{i=1}^{N}(X_i - \bar{X})^r}$
- $\mathbf{Q_1}$ **– First(lower) quartile of the auxiliary variable**
- $\mathbf{Q_3}$ **- Third(upper) quartile of the auxiliary variable**
- $\mathbf{M}$ $(\mathbf{m})$ **– Population (sample) Median of the study variable**
- $\mathbf{B}(.)$ **–Bias of the estimator**

- **MSE(.) −Mean squared error of the estimator**
- **V(.) −Variance of the estimator**
- **$\bar{y}$ −Simple random sampling without replacement (SRSWOR) sample mean**
- **$\hat{\bar{Y}}_R$ − Ratio estimator**
- **$\hat{\bar{Y}}_M$ −Median Based Ratio Estimator**

$\hat{\bar{Y}}_{p_j}$ − j^{th}Proposed median based modified ratio estimator of $\bar{Y}$

1.2 Existing Estimators

In case of SRSWOR, the sample mean $\bar{y}$is used to estimate population mean$\bar{Y}$which is an unbiased estimator. The SRSWOR sample mean together with its variance is given below:

$$\bar{y} = \frac{1}{n}\sum_{i=1}^{n} y_i \qquad (1)$$

$$V(\bar{y}) = \frac{(1-f)}{n} S_y^2 \qquad (2)$$

Where $f = \frac{n}{N}, S_y^2 = \frac{1}{N-1}\sum_{i=1}^{N}(Y_i - \bar{Y})^2$

The ratio estimator for estimating the population mean $\bar{Y}$of the study variable Y is defined as

$$\hat{\bar{Y}}_R = \frac{\bar{y}}{\bar{x}}\bar{X} = \hat{R}\bar{X} \qquad (3)$$

The mean squared error of $\hat{\bar{Y}}_R$ is given below:

$$MSE\left(\hat{\bar{Y}}_R\right) = \bar{Y}^2\{C'_{yy} + C'_{xx} - 2C'_{yx}\} \qquad (4)$$

where $C'_{yy} = \frac{V(\bar{y})}{\bar{Y}^2}, C'_{xx} = \frac{V(\bar{x})}{\bar{X}^2}, C'_{yx} = \frac{Cov(\bar{y},\bar{x})}{\bar{X}\bar{Y}}$

The modified ratio estimator$\hat{\bar{Y}}_i$ with known parameter λ_i of the auxiliary variable for estimating the finite population mean $\bar{Y}$is defined as

$$\hat{\bar{Y}}_i = \bar{y}\left[\frac{\bar{X}+\lambda_i}{\bar{x}+\lambda_i}\right] \qquad (5)$$

The mean squared error of $\hat{\bar{Y}}_i$ is as follows: $MSE\left(\hat{\bar{Y}}_R\right) = \delta\bar{Y}^2\left(C_y^2 + \theta_i^2 C_x^2 - 2\rho\theta_i C_x C_y\right)$(6)

PROPOSED ESTIMATORS

In this section, some more ratio cum median based modified ratio estimators with known linear combinations of the known parameters of the auxiliary variable like First Quartile Q_1 and Third Quartile Q_3 and skewness in line with the ratio cum median based modified ratio estimators by Jayalakshmi et.al (2016), Subramani et.al (2016) and Srija et.al (2016). The proposed estimators together with their mean squared errors are given below:

Case i:The proposed estimator with known First Quartile Q_1and the kurtosis β_2are

$$\hat{\bar{Y}}_{P_1} = \bar{y}\left\{\alpha_1\left(\frac{\beta_2 M+Q_1}{\beta_2 m+Q_1}\right) + \alpha_2\left(\frac{\overline{\beta_2 X}+Q_1}{\overline{\beta_2 x}+Q_1}\right)\right\} \qquad (7)$$

Case ii:The proposed estimator with known Third Quartile Q_3 and the kurtosis $\beta_2$are

$$\hat{\bar{Y}}_{P_2} = \bar{y}\left\{\alpha_1\left(\frac{\boldsymbol{\beta_2} M+Q_3}{\boldsymbol{\beta_2} m+Q_3}\right) + \alpha_2\left(\frac{\beta_2\bar{X}+Q_3}{\beta_2\bar{x}+Q_3}\right)\right\} \qquad (8)$$

Theorem 2.1:In SRSWOR, ratio cum median based modified ratio estimator

$$\hat{\bar{Y}}_{P_1} = \bar{y}\left\{\boldsymbol{\alpha_1}\left(\frac{\boldsymbol{\beta_2 M + Q_1}}{\boldsymbol{\beta_2 m + Q_1}}\right) + \boldsymbol{\alpha_2}\left(\frac{\beta_2\bar{X} + \boldsymbol{Q_1}}{\boldsymbol{\beta_2\bar{x} + Q_1}}\right)\right\}$$

where $\alpha_1 + \alpha_2 = 1$, for the known parameterQ_1 and $\beta_2$is not an unbiased estimator for its population mean $\bar{Y}$ and its bias and MSE are respectively given as:

$$B\left(\hat{\bar{Y}}_{p_1}\right) = \bar{Y}\left\{\alpha_1\left(\theta_i{}^2 C'_{mm} - \theta_i C'_{ym} - \theta_i\frac{B(m)}{M}\right) + \alpha_2\left(\varphi_i{}^2 C'_{xx} - \varphi_i C'_{yx}\right)\right\}$$

$$MSE\left(\hat{\bar{Y}}_{p_1}\right) = \bar{Y}^2\{C'_{yy} + \alpha_1^2\theta_i^2 C'_{mm} + \alpha_2^2\varphi_i^2 C'_{xx} - 2\alpha_1\theta_i C'_{ym} - 2\alpha_2\varphi_i C'_{yx} + 2\alpha_1\alpha_2\theta_i\varphi_i C'_{xm}\},$$

where $\theta_i = \frac{\boldsymbol{\beta_2} M}{\boldsymbol{\beta_2} M + Q_1}, \varphi_i = \frac{\boldsymbol{\beta_2}\bar{X}}{\boldsymbol{\beta_2}\bar{X} + Q_1}$

Proof: By replacing $T_i = Q_1/\beta_2$ in Theorem 2.0 the proof follows (Srija et.al.(2016)).

Theorem 2.2:In SRSWOR, ratio cum median based modified ratio estimator

$$\hat{\bar{Y}}_{P_2} = \bar{y}\left\{\alpha_1\left(\frac{\beta_2 M + Q_3}{\beta_2 m + Q_3}\right) + \alpha_2\left(\frac{\beta_2\bar{X} + Q_3}{\beta_2\bar{x} + Q_3}\right)\right\}$$

where $\alpha_1 + \alpha_2 = 1$, for the known parameter $Q_3$and $\beta_2$is not an unbiased estimator for its population mean $\bar{Y}$ and its bias and MSE are respectively given as:

$$B\left(\hat{\bar{Y}}_{P_3}\right) = \bar{Y}\left\{\alpha_1\left(\theta_i{}^2 C'_{mm} - \theta_i C'_{ym} - \theta_i \frac{B(m)}{M}\right) + \alpha_2\left(\varphi_i{}^2 C'_{xx} - \varphi_i C'_{yx}\right)\right\}$$

$$MSE\left(\hat{\bar{Y}}_{P_3}\right) = \bar{Y}^2\{C'_{yy} + \alpha_1^2\theta_i^2 C'_{mm} + \alpha_2^2\varphi_i^2 C'_{xx} - 2\alpha_1\theta_i C'_{ym} - 2\alpha_2\varphi_i C'_{yx} + 2\alpha_1\alpha_2\theta_i\varphi_i C'_{xm}\},$$

where $\theta_i = \dfrac{\boldsymbol{\beta_2} M}{\boldsymbol{\beta_2} M + Q_3}, \varphi_i = \dfrac{\boldsymbol{\beta_2}\bar{X}}{\boldsymbol{\beta_2}\bar{X} + Q_3}$

Proof: By replacing $T_i = Q_3/\beta_2$ in Theorem 2.0 the proof follows (**Srija et.al.(2016)**).

NOTE 2.1: The proposed estimators are written into a class of estimators with the population parameter T_i is

$$\hat{\bar{Y}}_{P_i} = \bar{y}\left\{\alpha_1\left(\frac{M+T_i}{m+T_i}\right) + \alpha_2\left(\frac{\bar{X}+T_i}{\bar{x}+T_i}\right)\right\} \quad (9)$$

where $\alpha_1 + \alpha_2 = 1, \quad i = 1,2$

The mean squared error of proposed estimator is given as

$$MSE\left(\hat{\bar{Y}}_{p_i}\right) = \bar{Y}^2\{C'_{yy} + \alpha_1^2\theta_i^2 C'_{mm} + \alpha_2^2\varphi_i^2 C'_{xx} - 2\alpha_1\theta_i C'_{ym} - 2\alpha_2\varphi_i C'_{yx} + 2\alpha_1\alpha_2\theta_i\varphi_i C'_{xm}\} \quad (10)$$

where $\theta_i = \dfrac{M}{M + T_i}, \varphi_i = \dfrac{\bar{X}}{\bar{X} + T_i}, \; C'_{xm} = \dfrac{Cov(\bar{x}, m)}{M\bar{X}},$

The detailed derivation of the above expression of the mean square error is given in Srija et.al.(2016)

3.EFFICIENCY COMPARISON

In this section, the efficiencies of proposed estimators given in (9)are assessed with that of SRSWOR sample mean ratio estimator and modified ratio estimators in terms of variance/mean squared error. The results are as follows:

3.1 Comparison with that of SRSWOR sample mean

Comparing (10) and (2), it is noticed that the proposed estimators perform better than the SRSWOR sample mean if $MSE\left(\hat{\bar{Y}}_{P_i}\right) \le V(\bar{y})$ i.e.,

$$\alpha_1^2\theta_i^2 C'_{mm} + \alpha_2^2\varphi_i^2 C'_{xx} + 2\alpha_1\alpha_2\theta_i\varphi_i C'_{xm} \le 2(\alpha_1\theta_i C'_{ym} + \alpha_2\varphi_i C'_{yx}) \quad (11)$$

3.2 Comparison with that of Ratio Estimator

Comparing (10) and (4), it is noticed that the proposed estimators perform better than the ratio estimator if $MSE\left(\hat{\bar{Y}}_{P_i}\right) \le MSE\left(\hat{\bar{Y}}_R\right)$ i.e.,

$$\alpha_1^2\theta_i^2 C'_{mm} + (\alpha_2^2\varphi_i^2 - 1)C'_{xx} + 2\alpha_1\alpha_2\theta_i\varphi_i C'_{xm} \le 2\left[\alpha_1\theta_i C'_{ym} + (\alpha_2\varphi_i - 1)C'_{yx}\right] \quad (12)$$

4. NUMERICAL COMPARISON

In the section3, the conditions for the efficiency of proposed estimators given in (9) with that of existing estimators have been derived algebraically. To support it by means of numerical comparison, data of a natural population from Singh and Chaudhary (1986, page.177) has been considered.

Population Description

X= Area under Wheat in 1971 and Y= Area under Wheat in 1974

The population parameters computed for the above population is given below:

N= 34	**n= 3**	**$\bar{Y}$= 856.4118**
Q_1= 94.25	**M= 767.5**	**$\bar{X}$= 208.8824**
	Q_3= 254.75	**β_2 = 2.9123**

The variance/mean squared error of the existing and proposed estimators at different values of α_1andα_2 are given in the following table

Table 4.1: Mean Squared Errors for different values of α_1 *and* α_2

Existing Estimators			
SRSWOR Sample mean	$\bar{y}$	163356.41	
Ratio Estimator	$\bar{Y}_R$	155579.71	
Proposed Estimators			
α_1	α_2	$\hat{\bar{Y}}_{P_1}$	$\bar{Y}_2$
0.1	0.9	123328.14	122008.12
0.2	0.8	114892.14	115222.97
0.4	0.6	100592.08	102236.07
0.5	0.5	94558.22	96772.33
0.6	0.4	90929.00	92118.86
0.7	0.3	86897.97	88955.01
0.8	0.2	83722.09	84324.36
0.9	0.1	81887.23	82335.70

From Table 4.1, it is observed that the proposed estimators discussed in (9) have less mean squared errors than the SRSWOR sample mean, ratio estimator and the modified ratio estimators.

The percentage relative efficiencies (PRE) of the proposed estimators with respect to the existing estimators are obtained by using the formula $\mathrm{PRE(e,p)} = \frac{\mathrm{MSE(e)}}{\mathrm{MSE(p)}} * 100$ and are given in the following table:

Table 4.2:PRE of proposed estimators with respect to SRSWOR sample mean

α_1	α_2	$\hat{\bar{Y}}_{P_1}$	$\hat{\bar{Y}}_2$
0.1	0.9	132.45	133.88
0.2	0.8	142.18	141.77
0.3	0.7	153.58	151.52
0.4	0.6	162.39	159.78
0.5	0.5	172.75	168.80
0.6	0.4	179.65	177.33
0.7	0.3	187.98	183.63
0.8	0.2	195.11	193.72
0.9	0.1	199.48	198.40

Table 4.3: PRE of proposed estimators with respect to Ratio Estimator

α_1	α_2	$\hat{\bar{Y}}_{P_1}$	$\hat{\bar{Y}}_2$
0.1	0.9	126.15	127.51
0.2	0.8	135.41	135.02
0.3	0.7	146.27	144.30
0.4	0.6	154.66	152.17
0.5	0.5	164.33	160.76
0.6	0.4	171.10	168.89
0.7	0.3	179.03	174.89
0.8	0.2	185.82	184.50
0.9	0.1	189.99	188.95

From Tables 4.2 and 4.3, it is observed that the PRE values of the proposed estimators with respect to SRSWOR sample mean, ratio estimator and modified ratio estimators are greater than 100 and hence we conclude that the proposed estimators are efficient estimators.

- In fact the PREs are ranging from
  - 132. 45to 199.48 for the case of SRSWOR sample mean
  - 126.15 to 189.99 for the case of ratio estimator

2. SUMMARY

In this paper we have proposed some more ratio cum median based modified ratio estimators with the known parameters such as quartiles Q_1 ,Q_3 and β_2 of the auxiliary variable and their linear combinations. The efficiencies of the proposed ratio cum median based modified ratio estimators are assessed algebraically as well as numerically with that of SRSWOR sample mean, ratio estimator and some of the modified ratio estimators. Further it is shown from the numerical comparison that the PREs of proposed ratio cum median based modified ratio estimators with respect to the existing estimators are more than 100. Hence the proposed ratio cum median based modified ratio estimators with known quartiles and kurtosis may be recommended for the use of practical applications.

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Design Scheme for Copyright Management System Based On Digital Watermarking and Blockchain

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Abstract:-- **In the past, traditional digital copyright protection system based on digital watermarking mainly focused on implementation of watermarking text or image while ignored the generation and storage of watermark information. In this paper, a new design scheme of copyright management system based on digital watermarking and its information such as blockchain is proposed which combines digital watermarking, blockchain, perceptual hash function, Quick Response (QR) code, and Inter Planetary File System (IPFS). Blockchain is used to securely store watermark information that implements to provide a timestamp authentication. Perceptual hash function is used to generate hash value based on the structure information of watermark image can be confirmed without original image. QR code is used to generate QR image containing image hash and copyright information of owner. IPFS is used to store and distribute watermarked images without centralized server and can reduce information-leakage, data destruction, improves security and transparency of information to facilitate circulation in network. Blockchain and multiple digital watermarks combined to record copyright information of every owner in authoring process and fully prove that this information to protect the legitimate rights and interests.**

Index Terms: copyright management, digital watermarking, blockchain, different hash function, QR code, (IPFS)

I. INTRODUCTION

With development of digital technology, multimedia, digital works in the form of image, audio, video and others have been published on Internet; their copyright-protection, information-integrity assurance gradually become an urgent issue needs to be resolved. Because digital works are easily copied, processed and made public. Pirates exploit these characteristics of digital-works to undermine legitimate-rights of copyright owner's to gain personal benefits. For traditional copyright protection, copyright owners need to provide digital works and some personal information as copyright information[1][2] to the copyright registration agency. This agency will manually review the submitted information and store in it. This not only results in inefficiencies and cost increases, but also has the risk of information being tampered with and leaked. At the same time, it also brings a trouble to copyright verifiers for doing digital-forensics because it is necessary to prove this information is indeed original information but not altered.

For this, we use blockchain to store copyright information; it is not practical to store digital images directly in blockchain. A more practical and convenient method is to hash the images and record values of these images in blockchain and the image files are stored elsewhere for calling. However, for multimedia file such as image file, traditional cryptographic hash algorithm such as SHA256 is used. Because in addition to tampering attacks on the structure, digital images will undergo normal operations such as adding digital watermarks, filtering, rotation, compression and other. However, the data structure of this digital image file has changed for computer, so the calculated results by traditional hash functions will become completely different. Obviously this is not the result that we want to see, so it needs a new hash algorithm that is robust to content manipulation and sensitive to content tampering. Perceptual hash function[3] performs a series of processing on images before calculating hash values, such as reducing size, simplifying colour, removing the image details, and retaining only the structure information of image. As long as the structure of a certain image has not changed, the hash value will not change. In other words, the structure information will not change after adding digital watermark to the original image, calculating the watermarked image by the same perceptual hash function, and the calculated hash value being compared with extracted digital watermark information. In this way, a certain watermarked digital image can be self-certified without the original image. As far as digital watermarking technology for copyright protection is concerned, the requirement for its robustness is actually very high. It is not only required that digital watermarks can be detected and extracted after a series of operations or attacks but also that the extracted digital watermarks should be clearly identifiable so that the copyright information can be confirmed. In addition, the watermark capacity is also an important feature, because it must have enough copyright information to play the role of copyright protection. For these two points, QR code[4] image can be used as digital watermark image. Even if there are defacements on a QR

code image, it can still be read by machine. Generally, defaced area of a QR code image can still be read in the range of 7%-30%. The rest of this paper is organized as follows.

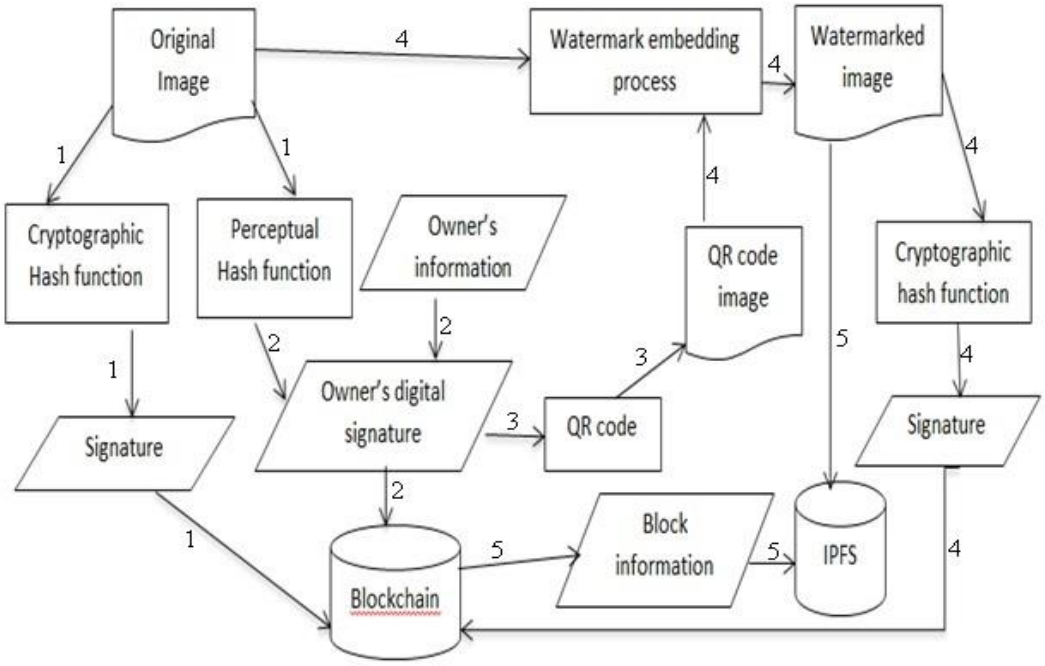

Fig 1: Schematic Diagram

2. IMPROVED DIGITAL IMAGE COPYRIGHT PROTECTION SYSTEM BASED ON DIGITAL WATERMARKING TECHNOLOGY

(1) perceptual hash function is used to calculate, ensure that the watermark information can still be verified without the original image. However in order to ensure that original can backup the complete blockchain data and they donot know the true identity of each other. This greatly reduces the risk of collision between nodes to tamper data. After

image and watermark is added, perform cryptographic hash calculations on the images to prove the order between them.
obtaining watermark information, the corresponding block may be retrieved according to the information to obtain at

(2) Blockchain technology is used to store the information about digital image as shown the image perceptual hash value, image owners information etc. Since blockchain is essentially decentralised database, can mutually authenticate each others identity by cryptography and securely store data without a third party. Each node in the blockchain network corresponding time so as to prove multiple watermarks.

(3) After all the necessary information is recorded on blockchain; the final stage says embedding of digital watermark. In order to improve robustness and amount of information, QR code is used to generate the watermark image which contains the owner's data recorded in the blockchain. The space frequency domain transformation used is Discrete Cosine Transformation(DCT)[4][5][6].

(4) In order to solve the problems that may occur in centralized servers, IPFS is used to store and distribute the image which says the DCT and IDCT functions and then we see that the all values to be placed in the blockchain and we will place that image with its owner details in IPFS. that includes a watermarked image, and a text file filled with information about its corresponding block which contains the index of this block, the title of image and owner's data. Users can browse images and related information through common browsers, and download them.

B. Process of the scheme

(1) Upload original image and submit some copyright owner's information. Then use the perceptual hash function to calculate hash value of image and use cryptographic hash function to calculate hash value of original image as a digital signature.

(2) The perceptual hash value, the copyright owner's information will be the digital signature. Coupled with the cryptographic hash value, they are used as additional information of a transaction to initiate a request and record in the blockchain.

(3) Generate a QR code image containing the copyright owner's digital signature i.e. the perceptual hash value, the copyright owner's information.

(4) Use this QR code image as digital watermark, embed it in original image and generate an image that has been added to digital watermark. Use cryptographic hash function to calculate hash value of this watermarked image, record it in blockchain.

(5) Upload this watermarked image file and its block information to the IPFS network.

(6) Use the same perceptual hash function to calculate this watermarked image and extract the watermark. The calculated hash value, the hash value in the digital watermark and the hash value in the blockchain are compared with each other to determine the copyright.

3. Simulation Of The Scheme

The test image selected for the simulation is kidzz4.jpg, as shown in the figure below Fig 2 which is the original image.

Here the simulation of the scheme says that all the process that had done all over the research and now each module is discussed below as follows: the module 1 gives the hash values of original image and next gives the QR code of original image and then we do the embedding and extract of

Fig 2: kidzz4.jpg

A. Calculating of image hash:

In the perceptual hash function, there are basically four categories, Average Hash (AHA), Different Hash (DHA), Perceptual Hash (PHA), and Wavelet Hash (WHA). Since the result of DHA in the test is the best and the error is minimal, so we select DHA to simulate. As shown in the Fig 3, hash value of kidzz4.jpg is 8e9696b6b68e8c64. In order to prove the change of the image after embedding digital watermark, use SHA256 to calculate kidzz4.jpg, as shown in Fig 4.

```
Cryptographic Hash of original image  :
 dd63240b23f6626773d7451af31cb6e17a9118e
3bbbeeaf198144ec8f2c8ccf0
```

Fig 3: Cryptographic hash value

```
Perceptual Hash of original image :  8e9
696b6b68e8c64
```

Fig 4: Perceptual hash value

B. Generation of QR code image:

Because size of the test image is 512*512, it is necessary to limit size of the QR code image on the premise that QR code information can be read. As shown in the fig 5, generate a 64*64 QR code image with the hash value of this image and copyright owner's information in fig 6.

Fig 5: QR code image of kidzz4.jpg

QR code details:

Perceptual Hash : 8e9696b6b68e8c64
Name : s
E-Mail : s
Mobile : s

Fig 6: QR code information

C. Embedding and extraction of the digital watermark:

Use MATLAB to write a Discrete Cosine Transform (DCT) based Frequency Domain digital watermarking algorithm for simulation, and use its Inverse Transform (IDCT) to extract the watermark. Two-dimensional DCT and Two-dimensional IDCT are used here. F(u,v) and f(i,j)

are respectively transform coefficient of DCT and IDCT. c(u) and c(v) are added coefficients, the main role is to make DCT and IDCT transform matrix[6][7] into orthogonal matrix is shown below, the embedded and extracted images of the original image is as follows.

$$F(u,v) = \left(\frac{2}{N}\right)^{\frac{1}{2}} \left(\frac{2}{M}\right)^{\frac{1}{2}} \sum_{i=0}^{N-1} \sum_{j=0}^{M-1} \Lambda(i).\Lambda(j).\cos\left[\frac{\pi.u}{2.N}(2i+1)\right] \cos\left[\frac{\pi.v}{2.M}(2j+1)\right].f(i,j)$$

DCT function

Fig 7: Embedded image of kidzz.jpg with DCT

$$\Lambda(\xi) = \begin{cases} \frac{1}{\sqrt{2}} & \text{for } \xi = 0 \\ 1 & \text{otherwise} \end{cases}$$

IDCT function

Fig 8: Extracted image of kidzz.jpg with IDCT

D. Generation of blockchain:

For easy way, by learning the blockchain program on GitHub, write a blockchain code[9] to simulate a function of blockchain meets the requirements of this scheme. As we know that the blockchain really shines the tamper-evidence, decentralization and transparency. Here we divide the chain into set of blocks and these blocks are indeed store the information of cryptographic hash value of original image, perceptual hash value of original image and cryptographic hash value with owner's information of the watermarked image. Here, we have the peers that will be saying what the active and inactive peers and the chain consisting data.

E. Inter Planetary File System (IPFS):

IPFS is a protocol, network designed to create content-addressable, peer-to-peer method of storing, sharing media in distributed file system with high integrity. It is so called as "off store" for blockchain. Here, we take blockchain information, watermarked image and convert them into a file then calculate the hash value for this file. Now, this file is placed in the IPFS[8].

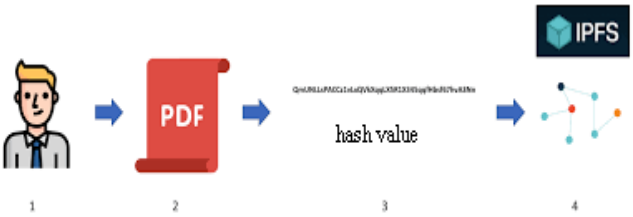

Fig 9: IPFS system process

F. Self Certification:

The DHA is still used to calculate the hash values for the original image kidzz4.jpg and the watermarked extracted.jpg. Finally, the Hamming Distance is used for comparison of these two hash values. If, we see hamming distance is 0, so these two images are the same image, and two hash values are both 8e9696b6b68e8c64. This hash value is consistent with the hash value in the digital watermark and the hash value in the blockchain. Copyright certification is completed.

4. CONCLUSION

Here, In the face of increasingly serious digital copyright protection issues, technologies used for copyright protection should also be enhanced. In this scheme, use digital watermarking, blockchain, perceptual hash function, QR code, and IPFS to provide a brand-new choice for digital copyright protection business in the fast-growing Internet era. In terms of file types, this paper only mentions the copyright management of digital image.

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Gas Turbine Blade Cooling of Flow Analysis by Using CFD

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Abstract:-- **Gas Turbines are planned to persistently and productively produce valuable control from fuel vitality and are created into exceptionally dependable tall execution motors. Presently days in gas turbine the turbine edge worked at temperature limits 1550-2000 ˚c and gas turbine edges have been put to utilize in different areas like, control plants, marine businesses as well as for mechanical impetus. For tall warm proficiency progressed gas turbines utilize tall temperature at the passage of the turbine. Subsequently, for the reason of expanding warm effectiveness of the turbines, it is basic to plan compelling cooling plans. The current Turbine Chanel Temperature in progressed gas turbines is much higher than the dissolving point of the edge fabric. As a result a shifted run of cooling procedures are utilized to cool the edge to preserve typical operation of the turbine.**

An endeavor has been made to computationally analyze the impacts of one sort of cooling framework, i.e by utilizingholes (6) on the edgepivotally, wherein the cooling impacts of discussstream through a punctured turbine edgeentry has been mimicked utilizing ANSYS- FLUENT(CFD Fluent). The mass stream rates of discuss through the section were shifted to watch the variety of cooling impacts with mass stream rate and comes about were compared. The temperature contours of the Edge for diverse mass stream rates were watched. The patterns of diverse parameters like warmexchange,speed conveyance, weightconveyancewere famous. It wasamous that by keeping apertures on the edges surface increments the warm exchange rate and produces cooling impact than characteristic edge without apertures and increments the life of edges and hence gives higherWarm effectiveness and control output

Index Terms: Computational fluid dynamics (CFD), staggered holes, Heat transfer rate, CAD, Turbulent-Intensity model.

INTRODUCTION

Gas Turbine Basics: There are three fundamental parts of a gas turbine, to be specific: the compressor, the combustor and the turbine. The work of then attempt has been made to computationally analyze the impacts of one sort of cooling framework, i.e by utilizingapertures (6) on the edgepivotally, wherein the cooling impacts of discussstream through a punctured turbine edgeentry has been recreatedutilizing ANSYS- FLUENT(CFD Fluent). The mass stream rates of discuss through the section were shifted to watch the variety of cooling impacts with mass stream rate and comes about were compared. The temperature forms of the edge for distinctive mass stream rates were watched. The patterns of distinctive parameters like warm exchange, speed dissemination, weight dissemination were famous. It was famous that by keeping apertures on the edges surface increments the warm exchange rate and produces cooling impact than normal edge without apertures and increments the life of edges and hence gives higher warm proficiency and control yield

Confinements on Turbine Channel Temperature:

Due to the nature of its working, the control produced by a turbine increments with expanding the temperature at which the gas enters, called the turbine gulf temperature. An expanded control yield comes about in a better proficiency. In any case, the turbine channel temperature cannot be expanded self-assertively since of the limits forced due to the temperature at which the edge fabric soften

Require for cooling: As the edge fabric dissolves at a lower temperature than the working conditions of the turbine, a cooling strategy must be joined into the edge plan to guarantee the secure and smooth running of the turbine. It is critical, whereas concocting a cooling conspire, to have information approximately the boundary conditions of the edge amid turbine operation, so that expansive angles can be maintained a strategic distance from, Turbulent-Intensity demonstrate.

Turbine cooling basics: In spite of the fact that cooling is vital, it influences the gas turbine operation inadvertently:

1. The cooling air supplied to the blades and vanes is directly bled from the compressor. As a result the mass of air going into the combustor is decreased.

2. In order to incorporate the various structures like fins, cooling passages etc. The trailing edge thickness of the blades must be increased which adversely affects the aerodynamic performance of the blades

Various parts of the turbine blade are cooled using various techniques. The front part, called the leading edge, is generally cooled by impingement cooling. The middle part is generally cooled by using snake-like passages endowed with ribs along with local film cooling. The back part, called the trailing edge, is generally cooled by impingement and film cooling.

Types of cooling:

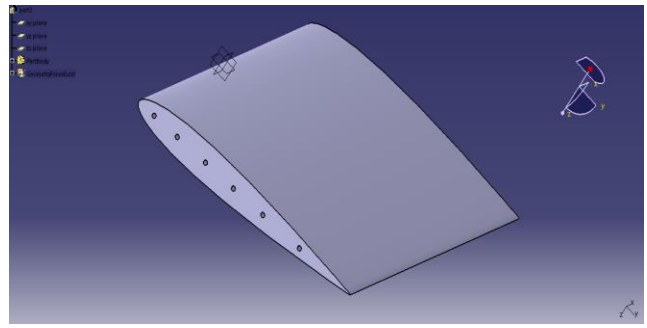
There are two wide categories of cooling utilized in gas turbine blades:1. Internal Cooling 2.ExternalCooling In inside cooling, the cool compressed discuss streams inside inside the sections of the turbine edge and in this way warm exchange happens between the cold discuss within the entry and the adjoining hot surface of the blade. In outside cooling, the cool compressed discuss is catapulted from gaps on the surface of the edge or the vane and makes a lean film between the environment and the edge surface in this way anticipating contact between the hot air and the edge surface, enhancing warm exchange utilized for the cooling of the turbine edges for their long life. Edges of gas turbine can be cooled either inside or remotely.

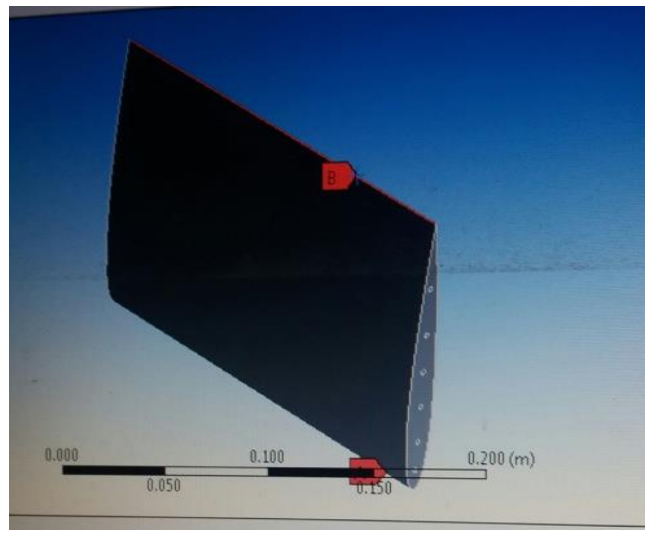
LITERATURE REVIEW

K HariBrahmaiah – Examine the heat transfer analysis of gas turbine with four different models consisting of blade with and without holes and blades with varying number of holes (5,9,& 13) were analyzed. Transfer rate and temperature distribution, the blade with 13 holes is considered as optimum. Steady state thermal and structural analysis is carried out using ANSYS software with different blade materials of Chromium steel and Inconel-718. While comparing these materials Inconel-718 is better thermal properties and induced stresses are lesser than the Chromium steel.

R.D.V. Prasad- Examine steady state thermal & structural performances for N155 & Inconel-718 nickel Chromium alloys. Using finite element analysis four different models consisting of solid blade and blades with varying number of holes (5,9,& 13) were analyzed of cooling holes. The analysis is carried out using ANSYS software package. While comparing materials, it is found that Inconel-718 is better suited for high temperature the graphs drawn for temperature distribution, von-misses stresses and deflection, the blade with 13 holes is considered as optimum, the induced stresses are minimum and the temperature of the blade is close to the required value of 800 degrees Celsius.

GEOMETRY





Geometry of turbine blade in catia v5

Chord	=	130mm
Length of extrusion	=	200mm
Thickness	=	100mm
Pitch of the blade	=	5.625deg
No of points	=	130

150240, No of nodes =166911

Setup

Boundary conditions: The boundary conditions utilized were as indicated. For the smooth channel as it were one mass stream rate of 0.01 kg/s was utilized in arrange to compare with the ribbed channel

Mass flow rate (m): 0.01 kg/s Convection Heat Transfer Coefficient (h) at outer surface of blade: 1000 W/m2-K Free-stream temperature of the surroundings (Tfree): 1700KTemperature of the air at the inlet(Tinlet): 300 K

Aerofoil shape design points:

X(mm)	Y(mm)	Z(mm)
129.3901	-12.5792	0
129.3156	-12.5612	0
129.0923	-12.5072	0
128.7206	-12.4174	0
128.2015	-12.2924	0
127.5361	-12.1327	0
126.726	-11.9391	0
125.7729	-11.7124	0
124.6791	-11.4537	0
123.447	-11.1643	0
122.0795	-10.8453	0
120.5797	-10.4981	0
118.951	-10.1243	0
117.1972	-9.72531	0
115.3223	-9.3028	0
113.3306	-8.85841	0
111.2268	-8.39389	0
109.0156	-7.91098	0
106.7021	-7.41148	0
104.2917	-6.89721	0
101.79	-6.37007	0
99.20268	-5.83195	0
96.53577	-5.28479	0
93.79543	-4.73059	0
90.98797	-4.17137	0
88.11988	-3.60922	0
85.19777	-3.04625	0
82.2284	-2.48464	0
79.21859	-1.92663	0
76.1753	-1.37449	0
73.10549	-0.83054	0
70.01629	-0.29713	0
66.91475	0.223343	0
63.80801	0.728487	0
60.70322	1.215896	0
57.6075	1.683183	0
54.52794	2.128003	0
51.47163	2.548053	0
48.44558	2.941112	0
45.45674	3.305087	0
42.51198	3.637979	0
39.61806	3.937949	0
36.78166	4.203333	0
34.00932	4.432663	0
31.30744	4.624657	0
28.68225	4.77828	0
26.13987	4.892724	0
23.6862	4.967394	0
21.32695	5.001974	0
19.06761	4.996369	0
16.91349	4.950696	0
14.86965	4.865318	0
12.94088	4.740757	0
11.13174	4.577765	0
9.446503	4.377188	0
7.889144	4.140046	0
6.463358	3.867399	0
5.17254	3.560414	0
4.019729	3.220255	0
3.007667	2.848089	0
2.138737	2.445041	0
1.414978	2.012175	0
0.838091	1.550462	0

SOLUTION

Sort of solver- Pressurebased. Physical show- Turbulent (k-e), vitality Equation Material property- Property of liquid such asair. Boundary condition- Weight, speed channel, speed outlet walletc. Solution strategy- Choosing the arrangement strategy such as energy condition, turbulent vitality equationetc. Solution initialization- Initialize the arrangement to urge the starting arrangement of theproblem. Run arrangement- Run the arrangement by giving no of cycle for arrangement ResultsAndConclusion

Turbine edge is carried out with differing models comprising of hub changing number of cooling gaps concurring to CFD examination of gas turbine edge:

• As we increases the no of holes the edge driving edge temperature will diminishes.

• Temperature will slightest for edge driving edge at 5 crevices bored

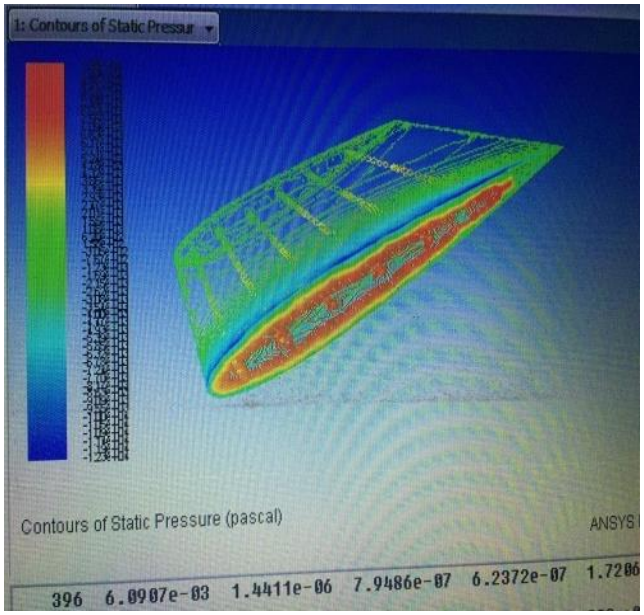
. • Normal edge temperature decreases by 3.98% when no of pivotalgapsshifted from 5 to 6.

• Warm trade coefficient of hot gas will increases with growing no of gaps.

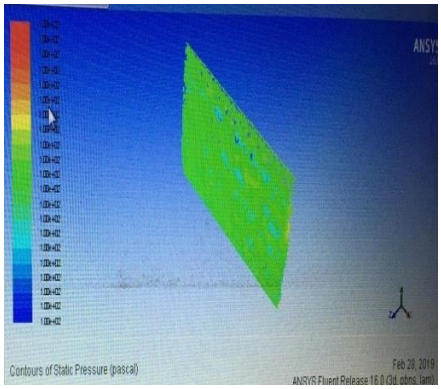
• Within the greatest ebb and stream of the edge profile the temperature scattering is nearly uniform.

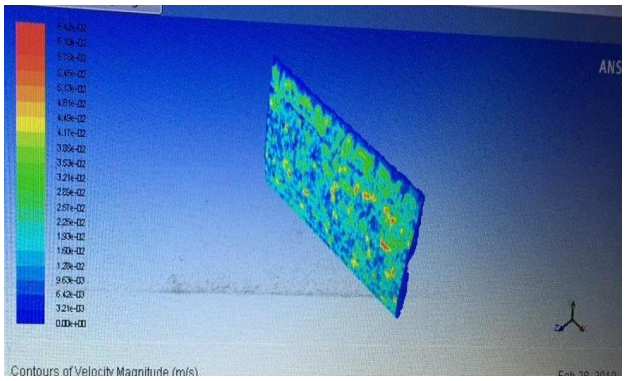
• Within the edge segment the temperature is directlydiminishing from tip to the root

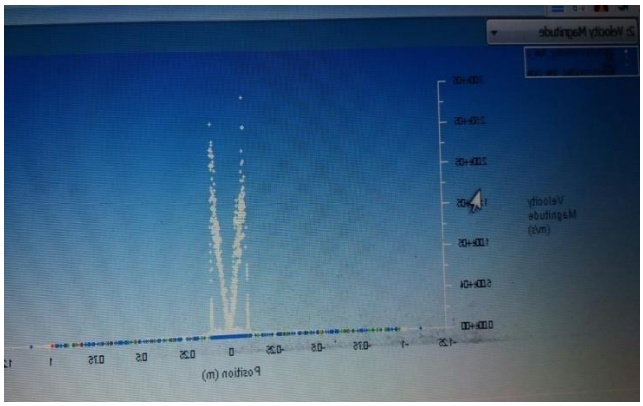
. • Warm trade rate increases by 14.96% when no of gapsshifted from converge. In arrange to have a comprehensive understanding of the stream and to compare diverse stream scenarios, the results of the recreation have been displayed completely different groups. A number of drift charts were moreover drawn to appear the variety over the edge volume



Solution







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Adaptive Gain Equalizer with Nonlinear Spectral Subtraction

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Abstract:-- **In many application of noise cancellation, the adjustments in signal characteristics may want to be pretty fast. This needs the usage of adaptive algorithms, which has rapid converges. Due to computational simplicity and easy implementation Least Mean Squares (LMS) and Normalized Least Mean Squares (NLMS) Adaptive filters have been used in numerous signal processing applications. The Recursive Least Squares (RLS) algorithm has achieved itself as the "ultimate" adaptive filtering algorithm by exhibiting the excellent convergence behavior. Unfortunately, sensible implementations of the algorithm are regularly related with excessive computational complexity and/or poor numerical properties. The adaptive filtering was presented recently, have a good balance between complexity and the convergence speed. So let me describe a new technique to noise reduction in speech enhancement the use of fast affine projection (FAP) algorithm. This is adaptive filtering algorithm is new algorithm used to attenuating noise in speech indicators and also to superior noise reduction method for sturdy speech focus by the use of Adaptive Gain Equalizer with Nonlinear Spectral Subtraction methods we may achieve it.**

INTRODUCTION

An early and crucial technique for noise reduction was once to use the concept of the optimum wiener filter .There are two most regularly used algorithms for noise cancellation are normalized least mean squares (NLMS) and recursive least squares (RLS) algorithms. NLMS algorithm has low computational complexity among these two. On the contrary, the weakest factor of RLS algorithm is its excessive computational complexity in remedy it offers fast adaptation rate. The preference of the adaptive algorithm to be utilized is always a tradeoff between fast convergence and computational complexity. Due to the property of convergence of the FAP algorithm is most efficient then LMS, NLMS, and affine projection (AP) algorithms and same to that of the RLS algorithm. In this algorithm, one of the filter coefficient is updated one or greater at each time instant to achieve appropriate tradeoff between computational complexity and convergences rate. The proposed algorithm performance is studied through the energy conservation analysis used in adaptive filters and the general expressions for the steady-state mean rectangular error and transient overall performance evaluation have been derived in. we can say through this paper FAP algorithm is good in noise cancellation for speech enhancement. The results are evaluated with classical adaptive filter algorithm such as LMS, NLMS, AP and RLS algorithms. Simulation outcomes show the exact overall performance of the two algorithms. In the following we find additionally the highest quality parameter which is used in these algorithms. Today, an often used digital method for wonderful noise reduction for Robust Speech Recognition in speech conversation is spectral subtraction. This frequency area approach is based totally on Fast Fourier Transform and is a nonlinear, but straight ahead way of decreasing undesirable broadband noise acoustically added to the signal.

TABLE I. NOTATIONS

Symbol	Description
$\lvert . \rvert$	Norm of a scalar
$\lVert . \rVert^2$	Squared Euclidean norm of a vector
$(.)^T$	Transpose of a vector or a matrix
$(.)^{-1}$	Inverse of a scalar or a matrix
$<.,.>$	Inner Product of two vectors

II. BACKGROUND

In Fig. 1, we show the prototypical adaptive filter setup, where x(n),d(n) and e(n) are the input, the desired and the output error signals, respectively. The vector h(n) is the Mx1 column vector of filter coefficient at time , in such a way that the output of signal, y(n) , is proper estimate of the desired signal, d(n).

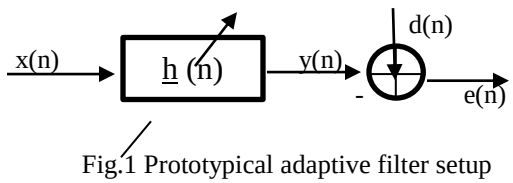


Fig.1 Prototypical adaptive filter setup

the filter vector update equation for the LMS algorithm is given by :

$$h(n+1)=h(n)+ Mx(n)e(n)$$

Where

$$\underline{x}(n) =[x(n),x(n-1)\ldots\ldots x(n-M+1)]^T$$

and is the step-size that determines the convergence speed and steady-state mean-square error (MSE). Also, the output error signal, is given by e(n)

$$e(n) =d(n)-\underline{h}^T(n)\,\underline{x}(n)\text{---------}1$$

To boost the convergence speed of the LMS algorithm, the NLMS and AP algorithms was proposed which can be stated as

$$\underline{h}(n+1) = \underline{h}(n) + \mu X^T(n)(\varepsilon I + X(n)X^T(n))^{-1}[\underline{d}(n) - X(n)\underline{h}(n)] \text{ --------}2$$

Where

$$X(n)= =[\underline{x}(n),\underline{x}(n-1)\ldots\ldots\underline{x}(n-K+1)]^T$$

And

$$\underline{d}(n) =[d(n),d(n-1)\ldots\ldots d(n-K+1)]^T$$

The update filter vector equation in RLS algorithm is:

$$\underline{h}(n+1)=\underline{h}(n)+C^{-1}(n)\underline{x}(n)e(n)\text{----------}3$$

C(n)=estimation of the autocorrelation matrix.

This is given by

$$C(n)= \sum_{i=0}^{n} \lambda^{n-i}\, \underline{x}(i)\underline{x}^T(i)\text{---------}4$$

where.

$0<<\lambda<1$

III. FAPA ALGORITHM

A Notation and problem description

With reference to Figure 1, the error signal, , e(n)can be expressed as:

$$e(n)=d(n)- \sum_{k=0}^{M-1} h_k(n)x(n-k)\text{----------}5$$

Considering the samples n-L+1,n-L+2…..n, where we focus on the situation where L>M, Eq.1 can be written as

(1) $\underline{e}(n)=\underline{d}(n)-X(n)\underline{h}(n)$

(2) $X(n)=[\underline{x}_o(n),\underline{x}_1(n)\ldots\ldots\underline{X}_{M-1}(n)]$

and columns furthermore defined through

$\underline{x}_j(n)=[x(n-j),x(n-j-1)\ldots.x(n-j-L+1)]^1$

The vector of desired samples are given by

$\underline{d}(n)=[d(n),d(n-1)\ldots\ldots d(n-L+1)]^T$

and e(n) is defined similarly. The problem of adaptive filtering. Now formulated as venture of finding the update for h(n) , at each time instant *n* , such that the error is made as small as possible

Note that X(n)h(n) can be written as

$$X(n)h(n)= \sum_{k=0}^{M-1} h_k(n)x_k(n-k)\text{---------}6$$

i.e. as a weighted sum of the columns of X(n) with the elements of h(n) being the weighting factors. A greedy algorithm for successively constructing (better) approximations to a vector given the usage of linear mixtures of vectors from a given set is the BMP algorithm. Inspired by this algorithm, we devise a technique for recursively building an approximation to d(n) the use of linear combos of the columns of X(n) .

B. Algorithm development

Assuming that we have an approximation to d (n -1) at Time n-1 given through X(n -1) h (n-1) , the approximation error at time n is

$$e(n)= d(n)- X(n)h(n-1) \text{.----------}8$$

In building a better approximation through the update of only one coefficient in h (n - 1), we would write the new error as

$$e_1(n)=\underline{d}(n)-(X(n)\underline{h}(n-1)+X(n)h(n))\text{---------}9$$

Note that j (n) is the index of the coefficient to be update in the zero'th P-iteration at time n , and u j is the M-vector with 1 in position j and 0 in all other positions. Intuitively, it would make feel to pick out j(n) as the index corresponding to that column of X(n) .The coefficient j(n) need to update. We pointed two methods to selecting j(n) : I) incrementing j(n) sequent through n Modulo M and II) deciding on j (n) in such a way as to Maximally reduce the residual of the corresponding update computation. Thus, in the FAPA, j(n) is determined as the index of the column of

X(n) onto which e(n) has its most projection, -or in different phrases.

$$h_{j_0(n)}(n) = h_{j_0(n)}(n-1) + h_{j_0(n)}(n) \text{ -----10}$$

where $h^{update}_{j_0(n)}(n)$ is the value of the projection of $\underline{e}_0(n)$ onto the unit vector with direction given by $\underline{x}_{j0(n)}(n)$,i.e.

$$h^{update}_{j_\circ(n)}(n) = \frac{<\underline{e}_\circ(n).\underline{x}_{j_\circ(n)}(n)>}{\left\|\underline{x}_{j_\circ(n)}(n)\right\|^2}. \text{ -----11}$$

Thus,the zero'th P-iteration updates the filter vector as follows:

$$h^{(0)}(n)=\underline{h}(n-1)+h^{update}_{j_0(n)}(n)\underline{u}_{j_0(n)} \text{ ---------12}$$

To have control on the convergence speed and stability of the algorithms, we introduce the step-size in the algorithm as following:

$$h^{(0)}(n)=\underline{h}(n-1)+\mu h^{update}_{j_0(n)}(n)\underline{u}_{j_0(n)} \text{ ---------13}$$

Given this, the updated error expression can be written as

$$e_1=d(n)-X(n)\, h^{(0)}(n)\text{----------14}$$

If we choose do greater than one P-iteration at time n, the process described above beginning with finding the maximum projection of e (n) onto a column of X(n) can be repeated with $e_1(n)$ taking the position of e(n) This can be repeated as many instants as desired, say P times, leading to a sequence of coefficient updates:

$$h_{j_0(n)}(n), h_{j_1(n)}(n) \ldots\ldots h_{j_{P-1}(n)}(n)$$

Note that if P>2 it is completely possible that one specific coefficient is updated extra than as soon as at a given time n. The ensuing filter coefficient vector after P iterations at time n is denoted h(P -1)(n) , but where there is no chance of ambiguity we shall refer to this filter vector truly as h(n).

The technique discussed above is to making use the BMP algorithm to a dictionary of vectors given by means of the columns of X(n) for the purpose of constructing an approximation to d(n). The solely distinction is that we do this for each new time instant n while maintaining the results of the BMP from the previous time instant n -1 . It is observed that an almost equivalent, process to the one described above would result if we tried to find the least squares solution to the over determined set of equations (remember L >M):

X(n)h(n)= d(n)

In the given initial solution, say h (n), we permitted to adjust one vector element only.

$$j_\circ(n) = \arg\max_j \frac{1}{\left\|x_j(n)\right\|}\left| <\underline{d}(n).\underline{x}_j(n)> - \sum_{k=\circ}^{M-1} h_k(n-1)<x_k(n).x_j(n)> \right|.$$

and

$$h^{update}_{j_\circ(n)}(n) = \frac{1}{\left\|\underline{x}_{j_\circ(n)}(n)\right\|^2}\{<\underline{d}(n).\underline{x}_{j_\circ(n)}(n)> - \sum_{k=\circ}^{M-1} h_k(n-1)<\underline{x}_k(n).\underline{x}_{j_\circ(n)}(n)>\}.$$

----------15 and 16

These are the pertinent equations if one coefficient update, i.e. one P-iteration is performed for each new signal sample. Note that having computed the terms of Eq. 15, very small additional work is involved in finding the update of Eq. 16. It is instructive to explicitly state these equations also for iteration

no. i > 0 at time n :

$$j_i(n) = \arg\max_j \frac{1}{\left\| \underline{x}_j(n) \right\|} \left| < \underline{d}(n), \underline{x}_j(n) > - \sum_{k=0}^{M-1} h_k^{(i-1)}(n) < \underline{x}_k(n), \underline{x}_j(n) > \right|$$

and

$$h_{j_i(n)}^{update}(n) = \frac{1}{\left\| \underline{x}_{j_i(n)}(n) \right\|^2} \{ < \underline{d}(n), \underline{x}_{j_i(n)}(n) > - \sum_{k=0}^{M-1} h_k^{(i-1)}(n) < \underline{x}_k(n), \underline{x}_{j_i(n)}(n) > \}$$

----------17 and 18

From these equations it is evident that some terms depend solely on n, i.e. they want to be computed once for each n and can consequence be used unchanged for all P-iterations at time n. Other terms depend on both n and the P-iteration index and ought to as a result be up to date for every P-iteration. Since, we must associate the update depending solely on n with generation no. 0, this is the computationally most costly update.

From the above section we can observe the prominent roles of inner products d(n),x(n) and x(n),xj(n) in computations. and these inner products are

$<\underline{d}(n),\underline{x}_j(n)>=<\underline{d}(n-1),\underline{x}_f(n-1)>+$
$d(n)x(n-j)-d(n-L)X(n-j-L)$

and

$<\underline{x}_k(n),\underline{x}_j(n)>=< <\underline{x}_k(n-1),\underline{x}_j(n-1)>$
$+x(n-k)x(n-j)-x(n-k-L)x(n-j-L)$

We close this section by pointing out that efficient Implementations of FEDS/FAP are available. With use of exponentially weighted and sliding window versions, implementations having a multiplicative complexity given by (5 +*P*) *M* can be devised. Multiplicative complexity of (3+ *P*) *M* are also possible by block exponentially weighted version.

IV. ADAPTIVE GAIN EQUALIZATION

The Adaptive Gain Equalization (AGE) approach for speech enhancement, introduced by Westerlund et al., [9] separates itself from the standard strategies of enhancing the SNR of a signal corrupted by using noise, via moving away from noise suppression and focusing in particular on speech boosting. Noise suppression traditionally, like spectral subtraction, appeared like subtracting an estimated noise bias from the signal corrupted with the aid of noise. Whereas speech boosting objectives to enhance the speech part of the signal with the aid of adding an estimate of the speech itself, for this reason boosting the speech part of the signal. The difference between noise suppression and speech boosting is introduced in Fig. 2(a) suggests a noise estimate being subtracted from a noise corrupted signal. While in Fig. 2. (b), an estimate of the speech signal is used to enhance the speech in the noise corrupted.

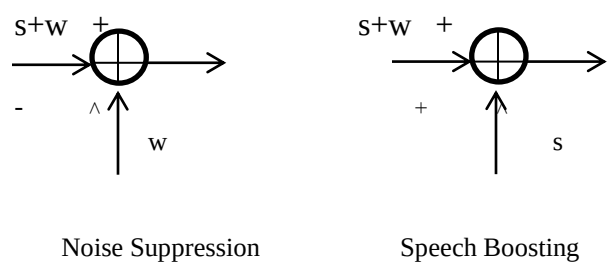


Fig. 2 Difference between Noise Suppression and Speech Boosting.

V. CONCEPT OF ADAPTIVE GAIN EQUALIZATION

The concept of obtaining a speech bias estimate to perform speech boosting might also appear like a daunting task. But it does no longer need to be, the AGE technique of speech enhancement depends on a few primary ideas. The first of which is that a speech signal which is corrupted by using band limited noise can be divided into a range of subbands and every of these subbands can be individually and adaptively boosted in accordance to a SNR estimate in that particular subbands.

In each subband, a short term average is calculated simultaneously with an estimate of a slowly various noise flooring level. By the usage of the short term average and flooring estimate, a obtain feature is calculated per subband through dividing the short term average by the aid of the flooring estimate. This achieve function is increased with the corresponding signal in each subband to form an output per subband. The sum of the outputs from every subband forms the last output signal, which need to include a greater SNR when in contrast to the authentic noisy signal.

The proposed technique of the AGE acts as a speech

booster, which is adaptively looking for a subband speech sign to boost. Fig.3 suggests this underlying notion in the back of the AGE. Outlining that speech energy is an exceedingly non stationary input amplitude excursion, if there is no such excursions no alteration to the subband will be performed, the AGE will remain idle, as a end result of the quotient between the short term magnitude average and the noise flooring estimate being unity, with them being about the same. If speech is current the short term magnitude average will change with the noise floor level approximately unchanged, therefore amplifying the signal in the subband at hand due to the quotient becoming larger than unity.

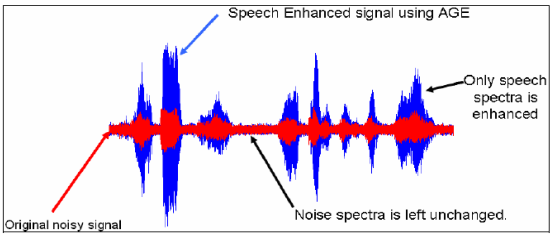


Fig. 3 Speech signal enhanced using AGE

VI. An Illustration of the Adaptive Gain Equalizer

The previous two section of the paper have outlined the fundamentals of the Adaptive Gain Equalizer is used in speech enhancement. To show the potential of using the AGE method a brief example will be demonstrated in this chapter. A speech signal which is corrupted by white noise is presented in Fig. 4.

The first step requires the signal to be filtered into number of subbands. In this example, number of subbands is chosen to be eight. The signal which is sampled at 16 KHz is filtered into eight subbands which are shown in the Fig. 5. From the Fig. 5, it is clear majority of speech is concentrated in first sub-

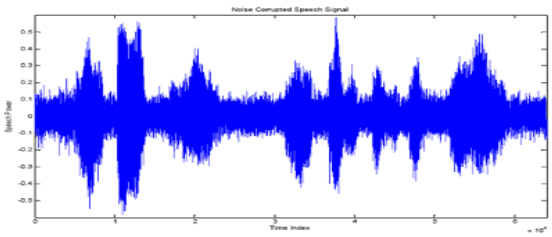


Fig. 4 Speech signal corrupted by white noise

bands, which is expected since human speech is generally assumed to be between 300 Hz and 3400 Hz and is expected to dominate in the subbands corresponding to this frequency range. Short term exponential magnitude average and noise floor is taken simultaneously and is shown in the Fig. 6. Using the short term exponential magnitude average and noise floor the gain is calculated, in this example the gain is limited to 5 dB and is displayed in Fig. 7. It is evident from Fig 7 that the AGE algorithm amplifies only the components of the signal which contain speech and remains idle when there is no speech component.

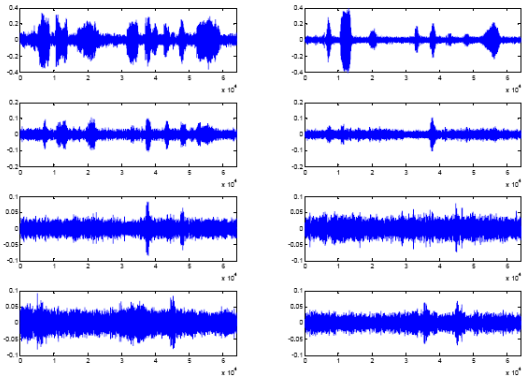


Fig.5 Speech signal corrupted by white noise and is filtered into eight subbands

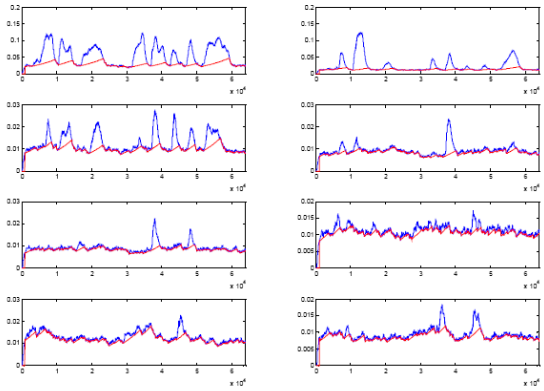


Fig. 6 Short term exponential magnitude average and noise floor per subband

The gain per subband is shown in Fig. 7 and is multiplied with its corresponding and then summed to form a speech enhanced signal and is shown in Fig. 8

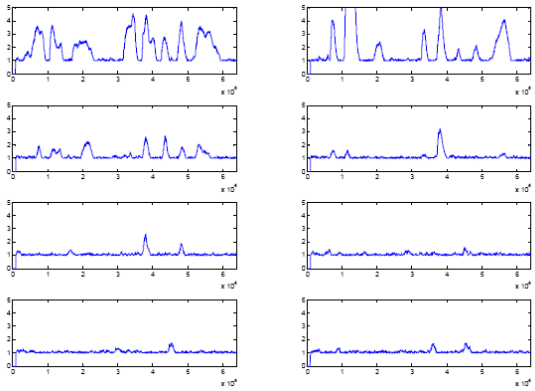


Fig. 7 Gain calculated per subband

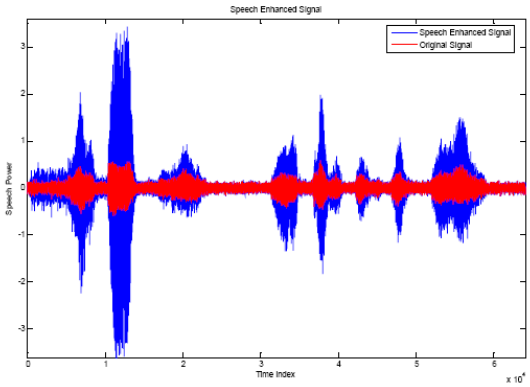


Fig. 8 Speech enhanced signal using 8 subbands.

VII. Nonlinear Spectral Subtraction

The basics of nonlinear spectral subtraction techniques (NSS) reside in the combination of two main ideas [10]:

• The noise-improvement model is used which is obtained in the course of a speech pause.

• The nonlinear subtraction is used when a frequency-dependent signal-to-noise ratio (SNR) is obtained. This means that in spectral subtraction a minimal subtraction factor is high SNR is used in turn.

VIII. Proposed Speech Enhancement Algorithm

AGE when coupled with Nonlinear Spectral Subtraction (AGE-NSS) performs better than AGE when SNR drops below -5db. The first step requires the signal to be filtered into number of subbands. In this paper, number of subbands is chosen to be eight. The signal which is sampled at 16 KHz is filtered into eight subbands. Nonlinear spectral subtraction is applied to each of the sub band. Short term exponential magnitude average and noise floor is taken simultaneously. Using the short term exponential magnitude average and noise floor the gain is calculated and it is multiplied with the spectra.

IX. Experimental Results

The order of the filter was once set to M=8. The parameter was once set to 0.002 in the LMS and 0.005 in the NLMS and AP algorithms. Fig. 4 shows the filtered output signal and the mean squared error (learning curve) in the LMS algorithm. The filtered signal SNR is calculated for this experiment. The SNR improvement (SNRI) is described as the original SNR subtracted from ultimate SNR. The SNRI in the LMS algorithm is 13.5905. Fig. 5, 6 indicates the effects for NLMS and AP algorithms. It is observed that the convergence speed in the NLMS and AP algorithms is faster than LMS algorithm. This reality can be observed in output of each filter and learning curve. For the NLMS and AP algorithms the SNRI are respectively 16.8679, 20.0307. In Figs. 7-8, we presented the results for FAP algorithm. The parameters was once set to L=25,P=8.

From result it is clear that FAP has faster convergence speed then LMS, NLMS and AP algorithms and comparable RLS algorithm.

TABLE II.SNR IMPROVEMENT IN DB

Algorithm	SNRI (db)
LMS	13.5905
NLMS	16.8679
APA	20.0307
FEDS	22.2623
FAPA	24.9078
RLS	29.7355

in the training phase, the uttered words are recorded the usage of 8-bit pulse code modulation (PCM) with a sampling rate of 8 KHz and saved as a wave file the usage of sound recorder software. The Automatic speech recognition systems work fairly properly under smooth stipulations but end up fragile in practical application involving real-world environments. Table shows the recognition performance achieved by the AGE and AGE-NSS were compared.

TABLE III. AVERAGE WORD ACCURACY

SNR in db	AGE	AGE-NSS	% of Improvement
5	41.5	50.75	18.23
0	35.5	41.25	13.94
-5	30.25	36.25	16.55
10	21.75	29.5	26.27
Average	32.25	39.4375	18.22

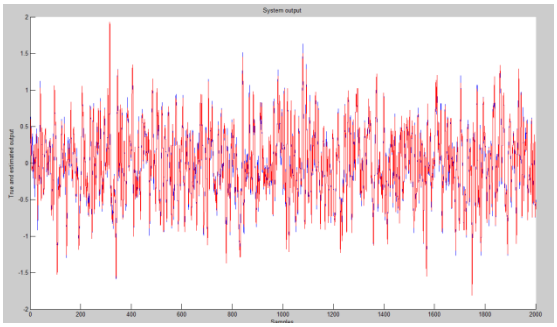
X. CONCLUSION

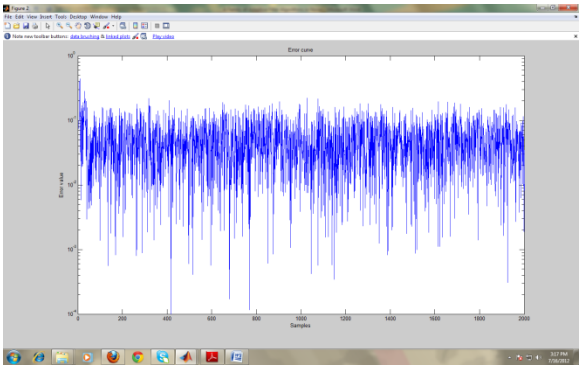
In this paper the adaptive noise cancellation set up imposed by FEDS and FAP algorithms. The results compared with the LMS, NLMS, AP and RLS algorithms, for attenuating noise in speech signals. From the simulation results it is observed that convergence rate of these algorithms is similar with the RLS algorithm. Also, the most effective values of the FEDS and FAP algorithms were calculated by experiments. In these algorithms, the huge range of iterations to be performed at every new sample time is a user selected parameter giving rise to attractive and explicit tradeoffs between convergence/tracking properties and computational complexity.

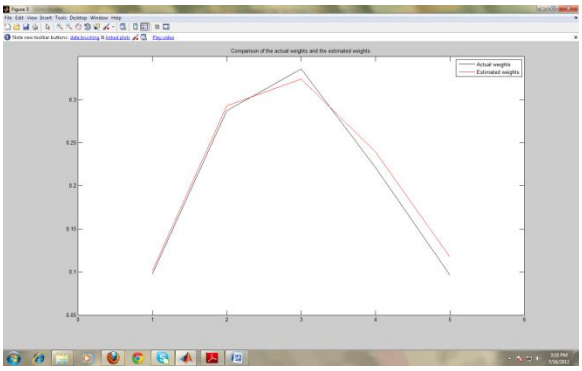
We have proposed a method for combining the Adaptive Gain Equalizer method and Nonlinear Spectral Subtraction, so that improved speech recognition accuracy overall performance also obtained under these noise conditions. Comparative experimental outcomes are shown in the figure through Fig. 8. to Fig. 11 against AGE & AGE-NSS, the speech recognition accuracy for AGE-NSS performs better that AGE for all cases.

Results:

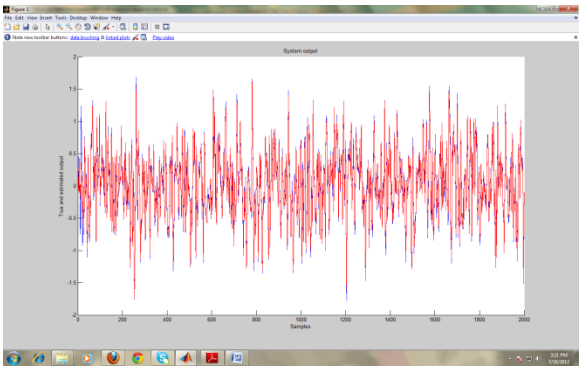
LMS algorithm:

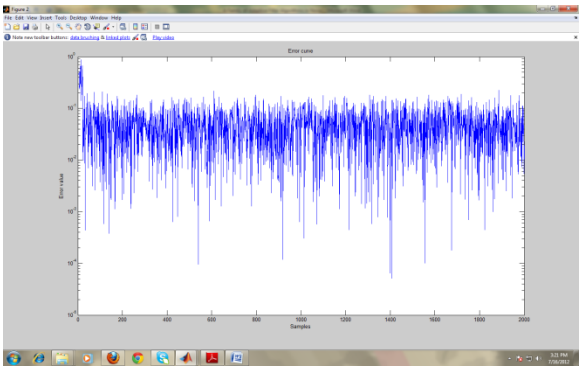


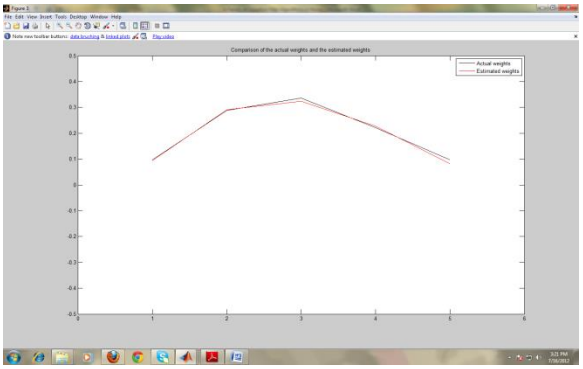


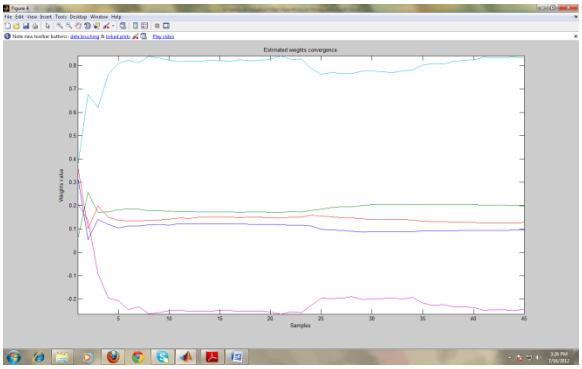


NLMS algorithm:

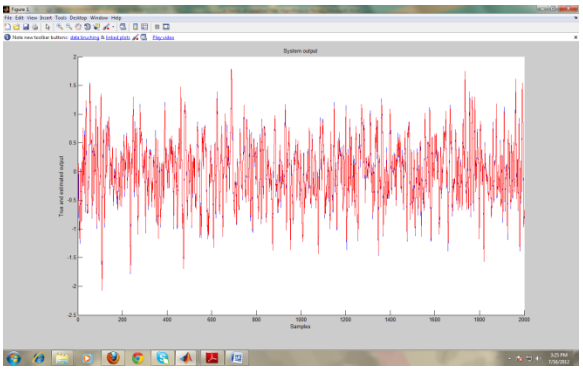


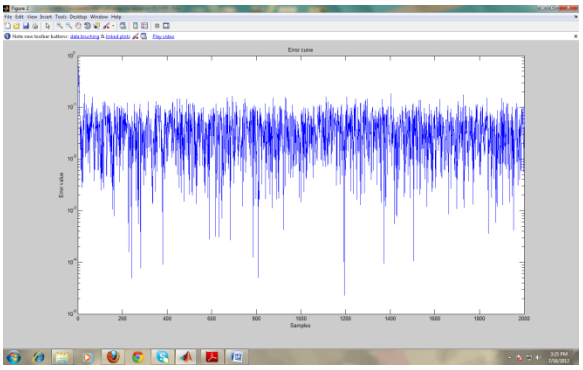


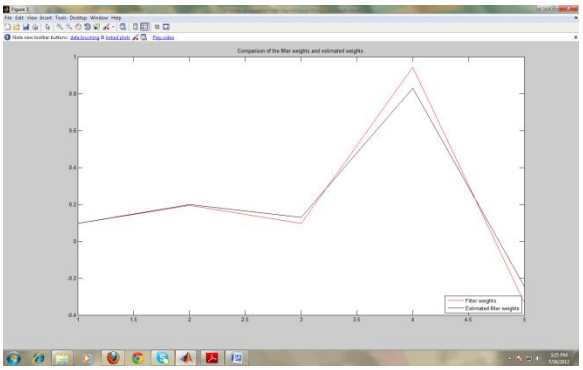




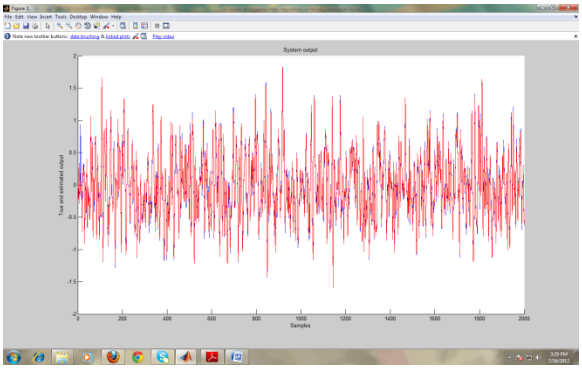
IIR-RLS algorithm:

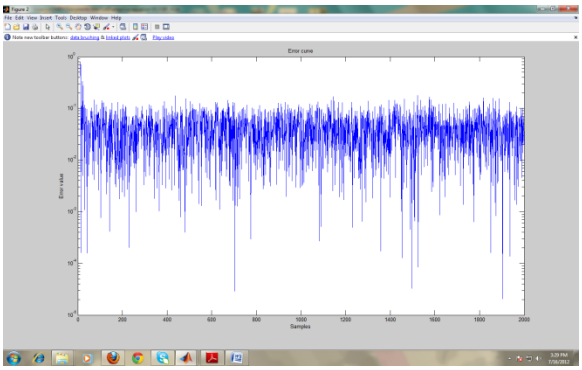


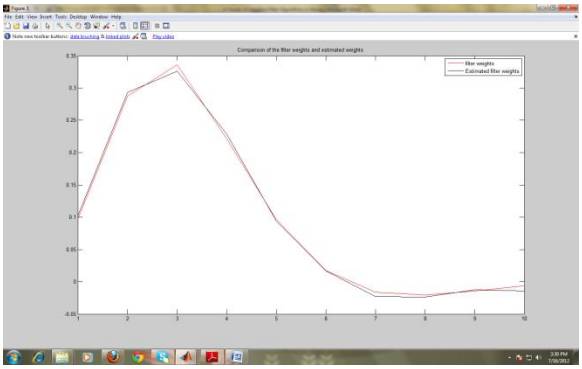


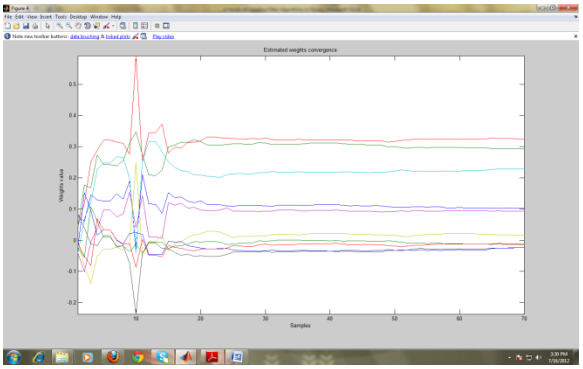


FIR-RLS algorithm:

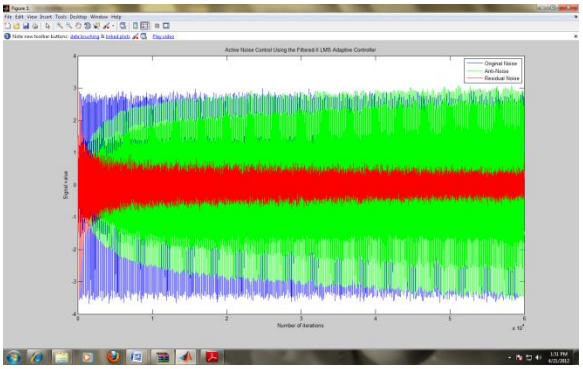




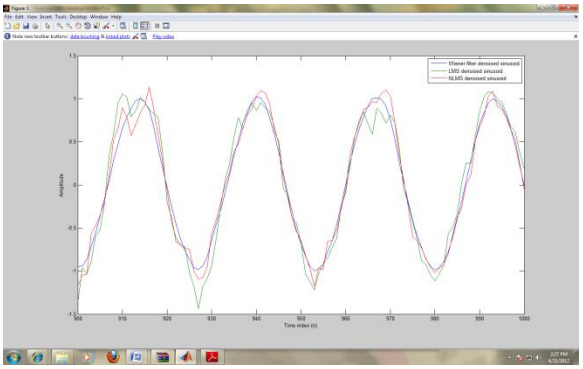




Active Noise Control using the filtered-X LMS Algorithm



Adaptive Filters comparison



Kalman Recursive Least Squares Algorithm

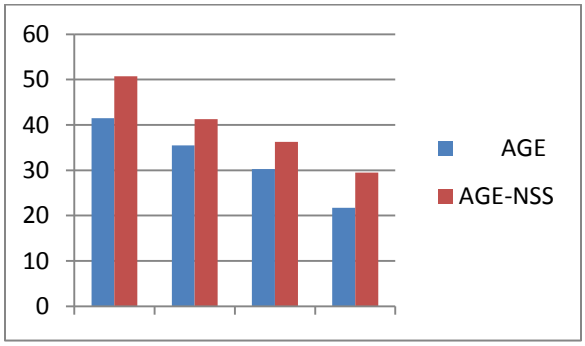


Fig. 8 Babble Noise added with speech signal

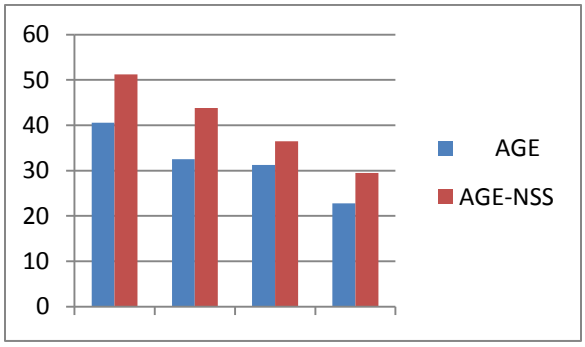


Fig. 9 Gun Noise added with speech signal

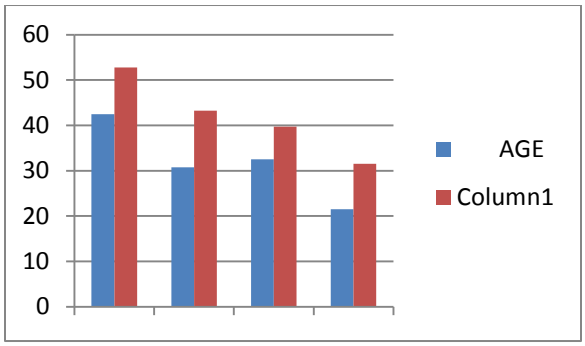


Fig. 10 Leopard Noise added with speech signal

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Congestion Management Considering Economic and Efficient Generation Rescheduling

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Abstract:-- **Increasing interconnections and usage of power networks makes the system to work at almost full loading capacities. Any type of disturbance in such scenario results in congestion of the existing network. This condition, if not managed within required time may result in system collapse. This paper presents a simple and economic transmission line overload alleviation method that is very much required in day-to-day operation and control of power systems. This method of managing the congestion aims primarily at improving the voltage stability of the system while relieving the overload and does this economically to the possible extent. Relative Electrical Distances (RED) between the loads and generators is the criterion for relieving the overload in a transmission line, by rescheduling the generation. The process of rescheduling is done economically by making use of fuzzy logic considering the incremental fuel costs of the generators. This method is illustrated using IEEE 39-node New England system and a real-life system, 75-node North Indian power system**

Index Terms—Congestion management, Generation rescheduling, Voltage stability, Fuzzy Logic

INTRODUCTION

Congestion management is an important technical challenge in power system operation. The electric power market background makes the operation of system further complicated. The congestion management problem can be devised as the emerging problem that needs to be concentrated much in order to supply power to the consumers in most reliable manner. The economical operation of power system is also of much concern during this process.

Addressing of various power flow control issues is made more complex and difficult than ever before because of competition and leads to several techno economical disputes. Several algorithms based on conventional optimization techniques are reported in the literature [1-4] in this regard. When congestion occurs in a deregulated power system, generation has to be rescheduled to ensure system security. Zheng and Chowdhury [1] and Lobato et al. [2] have described optimization methods to analyze and solve the transmission overloads.

B.K. Panigrahi and V. Ravikumar Pandi [3] proposed a new optimization approach, to solve the congestion management using bacterial foraging (BF) optimization technique. The multi objective framework to minimize both generation cost and line overload index is given by Sinha A.K. et al. [4]. However, these conventional optimization techniques are generally time-consuming from a computation point of view, especially for large systems. Hence, these methods are not suitable for improving the system security under emergency operating conditions.

For on-line applications, there is a need for tools which can quickly detect potentially dangerous situations of congestion in transmission lines and voltage instability problems in order to provide guidance to the operators to steer the system away from cascade tripping and a possible voltage collapse. Hence, efforts to improve the speed and ability to handle stressed power systems have led to the development of artificial intelligent techniques like Fuzzy logic and Expert systems [5, 6], which may be appropriate for assisting dispatchers in Energy Control Centre. By using Operational Load Flow, Bansilal D. Thukaram and K. Parthasarathy [5] presented an expert system for alleviation of network over loads using phase shifting transformers and generation rescheduling. A. N. Udupa et al. [6] presented a fuzzy control approach for alleviation of network overloads using Generation Shift Sensitivity Factor (GSSF). These methods are well suited for vertically integrated power systems. Kothari et al. [7] presented reviews on congestion management issues in the deregulated electricity markets. Under emergency conditions the operator has to make quick decisions, with little concern for the theoretical optimality of the operating point. In this context, an efficient and simplified approach has been proposed based on RED concept in [8]. However, economics of generators is not considered here.

Congestion management is one of the major tasks performed by system operators (SOs) to ensure the operation of transmission system within operating limits.

Generation rescheduling is one of the mostly used methods for the same purpose, it being simple and non-expensive. This paper proposes congestion management technique utilizing RED concept and incremental fuel cost of rescheduling generators using Fuzzy logic. This results in minimum number of generators for rescheduling and less cost involved in the rescheduling process.

The scheme of work in the paper is organized as follows. The basis of generation rescheduling, Relative Electrical Distances (RED) concept is explained in section II. The task of congestion management is illustrated using three different approaches: I, II & III here. Management of congestion by rescheduling generation is implemented using only RED based method in Approach-I. Economics of rescheduling is not considered in this approach. In Approach-II, the economics of rescheduling the generators is considered by making use of their incremental fuel costs alone. So the effect of rescheduling only economically, neglecting the desirable proportions, is dealt in this approach. Approach-III, the proposed method, deals with rescheduling process using fuzzy logic, which considers both incremental fuel cost and desired proportion of generations, D_{LG}, as suggested by RED method. A comparison of all three approaches is presented for the considered test systems.

BASIS FOR GENERATION RESCHEDULING - RED

Consider a system where n is the total number of buses with 1,2,……g; g is the number of generator buses, and g+1,……n are remaining (n-g) buses.

For a given system we can write,

$$\begin{bmatrix} I_G \\ I_L \end{bmatrix} = \begin{bmatrix} Y_{GG} & Y_{GL} \\ Y_{LG} & Y_{LL} \end{bmatrix} \begin{bmatrix} V_G \\ V_L \end{bmatrix}$$

(1)

Where, I_G, I_L, and V_G, V_L represent complex current and voltage vectors at the generator nodes and load nodes. $[Y_{GG}]$, $[Y_{GL}]$, $[Y_{LL}]$, $[Y_{LG}]$ are corresponding partitioned portions of network Y-bus matrix. Rearranging (1) we get

$$\begin{bmatrix} V_L \\ I_G \end{bmatrix} = \begin{bmatrix} Z_{LL} & F_{LG} \\ K_{GL} & Y_{GG} \end{bmatrix} \begin{bmatrix} I_L \\ V_G \end{bmatrix}$$

(2)

Where, $F_{LG} = - [Y_{LL}] -1 [Y_{LG}]$.

The elements of $[F_{LG}]$ matrix are complex and its columns correspond to the generator bus numbers and rows correspond to the load bus numbers. Relative Electrical Distance (RED) is the relative location of load nodes with respect to generator nodes, and is obtained from $[F_{LG}]$ matrix.

$$[R_{LG}] = [A] - abs\{[F_{LG}]\}$$

(3)

Where, [A] is the matrix with (n-g) number of rows and g number of columns, with all elements equal to 1.

The desired proportions of generators for desired load sharing is also obtained from $[F_{LG}]$ matrix, and is given by

$$[D_{LG}] = abs\{[F_{LG}]\}$$

(4)

$[D_{LG}]$ matrix gives the information, for each load bus, about the amount of power that should be taken from each generator under normal and network contingencies, as far as the system performance is considered with respect to the voltage profiles, bus angles and voltage stability L-index. This matrix is used as the basis for the desired generation scheduling. If each consumer takes the power from each generator according to the $[D_{LG}]$ matrix the system will have minimum transmission loss, minimum angle separation between generator buses and minimum L-indices.

The methodology used for relieving congestion in case of any contingency can be explained as follows. For a particular operating condition, Congested transmission lines (over loaded lines) are identified and the contribution of each generator to the congested line is estimated [9]. Among all the generators, those which are contributing to the congested line(generators that have a share in the flow of overloaded line) are identified as Generation Decrease group (GD group).This is the group where generation decrease is recommended to relieve the overloaded line ;And the generators which are not contributing to the congested line (generators that do not have a share in the flow of overloaded line) are categorized under Generation Increase group (GI group). This is the group where generation increase is recommended.

At any instant of time, total generation change in GD group must be same as the total generation change in the GI group. The amount of generation change required to relieve the congestion of the mostly congested line is estimated. Then the total amount of required capacity change is shared by the generators of the GD group in proportion to the margins available on these generators. Here, the margins of the generators of GD group are estimated based on D_{LG} matrix. The same amount of generation change is to be met from the generators of GI group to avoid load shedding.

ECONOMIC GENERATION RESCHEDULING USING FUZZY LOGIC (PROPOSED APPROACH)

Generation rescheduling in this method is done

economically using Incremental fuel costs and efficiently using D_{LG} values of RED method. Fuzzy Logic is used to obtain an optimal scheduling value, utilizing both the above-mentioned methods. Instead of selecting all the generators of GI group for rescheduling, Fuzzy Inference System (FIS) helps in selecting only few generators, thereby, the time involved in changing the settings of generators is reduced in case of an emergency situation. The method is explained as follows.

Since these congestion management studies are first performed offline, all the contingencies are simulated at varying load conditions and the probable schedules of the generators are calculated beforehand, so that they might be of use under emergency operating conditions. If in any case, the then operating condition of system does not match with the conditions available offline, then algorithm may be followed.

Algorithm for proposed Approach

Step 1: The solution of the load flows of the system, or the status obtained from the state estimator gives the picture of the system regarding voltages and power flows. If any transmission line is overloaded, proceed to the next step, otherwise stop.

Step 2: Based on RED concept, form the F_{LG} and D_{LG} matrices. The elements of D_{LG} matrix corresponding to the overloaded line give the estimate of desired generation from all the generators. The line with highest overload is considered in case of multiple line overloads.

Step 3: Find the contribution of each generator towards this highly overloaded line.

Step 4: Split up the generators into two groups, GD group consisting of generators which actually contribute to the overloaded line, and GI group consisting of non-contributing generators.

Step 5: Estimate the margin available on each contributing generator using D_{LG} matrix.

Step 6: Estimate the required generation decrease ΔP^- to relieve the congestion using the actual contributions of generators in the congested line.

Step 7: The total power ΔP^- of all generators of GD group together constitute the rescheduling amount of power

Step 8: For distribution of the rescheduling amount of power among GI group of generators, D_{LG} coefficients and incremental fuel costs of generators of this group are given as inputs to the Fuzzy Inference System (FIS).

Step 9: These generators are assigned a priority by the FIS, based on which the rescheduling power is allotted. Generator with highest priority is first assigned additional power depending on the margin available on it.

Step 10: The remaining power is allotted to generator with next priority considering its margin. This results in allotting the reschedule amount of power to few generators only.

Step 11: After distributing total ΔP among few GI group generators, perform the operational load flow and check if congestion is relieved. If congestion still persists on the overloaded line or other lines, go back to step 2.

Fuzzy Inference System (FIS)

Fuzzy inference is the process of formulating the mapping from a given input to an output using fuzzy logic. The mapping then provides a basis from which decisions can be made, or patterns discerned. As the present approach concentrates both on RED concept and incremental fuel cost, both these factors are considered as inputs for FIS in order to reschedule the power generation among the non-contributing generators to the congested line.

The inputs required for the FIS are

1. Elements of D_{LG} matrix
2. Incremental fuel costs of the generators

Elements of D_{LG} matrix, referred to as D_{LG} coefficients of the generators indicate the Relative Electrical Distance of the generator with respect to the overloaded line, and hence provide an index of how much power it can contribute so that the system parameters like real power loss and voltage stability indices are improved. FIS is designed such that the order of rescheduling of generators is decided by a combination of D_{LG} coefficient of a generator and its incremental fuel cost. Hence, the output variable of FIS is priority of the generator; this priority is set to be high for a generator whose D_{LG} coefficient is high and incremental fuel cost is reasonably low. The priority of a generator ranges from 0 to 1, where 0 indicates the lowest priority and 1 indicates highest. The amount of power to be re-allotted to a particular generator will depend on its priority and the margin available on it to accommodate any additional generation (considering the reactive limits also). Thereby, only some generators of GI group are selected for rescheduling process and the remaining generators are left without disturbing their generation. As a result, the number of generators of GI group to be rescheduled is reduced and also the additional time and cost incurred for overload relieving is also reduced.

Membership Functions and Rule Base of FIS

First input variable, D_{LG} coefficient is categorized into five membership functions namely, Very Low Contribution (VLCn); Low Contribution (LCn); Medium Contribution (MCn); High Contribution (HCn) and Very High Contribution (VHCn). Similarly, the other input

variable, Incremental fuel cost is also categorized into five membership functions namely, Very Low Cost (VL); Low Cost (L); Medium Cost (M); High Cost (H) and Very High Cost (VH). Similarly, Output of the FIS, Priority of the generator also consists of five membership functions, namely, Very Less Priority (P5); Less Priority (P4); Medium Priority (P3); High Priority (H2) and Very High Priority (P1). All the membership functions, as shown in Fig.1 are considered to be triangular in nature in order to have an even distribution of variables throughout the range.

A fuzzy rule base is developed to select the generators to be rescheduled on a priority-based order as given in Table I. These rules can be explained as follows. P1 through P5 are the priorities assigned to the generators, where, P1 corresponds to highest priority with value of 1; and P5 corresponds to least priority with a value of 0.

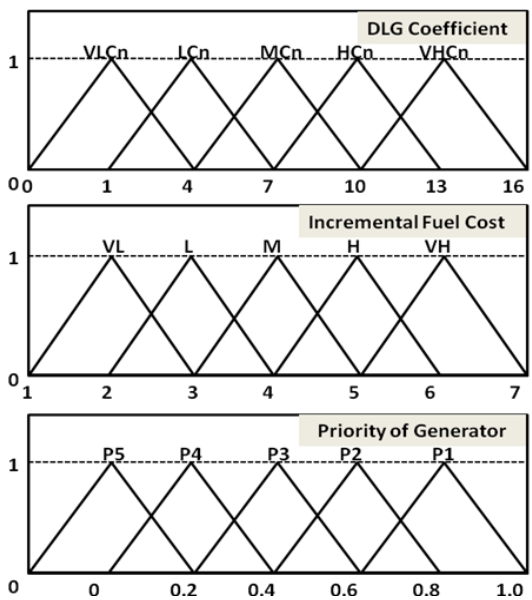

Fig.1. Membership functions of input and output variables

Fuzzy rules are similar to the general {If (..),then (..)} rules. One of the rules can be explained as follows.

"If D_{LG} coefficient of a generator is VHCn, and the Incremental Fuel cost is VL, then priority assigned is P1."

Similarly, 25 rules are framed in the proposed approach. The two inputs of FIS are combined using 'and' clause.

Table I. Fuzzy rule base

		Incremental Fuel cost				
		VL	**L**	**M**	**H**	**VH**
D_{LG} Coefficient	**VLCn**	P4	P4	P4	P5	P5
	LCn	P3	P3	P4	P4	P5
	MCn	P2	P2	P3	P4	P4
	HCn	P1	P2	P2	P3	P4
	VHCn	P1	P1	P2	P3	P4

CASE STUDIES

RED based congestion management method has been illustrated on IEEE 39-node New England System. The IEEE 39-node system is a simplified representation of the 345kV transmission system in the New England region having 10 generators and 29 load nodes as shown in Fig. 2.

The congestion in the system is simulated through a line outage which results in overloading of a nearby transmission line. This overload in the line is first relieved using Approach-I. For IEEE 39-node New England system, an example is illustrated to explain the congestion management procedure. As a consequence of line L10-13outage, the line L5-6 is overloaded, the flow being 726.1 MVA (flow limit is 500 MVA). From the contributions [10], it has been observed that flow in this overloaded line is actually contributed by generators G31 and G32 with percentages 55.8 and 44.2 respectively. Hence these two generators belong to GD group and remaining eight generators belong to GI group. Actual contributions of all the generators to the congested line as per D_{LG} matrix based on RED concept are indicated in Table II.

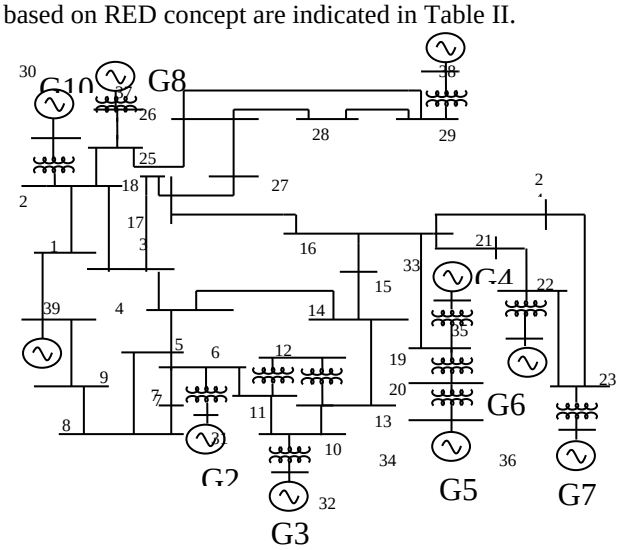

Fig 2. IEEE 39-node system

Margin available at G31 is (36.7-55.8) = -19.1%

Margin available at G32 is (29.1-44.2) = -15.1%.

The amount of generation decrease recommended at these two generators is in proportion to their margins.

By changing the generation at G31, 128.3 MVA can be relived and at G32, 99.0 MVA in the overloaded line can be relived.

Amount of generation decrease suggested at

G31 is ΔP31- = 128.3/0.558 = 230.0 MW.

G32 is ΔP32- = 99.0/0.442 = 224.0 MW.

The total Generation decrease for the GD group is (230+224) =454 MW.

Generators in GI group are allotted with rescheduling power in the ratio of their D_{LG} values.

The Generation rescheduling is as follows:

ΔP30+=71 MW ΔP33+=47 MW ΔP34+=21 MW

ΔP35+=49 MW ΔP36+=27 MW ΔP37+=42 MW

ΔP38+=26 MW ΔP39+=173 MW

ΔP31-= 230 MW ΔP32-= 224 MW

The generation to be rescheduled is as follows in the case of Approach-II, where only incremental fuel costs of the generator are considered.

ΔP36+ = 140 MW ΔP39+ = 200 MW

ΔP30+ = 114MW

ΔP31- = 230MW ΔP32- = 224MW

Table II. D_{LG} values of the overloaded line

G30	G31	G32	G33	G34	G35	G36	G37	G38	G39
6.5	**36.7**	**29.1**	**4.3**	**1.9**	**4.5**	**2.5**	**3.8**	**2.4**	**15.9**

In the proposed approach, priority of each generator is estimated as indicated in Table III from the output of the FIS. Based on the priority values, all the generators of GI group are ranked. The output of the FIS is the priority of the generators in the GI group ranging from 0 to 1, where 0 indicates the lowest priority and 1 indicates the highest.

The amount of generation decrease suggested at GD group generators (G31 and G32) is 230 MW and 224 MW respectively. Hence, the total amount of power to be rescheduled is 454 MW. All this power is to be allotted to the generators of GI group. Out of all the generators of GI group, G39 has the highest priority and the margin available on this generator is 200 MW. Out of 454 MW, 200 MW is allotted to G39. The generator of next highest priority is G30. Since the margin available is 250 MW, of the remaining power 250 MW is allotted to G30. Since some amount of power has to be allotted yet, the generator with next priority, G36 is allotted 4 MW. So with this proposed fuzzy logic approach the new generation scheduling is as follows

ΔP31- = 230 MW, ΔP32- = 224 MW

ΔP39+ = 200MW, ΔP30+ = 250 MW,

ΔP36+ = 4MW

Table III. Priorities of GI group generators of IEEE 39-node system

GI group Generators	Priority (obtained using FIS)	Rank of Generator (Based on Priority)
G30	0.44	2
G33	0.228	4
G34	0.087	8
G35	0.196	6
G36	0.300	3
G37	0.199	5
G38	0.170	7
G39	0.700	1

Table IV. Performance parameters of IEEE 39-node system

System Performance parameter	Pre-Rescheduling Flow	Rescheduling based on RED (Approach-I)	Rescheduling based on Economy (Approach-II)	Rescheduling based on FLC (Approach-III)
Flow in congested line 5-6 (MVA)	726.1 (145%)	443.1 (89%)	443.9 (89%)	442.3 (88%)
Ploss (MW)	46.33	49.99	46.64	43.66
Vmin (pu)	0.982	0.982	0.982	0.982
Max (Li)	0.1108	0.1040	0.1038	0.1049
Σ L2	0.1457	0.1411	0.1404	0.1402
ve	0.0305	0.0295	0.0296	0.0311
No.of generators rescheduled	--	10	5	5
Cost of Rescheduling of GI group generators ($/h)	--	54.87	20.18	20.70

From the above Table, it is clear that generation rescheduling in all the three approaches leads to relieving congestion of the overloaded line. These results indicate that the voltage stability improvement is much better with first approach, however this approach is not acceptable as it is expensive. The second approach that is aimed at economic rescheduling of generators results in less cost of rescheduling as the number of generators considered has been reduced. The proposed Fuzzy logic-based approach provides the more optimal solution, the power losses are least, voltage stability improvement is observed and the

cost of rescheduling is also almost as minimum as possible, similar to second approach.

From this analysis, it is obvious that the number of generator settings to be adjusted is reduced and the cost involved in doing so is also decreased inherently. The proposed approach not only improves the system security but also reduces the rescheduling cost of the generators of the GI group. Hence, this approach is most appropriate one for implementing in Energy Control Centre during emergencies.

The above results obtained from the proposed approach are compared with the results in Reference [8]. The outage of line 4-14 is considered to observe the rescheduling effect of mitigating congestion in the line 5-6. The results [9] of comparison are listed in Table V. It can be observed that the main objective of reducing the congestion in the overloaded line is achieved along with the added advantage of reduced number of generators adjustment for rescheduling and reduced cost of rescheduling.

Table V. Comparison results of proposed approach with Reference [8]

Parameter	Reference [8]	Proposed Approach
Flow in line 5-6 after rescheduling	511.8 MVA (102.4%)	494.6 MVA (99%)
Number of Generators for rescheduling	10	4
Cost of Rescheduling	39.46 $/MWhr	11.40 $/MWhr
Power loss	58.0 MW	54.6 MW
ΣL^2	0.7259	0.7246
Ve	0.0331	0.0339

Similar analysis is also summarized for a real 75-node North Indian power system. 75-node Indian power system corresponds to Uttar Pradesh State Electricity Board (UPSEB) system, shown in Fig.3. It has 15 generators, 60 load points and 98 transmission lines (including 24 transformers).

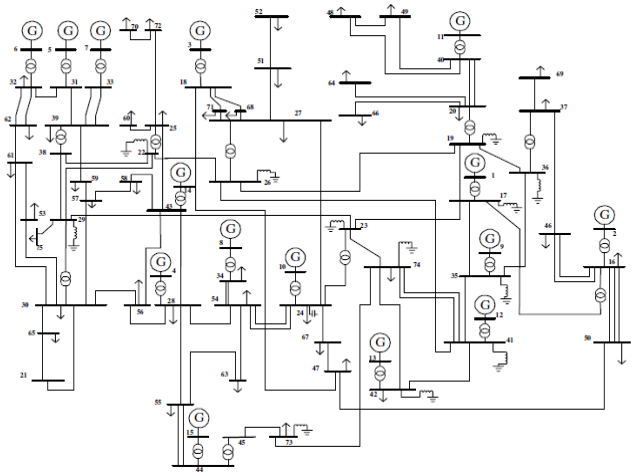

Fig.3. 75-node Indian Utility system

In order to illustrate the efficiency of the proposed method, the line connecting the buses 15 and 23 is considered for outage. This results in overloading of the line connecting 23 and 24 buses. The D_{LG} coefficients of all generators with respect to this overloaded line along with priority of all generators of GI group obtained using FIS are presented in Table VI . The results of rescheduling are illustrated in Table VII.

Table VI. D_{LG} values and Priorities of GI group generators of 75-node system

GI group Generators	D_{LG} values	Priority (obtained using FIS)	Rank of Generator (Based on Priority)
G2	10.7	0.221	12
G3	3.4	0.511	4
G4	9.2	0.343	6
G5	3.4	0.300	8
G6	2.7	0.225	11
G7	1.3	0.300	7
G8	1.5	0.260	10
G9	2.4	0.408	5
G10	7.2	0.525	2
G11	12.8	0.300	9
G14	2.4	0.554	1
G15	2.6	0.525	3

Table VII. Performance parameters of 24-node system

System Performance parameter	Pre Rescheduling	Rescheduling based on RED	Rescheduling based on Economy	Rescheduling based on FLC based economy
Flow in congested line (23-24) (MVA)	679.2 (133%)	582.4 (114%)	597.9 (117%)	567.1 (111%)

P loss (MW)	210.7	166.6	161.1	165.8
Vmin (pu)	0.918	0.936	0.937	0.937
Max (Li)	0.6716	0.5748	0.5489	0.5674
Σ L2	6.437	4.648	4.189	4.681
Ve	0.0655	0.0998	0.1093	0.1005
No. of generators rescheduled	--	15	8	8
Cost of Rescheduling of generators ($/h)	--	82.41	32.61	34.96

CONCLUSION

The objective of an energy control centre is to ensure secure and economic operation of power system. In this connection, three approaches for congestion relieving are discussed in this paper. Approach I based on RED concept not only relieves the congestion but also improves the voltage security and reduces the system power loss. But, the incremental fuel cost incurred is very high in the approach. To overcome this, an Approach II based on incremental fuel cost of generators has been explained. This Approach II is acceptable from economics point of view, but in terms of voltage security and loss reduction this approach is not advisable. Hence, an Approach III, based on RED and economic operation, using fuzzy logic is proposed in this paper. This approach not only improves the voltage security and loss reduction but also the solution obtained is economical. Finally, an attempt has been made for curtailing the number of generators to be rescheduled for congestion relieving. The results obtained on the considered test systems and practical systems reveal that the proposed approach is most appropriate one for implementing in Energy Control Centre for security and economy-oriented power system operation under present day deregulated environment.

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Genotype Coherence Detection and Classification

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Abstract:-- **A fundamental problem in human health is the inference of disease-causing genes, with important applications to diagnosis and treatment. Previous work in this direction relied on the knowledge of multiple loci associated with the disease, or causal genes for similar diseases, which limited its applicability. Here we present a new approach to causal gene prediction that is based on integrating protein-protein interaction network data with gene expression data under a condition of interest. The latter is used to derive a set of disease-related genes which is assumed to be in close proximity in the network to the causal genes. Our method applies a set-cover-like heuristic to identify a small set of genes that best "cover" the disease-related genes. We perform comprehensive simulations to validate our method and test its robustness to noise. In addition, we validate our method on real gene expression data and on gene specific knockouts. Finally, we apply it to suggest possible genes that are involved in myasthenia gravis.**

I. INTRODUCTION

The diseased gene identifying based on a network of interconnected proteins. Identifying disease genes from the human genome is an important and fundamental problem in biomedical research. Despite many publications of machine learning methods applied to discover new disease genes, it still remains a challenge because of the pleiotropy of genes, the limited number of confirmed disease genes among the whole genome and the genetic heterogeneity of diseases. The past two decades have witnessed an explosion in the identification, largely by positional cloning, of genes associated with Mendelian diseases. The roughly 1,200 genes that have been characterized have clarified our understanding of the molecular basis of human genetic disease. The principles derived from these successes should be applied now to strategies aimed at finding the considerably more elusive genes that underlie complex disease phenotypes. Typically, with these features available, a method for prioritizing disease genes computes a score quantifying the association between a gene and a disease, and then uses the computed scores to rank the candidates and select plausible susceptibility genes. However, various factors, such as the pleiotropy of genes, the interactions among genes, the genetic heterogeneity of diseases, and the ambiguous boundary between different diseases, as well as the incompleteness and false-positive data sources, might prevent the direct inference of single gene-disease association. We show that the correlation between phenotype similarities and gene closeness, defined by the concordance score, is a strong and robust predictor of disease genes. With the use of this score, we propose a new method, CIPHER to prioritize candidate genes and to explore gene cooperative behavior in human disease.

If we know something about the relationships between the genes, we can assess whether some genes (which may reside in different loci) functionally interact with each other, indicating a joint basis for the disease ethology. There are various repositories of information on pathway relationships. To consolidate this information, we developed a functional human gene network that integrates information on genes and the functional relationships between genes.

II. RELATED WORK

A method for prediction of disease-relevant human genes from the phenotypic appearance of a query disease is presented. Diseases of known genetic origin are clustered according to their phenotypic similarity. Each cluster entry consists of a disease and its underlying disease gene. Potential disease genes from the human genome are scored by their functional similarity to known disease genes in these clusters, which are phenotypically similar to the query disease. [8]

One of the major promises is that these advances will lead to personalized medicine, in which preventive and therapeutic interventions for complex diseases are tailored to individuals based on their genetic profiles. Personalized medicine already exists for monogenetic disorders such as Huntington disease, phenylketonuria (PKU) and hereditary forms of cancer, in which genetic testing is the basis for informing individuals about their future health status and for deciding upon specific, often radical interventions such as lifetime dietary restrictions and preventive surgery. Yet, the ethology of complex diseases is essentially different from that of monogenic diseases, and hence translating the new emerging genomic knowledge into public health and medical care is one of the major challenges for the next decades. [5] A network of disorders and disease genes linked by known disorder-gene associations offers a

platform to explore in a single graph-theoretic framework all known phenotype and disease gene associations, indicating the common genetic origin of many diseases. Genes associated with similar disorders show both higher likelihood of physical interactions between their products and higher expression profiling similarity for their transcripts, supporting the existence of distinct disease-specific functional modules. We find those essential human genes are likely to encode hub proteins and are expressed widely in most tissues. This suggests that disease genes also would play a central role in human interaction [10] Here we present a new approach to causal gene prediction that is based on integrating protein-protein interaction network data with gene expression data under a condition of interest. The latter is used to derive a set of disease-related genes which is assumed to be in close proximity in the network to the causal genes. Our method applies a set-cover-like heuristic to identify a small set of genes that best "cover" the disease-related genes. We perform comprehensive simulations to validate our method and test its robustness to noise. In addition, we validate our method on real gene expression data and on gene-specific knockouts [7] Here the gene-gene relations are extracted by taking a hybrid approach which is a combination of syntactic analysis and co-occurrence-based approaches. Specifically, we perform the syntactic parsing on the text and then, Keywords - gene ranking; text-mining; relation extraction; disease-related genes; microarray data analysis. within each clause of the parsed sentence, the co-occurred gene names are considered to be mutually related. Both the gene network derived from the gene-gene relations obtained in the above way and the gene expression scores is given as the inputs to the Gene Rank algorithm. [6]

III. PROPOSED WORK

In this section, we will see the proposed work and process flow to do Genotype Coherence Detection. The System Model has been depicted in Fig. 1.

Data sets:

The project requires datasets containing data on phenotypes, corresponding gene-phenotype and protein-protein interactions (PPI). The phenotypes and gene-phenotype data sets are obtained from OMIM database present in www.omim.org. The OMIM database is an authorized database consisting of 5206 known phenotypes and 7356 known genes and is being updated through medical research.

The PPI dataset is obtained from HPRD database from www.hprd.org. The HPRD database consists of 34,364 manually curated PPIs between 8919 human proteins.

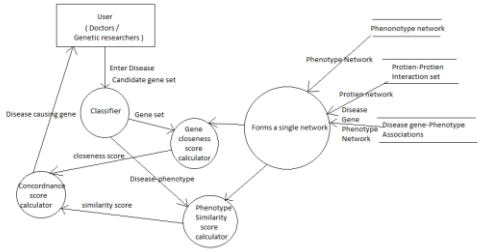

Fig.1: Gene Coherence Detection

Proposed Training Method

Using the above data sets a new merged dataset is obtained and is used to train the system. In the training, phenotype similarity score, gene closeness score and using the two-concordance score is calculated which is used to rank the system. The phenotype similarity score is calculated between the query phenotype and known phenotypes. It is determined by the cosine of their feature vector angle. Using the score similar phenotypes and their causative genes are obtained. The distance between these genes and candidate genes are compared to calculate gene closeness score and thus concordance score to rank the candidate genes.

Phenotype Network, protein-protein interaction set, and Disease Gene-Phenotype Association are the data sets used to form the network. In this network, we develop two score gene closeness score calculator and phenotype similarity score calculator.

By combining these two-score calculators we will get the concordance to score calculator. This score is used by the doctor to find the disease gene. The doctor uses a classifier to get the gene closeness score calculator and phenotype similarity score calculator.

Data columns	Range Index
MIM Number	7536
MIM Entry Type	7536
Entrez Gene ID	7536
Approved Gene Symbol	6652
Prefix	7513
Preferred Title; symbol	7536
Alternative Title(s); symbol(s)	5706
Included Title(s); symbols	791
Sort	7536
Confidence	7536
Mapping Method	7536
Mouse Gene Symbol	2416

Phenotype	7536
Chromosome	7536
Genomic Position Start	7536
Genomic Position End	7536
Cyto Location	7536
Computed Cyto Location	6322
Gene Symbols	7536
Approved Symbol Entrez Gene ID	6652
Mouse Gene Symbol/ID	6045

Testing the system

To test the trained system's ability in uncovering known disease genes and predicting novel susceptibility candidates, we present a case study for breast cancer, which is the most commonly occurring cancer among women and accounts for 22% of all female cancers. Known susceptibility genes, including BRCA1 (Miki et al, 1994) and BRCA2 (Wooster et al, 1995), can only explain less than 5% of the total breast cancer incidence and less than 25% of the familial risk, suggesting that many susceptibility genes remain to be discovered.

Analyzing the system

In the analysis phase, we analyze the ranking of the candidate genes showing their contribution level with the known research data.

Accuracy

Finally, we put together all the data and divided them into 2 files namely test data, train data files based on their similarity. Since null values should not be considered we only considered the data.

With the help of the lstm, we obtain the Accuracy, concordance score (A_{pp}'), similarity score (Score $_{combined}$) and Recall using the formulas below

$$S_{pp'} = C_p + \sum_{g \in G(p)} \sum_{g' \in G(p')} \beta_{pg} e^{-L^2_{gg'}}$$

$$\text{score}_{\text{combined}} = \text{score}_{\text{original}} \times (1-\alpha) + \text{score}_{\text{noise}} \times \alpha$$

IV. EXPERIMENTAL RESULTS & ANALYSIS

In Figure 2, a snapshot of the plots between genomic-start and genomic-end has been presented. Uniformity is better observed in the same. Similarly, other parameters also show fine-tuned progress of the iterations thereby. This indicates smooth learning of the system with finite convergence. A comparative analysis of the proposed scheme has been shown in Table I. The time of computation and rate of accuracy of the proposed scheme has been found to be comparatively better among all. Although the rate of accuracy is not so high, this can be considered as a good figure when we talk about health concerned risk.

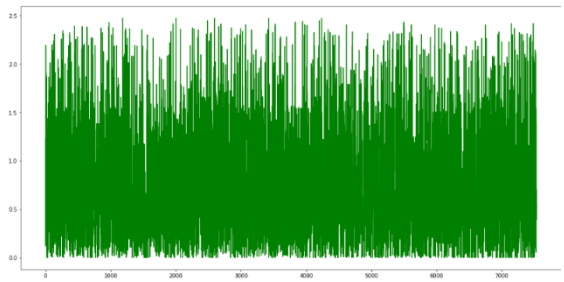

Fig.2: sample output

Table I

Accuracy (%)	concordance	Score combined
62.0	0.69	60.0

V. CONCLUSION AND FUTURE WORK

The availability of an annotated dataset has reduced the difficulty of PROTIN-PROTIN interaction to some extent. As we proposed in our paper, Gene Detection can be extended for as long as it encounters new data which are not specified in datasets. But even then, there are possibilities for the existence of some drawbacks as one gene may not always give appropriate sentiment for the whole sentence. Though the accuracy obtained is74.74%, the above-mentioned flaw in our approach can be reduced by the use of improved heuristics, which can be an extension to the current approach.

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Comparing Radiation Characteristics of Fractal arrays with Random and Periodic Arrays

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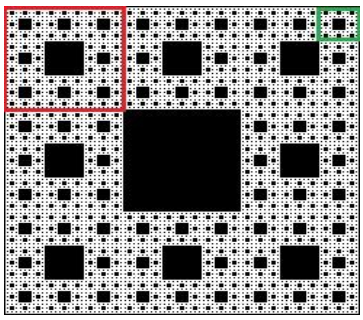
Abstract:-- **In recent years, Antenna design has become one of the important considerations in communication technology. Different antenna designs serve different purposes basing on their performance characteristics, physical design constraints and radiation characteristics. This paper discusses the concept of fractal geometry and applies it to antenna theory. This paper aims to investigate how a random array antenna radiation characteristics can be improved by the choice of fractal geometry of Sierpinski gasket over random and periodic array antenna. Matlab code is used to generate antenna geometry and also its radiation pattern along with its array factor curves.**

I. INTRODUCTION

The diseased gene identifying based on a network of Wireless communication has been advancing day by day with ever increasing demand for wireless devices, but works have been still going on to achieve desired radiation characteristics for specific applications. Designing a low profile antenna i.e small in size with wide band or multiband application and less complex in design is one of the most important concern. Many attempts have been made to achieve multiband operation but in most of the cases size reduction may not be possible. This size reduction along with multiband operation can be achieved using fractal geometries as antenna designs. Antenna arrays provide high gain, diversity, beam steering and also Maximize SNR and cancel interference patterns when compared with single antennas. An array of antennas can be of antenna elements placed on a plane in either a periodic or random fashion. These two patterns of arrangement show different radiation properties. Side lobe reduction can be achieved by periodic arrangement of array elements but require more number of array elements. On the other hand, random arrays have higher side lobes, but require less number of array elements and are likely to work in case if one or two elements in array may fail hence they are more robust. This concept of antenna arrays can be extended to Fractal geometry to bridge the gap between random and periodic configurations in antenna arrays. This paper is organized as follows. In section II describes Basics of fractal Geometry followed by Linear arrays in section 3 and then comes section 4 which contains periodic arrays followed by random arrays in section 5. While the results are depicted in section 6, optimized array comparisons are shown in section 7 and followed by conclusions and references

II. FRACTAL BASICS

Fractal geometries can be defined as geometries a part of which exhibits same characteristics as that of whole structure. Fractal geometries are subset of Euclidean Geometry. Self-Similarity is a properties exhibited fractal geometries that play a crucial role in fractal based antenna designs. Self-similarity can be defined as at any magnification a part of structure always looks exactly similar to that of original structure. For example consider figure1 which is called Sierpinski carpet



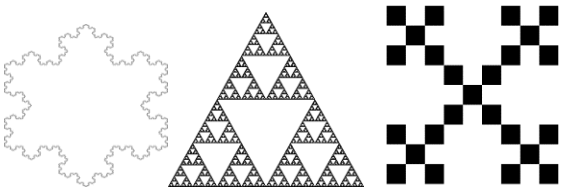
In above figure both large and small square boxes are exactly similar to that of whole structure even though they are at different magnification hence it is a self-similar structure. We can obtain a relation for fractal dimension if we know the scaling factor. Suppose if there are “N” such copies of original geometry scaled down by a fraction “F”,

then the dimension of the fractal is given by D , where

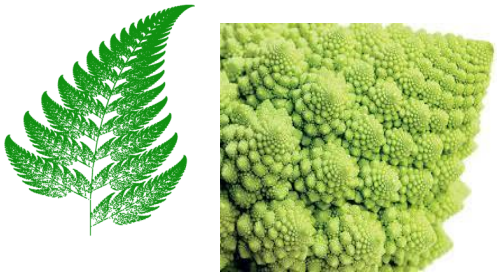
$$D = \frac{\log(N)}{\log(1/F)}$$

Examples of some fractals are Sierpinski gasket, von koch snowflake, Malinowski curve etc which are classified as deterministic. On the other hand there are another classification of fractals which represent naturally occurring objects like tress, mountains etc these fractals called as random fractals

Deterministic fractals



Random fractals



There may be many more fractal geometries in both deterministic and random fractals this paper limits the discussion to these fractals only. Fractal geometries can be generated using computer graphics with recursive algorithm. There are different procedures for both deterministic and random fractals. However this paper mainly focuses on Sierpinski triangle

Methods of generating Sierpinski gasket

A. Removing central part

Sierpinski triangle can be formed by removing the central part of base triangle. Initially we take a base triangle and join the mid points. Now the mid points are joined and 4 scaled versions of actual triangle are formed from which central triangle is removed. This completes one iteration and remaining 3 triangles resembles the scaled version of actual triangle. Same procedure is applied to those scaled triangle to as many required number of iterations. Usually equilateral triangle is taken but it is not mandatory. This method is difficult to implement using matlab. This is pictorially shown in figure 2

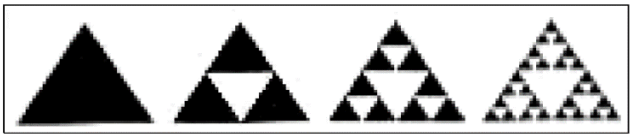


Figure2: Sierpinski gasket

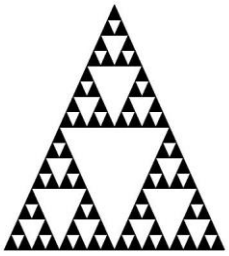
More are the number of iterations lesser are the resonant frequencies but it is significant over first few iterations only later it diminishes after few iterations. Also the amount of scale that is required for each iteration diminishes as no of iterations increase. This equation gives the relation between resonant frequency of linear dipole versus normalized frequency of fractal antenna

$$f = fd\left[1 - \exp\left(\frac{n-1}{n}\right)\frac{\ln D}{D}\right]$$

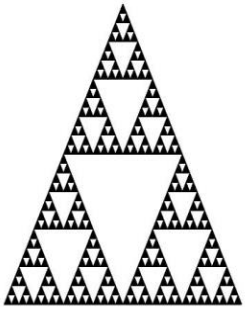
Where "f" is normalized resonant frequency of fractal antenna

And "fd" is the resonant frequency of linear dipole

Sierpinski Triangle for 4 iterations



Sierpinski Triangle for 5 iterations



B. Using Iterated function system(IFS)

Fractal geometries can be generated using Iterated function system (IFS). Again Iterated function system is a composite of affine transformations and random point generation. Affine transformations for Sierpinski triangle

are simpler and are generally expressed as matrices namely transitional and transformational matrix

Affine transformation :

$$W\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} a & b \\ c & d \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} + \begin{pmatrix} e \\ f \end{pmatrix}$$

Or

W(x,y) = (ax+by+e, cx+dy+f) where a,b,c,d,e,f are real

Rotation and scaling are controlled by parameters "a,b,c,d" while "e,f" control linear translation

Now consider "A" be the original geometry and W1,W2,W3,....Wn be a set of linear transformations, then applying these set of transformations to original geometry A results in generation of new geometry by collecting results from $W(A) = \bigcup_{n=1}^{N} Wn(A)$

By repeatedly applying "W" to previous geometries new fractal geometry will be obtained

A1= W(A) , A2 =W(A1) .. Etc

while on the other hand random point generation algorithm generates Sierpinski triangle by specifying the number of points with which the fractal should be generated. This method makes use of matlab script that uses probability to randomly place points within a boundary which are specific to Sierpinski fractal. Matlab random number generator is used to create fractal aids in filling the ordered vs disordered gaps. This paper uses random point generation method to generate Sierpinski gasket

III. ANTENNA ARRAYS

Individual antenna elements when arranged in an array shows higher gain than any of the individual array elements. This happens because gain of individual elements adds up resulting in higher gain than any of its elements in an array. There are two different ways of arrangement in array, namely linear fashion and planar fashion. In constructing linear and planar arrays the radiation properties of distinct patterns must be analyzed in order to optimize the array for certain uses. The linear arrays are considered upon which "N" number of elements are placed in linear fashion along a particular axis while in planar array, all the array elements are arranged in a plane. Theoretically radiation pattern for an array antenna can be found from pattern multiplication theorem which states

Array pattern = (array element pattern) X (Array factor)

Normalized value of array factor is obtained as follows

$$(AF)n = \frac{1}{N}\frac{\sin(N\Psi/2)}{\sin(\Psi/2)}$$

Here, N is the number of elements and is defined as the array phase function and is a function of the element spacing, phase shift, frequency and elevation angle.

Figure3 and figure4 gives the radiation pattern for linear array antenna with 25 elements and 50 elements respectively

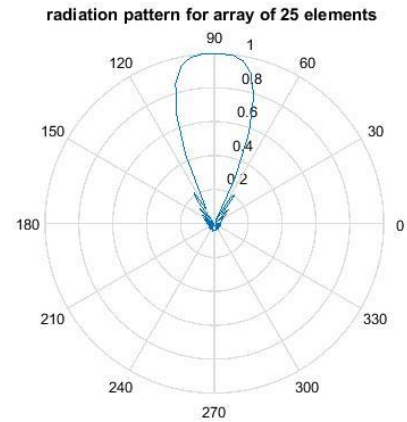


Figure 3 : linear array with 25 elements

$\frac{d}{\lambda} = 0.33$, for both arrangements

d/λ is the ratio of the distance between each element in wavelengths. The charge is kept equal for all elements to make the calculations simpler. As the elements are placed within 1 wavelength, there is constructive interference such that there is one main lobe and side lobe ratio decreases as more and more elements are placed in an array. But here the width of main lobe is observed to become narrower with increase in number of elements.

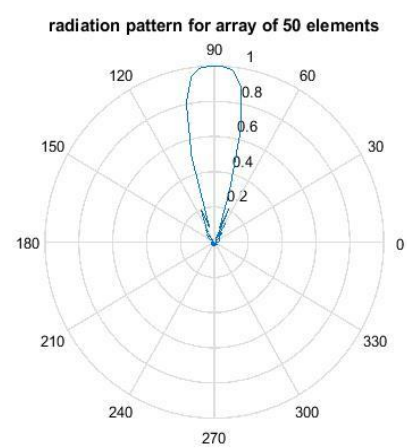


Figure4 : linear array with 50 elements

From the figures 3 and 4 we can say that side lobe are comparatively lower and main lobe is narrower in 50 element array compared to that of 25 element array. There is a trade of between gain and beam width in linear array arrangement.An optimized antenna will have no side lobes. The side lobes would easily cause air traffic control to confuse a large airplane at the height of the side lobes with a small plane at the peak of the main beam. Another characteristic of an optimized beam involves a thin single main beam.

IV. PERIODIC ARRAYS

Planar arrays have all the antenna elements arranged on a plane in a grid. Side lobes are comparatively lesser in ratio to that of main lobe. This paper make use of matlab to generate periodic array consisting of 412 elements represented with "*" symbol in corresponding graphs. We have chosen the limits of axis as -0.5 to 1.0 since we have used matlab random point generator to generate random arrays and fractal arrays which defaultly takes axis from -0.5 to 1.0. These dimensions are chosen for scaling purposes, as our fractal array uses this size window. Matlab generated planar array of antenna is shown in figure 4A.The radiated field is shown in figure 4B in a gray-scaled color map where blue is the lowest point and Red is the highest point in radiation pattern.

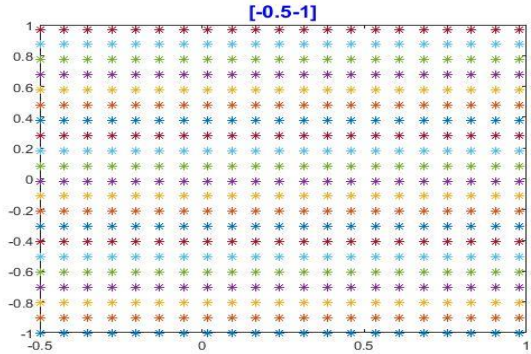


Figure 4A: Planar array with 412 elements having equal distances

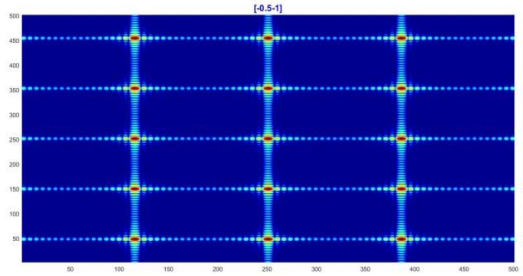


Figure 4B: Top view of radiation pattern for periodic array

V. RANDOM ARRAYS

The radiation characteristics of random arrays are more desirable. The random arrays have an advantage of exhibiting favorable radiation characteristics with less number of elements. In this type of array even if some elements fail the radiation characteristics are least affected. Using matlab random point generator, we plotted 412 random array elements. Figure 5A represents the random array of 412 elements. The radiation pattern of random array with 412 antenna elements is represented in figure 5B. One point to note in radiation pattern of random array is there is a 180-degree symmetry, which is more apparent about the main beam.

This paper bring the comparison between periodic arrays, Random arrays and attempt to show how the fractal arrays attempt to fill the void between the radiation characteristics of random array and periodic array. Fractal show that how the radiation characteristics of Random arrays can be achieved by using fractal geometries. In top view of radiation pattern Red indicate the highest point and blue indicate lowest point.

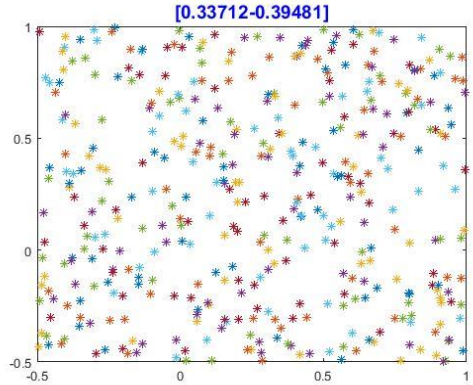


Figure 5A: Random array of 412 elements

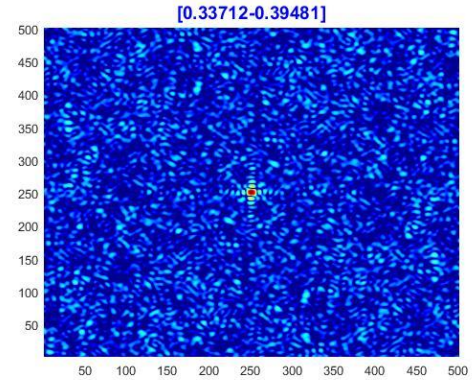


Figure 5B: Radiation pattern of Random array.

VI. SIERPINSKI FRACTAL

This paper makes use of Matlab code to generate Sierpinski triangle which essentially consists of 412 elements. The axis is defaultly fixed between -0.5 and 1.0 by random point generator in matlab. Figure 6A shows the fractal geometry of fractal array and figure 6B shows the radiation pattern. The radiation pattern indicate that side lobes are lesser than that of in periodic array but larger than in random array. It can also be observed that if more number of elements are used in a fractal array, the side lobes are further reduced

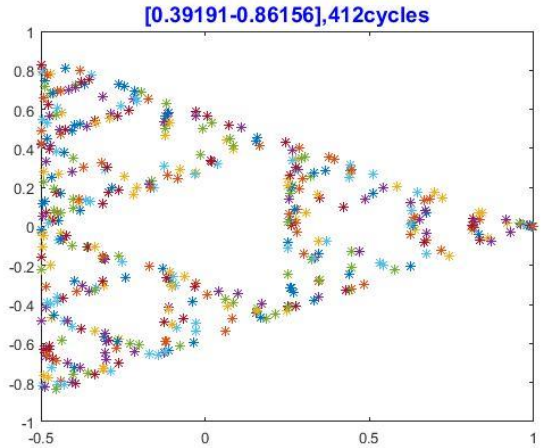


Figure 6A: Random-point-generated Sierpinski gasket.

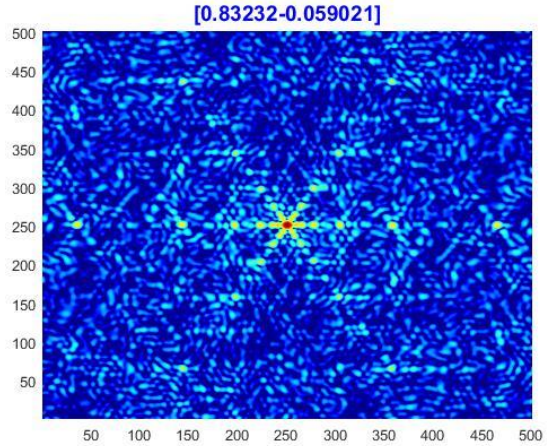


Figure 6B: Radiation from random-point-generated Sierpinski gasket.

VII. COMPARISON OF RADIATION PATTERN

In any antenna array it is always desired to have a low side lobe ratio. In figure 7C which represents the radiation pattern of periodic array the main lobe is in such a way that there is no chance of interference. Where as in figure 7A which represents the radiation pattern of random array has low side lobes unlike as in case of periodic array. Fractal array assumes the main lobe characteristics of periodic array and lower side lobe ratio like random array

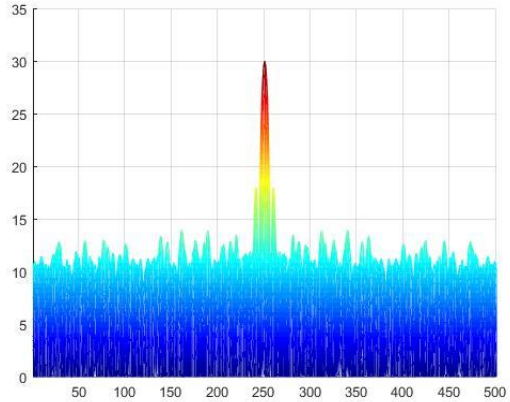


Figure 7A: Side view of radiation pattern of random array.

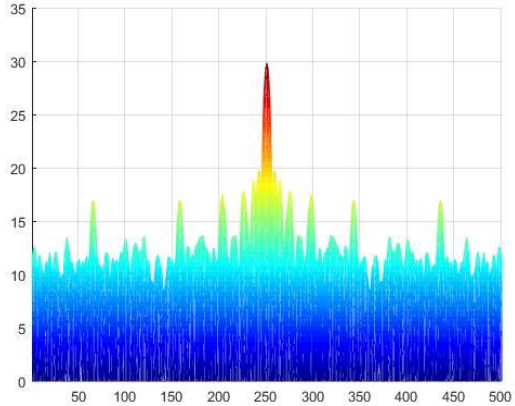


Figure 7B: Side view of radiation psttern of fractal array.

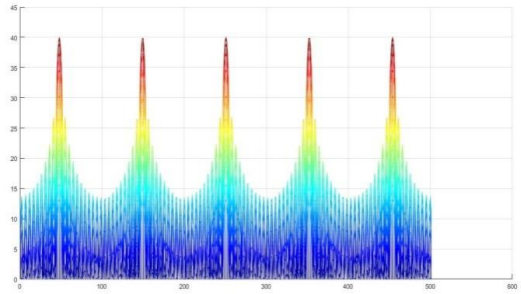


Figure 7C: Side view of radiation [pattern of periodic array

As the number of elements in an fractal array increases the side lobes are much reduced. Figure 7D represents the

radiation pattern of fractal array with 700 array elements. But one point to be noted here is the main lobe degradation which is undesirable occurs with increase in number of elements. Hence we can say that side lobes in radiation pattern of fractal antenna can be decreased at the cost of increase in main lobe degradation

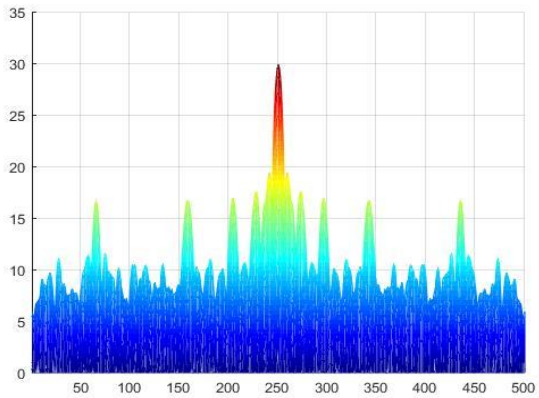


Figure 7D : Radiation pattern of fractal array with 800 elements

VIII. ADVANTAGES

1. Miniaturization of antenna size can be achieved while keeping high radiation efficiency using fractal antenna
2. Better impedance matching is possible using fractal antennas
3. Metamaterial applications like cloaks can be effectively done using fractal geometry
4. Shows consistency in performance over huge frequency range i.e (frequency independent)
5. Reduced mutual coupling in fractal array
6. Sierpinski gasket can be used as monopole and dipole elements whose peripherals are similar to cross section of monopole and dipole antenna

For linear dipole, the first resonance occur at $\lambda/2$ which may be higher for certain frequencies.For such frequencies height of antenna required will be higher which can obviously reduced by using Sierpinski triangle

IV. CONCLUSIONS

It can be observed that the random array performed better than the fractal array. According to previous work, there is an intersection point where the number of elements in a fractal array and random array cause for the one to be more effective as the other. As the array holds more elements, the random arrays perform better. Aside from the side lobe levels, the fractal did have overall a better main beam, regardless of the number of points. A draw back for random arrays with many elements at that, as the number of elements increases, main beam degradation is quite significant.

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A Review on Sustainable Micro-Concrete

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Abstract:-- **Construction sector which uses cement in its activities causing a release of CO2 into the atmosphere. Currently, all the sectors are viewing seriously in reducing environmental pollution and hazards. In this scenario, the research in industrial wastes such as fly ash, slag, used foundry sand, marble dust, etc., lead to use in construction industries as sustainable materials (SM), thereby contributing to reduction in environmental pollution. This paper reviewed the usage of these SM in the production of micro-concrete is very less when compared with new age conventional concrete, some of the effects of utilization of these SM in micro-concrete are presented. The quantum of research done in micro-concrete is very less, further studies to be done.**

Keywords:- Micro-concrete, Green concrete, Sustainable concrete, Polymer modified micro-concrete

INTRODUCTION

Micro-concrete (MC) is a mixture of suitably graded sand, cement and water to simulate concrete in small scale models. The cement and sand mixed in dry condition are available in pre-packed bags. It is ready to use dry powder but requires only the addition of water during the application. The required quantity of water is to be added for ensuring the flowability. It is formulated for use in repair works of concrete where placing of conventional concrete is difficult. It should be non-shrink and free flow in nature. As it is prepacked, wastages are less and application to the structural elements is very easy due to its flow nature and finished surface quality is smooth when compared with conventional concrete. The cement usage in concrete also responsible for emitting CO2 into the atmosphere, 1 Ton of cement releases approximately 0.9 Ton of CO2 [10, 11] and construction industry is the second largest producers of CO2 next only to the automobile industry.

Natural deposits like Sand (Fine Aggregate-FA) are depleting very rapidly due to their indiscriminate usage in concrete production. In this regard, there is a huge scope for research in looking for alternatives to concrete ingredients. As per available literature, cement can be partially replaced by industrial wastes like Flyash, GGBS, Waste Glass Powder, Silica Fume, Metakaoline etc. These are also observed to be a suitable partial replacement to cement. Materials that can be adopted as a partial replacement to FA are Used Foundry Sand (UFS), M sand (MS), Marble Powder (MP) etc., [12, 13]

The results of various researches initiated the usage of green materials in the manufacturing of concrete thereby contributing to the reduction of environmental pollution. The objective of this paper is to review the micro-concrete manufactured with sustainable materials like fly ash, GGBS, quartz sand, limestone, etc.

REVIEW OF LITERATURE

Fly ash and Ground Granulated Blast Furnace Slag (GGBS) are some of the by-products of iron and steel manufacturing industry collected from blast furnace as shown in Figs. 1 and 2. The stress-strain behaviour was studied by varying the type and size of aggregate in concrete and MC. It was found that with an increase in size and roundness of aggregates, compressive and tensile strength decreased [1].

Fig. 1. Fly ash

Fig. 2. GGBS

The concrete panels manufactured with reinforced micro-concrete, unreinforced micro-concrete and ferrocement were analyzed using probabilistic approach i.e., Weibull model. The strength of the panel depends on defects in microstructure level, loading and size of the structure. The ferrocement panels tested for multiple cracking in tension was predicted based on unreinforced MC tested in flexure. The heterogeneous stress effect on unreinforced and reinforced MC was studied based on the Weibull model. The fracture properties of unreinforced MC was analyzed based on macroscopic stress parameters [2].

MC manufactured with micro-aggregates i.e., quartz sand, river sand and limestone (size varies from 0.5mm to 1µm) as shown in Figs. 3 and 4 have improved the particle packing density in the cementitious system along with significant enhancement in rheological and mechanical properties. The micro-aggregates used in MC can be characterized based on the "fineness index"[3].

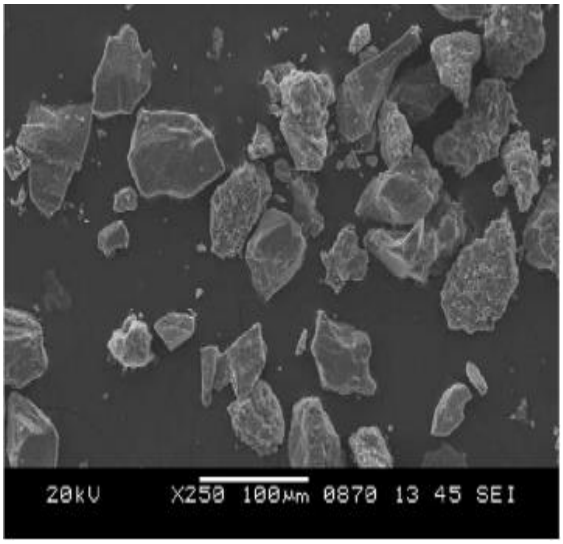

Fig. 3. SEM images of micro-aggregates - quartz sand

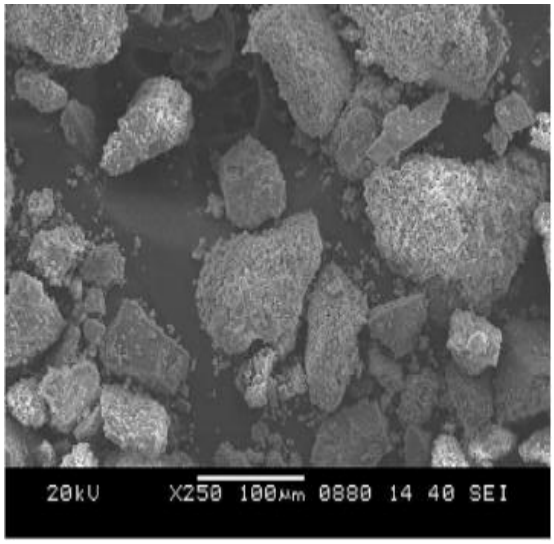

Fig. 4. SEM images of micro-aggregates - limestone

In aggressive environments, for repairing and rehabilitation of concrete structures it was concluded that polymer modified concrete (PMC) was economical when compared with fibre-reinforced polymer concrete (FRP) because of its resistance to moisture, good early strength and high durability [4, 14].

In self-compacting micro-concrete composites, composite fibres (polypropylene-PP and polyvinyl alcohol-PVA) are used. The cement matrix and properties of fibre play a key role in attaining the strength. The performance of these fibres was studied by the author in different matrices of MC manufactured with and without fly ash concluded that high strength cement matrix with a high strength composite fibre exhibited high performance in flexural and toughness tests. Addition of fly ash has not shown any significant reduction in the strength of self-compacting micro-concrete composites because fly ash was very fine and filled the voids present in the cement matrix [5].

Concrete filled tubular columns (CFT) is having a high load capacity. In tall buildings and bridges, CFT's are used because of high ductility, good static and dynamic impact properties. The steel tubes filled with micro-concrete was experimentally studied under impact load at an elevated temperature of 400oC using "split Hopkinson pressure bar". The CFT's are having high impact resistance at elevated temperature was experimentally proved and validated with test results [6].

Concrete matrix (mortar matrix, aggregates and pores) behaviour is studied in mesoscale as the macro strength of same depends on microstructure properties. Micro-concrete specimens are prepared to highlight the failure mechanisms of mechanical and morphological properties. X-ray scanner

and X-ray tomography (result was input to "3D-FE Meso model") was used and concluded that 3D mesoscale model can predict the failure patterns and macroscopic behaviour of the material [7].

Micro-concrete bond strength was investigated with substrate concrete surfaces in perpendicular, parallel and inclined directions by applying a load in respective directions and found that in tensile and flexure test, MC has shown independent behaviour when compared with substrate concrete. But in the compressive and shear test, MC has shown dependent behaviour with the substrate [8]. MC with sintered fly ash as a fine aggregate (sizes 4 to 8 mm) has low density when compared with conventional MC. Sand was replaced by weight with sintered fly ash at various percentages i.e., 50, 60, 70 and 100 in MC and found that drying shrinkage in temperature variation of non-conventional MC was within permissible limits. The compressive, flexural and flexural bond strengths of B-type MC has shown on par results with conventional MC. The E-type MC has shown very less drying shrinkage value compared with conventional MC [9].

CONCLUSIONS

- The compressive strength in case of extremely ground limestone and quartz was not parallel with flexural strength due to the surface roughness of ground limestone in fresh MC.
- Conventional concrete at inaccessible repair zones is difficult to place, whereas Polymer modified MC, due to its free flow, self-levelling, high early strength and easy placing will be preferred.
- PVA fibres in micro-concrete improved flexural strength and toughness, whereas PP fibres initially slipped from the matrix but after addition of fly ash improved frictional bond between the matrix and PP fibres.
- Steel tubes filled with MC performed well under impact loads and elevated temperatures (400oC).
- MC with higher compressive strength showed higher bond strength with substrate concrete when tested.
- With 60-70% of sintered fly ash aggregate in MC, there was an increase in flexural bond strength when compared with conventional MC, the demand for water increased with increase in replacement percentage.

SCOPE OF THE STUDY

Most of the research on sustainable materials are showing good results in mechanical and durable properties of conventional concrete. However, there is a need for more research in finding the effect of utilization of sustainable materials in micro-concrete. Furthermore, the scope in durability studies to be studied extensively.

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Issues and Opportunities in the Adoption of International Financial Reporting Standards (IFRS) For Small and Medium-Sized Enterprises (SMES) In India

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Abstract:-- **SMEs are considered to be the backbone of our country. They form around 95% of the total industry in the country, employees about 106 million, about 40% of India's workforce. They are regarded as the main source of innovation and modernization. To make SMEs more efficient International Accounting Standard Board (IASB) in 2009 introduced International Financial Reporting Standards (IFRS) for Small and Medium-sized Entities (SMEs) which are meant for those entities who do not have public accountability. The main theme of this research paper is to find out the appropriateness and hindrances an SMEs will face during implementation of these standards.**

Keywords:- SMEs, IASB, IFRS

INTRODUCTION

On 1st of July 2009 a distinct set of standards has been issued by IASB for SMEs called IFRS for SMEs which are applicable only to SMEs. A study group is working on the applicability and adaptability of IFRS for SMEs to Indian SMEs. According to latest reports there are around 48 million SMEs in India and they contribute around 8% to India's GDP, 45% of total manufacturing output and around 40% of total exports from country are contributed by SMEs. SMEs significantly contribute to India's balanced economic development. According to MSMEs Act, SMEs in India have been classified into Micro, Small and Medium enterprises based on investment in Plant, Machinery and Equipment.

Definition of MSMEs in India

(As Per Micro, Small & Medium Enterprises Development (MSMED) Act, 2006)

Manufacturing Enterprises - Investment in Plant & Machinery

Description	**INR**
Micro Enterprises	up to Rs. 25 Lakh
Small Enterprises	above Rs. 25 Lakh & up to Rs. 5 Crore
Medium Enterprises	above Rs. 5 Crore & up to Rs. 10 Crore

Service Enterprises – Investment in Equipment's

Description	**INR**
Micro Enterprises	up to Rs. 10 Lakh
Small Enterprises	above Rs. 10 Lakh & up to Rs. 2 Crore
Medium Enterprises	above Rs. 2 Crore & up to Rs. 5 Crore

In this era of globalization and economic development the importance of financial statements is increasing. IASB has been working on the adoption and application of IFRS for many years. Countries are converging their national standards with IFRS and the robust efforts of IASB has led to adoption and application of IFRS. India has converged

its existing accounting standards with IFRS and the new standards are called Ind AS which has been issued and notified. Adoption of common accounting standards have helped companies in comparison of their financial statements across countries. It has also helped investors, bankers and lenders to compare the financial statements following same reporting procedures. The adoption of IFRS for SMEs will help SMEs in doing more cross border transactions and merger and acquisition activities. IFRS for SMEs is easier to follow than full IFRS.

The importance of SMEs can be seen from the Table 1. It can also be observed the significance of SMEs in the Indian Economy in terms of employment. Maharashtra clearly transpires as having highest number of SMEs and providing the highest number of employment. The adoption of IFRS for SMEs should be taken into consideration because SMEs provide so much to the economy in terms of revenue and employment and India is one such country where SMEs plays a major role in the development of an economy. Adaptation of IFRS may represent a complex process for Indian entities as it will effect both accounting traditions and organization procedures but Indian SMEs will benefit from it in the coming years as the adoption will lead to more transparency and more cross border transactions.

Table- 1 State wise Cumulative Report

	Total MSME Registered				**Total Employment**		
State/UT	**Total**	**Micro**	**Small**	**Medium**	**Total**	**Micro**	**Small**
ANDHRA PRADESH	256145	226749	28553	843	1134820	609721	463906
ARUNACHAL PRADESH	891	499	367	25	12584	3971	7661
ASSAM	5839	4146	1591	102	78302	31236	32073
BIHAR	811116	794050	16235	831	2260393	1944917	181395
CHHATTISGARH	30664	24639	5816	209	245054	113943	115415
GOA	4658	3260	1329	69	56899	19673	31468
GUJARAT	574368	484430	86286	3652	3371054	2010421	1141795
HARYANA	95610	75705	18885	1020	977622	381765	483315
HIMACHAL PRADESH	8066	5796	2081	189	114993	38968	56506
JAMMU AND KASHMIR	5470	4320	1091	59	40133	15413	20400
JHARKHAND	112501	105256	6997	248	492161	349134	129646
KARNATAKA	182904	147534	33815	1555	1731574	832647	748846
KERALA	77231	65184	11583	464	539692	303597	200305
MADHYA PRADESH	542596	515041	26676	879	1927048	1477265	396340
MAHARASHTRA	896745	778740	112921	5084	5249499	2940595	1892176
MANIPUR	22022	18952	3027	43	173684	124052	47988
MEGHALAYA	1484	1349	129	6	9803	6847	2705
MIZORAM	1789	1366	399	24	17897	8972	8039
NAGALAND	614	440	166	8	6247	3445	2306
ODISHA	80686	72589	7825	272	543782	346344	174400
PUNJAB	101213	84124	16532	557	775376	369026	335794
RAJASTHAN	360450	322414	36744	1292	1798742	1227072	487975

SIKKIM	535	349	160	26	7960	1923	4238
TAMIL NADU	712226	627553	82600	2073	4784243	3183226	1420179
TELANGANA	190725	140291	49149	1285	1390141	604191	692598
TRIPURA	3779	3336	429	14	25065	17818	6877
UTTAR PRADESH	664555	621146	41561	1848	3355724	2312727	843615
UTTARAKHAND	19453	15724	3458	271	176122	76308	75855
WEST BENGAL	158854	144245	13966	643	1135375	724213	367648
ANDAMAN AND NICOBAR ISLANDS	4180	3353	787	40	22294	12494	9048
CHANDIGARH	5650	4601	987	62	53926	26016	21551
DADAR AND NAGAR HAVELI	2768	1849	857	62	40421	13566	21265
DAMAN AND DIU	1475	758	658	59	47278	6007	27252
DELHI	83133	65261	17147	725	1066744	526220	474237
LAKSHADWEEP	64	57	7	0	389	352	37
PUDUCHERRY	6266	5111	1112	43	56974	27919	22065
Total:-	**6,026,725**	**5,370,217**	**631,926**	**24,582**	**33,720,015**	**20,692,004**	**10,946,919**

Source- Udyog Aadhaar

LITERATURE REVIEW

Ana Bonito and Claudio Pais in one of their studies have taken a representative of 84 adopters and non-adopters of IFRS for SMEs of both developing and developed countries and they found out that the countries that are not having any national set of accounting standard, having experience of using IFRS and having a common law legal system have more probability of applying IFRS for SMEs because they are already having some knowledge related to IFRS so it will become more convenient for those countries to adopt IFRS for SMEs as they will be having trained staff who are having some knowledge related to IFRS.

Bukics and Masler states that the regulatory body of professionals and its members should occupy themselves in vigorous and thoughtful analysis of the standards before coming to the conclusion of adoption. To successfully take up IFRS for SMEs one requires extensive training and education to reap the benefits of the standards. The employees of the big four firm have already given ample training on IFRS for SMEs. The problem is for those professionals who are in non-Big four firms because they are only familiar with their local standards. Hence it becomes important that accountants in non-Big Four firms should be given proper training and education to be able to properly apply and understand the standards successfully.

Christie and Brozoysky states that so many countries are adopting these standards but it is still doubtful whether the accountants of local firm will find it beneficial or not. The non-Big Four firms will have to face the challenge of developing their IFRS related skills because they have to maintain the transparency and has to provide a fair opinion on SMEs financial statements. Moreover, they have to employ such employees who are having adequate knowledge in IFRS. Besides this these firms also face the insufficiency of resources and proficiency in providing in house training for their employees

Miller and Becker in one of their studies states that there should be proper knowledge of standards to auditors and accounting professionals because that will only lead to the success of any set of accounting standards. Professionals need to keep themselves updated about the changes which are happening in accounting profession through continuous professional educational programs. It is essential for universities to update their syllabus by including newer standards like IFRS for SMEs in their degree programs.

According to Madhuri IFRS for SMESs increases the reliability and comparability. IFRS for SMEs will open

many new opportunities while obtaining finance or entering into a Joint Venture and collaborations.

According to Pascu A.M., Vasiliu the biggest problem that the SMEs have to face during the process of implementation of IFRS is the cost of execution because standards are little bit complicated and applying these standards means applying new methodology, fixing up the internal processes, training staff on new accounting system, stakeholders are used to the existing accounting rules, obligation for maintaining new set of accounts can be costly. Companies which have only limited number of shareholders and operates domestically will have no benefits

Albu et al. in his study has taken an opinion of the stakeholders of four countries which includes Czech Republic, Hungary, Romania and Turkey in context of the execution of IFRS for SMEs by taking semi structured interviews. The results show that majority of the respondents were in the favor of the implementation of IFRS for SMEs rather they support obligatory adoption instead of convergence

According to European Commission 2012 SMEs gauged for around 67% of total employment in 2010 and in the years between 2002-2010, SMEs generated around 85% of new jobs in European Union. In Asia Pacific Economic Cooperation countries (APEC) SMEs are the prodigious and their contributions are remarkable.

According to (IASB 2009) Before the admeasurement of IFRS for SMEs by International Accounting Standard Board (IASB) countries were using either their own national standards or full IFRS for SMES. IASB believes that acquiring IFRS for SMEs will open new opportunities to international finance through harmonized and high quality financial statements.

According to Perera, D., & Chand, P. the countries which are maintaining their financial statements according to IFRS have more knowledge or practical experience in adopting IFRS for SMES. For e.g. Hong Kong, Malaysia, Chile, Uruguay have adopted full IFRS for SMEs with few changes as well as they use full IFRS for listed companies. On the other hand, India, Bolivia, China, Egypt, Indonesia and Japan have adopted neither full IFRS or IFRS for SMES. So it was concluded that the countries which are not having full knowledge of IFRS are less likely to adopt IFRS for SMES

DISADVATAGES

The major difficulty the SMEs has to face in the implementation of IFRS for SMEs is to provide requisite training to understand the inference of using IFRS for SMEs in maintaining their financial statements. (IASB 2004)

Buckics et al (2009) mentioned that professional regulatory bodies and its members should participate in vigorous and thoughtful discussion before coming to the conclusion of implementing IFRS for SMEs. They have to apprehend the difference that exists between full IFRS and IFRS for SMEs and for that proper training and knowledge is required. The professionals who are working in Big 4s are already experienced and are having knowledge in full IFRS. The problem lies for those professionals who are not working in Big 4s and it becomes important for them to have knowledge and training as they are only familiar with their local standards and have never prepared financial statements complying IFRS. The SMEs will also face the difficulties of recruiting people. These firms also face insufficiency of resources and skill to conduct proper training for their employees, upgrading information system and increase in audit fees as audit fees is possibly going to increase after the adoption. IFRS transition to SMEs is much more challenging then what it would have for large entity because they come with certain characteristics, the skills sets are not as advanced and possibly not as comparable as for large entity.

The main challenge faced by SMEs is the need for finance and by this it means immediate requirement of funds because they often have the orders that they have to service or they have to complete the certain contract so they require financing. SMEs rarely have collateral security that they can offer to institutions to cover this financing and this is where the main challenge comes in. Most institutions required to have some security deposits with certain level of the bank so they offer credit facilities. One of the other challenges is that many of them don't have proper financial records so when they show up at the bank or the financial institutions and ask for facilities they don't have proper records of accounts of how their business is performing because we tend to look into the past that how well the business is performing so by adopting IFRS for SMEs firms will be able to produce financial statements which will help them in getting finance from banks as there will be transparency in maintaining financial statements and they will be able to maintain the proper records to show at the banks.

IFRS for SMEs fulfils a different role for us. It is not intended to be a global standard. IFRS for SMEs is a standard for non-accountable entities and full IFRS is for accountable entities. They are the ones we should be reading, we expect people to be engaged with it and they have a bigger impact. But IFRS for SMEs does not have a broader market and does not have far spread but we should understand that unlike full IFRS we would like to see it positioned as a global standard, we should believe in encouraging cross border trade

Nadia Albu did some research on the IFRS adoption in emerging economies in the region and Romania in special and investigated the potential adoption of IFRS for SMEs. She wants to bring to the dimension into the discussion of the decision regarding the potential adoption of the standard. so first she had the economic cost analysis. Most of the discussion around the standard were built in this direction. On the other hand, there is a political angle and based on the experience in emerging economies this is extremely important and even in theory this should go hand in hand. There are cases when political decision is based on other agreements. So after the standard was issued in 2009, a cost benefit analysis was initiated by the academic environment mostly based on interviews and there was support for the adoption of the standard but mostly based on convergence plan but not directly adoption. The most significant cost was expected disconnection between accounting and taxation and this was also the key elements for expected benefits as well. However, in the case of disconnection between accounting and taxation they will have a better view of what is happening in various industries and at the national level. So the key issue here would be to achieve this connection which is debatable She even had a discussion with the leading auditing and accounting experts of different countries to understand what IFRS for SMEs is. One of the thing which came to the notice in the discussion to adopt IFRS for SMEs at the country level is that in most jurisdictions there are people proposing IFRS for SMEs but there is relatively little direct support and rarely somebody said yes pushing for it.

If we look at the pros and con of using IFRS for SMEs, the thing which came to the notice by going through various articles and research papers was the point of comparability. As comparability can be used as both pros and con argument because when private firms started using IFRS for SMEs they become more comparable across countries and their public counterpart but at the same time if you have a system where you have some private rules, some IFRS rules and then IFRS for SMEs rules then in this case in many jurisdictions firms become less comparable to their national counterparts. Another disadvantage of using IFRS for SMEs was of the cost. Many accountants and auditors was of the view that preparing accounts according to IFRS will increase the cost of SMEs. Cost means simple plain cost, application cost to get the people prepared the financial statements. Another thing is that there is significant variation across jurisdictions. E.g. in Serbia IFRS for SMEs is implemented but at the same time firms really don't use that much because they stick to its own reporting framework whereas in South Africa the one country where the IFRS for SMEs is widely used. In South Africa there is good and established network of accountants who trained their accountants to enforce the use of IFRS for SMEs. Another problem which SMEs will face is of the issue with compliance because there are many small firms and small accounting departments where there is a single person or advisor and there is lack of education so even of those firms want to comply with these standards they are not able to because of the lack of knowledge and resources.

ADVANTAGES

The implementation of IFRS for SMEs will increase the comparability of financial statements and it will also enhance the opportunity to international funding. As mentioned by KPMG (2010) as more and more entities adopt IFRS for SMEs it will lead to better interpretation process and will lessen up the time for preparing the financial statements. Adoption of IFRS for SMEs will make the position of SMEs stronger with credit institutions and will also have the positive effect on the credit rating. So this will lessen up the cost of borrowing. This is because IFRS information and maintaining account according to IFRS will help SMEs in building new relationships with suppliers and customers domestically as well as globally.

IFRS for SMEs provides an uncomplicated model to apply which will lessen up the time and cost of preparing the statuary filings yearly. As it is less peculiar in many areas it enables companies to choose easier accounting models for their subsidiaries. IFRS for SMEs are growingly allowed for statuary filings, it will enable service centers to centralize their accounting expertize, create efficiencies and reduce cost. Adopting IFRS for SMEs will enhance international discernibility and goodwill of a company. Implementing IFRS for SMEs will have a positive addition in respect to SMEs as SMEs will also be known globally. According to Teodori and Veneziani there will be many benefits to SMEs in the adoption of IFRS for SMEs. Firstly, there will be a common accounting language globally for SMEs and adoption of IFRS will also help in the "modernization" of financial statements. There will be a lot of advantages to the companies as well as it will improve the goodwill of the company and international visibility. In one of the study it was concluded that the implementation of IFRS will increase the transparency and comparability. Adoption will, also save administration and operational cost for groups having foreign subsidiaries because there will be single accounting system thus avoiding "double financial statements". Flow of information will be better resulting in better combination between group function and information system. IFRS for SMEs will also help companies in its growth and captivating new investors.

RESEARCH METHODOLOGY

There are many advantages from the adoption of IFRS for SMEs like transparency, comparability and better quality of financial statements which will assist in making better financial decisions and will decrease the cost of capital. An interview was conducted from 50 Chartered Accountants regarding the possible advantages of the adoption of IFRS for SMEs as presented in Table 2. the respondents were asked to evaluate those statements on a five point Likert scale from 1 to 5 (1= strongly agree, 5= strongly disagree).

We have examined whether there is a notable difference in responses to advantages of IFRS for SMEs based on preparedness. I have divided preparedness in two groups. It was expected that prepared Chartered Accountants will be more aware of the advantages of IFRS for SMEs but the results show that there is no significant difference between the responses of the prepared and unprepared Chartered Accountants.

Table 2. Descriptive Statistics Preparedness

	N	Mean(overall)	Std. Deviation	Mann-Whitney U	Asymp. Sig. (2-tailed)
SIMPLIFY	50	1.9000	.30305	175.000	.243
ACCURACY AND RELIABILITY	50	1.9800	.24661	171.000	.087
BETTER COMPARISON	50	2.0000	.34993	176.500	.312
INTERNAL AUDIT EASY	50	2.1000	.36422	151.500	.051
PREVENTS FRAUDS	50	2.0200	.14142	195.000	.617
OPPORTUNITIES FOR SMES TO GROW	50	1.7600	.47638	189.000	.733

Table 3. Ranks

	PREPAREDENESS	Mean Rank	Sum of Ranks
SIMPLIFY	YES	28.00	280.00
	NO	24.88	995.00
	Total		
ACCURACY AND RELIABILITY	YES	28.40	284.00
	NO	24.78	991.00
	Total		
BETTER COMPARISON	YES	23.15	231.50

	NO	26.09	1043.50
	Total		
INTERNAL AUDIT EASY	YES	30.35	303.50
	NO	24.29	971.50
	Total		
PREVENTS FRAUDS	YES	25.00	250.00
	NO	25.63	1025.00
	Total		
OPPORTUNITIES FOR SMES TO GROW	YES	26.60	266.00
	NO	25.23	1009.00
	Total		

Table 4. Test Statistics

	SIMPLIFY	ACCURACY ANDRELIABILITY	BETTER COMPARISON	INTERNALAUDITEASY	PREVENTSFRAUDS	OPPORTUNITIESFORSMESTOGROW
Mann-Whitney U	175.000	171.000	176.500	151.500	195.000	189.000
Wilcoxon W	995.000	991.000	231.500	971.500	250.000	1009.000
Z	-1.167	-1.709	-1.010	-1.954	-.500	-.342
Asymp. Sig. (2-tailed)	.243	.087	.312	.051	.617	.733
Exact Sig. [2*(1-tailed Sig.)]	.558[b]	.495[b]	.574[b]	.244[b]	.914[b]	.802[b]

CONCLUSION

SMEs plays a very important role in the development of an economy and their accounting matters are currently under debate because of the issuance of the standards by IASB for SMEs called IFRS for SMEs in 2009. One of the common pitfall of SMEs is the "lack of financial statements". They do not prepare the financial statements on which the bank or financial institutions can rely on for determining their revenues, profits and capability to pay which often necessitates collection of information from the entrepreneur himself which cause the problem of information asymmetry. Entrepreneurs often inflate their income or understate their expenses in the hope of obtaining higher loan amounts. So having a common set of accounting standards will help SMEs in overcoming these challenges. A single set of reporting framework will result

in more transparent and will ameliorate the comparability and consistency of SMEs. SMEs in many countries follow their own national account ting standards but such standards but such standards lack comparability of financial statements and are often outmoded. Many countries around the globe have already adopted but during the process of adoption have faced many obstacles. The big 4 accounting entities may get an advantage from these global standards but the accountants of SMEs may remain in the same position as they were before because most of the clients of SMEs are worried about the additional cost of reporting and also noncompliance of the standards because of the higher reporting cost. Moreover, the standards are such that they may not be relevant for the developing economies so proper analysis should be done before adopting these standards. The drawback of the current study is the limited sample size which has made it strenuous to discover the findings of the research. Future research will consider of increasing the sample size in order to confirm the finding of the current study.

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Identifying Object in an Image and Generating Caption For Given Image

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***Abstract:*-- Automatically generating the textual description for an image from an artificial system is known as image captioning. It uses each tongue process and computer vision to get the captions. It is a challenging artificial problem since it requires computer vision to understand the content of the image and a language model from the field of natural language processing to turn the understandings of the image into words. Many techniques proposed to solve this problem. Current approaches or techniques mainly focus on generating captions that are general about image contents.Describing images at a human level and applicable in real life environments is a challenging issue. In this paper, we would implement a neural network based method for image captioning and make it generate the captions for images at a human level by using image captioning, well grounded by the elements of images.**

Keywords:- Convolutional Neural Network, Recurrent Neural Network

1. INTRODUCTION

Given an image a quick glance is sufficient for a human to understand and describe what is happening in that image.Automatically generating this matter description from a synthetic system is that the task of image captioning. The task is simple the generated output is anticipated to explain what's shown within the image the objects gift, their properties, the actions being performed and therefore the interaction between the objects, etc.

As a problem that integrates vision and language understanding, its main challenges arise from the need of translating between two different, but usually paired, modalities. It was shown that just a fraction of a second is sufficient for a human to capture the meaning of the scene in order to be able to describe it accurately. This includes not only to discern most salient objects and their attributes but also reasoning about intricate relationships and interactions between them. Even more so, people describing an image usually rely on common sense knowledge for adding context, or are capable of using imagination for making descriptions vivid and interesting. But to duplicate this behaviour in a man-made system may be a vast task, like any other image process drawback and thus the employment of advanced and advanced techniques such as machine learning to solve the task. It is a relatively new task to let a computer use a human-like sentence to automatically describe an image that is forwarded to it.

As a challenging and meaningful research field in artificial intelligence, image captioning is attracting more and more attention and is becoming increasingly important. Since much of human communication depends on natural languages, whether written or spoken, enabling computers to describe the visual world will lead to a great number of possible applications, such as producing natural human robot interactions, early childhood education, information retrieval, and visually impaired assistance, and so on.

Although much of research has gone through in this field, the current approaches mainly focus on generating captions that are general about image contents. However, they don't describe images at a human level so that they can be applicable in real-life environments. Hence in this paper we mainly focus on generating an image caption at a human level using one of the image captioning methods.

2. RELATED WORK

Recent analysis[2,3,4] has incontestable progressive image captioning results miss treat deep learning technique.These ways analyze visual data, acknowledge and classify objects and actions, and describe each still and video frames through captions. All these works use a supervised learning theme wherever pictures with corresponding captions area unit wont to train the network.Convolutional Neural Networks (CNNs) area unit deployed for visual feature extraction and algorithmic neural network based mostly architectures, either a simple recursive network or a Long-

Short Term Memory (LSTM) based architectureare wont to learn the language mode land so generate descriptions. This Project work draws inspiration from their work, adapts some of the concepts used in the works and builds upon those techniques to help overcome their limitations in an attempt to improve results. This section briefly walks the readers through the approaches employed in the aforementioned researches and describes the concepts adapted.

The first work being delineate during this section is by Karpathy et al[3].The basic design for his model is shown fig 2.It uses a CNN that has been pretrained on ImageNet[5] and fine-tuned on data sets in ImageNet. In addition straight forward perennial network (SRN) is employed to operate as a caption generator .During training the SRN is fed the image feature descriptor from the CNN in addition with the keyword START at the first time instance followed by each word in the ground through image caption from the coaching knowledge at every instance along with the hidden state from the previous time step.After coaching with enough examples. The SRN learns the language semantics and predict the next word with good accuracy based on either the previous word or the image features through the weight updates. During testing the image features descriptor extracted from the CNN is used as the first input to the SRN along with the keyword START. The first word of the image caption is excepted supported the image feature descriptor. The next prediction is created is created supported the previous prediction as input in conjuction with the previous hidden state.The process continues till the tip of sentence has been encountered .fig1 demonstrates however the project design makes a prediction on take look at image that includes a image of a person carrying a hat

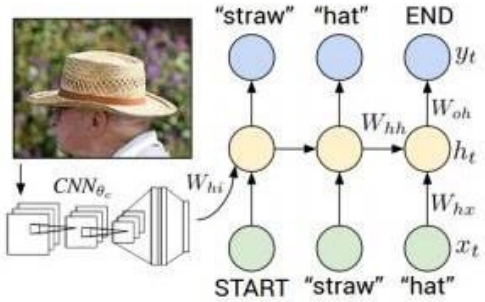

Fig 1. Architecture of image description model proposed by Karpathy et al. [3]

Before the coaching and testing, Karpathy preprocessed the words by mapping them into identical vector areas because the image feature vectors extracted from the CNN such the dot product of a word vector with its corresponding image vectors is maximized. This has been achieved through AN RCNN as planned by Girshick et al in [6], that identifies the highest nineteen regions/objects in a picture and generates twenty image feature vectors by passing these nineteen regions together with the complete image through a CNN.A SRN design, known as two-way algorithmic Neural Network (BRNN) [7] is employed to map every word into identical vector area because the image feature vector supported the contextual info close the word in each directions and also the feature vector of the word's corresponding image.

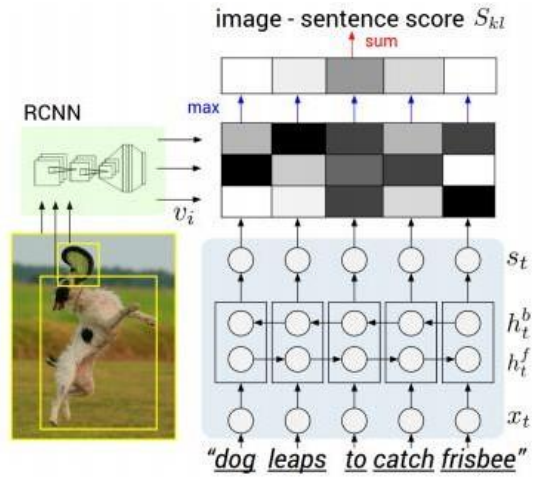

Fig 2. RCNN/BRNN based word and image feature vector embedding. [3]

This is illustrated in fig 3, whenever an image of a dog catching disk is passed to the RCNN. The example has 3 regions of interest: dog ,disk and also the entire image. The word dog, catch and leaps correlate well with the image feature vector of dog. maximizing the image-sentence scores, which is the dot product of image feature vector and word vector. Similarly the image feature vector disk features high correlation with the word disk. Higher scores are indicated with in the image with lighter shades whereas darker shades indicate lower image sentence scores .Because of this preprocessing step for word vectors and also the cooling of all the layers in CNN that is that the image feature extracting stage this model isn't end-to-end trainable .Also while multi-modal embedding is an important start as other researches show, learning it offline through a separate model is probably unnecessary

3. PROPOSED SYSTEM

The task of image captioning aims to develop visual systems that generate textual descriptions about objects in images.Given a picture, break it right down to extract the various objects, actions, and attributes, and at last generate a present sentence (caption/description) for the image. A description must contain not only the objects contained in

an image, but it also must express how these objects relate to each other as well as their attributes and the activities they are involved in. The description must also be presented in a semantically correct format in a natural language like English. Hence we also need a language model in addition to the visual understanding.Thus the matter boils right down to 2 things - image analysis to urge options, so a language model to come up with important captions

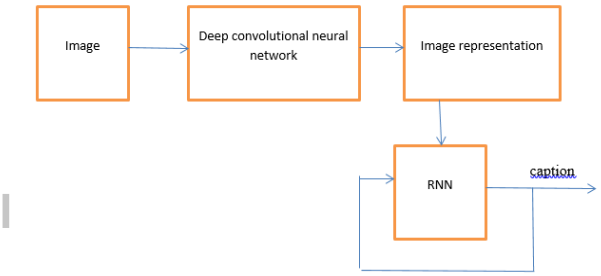

Fig:3 architecture

3.Implementation details

In this paper two summarization algorithms are implemented which mainly focuses on research papers of the given area. The two algorithms are, as follows

- Convolution neural networks
- Recurrent neural networks

3.1 .Convolution neural networks

Convolutional Neural Networks (CNNs) are a specific form of FNNs that explicitly assume the inputs to the network be structured samples, such as audio signals or image pixels which can be filtered. These architectures usually specialize in solutions for pc vision applications, like classification, localization and segmentation of pictures and videos .So far it has been assumed that layers in FNN are fully-connected, thus making each input contribute to the output of all hidden layers.If a fully-connected FNN were to be used for associate application that uses associate input from a VGA camera, whose customary resolution would be 640x480x3, then each hidden neuronshall have 921,600 weights for the connections between the input and initial hidden layer alone.An image of this dimension would need the primary hidden layer to own thousands of neurons.The model would have a billion weight parameters just for the connections between input and hidden layer. This is unacceptable both in terms of the computational power and memory requirements.

3.1.1.Convolution layer

To prevent the networks from having too many parameters, the fully-connected layers are replaced by convolutional layers in a FNN, leading to CNN models. In convolutional layers (CONV), the hidden neurons are replaced with convolutional filters .Instead of resolution for somatic cell weights, we solve for a family of filters, each filter having its own weights. The convolutional layers arrange the neurons in a 3D fashion using the height, width and depth for the signal being processed. Fig 4shows a comparison of a fully-connected conventional FNN and a CNN. Each layer in the depth dimension, aka depth slice, of the CONV layer is analogous to a filtered signal used for digital image processing, where each filtered signal came from a learned filter, whose weights shall be learned throughout the coaching method

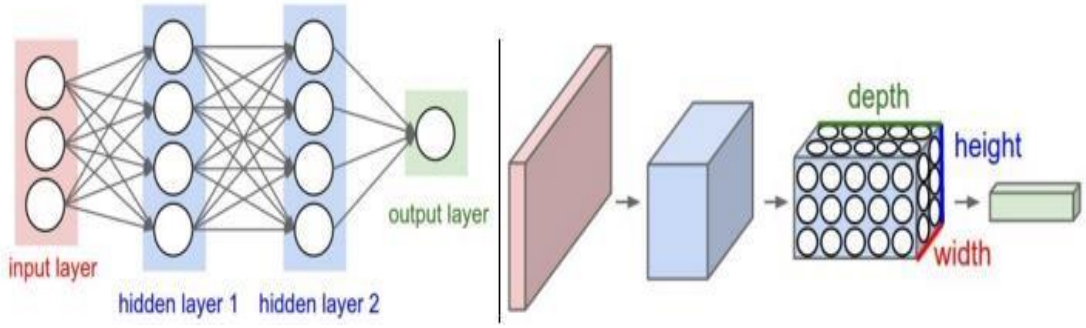

Fig 4. Comparison of FNN and CNN.

3.1.2.Depth

The depth of the convolutional layer, determines the number of different neurons that process the same receptive fields which is called the depth column, with a different set of weights. For example, in ancient gray scale image process, filter could also be of size 5x5.If the image were and color RGB image, the filter would be extended to 5x5x3. The underlying idea is similar to connecting the same input node being processed by multiple hidden nodes in traditional FNN architectures. The objective of having multiple neurons processing the same receptive field is to identify and capture different features for the same input region. Each filter applied to the input image (regardless of

the depth), outputs a single output plane. The number of filters, and thus the depth of the convolutional layers are increased as the network moves from input to output as the network switches from capturing simple features to more complex features within images. The depth of the convolutional layer should not be confused with the depth of the CNN which is the number of hidden layers in a CNN.

3.1.3.Stride

While the depth is determined by the number of input planes to a filter, the stride determines the step value across and down the image as the convolution is performed. The filter width, height, depth, and stride are used to construct the 3D convolutional layer. A unit stride implies the need for introducing new depth columns for spatial regions of the image that are a unit distance apart. The stride should be chosen carefully as low stride values lead to a higher number of resolution per each filtered image, with a high overlap in the receptive fields leading to an increased redundancy in weights. Contrarily, higher stride values yield lower resolution filtered images, at the cost of an increased risk in rapid loss of vital information due to many input parameters contributing to a relatively smaller set of parameters

3.1.4.Output volume of CONV

The output volume of each CONV layer is the dimensions of the output of convolutional layer, is calculated using (11), (12) . Let Hin, Win, Din and $Hout$, $Wout$, $Dout$ be the height, width and depth of input and output of a given convolutional layer. In addition, let it be assumed that the hyperparameters receptive field, depth, stride and zero padding size are given byHrf x Wrf, K, S and P respectively.Then the output volume parameters may be obtained by the subsequent equations.

$$Hout = (Hin - Hrf + 2 * P + 1)/S$$
$$Wout = (Win - Wrf + 2 * P + 1)/S$$
$$Dou = K$$

The stride value S needs to be picked such that H_{out}, W_{out} are integral values.

3.1.5.Parameter Sharing

In observe, there square measure a awfully few applications that value pel values at totally different|completely different} locations in a picture with different filter values.Thus, a parameter sharing scheme would lead to a great improvement in terms of the computational power, training time and memory requirements. Now that there is only one set of weights per filter for all the pixel values, the output of the CONV layer can be computed as a 3D convolution between the input and the filter weights.This is really the explanation for naming this specific FNN architectures as Convolutional Neural Networks.

3.1.6.Benefits

Based on what has been discussed so far the number of neurons in the convolutional layer shall be $Hout * Wout * Dout$ and each of these neurons has $Hrf * Wrf * Din$ + 1 weight parameters. Considering the previous VGA input image with dimensions 640x480x3 with a stride of 5, a receptive field of 5x5, a filter size of 100, and a zero padding size of 0, the output volume becomes 127x95x100 and each of the neuron in the CONV has 5*5*3+1,i.e. 76 weights.Thus the convolutional layer shall have ninety one,694,000 weight parameters that is incredibly high

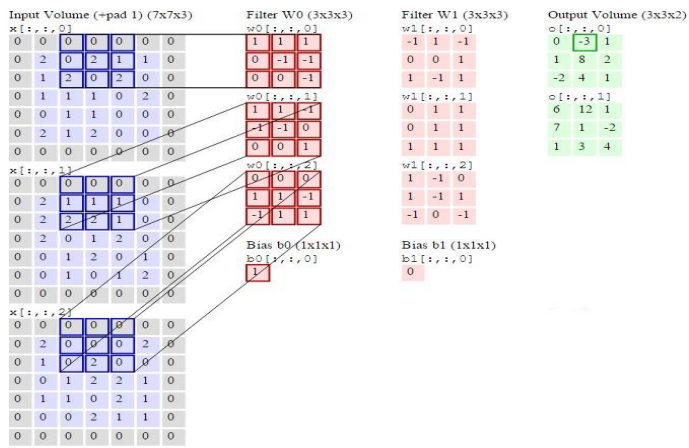

Fig 5. Output computation for CONV illustrated using a 5x5x3 input.

computation for $Dout$ filters every having $Hrf * Wrf * Din$ + one weight parameters. This reduces, the parameters of the illustrative model to 7600 from ninety one,694,000 that may be a vast improvement.Fig eighteen shows output computation for a convolutional layer with inputs of size 5x5x3, receptive field of 3x3, zero size of one, depth two and stride two.

3.2. CNN Architecture

CNNs are made up of four kinds of layers. The main constituent is the convolutional layer, CONV. The focus in this section will shift to the other three layers that constitute the CNNs.They are RELU layers (RELU), Pooling layers (POOL) and absolutely Connected layer (FC).

3.2.1.Pooling Layers

computing the output volume for the CONV layer requires a careful choice of architectural specifications such that the parameters of the output volume always yield integral

outputs. Also, it is important to consider the fact that the aforementioned equations are used recursively over multiple CONV layers where the output of the first CONV layer becomes the input to the second and so on until the end. Instead of going through the painstaking process of solving these equations, it is much simpler to fix the stride to 1 and the receptive field to some constant for all the convolutional layers and adjust the padding size such that the input and output always have the same spatial dimensions .using this system to change the planning method as against [3] that will it the sophisticated approach.However, now that more researchers are preferring the simpler approach; it is essential to have a mechanism through which the spatial features can be downsized when moving away from the input layer towards the output layer thus effectively moving away from more number of simpler feature to less number of complex features. This can be achieved by using pooling methods. The pooling layer reduces the spatial dimensions of the output volume and keeps the number of weight parameters in check. The pooling operation, works on each depth slice of the input and down samples it.The pooling operation uses 2 parameters receptive field and stride.

Let H_{ip}, W_{ip}, D_{ip} and H_{op}, W_{op}, D_{op} be the height, width and depth of input and output of a given pooling layer. In addition, let it be assumed that the receptive field and stride are x W_{rf} and S respectively. Then the output parameters of the POOL layer can be obtained by the following equations.

$$Hop = (Hip - Hrf + 1) / S$$

$$= (p - Wrf + 1) / S$$

$$Dop = Dip$$

Large receptive fields are usually not used as that may throw away loads of information .The reduction in the number of parameters shouldn't be at the cost reduced accuracies of the CNNs. Some of the foremost common pooling techniques are mentioned below.

3.2.2.Max Pooling

The max pooling technique replaces all the elements of the receptive field in the input with the maximum element in the receptive field for the output. Then it moves with the specified stride to the next receptive field in the input. The most common values are 3x3 receptive fields with a stride of 2 and 2x2 receptive fields with a stride of 2. The former is referred to as overlapping max pooling, while the latter goes by non-overlapping max pooling. The latter is the most commonly employed pooling technique. Fig 7(a).provides visual image for down sampling through pooling in conjunction with Fig 7(b).which illustrates non-overlapping max pooling with an example.

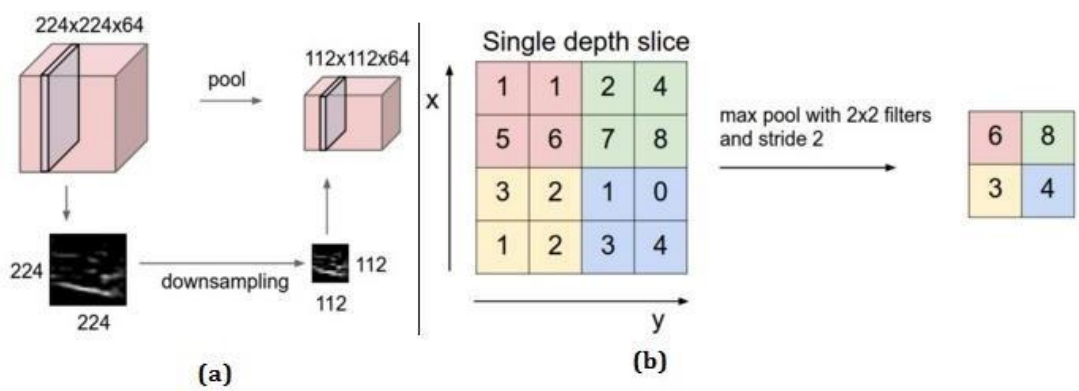

Fig 6. Downsampling the output size through pooling.

(a) Visualization of down sampling of an image using non-overlapping max pooling.

(b) Illustrative example of non-overlapping max pooling.

3.2.3.Average Pooling

The average pooling method replaces the receptive field with a single element whose value is equal to the mean of all the elements in the receptive field.This technique has been used traditionally however isn't any longer favored because it has been through empirical observation incontestible that goop pooling outperforms average pooling.This is most likely due to the fact that max pooling retains the most prominent information while averaging blurs out details during downsamplingL2 PoolingThe L2 pooling method computes the L2 norm of all the elements in the receptive field and replaces the receptive field with this value. The L2 norm is just the square root of the sum of squares of all elements in the receptive field.

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3.2.4.Fully Connected layers

As previously talked about, fully connected (FC) layers are hidden layers where all the input nodes connect and contribute to all the output nodes. A fully connected layer can thus be represented as a special case of a convolutional layer where the receptive field of the filters is equal to the spatial dimensions of the input, with a padding size of zero and no stride, thus producing an output volume of 1x1xK, where K is the number total number of neurons in the FC layer. This relation between the two helps in implementing both FC and CONV layers the same way for CNNs.Now that all the layers involved in a CNN architecture have been discussed, it is time to evaluate the architecture of a typical CNN. A typical CNN architecture is shown inFig 7.

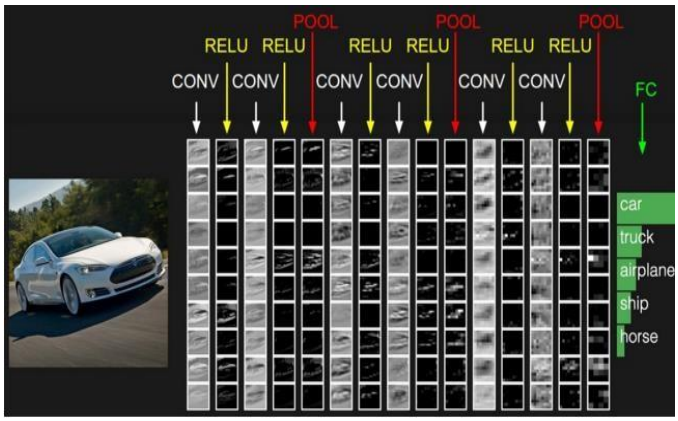

Fig 7 : CNN architecture for a typical image classification problem.

Typically, the POOL layer is not used after each CONV and RELU layers.This is as a result of exploitation multiple convolutions with smaller receptive field area unit typically most popularover one CONV layer with a bigger receptive field. CONV layers with smaller receptive field has a similar result as exploitation one convolutional filter with giant receptive field, with the addedbenefit of having a lower range of parameters overall.To demonstrate this they have replaced a 7x7 convolutional filter with a 3x3 convolutional filter and used the 3x3 filter thrice.Performing a 3x3 convolution thrice would cowl a similar space as a 7x7 filter would.However a 7x7 filter would have 49 parameters and all the three 3x3 filters combined would have 27 parametersThus, smaller filters perform a similar job with abundant fewer parameters.Furthermore using more number of CONV layers with smaller filters to do the same job, will increase the depth of the CNN architecture, and will increase the non-linearity introduced in the data leading to better classification results. Despite all these advantages, a CONV layer with large receptive field can be used in the first layer, if the spatial co-ordinates of input to the CNN is very high and needs to be reduced in the output volume

3.3.Recurrent Neural Networks

Recurrent Neural Networks (RNNs) are ANNs wherein the neurons are allowed to form cyclical connections with themselves and are allowed to connect with other neurons within the same layer. A baseline RNN is depicted in Fig 8. Two specific RNN architectures include the Simple Recursive Networks (SRNs) and Long Short Term Memories (LSTMs), each of which is described and analyzed in the sections that follow.

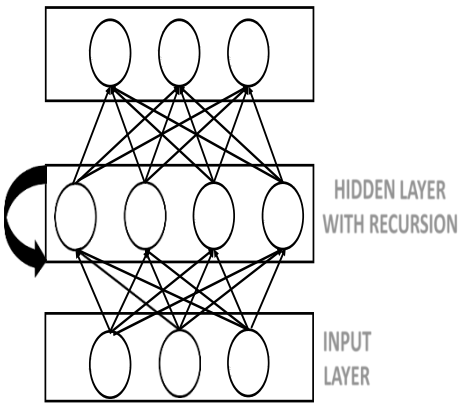

Fig 8. RNN displaying the characteristic cyclical connections.

3.3.1,Simple Recurrent Networks

A Simple Recurrent Network is a basic RNN with both cyclical and in layer connections. The architecture of a SRN can be depicted as shown in the fig 9a and fig 9b. Both these figures represent the same architecture. While the former depicts the conventional representation with the recursive connection, the latter gives an insight into the working of an RNN by depicting what happens during each time step and how the previous output of the hidden layer impacts the output of the current hidden output, along with the current input. As the output is depend on the

previous hidden state(s), the output of the previous time step is impacting the current output

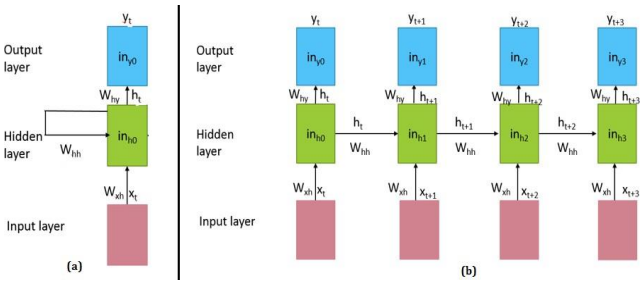

Fig 9. SRN architecture with one hidden layer.

(a) SRN architecture with all weight parameters, inputs and outputs labelled.
(b) Visualization of the impact of previous hidden states on current output using an unrolled SRN.

4. RESULTS AND PERFORMANCE EVALUATION

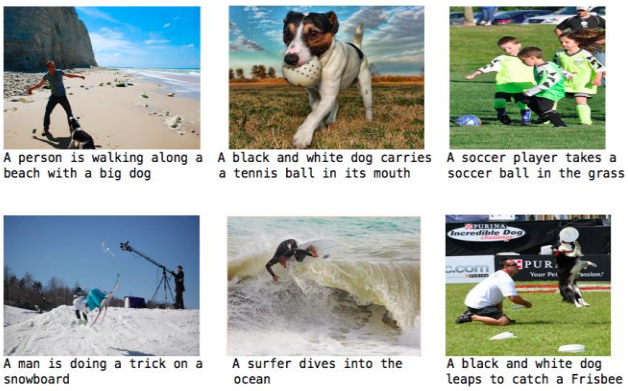

Fig 10: results

5. CONCLUSION AND FUTURE WORK

Conclusion

Image captioning has become a most recent field of research since it includes the task of computer vision and also natural language processing. It has been shown in this work we have successfully used for generating the captions of images by using neural network methods. All the existing techniques reflect some issues. The proposed method overcomes all those issues and can be used as best of all techniques.

Future Scope

Automatic image captioning is a relatively new task, thanks to the effort s made by researchers in this field, great progress has been made. In our opinion there is still much room to im- prove the performance of image captioning. due to the lack of paired image-sentence training set, research on utilizing unsupervised data, either from images alone or text alone, to improve image captioning will be promising. Fourth, current approaches mainly focus on generating captions that are general about image contents. However Research on solving image captioning problems in various special cases will also be interesting.

6.ACKNOWLEDGEMENT

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A Novel Multilevel Solar Inverter through Dispensed Maximum Power Point Tracking

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Abstract:-- **The prospective paper presents a measured cascaded H-bridge multilevel photovoltaic (PV) inverter for single-or three-stage grid associated applications. The secluded cascaded multilevel topology improves the effectiveness and adaptability of PV systems. To acknowledge better use of PV modules and boost the solar energy extraction, an appropriated maximum power point tracking control plot endure connected to both single-and three-stage multilevel inverters, whichever permits free control of every dc-link voltage. For three-stage grid-associated applications, PV confounds might present unequal provided power, prompting uneven grid current. To comprehend this issue, a control conspire among modulation compensation endure likewise proposed. A test three-stage seven-level cascaded H-bridge inverter has been fabricated using nine H-bridge modules (three modules for exclusive stage). Every H- bridge module endure associated among a 185-W solar panel. Simulation results obtain exhibited to confirm the practicality of the prospective methodology.**

Keywords:- cascaded H-bridge inverter ,photovoltaic (PV) inverter nine H-bridge modules

1. INTRODUCTION

Solar Power Systems

A photovoltaic framework, also sun based PV control framework, or PV framework, endure a power conspire intended to supply usable sun powered power beyond methods for photovoltaic's. It comprises of a course of action of a few parts, including sun powered boards to ingest and change over daylight into power, a sun powered inverter to change the electric flow against DC to AC, equitable as mounting, cabling and other electrical accomplices to set up a working framework.

Entirely, a sun powered cluster equitable incorporates the group of sunlight based boards, the unmistakable piece of the PV framework, and does exclude the various equipment, frequently outlined as parity of plan (BOS). Besides, PV frameworks convert light specifically into power and shouldn't act mistaken for different advancements, for example, concentrated sun oriented power or sun oriented warm, utilized for warming and cooling. PV frameworks run against little, rooftop top mounted or assembling coordinated frameworks among limits against a couple to a few several kilowatts, to expansive utility-scale control stations of many megawatts. associated, while off-lattice or remain solitary frameworks represent a little bit of the market. Working quietly and among no moving parts or ecological emanations, PV frameworks have created against being specialty advertise applications into a develop innovation utilized for standard power age. A housetop conspire recovers the contributed vitality for its assembling and establishment inside 0.7 to 2 years and creates about 95percent of net clean sustainable power source over a 30-year administration lifetime.

Because of the exponential development of photovoltaic, costs for PV frameworks have quickly declined as of late. latest any case, they shift beyond market and the span of the framework. latest 2014, costs for private 5-kilowatt frameworks latest the United States were around $3.29 per watt,[4] while latest the exceptionally infiltrated German market, costs for housetop frameworks of up to 100 kW declined to €1.24 per watt.[5] Nowadays, sun powered PV modules represent not exactly 50% of the system's beyond and large cost leaving the rest to the rest of the BOS-segments and to delicate costs, which over incorporate client obtaining, allowing, review and interconnection, establishment work and financing costs. Notwithstanding, ready obtain two power change organizes latest this setup. Another fell inverter endure appeared latest Fig. 1(f), where exclusive PV board endure associated among its own dc/air conditioning inverter, and those inverters obtain again put latest arrangement to achieve a high-voltage level . This fell inverter would keep up the advantages of "one converter for every board, for example, better use per PV module, capacity of blending distinctive sources, and excess of the framework.

What's more, this dc/air conditioning fell inverter evacuates the requirement for the per-string dc transport and the focal dc/air conditioning inverter, which over further improves the general proficiency. The particular fell H-connect staggered inverter, which over requires a

confined dc hotspot for every H-connect, endure one dc/air conditioning fell inverter topology.

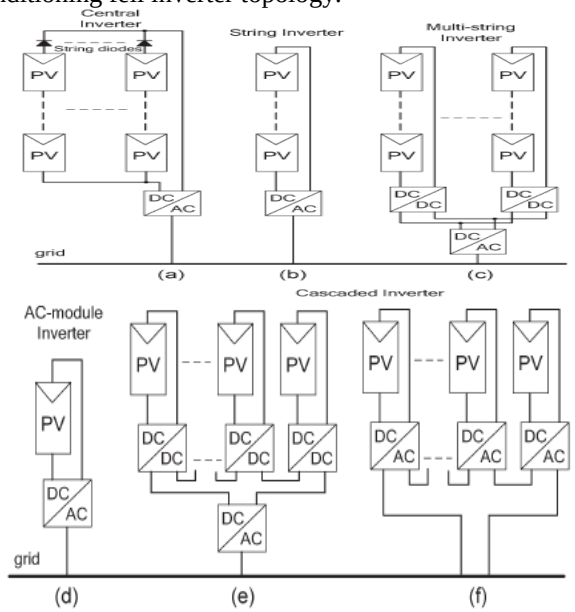


Fig. 1 Configurations of PV systems. (a) Central inverter. (b) String inverter. (c) Multi string inverter. (d) AC-module inverter. (e) Cascaded dc/dc converter. (f) Cascaded dc/ac inverter.

A measured fell H-connect staggered inverter topology for single-or three-stage lattice associated PV courses of action stopover realistic inside this paper. The board crisscross issues act routed to demonstrate the need of individual MPPT control, and an oversee conspire through disseminated MPPT oversee stopover at such point proposed. The circulated MPPT oversee plot protect act connected to both 1 and three-stage frameworks. Inside expansion, for the exhibited three-stage lattice associated PV framework, if exclusive PV module remains worked at its owing MPP, PV crisscrosses might acquaint anomalous power provided among the three-stage staggered inverter, prompting irregular infused matrix current. To adjust the 3-stage lattice current, tweak repayment remain besides added to the oversee framework.

II. SYSTEM DESCRIPTION

Particular fell H-connect staggered inverters for 1 and three-stage framework associated PV game plan obtain uncovered inside Fig. 2.

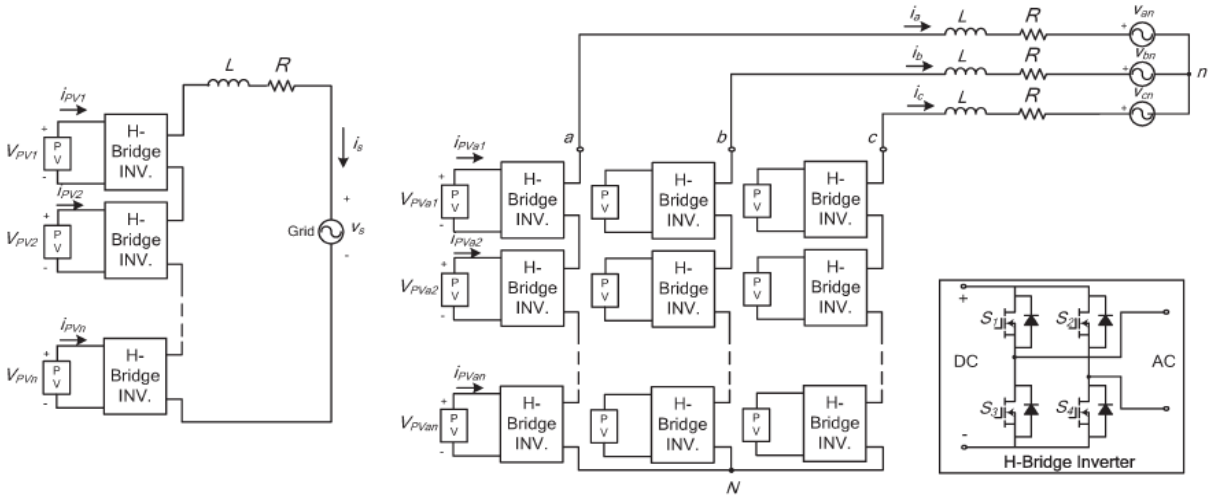


Fig. 2 Topology of the modular cascaded H-bridge multilevel inverter for grid-connected PV systems.

Each fragment comprises of n H-connect converters related inside arrangement, and the dc connection of exclusive H-connect save act nourished beyond a PV board or a short grouping of PV boards. The fell staggered inverter stopover irrelevant to the matrix through L channels, which over act utilized to lessen the exchanging music inside the current. Beyond various mixes of the four switches inside exclusive H-connect module, three yield Vtg levels protect act created: −vdc, 0, or +vdc. A fell staggered inverter through n input sources desire give 2n + 1 levels to orchestrate the air conditioner yield waveform. This (2n + 1) level Vtg waveform empowers the decrease of sounds inside the incorporated current, lessening the span of the required yield channels.

III. PANEL MISMATCHES

Each portion comprises of n H-connect converters related inside arrangement, and the dc connection of exclusive H-connect safeguard act bolstered beyond a PV board or a short succession of PV boards. The fell staggered inverter stopover irrelevant to the lattice through L channels, which over act utilized to diminish the exchanging sounds inside the current. Beyond various blends of the four switches inside exclusive H-connect module, three yield Vtg levels protect act produced: −vdc, 0, or +vdc. A fell staggered inverter through n input sources desire give 2n + 1 levels to combine the air conditioner yield waveform. This (2n + 1) level Vtg waveform empowers the decrease of music inside the combined current, diminishing the extent of the required yield channels.

Consider a working circumstance such exclusive board has an alternate light against the sun; board 1 has irradiance S = 1000 W/m2, and board 2 has S = 600 W/m2. On the off chance such equitable board 1 stopover followed and its MPPT coordinator decides the normal Vtg of the 2 boards, the power separated against board 1 would act 133 W, and the power against board 2 would act 70 W, as safeguard act seen inside Fig. 3.

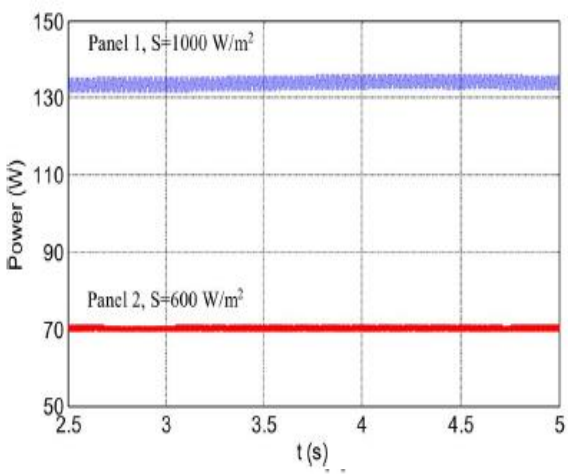


Fig. 3 Power extracted from 2 PV panels.

Without individual MPPT compose, everything impact collect starting the PV technique stopover 203 W. latest any case, Fig. 4 demonstrates the MPPs of the PV boards underneath the different irradiance. The best efficiency control guidelines inspiration act 185 and 108.5 W while the S esteems act 1000 and 600 W/m2, correspondingly, which over income to the all out power gather against the PV proposition would act 293.5 W if character MPPT protect act accomplish. These higher qualities stopover about 1.45 occasions of the 1 preceding. Latest this manner, personage MPPT manage inside exclusive PV segment wait required to intensify the proficiency of the PV association.

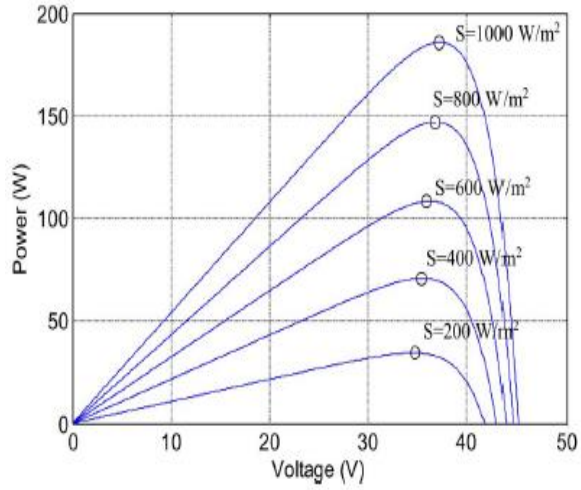


Fig. 4.P–V characteristic under the different irradiance

Inside a 3-stage framework associated PV framework, a PV crisscross might cause more issues. Aside initiating lessening the beyond and large effectiveness, this might even begin anomalous power provided to the three-stage lattice associated framework. On the off chance such ready act PV befuddles associating stage, the information impact of exclusive stage would act particular. Since the lattice Vtg stopover unbiased, this distinction inside information power desire make anomalous current the network, which over remains not permitted beyond matrix gauges.

IV. CONTROL SCHEME

A. Distributed MPPT manage

So as to annul the unfriendly impact of the jumbles and increment the productivity of the PV framework, the PV modules need to work at various voltages to improve the usage per PV module. The different dc interfaces inside the fell H-connect staggered inverter make autonomous Vtg oversee conceivable. To acknowledge individual MPPT oversee inside exclusive PV module, the oversee conspire prospective inside remain refreshed for this application. The conveyed MPPT chief of the 3-stage fell H-connect inverters remain appeared inside Fig. 5.

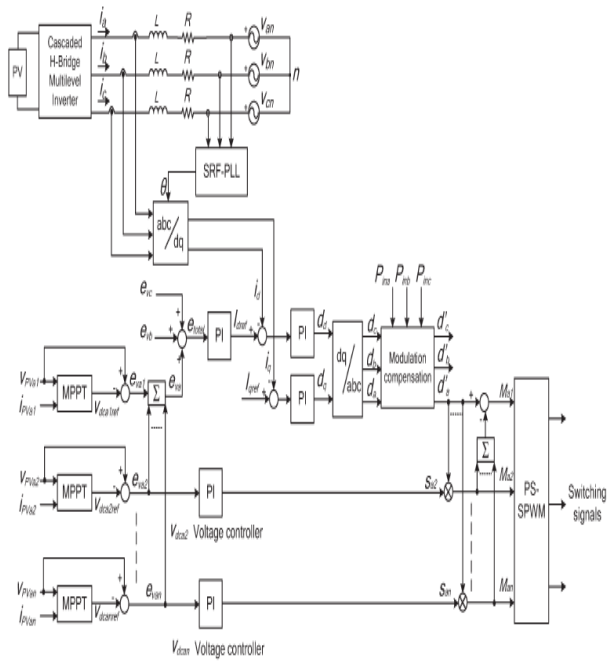


Fig. 5 manage scheme for three-phase modular cascaded H-bridge multilevel PV inverter.

Inside exclusive H-connect module, MPPT controllers remain added to create the dc-interface Vtg reference. Exclusive dc-interface Vtg remain contrasted among the relating Vtg reference, and the total of all blunders stopover controlled through an all out Vtg controller such decides the present introduction I_{dref} . The responsive current introduction I_{qref} save act set to zero, or if receptive power remuneration stopover required, I_{qref} protect latest addition act given beyond a receptive current number cruncher. The synchronous introduction outline stage bolted circle (PLL) has been utilized to discover the stage point of the matrix voltage.

The disseminated MPPT oversee conspire for the single-stage plot remain almost the equivalent. The all out Vtg controller gives the greatness of the dynamic current reference, and a PLL gives the recurrence and stage edge of the dynamic current reference. The present circle at such point gives the regulation list. To make exclusive PV module work at its owing MPP, take stage a for instance; the voltages vdca2 to vdc a act controlled separately through n − 1 circles.

A stage moved sinusoidal heartbeat width adjustment exchanging plan stopover at such point connected to deal among the exchanging gadgets of exclusive H-connect. It safeguard act seen such ready remain 1 H-connect module out of N modules chose balance index remain gotten beyond subtraction. For single-stage frameworks, N = n, and for 3-stage frameworks, N = 3n, where n remain the quantity of H-connect modules per juncture.

B. Modulation Compensation

As referenced before, a PV bungle might make more issues a three-stage particular fell H-connect staggered PV inverter. Through the individual MPPT oversee inside exclusive H-connect module; the info sunlight based intensity of exclusive stage would act extraordinary, which over acquaints strange current among the matrix. To illuminate the issue, a zero arrangement Vtg save act forced upon the stage legs inside request to influence the present streaming into exclusive stage.

In this way, the tweak pay obstruct, as appeared inside Fig. 6, remain added to the oversee plan of 3-stage particular fell staggered PV inverters. The key remain how to refresh the regulation catalog of exclusive stage without expanding the multifaceted nature of the oversee framework.

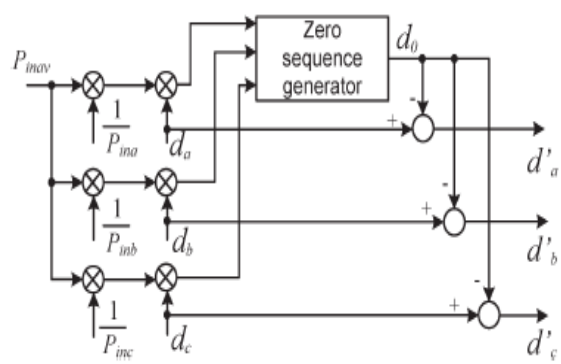


Fig. 6 Modulation compensation scheme

In the first place, the irregular power stopover weighted beyond proportion rj , which over stopover determined as

$$r_j = \frac{P_{inav}}{P_{inj}} \quad (1)$$

Where P_{inj} remain the information intensity of stage (j = a, b, c), and P_{inav} remain the normal info control. At such point, the infused zero arrangement adjustment files safeguard act produced as

$$d_0 = \frac{1}{2}[min(r_a.d_a, r_b.d_b, r_c.d_c) + max(r_a.d_a, r_b.d_b, r_c.d_c)] \quad (2)$$

Where dj remain the adjustment catalog of stage (j = a, b, c) and stopover dictated beyond the present circle controller. The tweak index of exclusive stage remain refreshed by

$$d_j' = d_j - d_0 \quad (3)$$

Just straightforward figurings act required inside the plan, which over won't expand the intricacy of the oversee conspire. A model remain exhibited to demonstrate the

tweak pay conspire all the more unmistakably. Accept such the information intensity of exclusive stage stopover unequal

$P_{ina} = 0.8 \quad P_{inb} = 1 \quad P_{inc} = 1$ (4)

By infusing a zero succession balance registry at t = 1 s, the fair-minded balance catalog desire act refreshed, as appeared inside Fig. 7. It protect act seen that, through the remuneration, the refreshed tweak catalog stopover strange relative to the power, whichever implies such the yield Vtg (vjN) of the three-stage inverter stopover uneven, however this creates the ideal impartial network current.

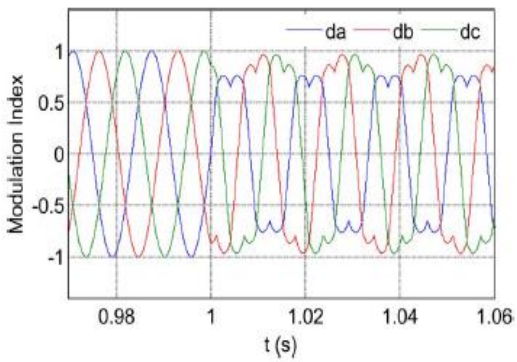


Fig. 7 Modulation indices before and after modulation compensation

V. SIMULATION RESULTS

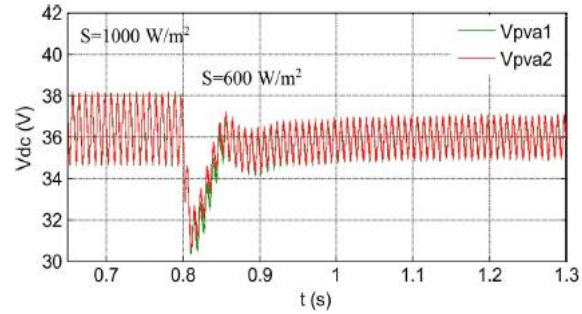
Reproduction tests act completed to approve the prospective thoughts. A particular fell staggered inverter model has been worked inside the research center. The MOSFET IRFSL4127 stays chose as inverter switches working at 1.5 kHz. Three-stage seven-level fell H-connect inverters stopover mimicked and tried. Exclusive H-connect has its owing 185-W PV board associated as an autonomous source. The inverters stopover associated among the lattice through a transformer and the stage Vtg of the auxiliary oblique remain 60 Vrms. The plan parameters obtain appeared Table I.

TABLE I
SCHEME PARAMETERS

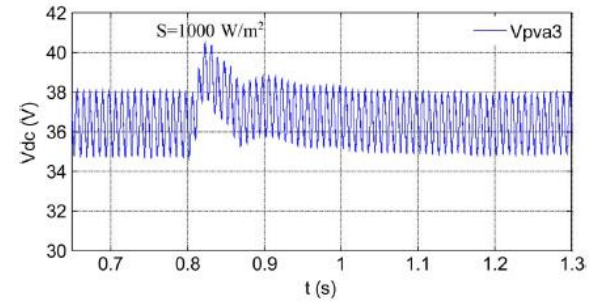
Parameters	Value
DC-link capacitor	3600 μF
Connection inductor *L*	2.5 mH
Grid resistor *R*	0.1 ohm
Grid rated phase voltage	60 Vrms
Switching frequency	1.5 kHz

A. Simulation Results

To check the prospective oversee plot, the three-stage matrix associated PV inverter stopover reproduced inside 2 disparate conditions. Initially, all PV boards act worked under a similar irradiance S = 1000 W/m2 and temperature T = 25 ◦C. At t = 0.8 s, the sun based irradiance on the first and 2 boards of fragment a reductions to 600 W/m2, and such for alternate boards remains the equivalent. The dc-interface voltages of stage a act appeared inside Fig. 8.



(a)



(b)

Fig. 8 DC-link voltages of phase a through distributed MPPT (T = 25 ◦C). (a) DC-link Vtg of modules 1 and 2. (b) DC-link Vtg of module 3

The PV contemporary waveforms of segment a act proven inside Fig. 9. After t = 0.Eight s, the currents of the first and 2d PV panels act an awful lot smaller because of the low irradiance, and the lower ripple of the dc-hyperlink Vtg maintain act discovered inside Fig. 8(a).

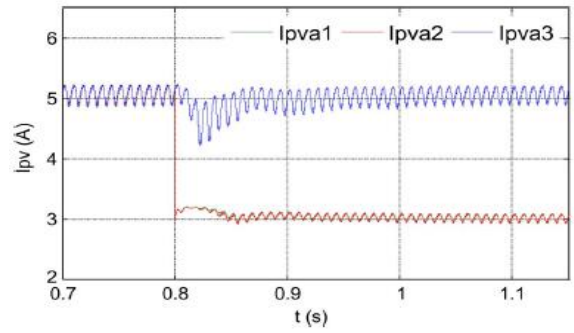


Fig. 9 PV currents of phase a through distributed MPPT (T = 25 ◦C).

The dc-interface voltages of stage b act appeared inside Fig. 10. All stage b boards track the MPP Vtg of 36.4 V, which over demonstrates such they act not impacted beyond different stages. Through the circulated MPPT control, the dc-connect Vtg of exclusive H-connect protect act controlled autonomously. Inside different words, the associated PV board of exclusive H-connect save act worked at its owing MPP Vtg and won't act affected beyond the boards associated among other H-spans.

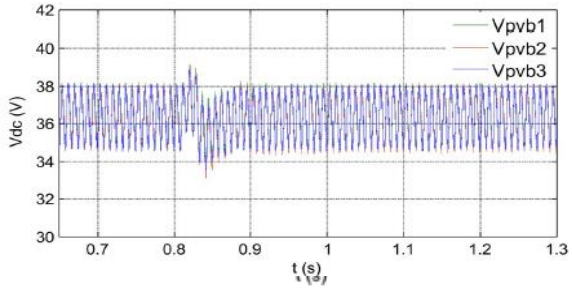


Fig. 10 DC-link voltages of phase b through distributed MPPT (T = 25 ∘C).

Thus, more solar energy maintains act extracted, and the performance of the overall PV scheme could act increased. Fig. 11 shows the power extracted against every segment. At the beginning, all panels act operated beneath irradiance S = a thousand W/m2 and exclusive section remain producing a maximum power of 555 W. After t = zero.8 s, the power harvested against phase a decreases to 400 W, and those against the alternative 2 levels stopover the same.

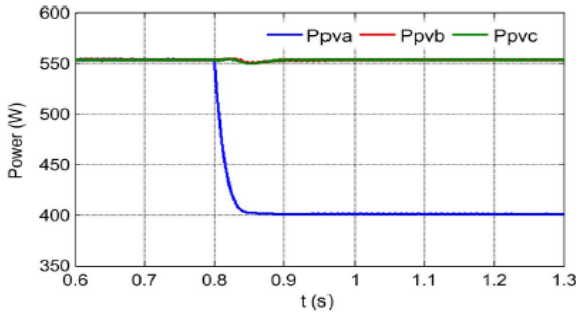


Fig. 11.Power extracted from PV panels through distributed MPPT.

Clearly, the power provided to the three-stage matrix associated inverter stopover unequal. Act such as it may, beyond applying the regulation remuneration plot, the power infused to the matrix stopover still adjusted, as appeared inside Fig. 12. Inside expansion, beyond looking at the all out power removed against the PV boards through the all out power infused to the matrix, it safeguard act seen such ready remain no additional power misfortune brought about beyond the adjustment remuneration conspire.

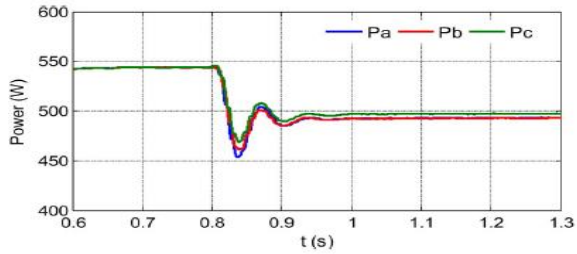


Fig. 12 Power injected to the grid through modulation compensation.

Fig. Thirteen shows the output voltages (vjN) of the 3-phase inverter. Due to the injected 0 collection thing, they act peculiar after t = 0.Eight s, which over assist to equilibrium the grid cutting-edge shown inside Fig. 14.

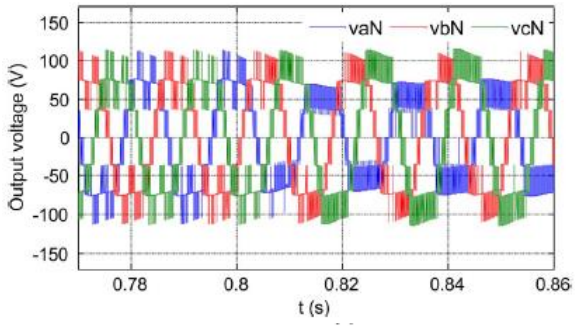


Fig. 13 Three-phase inverter output Vtg waveforms through modulation compensation.

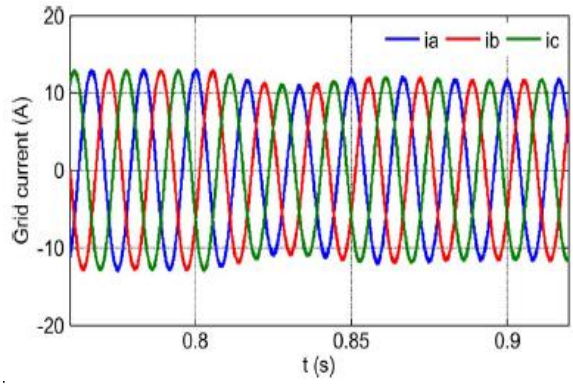


Fig. 14.Three-phase grid current waveforms through modulation compensation

VI. CONCLUSION

In this paper, a particular cascaded H-bridge multilevel inverter for grid-associated PV applications has been displayed. The multilevel inverter topology desire improve the usage of associated PV modules if the voltages of the

different dc links obtain controlled autonomously. Hence, a conveyed MPPT control conspires for both single-and three-stage PV systems has been connected to expand the general effectiveness of PV systems. For the three-stage grid-associated PV system, PV befuddles might present unequal provided power, bringing about uneven infused grid current. Modulation compensation conspire, which over expand the unpredictability of the control scheme or cause additional power misfortune, endure added to adjust the grid current. A measured 3-stage seven-level cascaded H-bridge inverter has been worked latest the lab and tried among PV panels under various fractional shading conditions. among the prospective control conspire, exclusive PV module receptacle act worked at its own MPP to augment the solar energy extraction, and the three-stage grid current endure offset even among the unbalanced provided solar power.

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Smart and Robust Speaker Recognition for Context-Aware Applications

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Abstract:-- **The importance of robust voice recognition has rapidly increased in latest years, as the numbers of applications and devices are increasing. This effect is strongly related to the Internet of Things framework, where these concepts are widely used in smart and under developing cities.In Computer Science, Context Awareness refers to the idea that devices and computer connected can both sense and react based on their environment. The use of this system can play a vital role in distinguishing between actual user and normal user so that it can customise the services. Driven by this motivation, in this paper we present a speaker recognition system design to get efficient output in challenging and robust conditions. We proposed this system by embedding a smart pre-processing method based on the features of voice which can efficiently extract features of the voice and detect the user by feature matching by using Gaussian Mixture Model algorithm. Moreover, it can reduce the influence of noise and other factors affecting the classification. Results shown that this system can improve the classification rate for detecting the actual user even in the case of noisy environment.**

Keywords:- speaker recognition, smart pre-processing, Gaussian Mixture Model, noise.

1. INTRODUCTION

Speaker recognition is the process of finding identity of a speaker using his/her voice. In other words we are able to find the person who is speaking. In present day this kind of applications used for biometric and security purpose. It can provide an alternative and more secure means of permitting entry without any need of remembering a password, lock combination. The system need only voice sample of a person to grant access. The principle of this system is that every person speaks a content with different frequencies. We take advantage this variations in frequency for identifying speaker. Speaker recognition is mainly divided into speaker verification and identification. Speaker verification is the process of verifying whether a person is a valid speaker or not. Speaker identification is finding identity of speaker. In this paper we mostly discuss about speaker identification. Before we go deeper we need to remember that environment of a speaker is always not same and speaker could use different words for his identification. We designed a robust system which can work in different environment but we use same text during training and testing of the system. This makes identification process easier. To design such kind of system we need to pre-process the audio samples collected for a speaker. The number of samples per user should be a minimum of five. We split these audio signals into small frames so that we can process the signals deeper. Once we are done with framing we perform pre-processing followed by feature extraction. For feature we use Mel-frequency cepstral coefficients(MFCC). MFCCs helps in identifying the linguistic content and discarding all the other stuff which carries information like background noise, emotion etc. Finding MFCCs includes framing, power spectrum calculation, filter-banks and DCT. Using MFCC we collect up-to 20 coefficients per speaker. Now we finally use GMM model to train the system using MFCC values. During Speaker identification(testing), we use this trained model to identify speaker. (In this paper pre-processing included in MFCC).

2. RELATED WORK

The literature survey for research was done by referring to various journal papers, conference papers, articles and internet. In this paper we improve the efficiency and accuracy of speaker recognition system in different kinds of applications in which this system is used.These early speech recognition system tried to apply a set of grammatical and syntactical rules to identify speech. These solutions usually exploit in-formation related to the users, in order to analyse the users voice they require a certain amount of time to collect features[1].

Speech recognition research has been going on for about 80 years in which there has been at-least 4 generations of approaches, and a 5th generation of approach being a present theme of research. In the current state, there are several methods for automatic classification of utterances into emotional state has be proposed. However, the reported error rate are rather high, far behind the word error rates in speech recognition. Their research has given way for performance optimisation by the use of self-

adaptive genetic algorithm. This paper consists of self-adaptive genetic algorithm to increase the probability of correct classification.

In a comparative study of past work in voice recognition and reviews by modern recognition systems and humans in order to determine how far the recent dramatic advances in technology had made progress towards the goal of human-like performance is performed. Results from random study which have compared humans and machine speech recognition on similar tasks are being summarised to determine the degree to which voice recognizer must improve to match the human performance[2][3].

3. SPEAKER RECOGNITION SYSTEM ARCHITECTURE

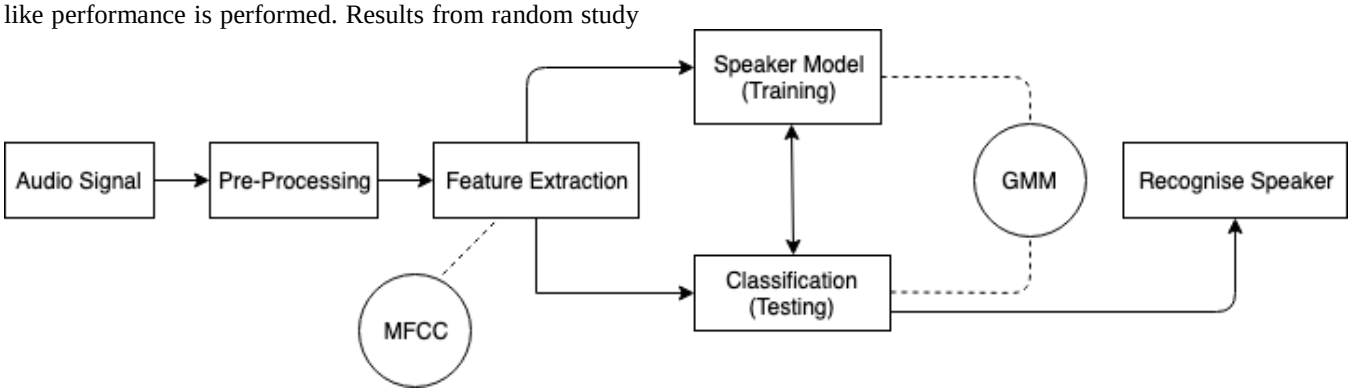


Figure 1: System Architecture

The overview of employed architecture is illustrated in the Figure 1. The proposed system is to recognise the speaker closest to feature analysis produced by the unknown user. Speech is the primary means of communication between living beings and is the interface for the humans with various developing technologies which works on voice i.e Internet Of Things. These technology was increasingly used around the world for the auto-machining and ease of living life's. Independently of this specific aspect, the general design of the proposed speaker recognition architecture is to identity the user in various environmental conditions.

The acquired audio signals fed into pre-processing stage, in which truncation, frame blocking, sampling, and noise cancellation, windowing, and short term fourier transform of the given audio input is processed. Details of this stage is discussed in Section IV.

When the audio signal is pre-processed, we proceed to feature extraction phase. In this stage speech features are computed. The best algorithm used for extraction is Mel Frequency Cepstral Coefficients (MFCC). Details of this phase are reported in Section V. After the extraction phase, the aforementioned features will be used to train a supervised classifier, in order to build proper speaker model. De-tails of this model is discussed in Section VI[3].

4. PRE - PROCESSING

In development of this system, pre-processing is considered to be the first phase of other phases to differentiate between voiced signal and unvoiced signal and create feature vectors. In this phase the speech signal increases the amplitude of high frequency bands and decrease the amplitudes of lower bands which is implemented by FIR filter.

Sampling: The sampling rate of the signal will change based on the desired measurement being the frequency or the shape of the signal. To accurately measure the frequency of a signal, we need a sampling rate of at least twice the highest frequency in the signal. This concept is known as Nyquist's theorem. To get the shape of the signal, you will need a sampling rate of at least ten times higher than the highest frequency in the signal. The equation for frequency measurement is found below:

$$f_{max} = f_{Nyquist} = \frac{fs}{2}$$

where,
fmax is the maximum resolvable frequency
$F_{Nyquist}$ is the N_{yquist} frequency
fs is the sampling frequency, To measure the shape of the signal, fs will need to be divided by 10 instead of 2.

The frequency resolution (df) is dictated by the acquisition time:

$$df = \frac{1}{T} = \frac{fs}{N}$$

where T is the period of the signal
N is the number of samples acquired
fs is the sampling frequency

For example, a signal with frequency 50 Hz, there will need to be at least 0.02(1/50) seconds of data for a full period of the signal. At a sampling rate of 100 Hz for a frequency measurement, N will be 5000.

Truncation:
The default sampling frequency of wavread command is 44100 Hz. When an audio clip is recorded, say for a duration of 2 secs, the number of samples generated would be around 90000 which are too much to handle. Hence we can truncate the signal by selecting a particular threshold value. We can mark the start of the signal where the signal goes above the value while traversing the time axis in the positive direction. In the same, we can have the end of the signal by repeating the above algorithm in the negative direction.

Noise Cancellation:
Noise is ubiquitous in almost all acoustic environments. The speech signal, that is recorded by a microphone is generally infected by noise originating from various sources. Such contamination can change the characteristics of the speech signals and degrade the speech quality and intelligibility, thereby causing significant harm to human-to-machine communication systems. Noise detection and reduction for speech applications is often formulated as a digital filtering problem, where the clean speech estimation is obtained by passing the noisy speech through a linear filter. With such a formulation, the core issue of noise reduction becomes how to design an optimal filter that can significantly suppress noise without noticeable speech distortion.

Frame Blocking:
In this step the continuous speech signal is divided into frames of N samples, with adjacent frames being separated by M samples with the value M less than that of N. The first frame consists of the first N samples. The second frame begins from M samples after the first frame, and overlaps it by N - M samples and so on. This process continues until all the speech is accounted for using one or more frames[3]. We have chosen the values of M and N to be N = 256 and M = 128 respectively. Figure 3 below gives the frame output of the truncated signal. The value of N is chosen to be 256 because the speech signal is assumed to be periodic over the period. Also the frame of length 256 being a power of 2 can be used for using a fast implementation of Discrete Fourier Transform (DFT) called the FFT (Fast Fourier Transform).

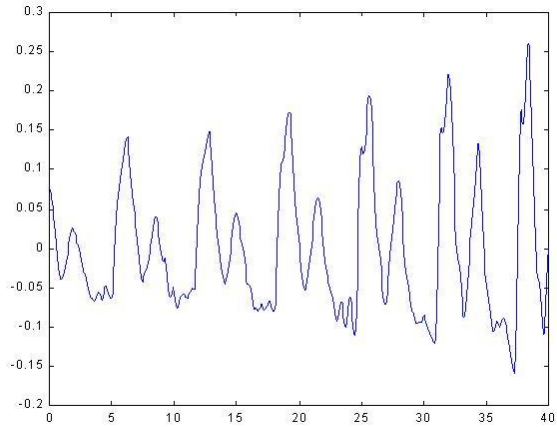


Figure 2 Frame output of truncated signal

Windowing:
The next step is to window each individual frame to minimize the signal discontinuities at the beginning and end of each frame. The concept applied here is to minimize the spectral distortion by using the window to taper the signal to zero at the beginning and end of each frame. If we define the window as w(n), $0 \le n \le N-1$, where N is the frame length, then the result of windowing is the signal.

$$y(n) = x(n)w(n),\ 0 \le n \le N-1$$

Hamming Window:

$$w(n) = 0.54 - 0.46\cos\left(\frac{2\Pi n}{N-1}\right),\ 0 \le n \le N-1$$

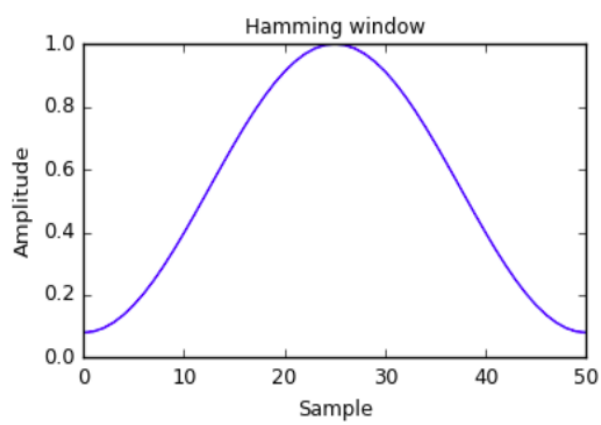


Figure 4: Hamming Window

Short Term Fourier Transform (STFT):
The next step is the application of Fast Fourier Transform (FFT), which converts each frame of N samples from the time domain into the frequency domain. The FFT which is

a fast algorithm to implement the Discrete Fourier Transform (DFT) is defined on the set of N samples $\{x_n\}$, as follows:-

$$X_k = \sum_{n=0}^{N-1} x_n e^{\frac{-j2\Pi kn}{N-1}} \quad , k = 0,1,2,3,..,N$$

In general X_k"s are complex numbers and we consider only their absolute values. The resulting sequence $\{X_k\}$ is interpreted as follows: positive frequencies $0 \le f < F_s / 2$ correspond to values $0 \le n \le N / 2 - 1$, while negative frequencies $-F_s / 2 < f < 0$ correspond to $N / 2 + 1 \le n \le N - 1$. F_s denotes the sampling frequency. The result after this step is often referred to as spectrum or periodogram[3].

5. FEATURE EXTRACTION

Feature Extraction is the most important step in automated speech recognition. Since speech signals are unstable in nature, statistical representations should be generated for representation of the speech signal variability which is achieved by performing feature extraction. These features can be obtained by spectrogram of the speech signal, and we are using Mel-Frequency Cepstral Coefficients (MFCC) features in speaker identification, the advantages of perceptual frequency scale based critical bands with cepstrum analysis are combined[1][3].

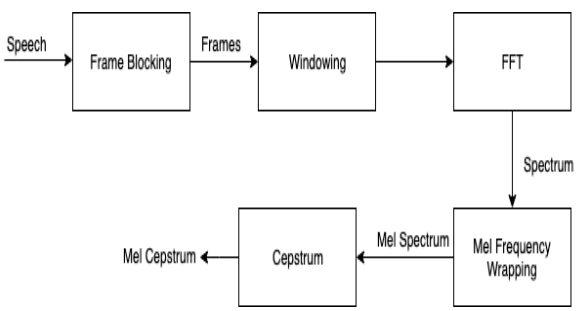
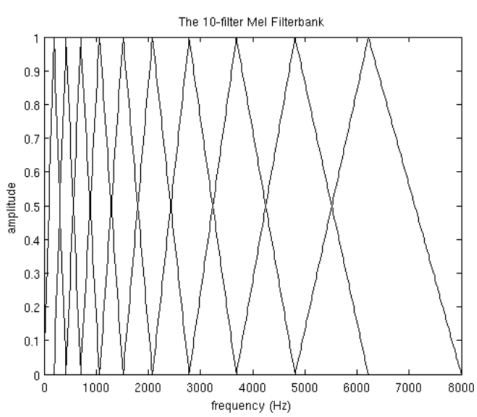


Figure 4 Mel Frequency Cepstral Coefficients



The MFCC processor involves the following steps:

Mel Frequency Wrapping:

As given in the block diagram we have already subjected the continuous speech signal to frame blocking, windowing and FFT in the pre-processing step. The result of the later step is the spectrum of the signal. Psychophysical studies have revealed that human perception of frequency content of sounds for speech signals doesn't follow a linear scale. For each tone with an actual frequency f, a subjective pitch is measured on a scale called the „mel" scale. The mel-frequency scale provides a linear frequency spacing below 1 KHz and a logarithmic spacing above 1 KHz. The Mel Frequency Scale is given by:-

$$F_{mel} = (1000/\log(2)) * \log(1 + f/1000)$$

One approach towards simulating the subjective spectrum is to use a filter bank which is spaced uniformly on the mel-scale. The filter bank has a triangular band pass frequency response. The spacing and the bandwidth is determined by a constant mel frequency interval. We choose K, the number of mel spectrum coefficients to be 20. This filter bank being applied in the frequency domain simply amounts to applying the triangle-shape windows to the spectrum. A useful way to think about this filter bank is to view each filter as a histogram bin (where bins have overlap) in the frequency domain. Figure 6 below gives an example of a mel-spaced frequency bank.

Cepstrum:

In this final step, we convert the log Mel spectrum to time domain. The result is called the MFCC (Mel Frequency Cepstral Coefficients). This representation of the speech spectrum provides a good approximation of the spectral properties of the signal for the given frame analysis. The Mel spectrum coefficients being real numbers are then converted to time domain using Discrete Cosine Transform (DCT). If we denote the Mel power spectrum coefficients that are the result of the last step as S_k, k = 1,2,...,K, we can calculate the MFCC's C_n as

$$Cn = \sum_{k=1}^{K} (\log S_k) \, Cos\left[n\left(k - \frac{1}{2}\right)\frac{\Pi}{2}\right] , n = 1,2,..,K$$

We exclude the first component from the DCT since it represents the mean value of the input signal which carries little speaker specific information[11].

6. FEATURE MATCHING

The problem of speaker recognition has always been a much wider topic in engineering field so called pattern recognition. The aim of pattern recognition lies in classifying objects of interest into a number of categories or classes. The objects of interest are called patterns and in

our case are sequences of feature vectors that are extracted from an input speech using the techniques described in the previous chapter. Each class here refers to each individual speaker. Since here we are only dealing with classification procedure based upon extracted features, it can also be abbreviated as feature matching.

To add more, if there exists a set of patterns for which the corresponding classes are already known, then the problem is reduced to supervised pattern recognition. These patterns are used as training set and classification algorithm is determined for each class. The rest patterns are then used to test whether the classification algorithm works properly or not; collection of these patterns are referred as the test set. In the test set if there exists a pattern for which no classification could be derived, and then the pattern is referred as unregistered user for the speaker identification process. In real time environment the robustness of the algorithm can be determined by checking how many registered users are identified correctly and how efficiently it discards the unknown users. Feature matching problem has been sorted out with many class-of-art efficient algorithms like VQLBG, DTW and stochastic models such as GMM, HMM. In our study project we have put our focus on VQLBG, DTW and GMM algorithm. VQLBG algorithm due to its simplicity has been stressed at the beginning followed by DTW and GMM respectively.

7. SPEAKER MODELLING

Using Cepstral coefficients and MFCC as illustrated in the previous section, a spoken syllable can be represented as a set of feature vectors. A person uttering the same word but at a different time instant will be having similar still differently arranged feature vector sequence. The purpose of voice modeling lies in building a model that can capture these variations in a set of features extracted from a given speaker. There are usually two types of models those are extensively used in speaker recognition systems:

- Stochastic models
- Template models

The stochastic model exploits the advantage of probability theory by treating the speech production process as a parametric random process. It assumes that the parameters of the underlying stochastic process can be estimated precisely, in a well-defined manner. In parametric methods usually assumption is made about generation of feature vectors but the non-parametric methods are free from any assumption about data generation. The template model (non-parametric method) attempts to generate a model for speech production process for a particular user in a non-parametric manner. It does so by using sequences of feature vectors extracted from multiple utterances of the same word by the same person. Template models used to dominate early work in speaker recognition because it works without making any assumption about how the feature vectors are being formed. Hence the template model is intuitively more reasonable. However, recent work in stochastic models has revealed them to be more flexible, thus allowing for generation of better models for speaker recognition process. The state-of-the-art in feature matching techniques used in speaker recognition includes Dynamic Time Warping (DTW), Gaussian Mixture Modeling (GMM), and Vector Quantization (VQ)[3][4].

8. PROPOSED SCHEME USING GMM

This is one of the non-parametric methods for speaker identification. When feature vectors are displayed in d-dimensional feature space after clustering, they somehow resemble Gaussian distribution. It means each corresponding cluster can be viewed as a Gaussian probability distribution and features belonging to the clusters can be best represented by their probability values. The only difficulty lies in efficient classification of feature vectors. The use of Gaussian mixture density for speaker identification is motivated by two facts[4][5]. They are:-

1- Individual Gaussian classes are interpreted to represents set of acoustic classes. These acoustic classes represent vocal tract information.
2- Gaussian mixture density provides smooth approximation to distribution of feature vectors in multi-dimensional feature space[4].

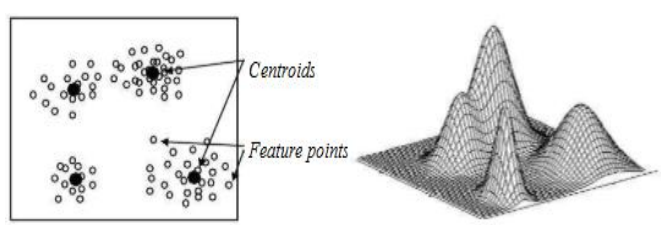


Figure 7: GMM model showing a feature space and corresponding Gaussian model

8.1 MODEL DESCRIPTION

A Gaussian mixture density is weighted sum of M component densities and given by the equation:-

$$p(\underline{x} \mid \lambda) = \sum_{i=1}^{M} p_i b_i(\underline{x})$$

where x refers to a feature vector, pi stands for mixture weight of ith component and bi (x) is the probability distribution of the ith component in the feature space. As the feature space is D-dimensional, the probability density function bi (x) is a D-variate distribution. It is given by the expression:-

1

$$b_i(\underline{x}) = \frac{}{\exp\left\{-1/2(\underline{x} - \underline{\mu_i})^t \Sigma_i^{-1}(\underline{x} - \underline{\mu_i})\right\}(2\pi)^{D/2}|\Sigma_i|^{1/2}}$$

where μ_i is the mean of ith component and $\sum_i$ is the co-variance matrix[4].

The complete Gaussian mixture density is represented by mixture weights, mean and co-variance of corresponding component and denoted as:-

$$\lambda = \left\{p_i, \underline{\mu_i}, \Sigma_i\right\} i = 1, \ldots\ldots, M$$

Diagrammatically it can be shown as:- (Figure 7)

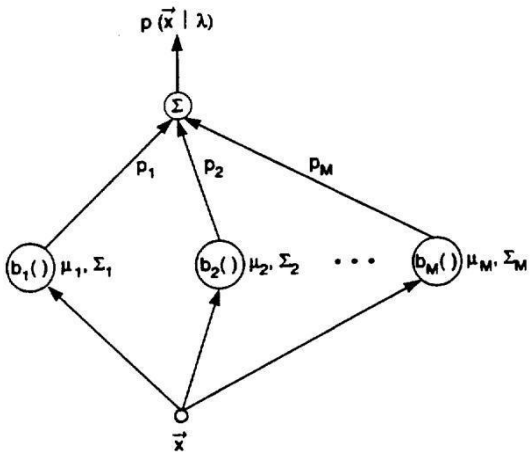


Figure 7: Description of M-component Gaussian densities

8.2 MAXIMUM LIKELIHOOD PARAMETER ESTIMATION

After obtaining the feature vectors the next task lies in classifying them to different Gaussian components. But initially we don"t know mean, co-variance of components present. Thus we can't have proper classification of the vectors. To maximize the classification process for a given set of feature vectors an algorithm is followed known as Expectation Maximization (EM)[6][7] .This algorithm works as follows:-

- We assume initial values of μ_i, Σ_i and w_i.
- Then we calculate next values of mean, covariance and mixture weights iteratively using the following formula so that probability of classification of set of T feature vectors is maximized[7][8].

The following formulae are used:-

Mixture Weights:

$$\underline{p_i} = 1/T \sum_{t=1}^{T} p(i \mid \underline{x_t}, \lambda)$$

Means:

$$\underline{\mu_i} = \frac{\sum_{t=1}^{T} p(i \mid \underline{x_t}, \lambda)\underline{x_t}}{\sum_{t=1}^{T} p(i \mid \underline{x_t}, \lambda)}$$

Variances:

$$\underline{\sigma_i^2} = \frac{\sum_{t=1}^{T} p\left(i \mid \underline{x_t}, \lambda\right) x_t^2}{\sum_{t=1}^{T} p\left(i \mid \underline{x_t}, \lambda\right)} - \underline{\mu}_i^2$$

where p(i | $\underline{x_i}$, λ) is called posteriori probability and is given by the expression:-

$$p\left(i \mid \underline{x}_t, \lambda\right) = \frac{p_i b_i\left(\underline{x}_t\right)}{\sum_{k=1}^{M} p_k b_k\left(\underline{x}_t\right)}$$

8.3 SPEAKER IDENTIFICATION

After modeling each user"s Gaussian mixture density, we have a set of models, each representing Gaussian distribution of all the components present. For K number of speakers it is denoted as λ= {λ1, λ2, λ3,……, λk }. The objective culminates in finding the speaker model λ having maximum posteriori probability for a given test utterance[8]. Mathematically it can be represented as:-

$$\hat{S} = arg\ max\ P_r(\lambda_k \mid X) = arg\ max\ \frac{p(X \mid \lambda_k)\, P_r(\lambda_k)}{p(X)}$$

9. RESULTS AND DISCUSSION

We evaluated the text independent speaker identification using phase information on NIT dataset. The speaker identification results by the table below:

Speed		Normal	Fast	Slow	Average
MFCC - based GMM		98.7	96.7	96.9	97.4
$\{\underline{\theta}\}$	(60 - 70 Hz)	52.6	51.6	51.7	52.0
	(300 - 1000 Hz)	61.0	57.6	56.6	58.4
	(600 - 1300 Hz)	31.6	31.7	34.7	32.7

The method phase $\{\underline{\theta}\}$ means the phase value obtained by the equation below was used as the speaker identification feature.

$$\underline{\theta}(w,t) = \theta(w,t) + \frac{\omega}{\omega_b}\left(-\theta(\omega_b,t)\right)$$

However, the phase information based method performed worse than MFCC based but it is useful for speaker recognition.

The below graphs shows results using a combination of MFCC and the original phase.

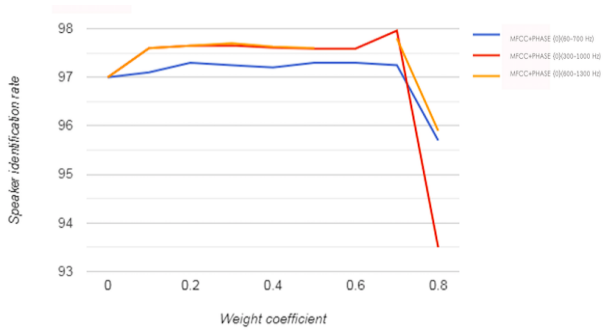


Figure 9: Results of average of 3 speaking modes.

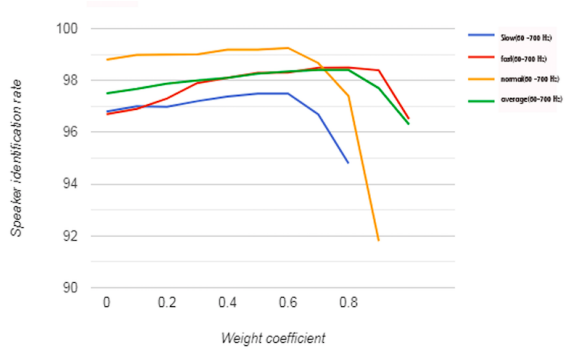


Figure 10: Results of frequency range 60-70 Hz

10. CONCLUSION

The objective of this final project was to design and implement a robust and smart speaker recognition system with user interface.This is the simulation model of the Speaker Recognition system in context aware applications.A genuine time voice recognition system is projected. It depends on MFCC for feature removal and on GMM for preparation. Firstly the voice is taken from side to side microphone and voice features are extracted by dividing voice sample into 30ms frame length with 20ms edge partly cover to the preceding edge.The speaker is recognized by comparing the log probability to the defined threshold in the system. The Speaker Recognition system needs to be evaluated on a variety of larger datasets, so that more inferences can be drawn from the results and enhancements to the Shifted MFCC can be made. Also different fusion techniques at the modeling level such as SVM Vs. GMM, HMM Vs. SVM needs to be studied, and evaluated on a variety of datasets to better understand the effect of different fusions, so that a common technique can be formulated to find the optimal fusion weights. The process of identifying human through speech is a complex one and our own human recognition system is an excellent instrument to understand this process. The human recognition system extracts several other features from a single speech signal, due to which it achieves high accuracy. The goal of a speech researcher should be to identify such missing pieces of information, in a hope to match the human recognition system someday.The emulator version of the same project could be developed to get better real time experience

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Experimental Investigation on Mechanical Properties of Pervious Concrete

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Abstract:-- **Pervious Concrete which is also called as No-amercement Concrete is a combination of cement, water and a particular size of coarse aggregate combines to form a porous structural material. The main application of pervious concrete in pavements is to focus on storm water control which occurs mostly in urban areas where scarcity of land is high. Permeable Pavement allows the water from precipitation and other sources through it and hence reduces the overflow from a site which termination in the ground water recharge and the level increases. In this Pavement coarse sum with no fine aggregates is used. The objective of this study is to know about the usage of pervious concrete and also to use high range water reducer(HWWR) as an additive and develop a strong and durable Pervious cement concrete mix. The various tests such as compressive strength are performed to determine the suitability and durability.**

Keywords:- Pervious Concrete, Permeable, high range water reducer, durability.

1. INTRODUCTION

As urbanization increases in India and also in many parts of the earthly concern there is a problem of logging of water and huge demand for drainage facility is present [1]. This is because of impervious nature of the bituminous and concrete pavements in minor aspect. Pervious concrete which has feasible open spaces help significantly to provide high school permeability due to its interconnected pores. Pervious concrete which is also called porous concrete, permeable concrete is an another type of Concrete which haves high porosity is used for concrete flatwork applications that allows water from precipitation and other sources to penetrate directly through and by that reduces the runoff from a site and allowing groundwater recharge. Large sized aggregates without fine aggregates is used to prepare pervious concrete. In the United States pervious concrete has been used for over 30 years. It was first used in the 1800s in Europe as pavement surfacing and load bearing walls [2]. Cost efficiency was the main motive because of omission of sand.

2. EXPERIMENTAL MATERIALS AND MIX PROPORTION

2.1. Cement

In this 53 grade Deccan Cement (OPC) is used. The color of cement is gray and free from lumps. As per IS: 12269:2013. Tests are performed for cement and are according to standards.

2.2. Mix Proportion [3]

Mix	Cement (kg/cu.mt)	Aggregate (kg/cu.mt)	Water (lit/cu.mt)
Ratio	1	4	0.33
Quantity	450	1800	135

Table I: Mix proportions

Preparation of Sample and Testing:
Mechanical properties of hardened concrete are found out by performing tests of compression strength, flexural strength, porosity and permeability [1]. In order to calculate the compression strength, cylinders of dimensions 100x200 mm are used [10]. The proportions are then mixed and placed in the cylinder in two layers by giving 25 blows with a modified proctor hammer for each layer and is then kept for curing for about 7,14,28,56,91 days [3]. After the curing period, compression strength of the specimen is found out by testing it in the Compression Testing Machine ACTM.

3. FLEXURAL STRENGTH TEST

Test procedure:
The following testing procedure was undertaken during the flexural strength testing [4]:

1. The specimens for testing are prepared by molding the concrete into beams, curing by standard procedure. The dimensions of the beam should be of 100 mm or 150 mm. The overall length of the specimen shall be 4d to 5d. The ratio

of dimensions to the maximum particle size of aggregate should not be less than three.

2. In order to provide the support and loading points to the specimens, circular rollers made of steel having a cross section of diameter of 32mm are used. The longitudinal dimension of the rollers should be at least 10 mm more than the lateral dimension of the test specimen. A total of 4 rollers shall be used, 3 out of which are capable of rotating along their own axes. The distance between the outer rollers shall be 3d and the distance between the inner rollers shall be **d**. The inner rollers are equally spaced between the outer rollers, such that the entire system is systematic.
3. The specimens which are cured in water are tested immediately after taking out of water; while they are still wet. The test specimen should be placed in the machine correctly by centering with the longitudinal axis of the specimen at 90^0 to the rollers. The loading direction should be normal to mould filling direction in case of moulded specimens.
4. The load should be applied slowly without sudden loads at a rate so as to increase the stress at a rate of 0.06 + 0.04 N/mm^2 per second.
5. The Flexural Strength (F_b) is given by,

$$F_b = \frac{P \times L}{b \times d^2}$$

Where, F_b = Flexural strength (N/mm^2),
P = maximum load in kg applied on the specimen,
L = length in cm of the span of the support.
b = width of the specimen(cm),
d = depth of the specimen(cm).

4. DENSITY AND VOID CONTENT:

Test Procedure [9] [10]:

1. Calculate the mass of each sample core to the nearest 0.1 g, and record it as "Initial Mass."
2. Initially dry the sample for 24 h ± 1 hour, and find this mass (W_D), to the nearest 0.1 g. Place the specimen in the oven for about one hour and note the mass again. When the difference in mass is less than 0.5 %, then constant mass is achieved. Drying in the oven should be continued until a constant mass is achieved.
3. In a bulk density tank-scale measuring system is filled completely with tap water, specimens are submerged completely, and place them straight for 30 minutes underwater.
4. After 30 minutes, keeping the specimen submerged in water, the side of the specimen is tapped 10 times with a rubber mallet. Rotate the specimen slightly after each tap so that they are equally spaced around the circumference of the core.
5. The mass of the specimen is measured to the nearest 0.1 g by submerging the specimen under water, and record it as the "Submerged Mass" (W_S)

Calculate the Porosity as follows:

$$P = [1 - ((W_D - W_S) / \rho_w)/V_T] \times 100$$

5. WATER PERMEABILITY TEST:

1. **Measurement of water permeability [5][9]:** As pervious concrete contains large interconnected pore network, the methods that are used to evaluate the hydraulic conductivity of normal concrete are not applicable directly. In order to estimate the hydraulic conductivity of pervious concrete, a falling head permeability cell has been designed [6].

2. The permeability cell have a 300 mm long acrylic tube with an inner diameter of 110 mm.

3. The specimen is closed in a sponge type membrane. and was inserted into the equipment. In order to fill the specimen cell, water is added to the graduated pipe and the draining pipe. The specimen was preconditioned by allowing water to drain out through the pipe until the level in the graduated cylinder was the same as the top of the drain pipe. This eliminated any air pockets in the specimen and ensured that the specimen was completely saturated. With the valve closed, the graduated cylinder was filled with water. The valve was then opened, and the time in seconds (t) required for water to fall from an initial head of 290 mm (h1) to a final head of 70 mm (h2) measured. This procedure was repeated three times, and the average value of t was used

4. The coefficient of permeability (K) was calculated according to Darcy's law

$$K = \frac{A_1 l}{A_2 t} \log\left(\frac{h_2}{h_1}\right)$$

5. Where A1and A2 are the areas of the cross-section of the sample and the tube respectively and l is the length of the specimen. For a given specimen geometry, and same initial and final heads, the coefficient of permeability is given as:

$$K = \frac{A}{t}$$

Q = KIA

K = permeability m/s
I = hydraluic gradient
A = cross sectional area m^2

6. RESULTS

6.1 Compressive strength:

Table II: Compressive strength of 28 days' plain pervious concrete

cement – aggregate ratio	water-cement ratio	size of aggregate (mm)	curing period (days)	compressive strength (N/mm^2)
1:4	0.33	4.75	28	7.96

Table III: Compressive strength of plain pervious concrete with 10 mm aggregate size

cement – aggregate ratio	water-cement ratio	size of aggregate (mm)	curing period (days)	Compressive strength (N/mm^2)
1:4	0.33	10	28	9.48

Table IV: Compressive strength of plain pervious concrete with 11.2 mm aggregate size

cement – aggregate ratio	water-cement ratio	size of aggregate (mm)	curing period (days)	Compressive strength (N/mm^2)
1:4	0.33	11.2	28	5.63

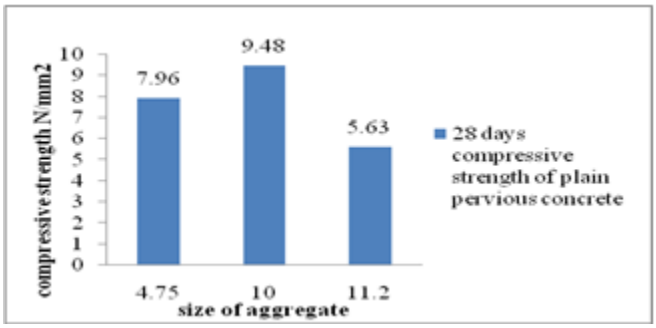

Fig 1: shows compressive strength of plain pervious concrete.

6.2 Flexural strength:

Table V: shows flexural strength of 4.75 mm plain pervious concrete

cement – aggregate ratio	water-cement ratio	size of aggregate (mm)	curing period (days)	Flexural strength (N/mm^2)
1:4	0.33	4.75	28	3.03

Table VI: Flexural strength of 10 mm aggregate Size

cement – aggregate ratio	water-cement ratio	size of aggregate (mm)	curing period (days)	Flexural strength (N/mm^2)
1:4	0.33	11.2	28	2.33

Table VII: Flexural strength of 11.2mm pervious concrete

cement – aggregate ratio	water-cement ratio	size of aggregate (mm)	curing period (days)	flexural strength (N/mm^2)
1:4	0.33	10	28	2.44

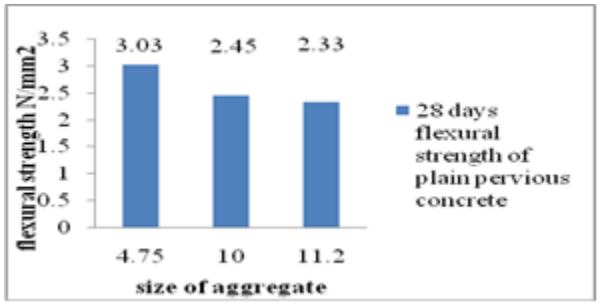

Fig 2: shows Flexural strength of plain pervious concrete

6.3 Permeability:

Table VIII: Permeability of plain pervious concrete

size of aggregate (mm)	curing period (days)	permeability (m/s)	flow rate(m^3/s)
4.75	28	0.000796	0.00000627
10		0.00193	0.00001523
11.2		0.000842	0.0000066

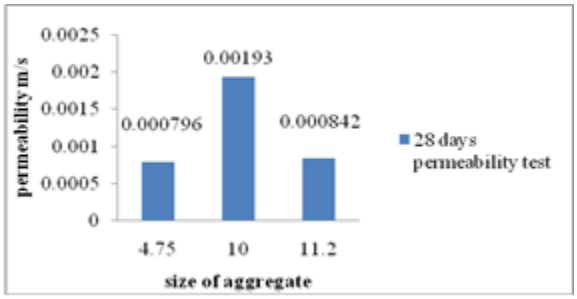

Fig 3: permeability of plain pervious concrete

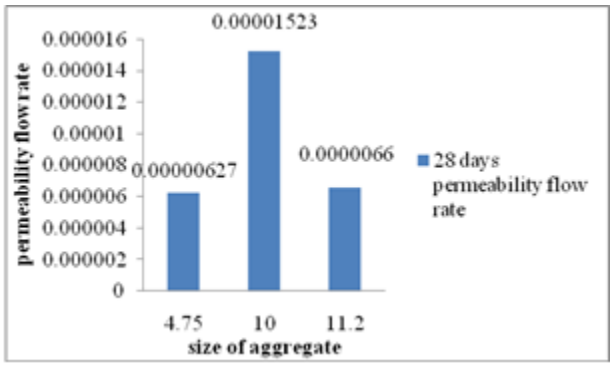

Fig 4: permeability flow rate of plain pervious Concrete

Table IX: shows 28 days' density and void ratio

size of aggregate (mm)	initial weight (kg)	oven dried weight (kg)	Sub merged weight (kg)	density (kg/m^3)	void ratio (%)
4.75	3.071	2.963	1.795	1886.3	23.27
10	3.23	3.118	1.915	1984.9	23.27
11.2	3.155	3.061	1.8425	1947.2	22.28

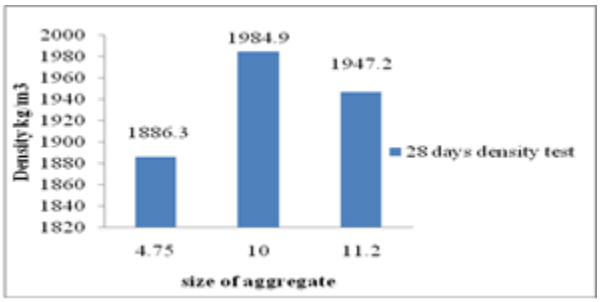

Fig 5: shows 28 days density test

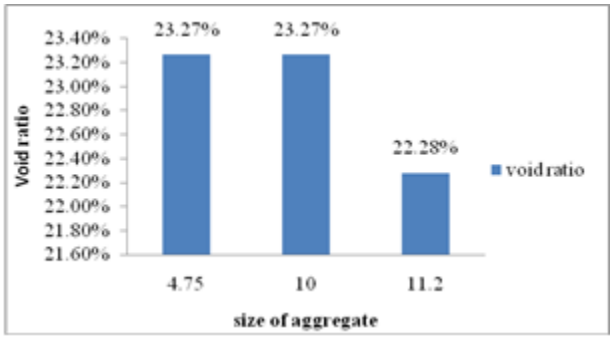

Fig 6: shows 28 days' void content

CONCLUSION

The compressive strength of plain pervious concrete for 10mm size is more than 4.75mm and 11.2mm. This shows that the compressive strength depends on size of aggregate. when we observe for flexural strength in the investigation above, for 4.75mm of aggregate it is higher than 10 mm and 11.2 mm.

The flexural strength is increased for 4.75 mm due to its bonding between cement and aggregates. As it is a low grade aggregate, the binding nature will be high when compared to other. In permeability test, it is observed that the permeable nature will be high in 10 mm than 4.75 and 11.2mm aggregates. For 10 mm aggregate, in the observed study the voids between the aggregates are higher than 4.75mm which is bonded packly. When coming to density and void ratio, density for 10 mm aggregate is higher than 4.75 and 11.2 mm aggregates. Density for 10mm aggregate is 1984.9 kg/m^3 which symbolizes the bonding strength between the aggregates is high when compared to other. The void ratios of 4.75mm and 10mm aggregates show similar values. As void ratio is high then the permeable nature will be high due to more void content. However, the compressive strength, flexural strength, permeability, density and void ratio of plain pervious concrete are satisfying the standards.

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Performance Analysis of different Machine Learning Algorithms for Detection of Sleepy Spindles from EEG signals

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Abstract:-- **Now a days spindles caused by drowsiness and it has become a very serious issue to accidents. A constant and long driving makes the human brain to a transient state between sleepy and awake. In this BCI plays a major role, where the captured signals from brain neurons are transferred to a computer device. In this paper, I considered the data which are collected from single Electroencephalography (EEG) using Brain Computer Interface (BCI) from the electrodes C3-A1 and C4-A1.Generally these sleepy spindles are present in the theta waves, whose are slower and high amplitude when compared to Alpha and Beta waves and the frequency in ranges from 4 – 8 Hz.The aim of this paper to analyse the accuracy of different machine learning algorithms to identify the spindles.**

Keywords:- Electroencephalography (EEG), Brain Computer Interface (BCI), Wavelet Transform, Fast Fourier Transform (FFT), Support Vector Machines (SVM), Neural Networks (NN), Random Forest (RF), Gaussian Naïve Bayes (GNB), K-nearest neighbour (K-NN)

INTRODUCTION

Spindles are caused while the human is in sleeping or in drowsiness .This state of behaviour is identified by the physical activities of the human like rapid eye blinking or full eye closing. This will make big accidents in driving. So, our proposed work is we are analysing the mental activity of human brain by using Electroencephalography (EEG) signals based on Brain Computer Interface (BCI) technology. Here I am analysing performances of different classification technique on the EEG signal. The signal is extracted from single channel EEG from C3-A1 and C4-A1 electrodes.

LITERATURE SURVEY

Drowsiness can be detected from other technologies like image processing. But our proposed way of detection is very efficient because here we directly extracted the brain signals to examine the driver state of the emotion. Here the main challenge is how to identify the driver drowsiness state of emotion. EEG has various frequency bands called theta, delta,alpha, beta and gamma. Figure: 1 shows a few examples of the brain waves frequencies and corresponding human brain state of emotion.

In [12]M.Murali, Varun Pathak, Manish Sen proposed using of Level splitter section(LSS) to analyses the level of state of emotion of the driver and gives alert and keep the vehicle in self-controlled functioning mode until awaken state .

In [13] A. Garces Correa and E. Laciar Leber proposed a method by combining best features extracted from power Spectral Density (PSD) and Wavelet Transform (WT). He used NN for classifying the extracted features.

In 2009 A. Garcés Correa, P Diez , E Laciar proposed the work that the results obtained with the Central frequency, the first quartile frequency, the Maximum frequency, the power of Theta and Alpha bands and discriminate analysis were of 73.6 % of good drowsiness segment detection. Adding new features (ZC and IEEG) and classifying the data with NNs the results improved to 84.1 %.In [18] Pai-Yuan Tsai; Weichih Hu; Kuo, T.B.J.; Liang-Yu Shyu proposed a model of detection accuracy when the subjects were alert (79.1%) was much less than the accuracy when the subjects were drowsy (90.9%). Here my proposal produce accuracy 98.45% of detecting drowsiness by extracting brain signals from C3-A1 and C4-A1 using BCI. ANN – MLP (Multi-LayerPerceptron) with 2

layers of 100 neuron each and 10 epochs for forward pass and backward pass.

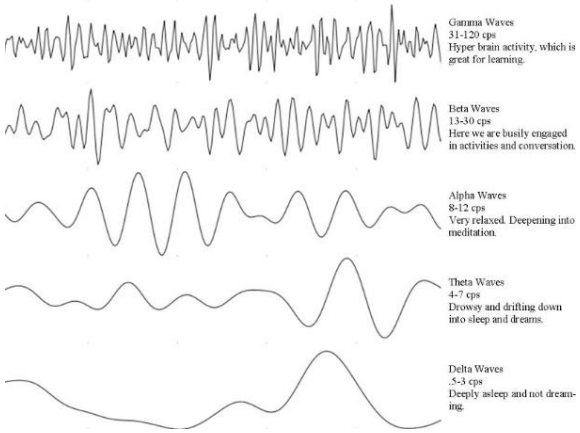

Figure 1: EEG signal bands

III. THEORETICAL CONSIDERATIONS

In this section, we discuss some of the related theoretical concepts.

A.EEG Signals

EEG is a non-invasive method to record electrical signals of the brain from the scalp. Electrical recordings from the surface of the brain or even from the outer surface of the head demonstrate that there is continuous electrical activity in the brain [1]. Much of the time, the brain waves are irregular, and no specific pattern can be discerned in the EEG. The EEG signals are commonly decomposed into five EEG signal bands based on the frequencies: delta, theta, alpha and beta. Figure: 1 shows a few examples of the brain waves. Beta waves represents arousal state of human brain. These are relatively low amplitude and high frequency of all the brain waves. Their frequency ranges from 12 to 40 Hz's (cycles per second) and usually has a low voltage between 5 and 30 µV. A person who is in fully engaged mind is in Beta state

i.e. talking, debating,speech..etc. Alpha wave represents non-arousal state. These are slower and high at amplitude when compared to beta waves. Their amplitude ranges from 8 to 12 Hz (cycles per second) with 30–50 µV amplitude. A person is awaken and taking rest after done with any work/task is in Alpha state .Examples – A person takes a break form a speech/lecture, A person walks in the ground is also in alpha state . Theta waves are slower and high at amplitude compared to alpha and beta waves. Their frequency ranges from 4 to 8 Hz (cycles per second and 20 µ V amplitude. A person who takes time off from any work and begins today sleep or in drowsy is in Theta state. A person in sleep/dream sleep with little bit conscious or idle state like driving in freeways or repetition nature of driving compared to city road driving with traffic. Delta waves are the final state of the human. Delta waves are very slow and high amplitude compared to alpha and theta waves. Their frequency ranges below 4Hz (cycles per second). The frequency never goes to zero, means the brain is dead. A person who is in deep sleep /dreamless sleep is in delta state.

BCI

BCI is an AI system that can recognize patterns from the brain signals. BCI system working has 5 consecutive stages.1) Signal acquisition – Capture brain activity and may also perform noise reduction and artefact processing.2)Pre-processing or filtering – It prepares the signal in a suitable form for further processing. 3)Feature Extraction – It identifies the discriminant features as vector from the processed signals. 4)Classification- It classify the brain signals by taking Feature vectors into account. 5) Control interface – Finally it translate the classified signals into commands for the connected devices.

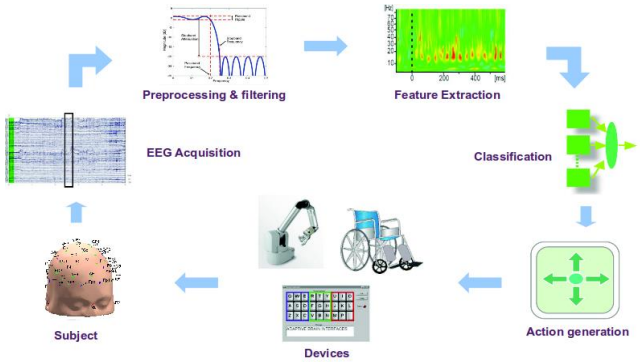

Figure 2: BCI block Diagram

Pre-processing

There are several objectives when pre-processing of EEG signals. Main objective is identifying and removal of artefacts. Artefacts are nothing but unwanted patterns which are caused by the underlying physiological events of interest like eye movements, muscle movements and some are due to electrical field changes. Methods for processing artefacts in sleep EEG have been reviewed in a general context in [2] whereas the specific application to infants and newborns (which are subject to similar forms of artefacts) are considered in [3]. Frequency selective filters (low-pass, high-pass, band-passand band-stop) have been generally used in artefact processing especially for muscle artefact removal [4].

Feature extraction

The main objective of the feature selection step in pattern recognition is to select a subset from large numbers of available features.

Time–frequency features

Time–frequency analysis is a powerful tool which allows decomposition of signals into both time and frequency [5]. Time–frequency analysis is a powerful tool which allows decomposition of signals into both time and frequency [5]. It thus provides a means for analyzing signals which are non-stationary, such as sleep EEGs. In the analysis of such signals one is often interested in the evolution of the frequency content with time. This is particularly important in the analysis of sleep EEGs where many of the events (e.g. arousals, sleep spindles, alpha intrusions) are manifested by sudden changes in amplitude and frequency characteristics. Some of the more commonly used time–frequency methods in the analysis of sleep EEGs are highlighted below,

Short time Fourier transform (STFT)

The wavelet transform

Matching pursuits (MP)

Empirical mode decomposition (EMD)

E. Classification

Once features are extracted from a signal then grouping these features by using classification that is assigning the feature vector into a discrete number of groups: one for each class to be classified. For instance, in sleep staging we have to consider two stages spindle and non-spindle. Here classification is based on similarity between the features of the same group.

i. Neural network (NN) classification (supervised learning) - Multilayer perceptron (MLP)

Neural networks or artificial neural networks (ANN) are mathematical models inspired by neuronal interactions in the brain and can be used to model a wide range of complex systems. ANNs become capable of modeling very complex nonlinear systems [6].

ANN consists of following components [7][8][9]

Input

An arbitrary no. of hidden layers

An o/p layer

A set of weights & biases between each hidden layer , w & b

A choice of activation functions for each hidden layer.

When counting the No. Of layers you have to exclude the Input layer. Each iteration of the training process has the following steps:

Calculating the predicted output - feed forward

Updating weights & bias – back propagation.

iii. KNN

The K-nearest neighbor algorithm is one of the simplest supervised learning algorithms. It simply measures the distance between the new data point to all the other training data points. The distance measure can be either Euclidean or Manhattan. In k-NN classification, the output is a class label. An object is classified by a plurality vote of its neighbors, with the object being assigned to the class most common among its k nearest neighbors. If k = 1, then the object is simply assigned to the class of that single nearest neighbor. While designing a model we have to specify the n_neighbors value as a integer to classify the data object.

iii. Random Forest

Random forest is also a supervised classification methodology which combines the multiple algorithms of same type to form a powerful prediction model i.e.multiple decision trees. It works by generating multiple decision trees and fit a model by giving each training object to every tree and assign the class label, which more no. of trees produce as a result.

iv. GaussianNB

Naive Bayes classifier is a supervised learning algorithms based on applying Bayes' theorem with the "naive" assumption of conditional independence between every pair of features given the value of the class variable. Bayes' theorem states the following relationship, given class variable Y and dependent feature vector X_1 through X_n,

$$P(Y|X_1,\ldots,X_n) = \frac{P(X_1,\ldots,X_n|Y)P(Y)}{P(X_1,\ldots,X_n)}$$

Using the naive conditional independence assumption that

$$P(X_i|Y, X1, X2,\ldots X_{i-1}, X_{i+1},\ldots X_n) = P(X_i|Y)$$

The class conditional probability is calculated through

$$P(X_1,\ldots,X_n|Y) = \prod_{i=1}^{n} P(X_i|Y)$$

Gaussian is used in classification and it assumes that features follow a normal distribution and the class conditional probability is calculated through:

$$P(x_i \mid y) = \frac{1}{\sqrt{2\pi\sigma_y^2}} \exp\left(-\frac{(x_i-\mu_y)^2}{2\sigma_y^2}\right)$$

IV. RESULTS

Generally sleepy spindles are present in the Theta waves, whose are slower and high amplitude when compared to Alpha and Beta waves and the frequency in ranges from 4 – 8 Hz.

A. Data

I considered the data which are collected from single Electroencephalography (EEG) using Brain Computer Interface (BCI) from the electrodes C3-A1, O1-A1, C4-A1 and O2-A1. Data set contains 251038 instances and 10 attributes.

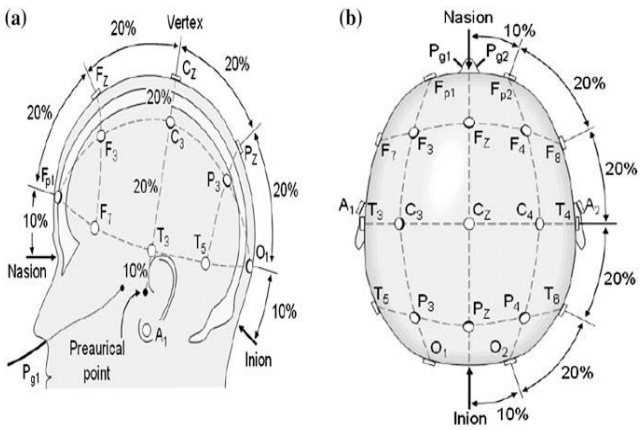

Figure 2: Electrode placement over scalp according to the international 10-20 system. a) As seen from left side. b) As seen from top

The signal of this data set was sampled with a frequency of 250Hz. Fig.2 illustrates the position of electrodes on 10 -20 system.

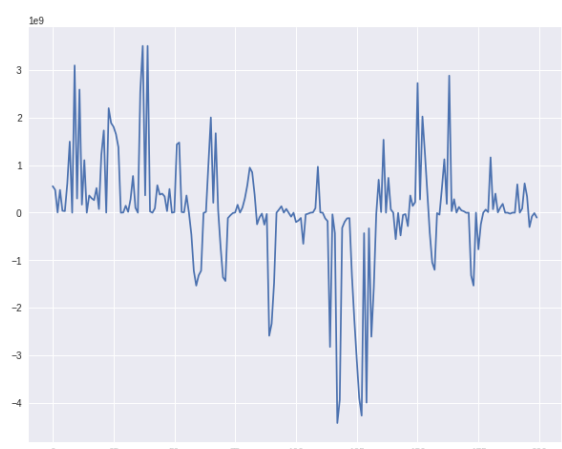

Figure 4. Theta signals from EEG C3-A1 electrode

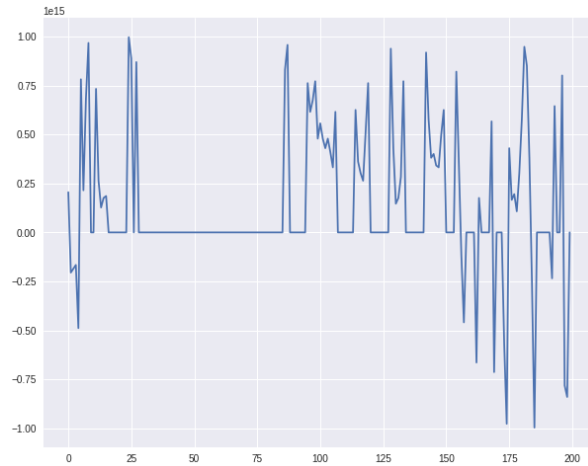

Figure 5. Sleepy spindles from EEG C3-A1 electrode

B. Performance evaluation

Accuracy,precision and sensitivity or recallare the statistical measures to evaluate the performance of any binary classifier. All possible outcomes of a classifier is represented in the form of Confusion matrix as shown is a Fig.6

	Predicted 1	Predicted 0
True 1	TP	FN
True 0	FP	TN

Figure 6: Confusion Matrix

Accuracy is the proportion of the true results in the dataset.

$$\text{Accuracy} = \frac{tp + tn}{tp + fp + tn + fn}$$

Precision measures the ability of the classifier not to lable as positive if sample that is negative .

$$\text{Precision} = \frac{tp}{tp + fp}$$

Recall measures the ability of the classifier to find all the positive samples.

$$\text{Sensitivity} = \text{Recall} = \frac{tp}{tp + fn}$$

NN-MLP result:
If I consider 2 layers MLP with 100 neurons in each and 10 epochs while fitting the model then the result in accuracy is:98.46 %

K-NN result:
Confusion matrix is
[62102 0]
[62 596]

Statistical measures are:

	Precision	recall
0	1.00	1.00
1	1.00	0.91

Accuracy: 99.9%

Random forest result:
Confusion matrix is
[62102 0]
[345 313]

Statistical measures are:

	Precision	recall
0	0.99	1.00
1	1.00	0.48

Accuracy: 99.45%

Gaussian NB result:
Confusion matrix is
[62102 0]
[345 313]
Statistical measures are:

	precision	recall
0	0.99	1.00
1	1.00	0.48

Accuracy:99.45%

All the analyzedclassifiers performance is shown in Table1.

Classifier	Accuracy
NN-MLP	98.46 %
K-NN	99.90%
RF	99.45%
NB	99.45%

Table 1: Performance analysis

V.CONCLUSION AND FUTURE SCOPE

In this we utilize electroencephalography (EEG) signals using Brain computer Interface (BCI). Generally these sleepy spindles are present in the theta waves, whose are slower and high amplitude when compared to Alpha and Beta waves and the frequency in ranges from 4 – 8 Hz. Here we analyses the performances of different supervised classification methodologies. Among all these classifiers K-Nearest Neighbor (K-NN) classifier gives highest accuracy 99.90% when compared to Neural Networks, Random Forest, Gaussian Naïve Bayes classifiers. In future we directly identify the spindles from the theta waves instead of combining theta and spindles separately and also try to use the dimensionality reduction technique while consider the feature vector for classification.

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Smart and Secure Delivery System: a Novel Idea using IoT and Cloud Computing Technologies

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***Abstract*:-- Now a day, security is becoming a major problem in any online delivery system. There may be chances of theft or misuse of customer ordered item. Themain theme of the paper is to deliver goods in a smart and secure way withoutmisuse of the goods. Here goods mean food. The Customer orders the food,through a mobile app and the restaurant accepts the order. When the order isready to ship, the ordered item will be placed in a delivery box with digital locking mechanism and an OTP will be generated by respective associate ofrestaurant to the registered mobile number of the customer. Using OTP, thedelivery boy opens the digital lock and delivers the item to the customer. Withthis, there is no worry to the customer about his ordered item and he gets moresatisfaction. It is not only for food, it can be applicable to any online deliveryproducts without change of item. This problem is solved by the IoT technologyand Cloud Computing concepts.**

Keywords:- Security, Delivery System, OTP, IoT Technology, Cloud Computing

INTRODUCTION

Security is becoming a major problem in any online delivery system. There may be chances of theft or misuse of ordered item. The main theme of our proposed system is to deliver goods in a smart and secure way without misuse of ordered items. For this to happen, we use a safe and secure box with digital locking mechanism. Customer orders the food, restaurant management accepts the order and when order is ready to ship, the order will be placed in the delivery box with a digital lock. An OTP will be generated by respective manager or restaurant associate to the registered mobile number of the customer. Using OTP, item can be safely reached to customer without any disturbance. It is not only for food, it can be applicable to any online delivery products without change of item. In this fast-moving world, everyone is getting busy with their own works. People are thinking to make their daily works smart. That is the reason why online systems like online shopping, online food ordering, online bookings are growing rapidly. Security plays a major role in online ordering systems because it involves a third-party. We took online food delivery as our project to provide security, based upon a recent incident experienced by zomato.

The Internet of Things (IOT) is the extension of Internet connectivity into physical devices and everyday objects. Embedded with electronics, Internet connectivity, and other forms of hardware such as sensors, these devices can communicate and interact with others over the Internet, and they can be remotely monitored and controlled. The definition of the Internet of things has evolved due to convergence of multiple technologies, real-time analytics, machine learning, commodity sensors, and embedded systems.

In the consumer market, IOT technology is most synonymous with products pertaining to the concept of the "smart home", covering devices and appliances such as lighting fixtures, thermostats, home security systems and cameras, and other home appliances that support one or more common ecosystems, and can be controlled via devices associated with that ecosystem, such as smart phones and smart speakers.The IOT concept has faced prominent criticism, especially in regards to privacy and security concerns related to these devices and their intention of pervasive presence. According to its developers, “ThingSpeak is an open-source, Internet of Things (IOT) application and API to store and retrieve data from things using the HTTP protocol over the Internet or via a Local Area Network. ThingSpeak enables the creation of sensor logging applications, location tracking applications, and a social network of things with status updates”. Thing Speak was originally launched by ioBridge in 2010 as a service in support of IOT applications

II. LITERATURE SURVEY

Ajinkya Kumar Jadhav proposed the “Development of wireless ordering system for hotel”. This work presented in-depth analysis on the technical operation of micro controller and ZigBee module based wireless

ordering system (WDS) [1] including system architecture, function and limitations.In the past decades, the rapid growing of network and wireless technology did a great impact for how people communicate with each and other remotely. At the same time, this technology also leads different kind industries to change their entire management aspect. F&B industry is one of the industries in the market that apply these technologies into their business processes that assist them to be much more convenience and efficient.

From the message above, Wireless Food Ordering System is a system that integrated both concept of intranet and wireless technology (Khairunnisa, K. and Ayoub, J., 2009). This system provide user to access the data, information and services from a remote server, which enable user to access the central databases distributed across the restaurant network. Most of the handheld devices have implemented and support wireless technology and thus mobile devices is an ideal hardware device that use to support this system in order to allow user remote access to the database for data retrieval.The system requires the user to build an intranet network within the restaurant and there will be a central database server resides in the network and the client can perform data retrieval by using the mobile devices such as PDA (Personal Digital Assistant) connect to the wireless access point.

Aman Jain proposed "Automated Restaurant Management System'' which works as a link between waiters to provide optimum quick and effective and almost effortless services to the hotels and restaurants.In an automated food ordering system is proposed which will keep track of user orders smartly. Basically, they implemented a food ordering system for different type of restaurants in which user will make order or make custom food by one click only. By means of android application for Tablet PCs this system was implemented. The front end was developed using JAVA, Android and at the backend MySQL database was used.

This order system overcome the drawback of traditional paper-based order system, it changes everything from paper based into computerized. First of all, the system will be programmed with the food availability from the respective restaurant and display on touch screen devices that have been setup in each of the tables within the restaurant. In addition, the touch screen device will have a very attractive Graphic User Interface (GUI) that displays the food menu for customer to make their choices and enable customer to place an order by touching the particular food image that display on the device screen. Next, when the customer placed an order, the food order will be sent to the kitchen and the chef can prepare for the food. This system eliminates the issue from traditional paper-based system that the waiter has to manually deliver the order to kitchen. Other than that, the system provides a sub-module that enable restaurant owner to update the food details, food price and etc. It was very convenience compare to the traditional paper-based system, because paper-based system requires the restaurant owner to dispose all old food menu cards and re-print the latest food menu card to serve their customers.

Last but not least, the system was fully relying on the gadgets and the gadgets don't need leave or vacation and thus it can work efficiently 24/7. Therefore, it can reduce the excess man power need in the restaurant business by reducing the number of the employee within the restaurant.

III. EXISTING SYSTEM

In the modern world, online food ordering system is a one of popular e-business tactics used all over the world. In those systems restaurant or cafeteria lists their products and other relevant information about the products. Buyers will browse the listed products through internet, and they order some food, some of them has ordering facilities among those system few of them has facility to order online in other system customer have to give a phone call to order.

Disadvantages

- Less Security
- The ordered item can be misused, disturbed or replaced
- There is no proper tamper proof packing.
- In between there may chances of replacing or misuse of item.

IV. PROPOSED SYSTEM

The online food ordering system sets up a food menu online and customers can easily place the order as per they like. Also, the online customers can easily track their orders management maintains customer's database, and improve food delivery service. This system also provides a feedback system in which user can rate the food items. Also, the proposed system can recommend hotels, food, based on the ratings given by the user, the hotel staff will be informed for the improvements along with the quality. The payment can be made online or cash or pay-on-delivery system. For more secured ordering separate accounts are maintained for each user by providing them an ID and a

password. Security is less. The ordered item can be misused, disturbed or replaced. Proposing digital locking mechanism for delivery box.

Advantages

- Provides security to the delivery item.
- Trustworthiness
- Digital Technology

V. METHODOLOGY OF PROPOSED SYSTEM

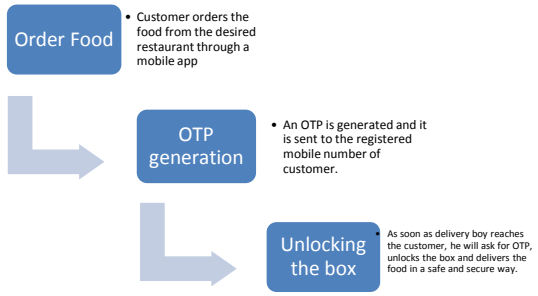
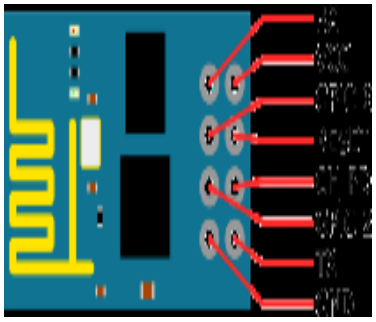


Fig: Flow of Delivery System

The user has to create an account by using his details like user name, password, email, contact number.Later login to the app by using user name and password.When the user login in to the account, then the menu items are displayed. Later he can order the food from the respective restaurant.After the food is packed then the restaurant associate kept the food in a box and lock it, once locked an OTP will be sent to the customer. When item / food reach home, delivery boy will ask for OTP to unlock the box.

VI. REQUIREMENTS TO IMPLEMENT

Wi-Fi module:
The ESP8266 is a low-cost Wi-Fi microchip with full TCP/IP stack and microcontroller capability produced by Shanghai-based Chinese manufacturer, Espressif Systems. The chip first came to the attention of western makers in August 2014 with the ESP-01 module, made by a third-party manufacturer, Ai-Thinker. This small module allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections using Hayes-style commands. However, at the time there was almost no English-language documentation on the chip and the commands it accepted. The very low price and the fact that there were very few external components on the module which suggested that it could eventually be very inexpensive in volume, attracted many hackers to explore the module, chip, and the software on it, as well as to translate the Chinese documentation. The ESP8285 is an ESP8266 with 1 MiB of built-in flash, allowing for single-chip devices capable of connecting to Wi-Fi. The successor to these microcontroller chips is the ESP32. In late October 2014, Espressif Systems released a software development kit (SDK) that allowed the chip to be programmed, removing the need for a separate microcontroller. Since then, there have been many official SDK releases from Espressif; Espressif maintains two versions of the SDK – one that is based on Free RTOS and the other based on callbacks. An alternative to Espressif's official SDK is the open source ESP-Open-SDK that is based on the GCC tool chain. ESP8266 uses the Cadence Tensilica L106 microcontroller and the GCC tool chain is open-sourced and maintained by Max Filippov.



Wifi- module

NodeMCU:
NodeMCU is an open source IOT platform. It includes firmware which runs on the ESP8266 WiFiSoC from Espressif Systems, and hardware which is based on the ESP-12 module. The term “NodeMCU” by default refers to the firmware rather than the developments kits. The firmware uses the Lua scripting language. It is based on the eLua project, and built on the Espressif Non-OS SDK for ESP8266. It uses many open source.

ESP8266 Arduino Core:
As Arduino.cc began developing new MCU boards based on non-AVR processors like the ARM/SAM MCU and used in the Arduino Due, they needed to modify the Arduino IDE so that it would be relatively easy to change the IDE to support alternate toolchains to allow Arduino C/C++ to be compiled for these new processors [2]. They did this with the introduction of the Board Manager and the SAM Core. A "core" is the collection of software components required by the Board Manager and the Arduino IDE to compile an Arduino C/C++ source file for the target MCU's machine language. Some ESP8266 enthusiasts

developed an Arduino core for the ESP8266 WiFiSoC, popularly called the "ESP8266 Core for the Arduino IDE".This has become a leading software development platform for the various ESP8266-based modules and development boards, including NodeMCUs.

Servo Motor

A servomotor is a rotary actuator or linear actuator that allows for precise control of angular or linear position, velocity and acceleration.[1] It consists of a suitable motor coupled to a sensor for position feedback. It also requires a relatively sophisticated controller, often a dedicated module designed specifically for use with servomotors. Servomotors are not a specific class of motor although the term servomotor is often used to refer to a motor suitable for use in a closed-loop control system.

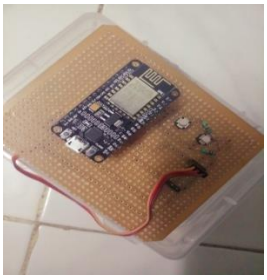
A servomotor is a closed-loop servomechanism that uses position feedback to control its motion and final position. The input to its control is a signal (either analogue or digital) representing the position commanded for the output shaft.The motor is paired with some type of encoder to provide position and speed feedback. In the simplest case, only the position is measured. The measured position of the output is compared to the command position, the external input to the controller. If the output position differs from that required, an error signal is generated which then causes the motor to rotate in either direction, as needed to bring the output shaft to the appropriate position. As the positions approach, the error signal reduces to zero and the motor stops.Servomotors are used in applications such as robotics, CNC machinery or automated manufacturing.

VII. WORKING MODEL & PROCEDURE

Customer ordered particular food item in particular restaurant, the ordered item is placed in the delivery box. After the delivery box is locked, the OTP will be generated to the customer for the respective registered mobile number. When the delivery boys reach the destination, the OTP should be entered by the customer itself and have to submit it. Later, the delivery box is unlocked. We have written code in nodeMCU for two operations one is, when we pressed the button either the box (motor) has to be closed or it has to rotate. Whenever the motor rotates it will generate one number to think speak address and it has to check whether any data is available near server.

The two operations done by nodemcu is to close the box by pressing the button and to check the data from the server. Whenever we get the data from the server then the box will be unlocked. In UI, first one is the OTP which was generated should be compared and submitted and it was received by theserver, if it was true then box will be unlocked.

VIII. RESULTS / WORKING PROTOTYPE



IX. CONCLUSIONS & FUTURE DIRECTIONS

The entire idea has been developed and implemented as per the requirements stated by the user. It provides safety and security. It does not allow the delivery boy to unlock the box. So, our project is feasible for coming versions, which are planned to develop in future. Therefore, conclusion of the proposed system is based on user's need and is user centred. The system is developed in considering all issues related to all users which are included in this system. Wide range of people can use this if they know how to operate android smart phone. Various issues related to Mess/Tiffin

Service will be solved by providing them with a full-fledged system. Thus, implementation of Online Food Ordering system is done to help and solve one of the important problems of people. The future directions of our project are to add extra racks in the delivery box with same locking mechanism. So, that multiple orders can be delivered safe and secure. Robotics will play a major role in future in deliver the goods across the world.

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Identification and prioritize Improvement of Accident-prone Locations between Srikakulam to Chilakapalem junction- A Case Study

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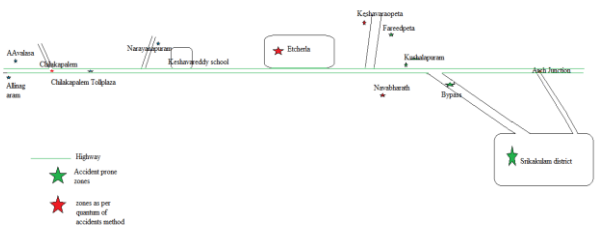
***Abstract*:-- Thе factual investigation of accident is yielded out occasionally at grave areas or street extend which will touch base at appropriate measures to viably diminish accident rates. It is the measure (or gauges) of the number and seriousness of accidents. Thinking about the significance of point, distinguishing the reasons for street accidents has turned into the principle plan to decrease the harm brought about by automobiles collisions. So, study was carried to know how to reduce accidents by reducing the accident causing problems on NH16 from Srikakulam to Chilakapalem statistically to improve the accident locations based on priority wise.**

INTRODUCTION

There are a lot of vehicles driving on the roadway every day, and traffic accidents could happen at any time anywhere[1]. The data identifying with car crashes and unfortunate casualties speaks to a fundamental device to control and distinguish security issues in transport, to recognize need activity regions and to assess the adequacy of the measures used to improve security. The issue of giving safe travel out and about system inside the urban and rural one of the major standards overseeing the building, traffic and transportation arranging[3]. Almost 3,500 individuals died on the world's streets each day Tens of a large number of individuals are harmed or impaired each year. Youngsters, people on foot, cyclists and the old are among the most defenceless of street clients. 90% road accidents occurred due to driver's careless ness like over speed, rash driving, drink and driving .in some cases due to skidding of vehicles were seen, due to very less maintenance of roads[3]

Route map:



Study area:

Analysing road crash data:

Estimates have shown that 1.24 million road users die every year on the world's roads, and another 20 to 50 million sustain non-fatal injuries as a result of road traffic crashes Traffic safety is a societal issue and all over the world guidelines are made in an attempt to improve traffic safety and thereby decrease the high fatality and injury numbers[5]. Traffic safety is described as the science providing methods (and/or measures) to reduce the number of fatalities and injured road users in traffic accidents

Reporting:

The issue of under-announcing isn't remarkable to auto collisions and serious underreporting is available in numerous other incident fields[5]. The revealing issues have been tended to in diverse ways[6]: (I) taking a gander at different information sources, (ii) examining social purposes behind detailing, (iii) assessing administration quality inside experts[6].

Srikakulam is a city and the district headquarters of Srikakulam district in the Indian state of Andhra Pradesh. It is a municipal corporation and also the Mandal headquarters of Srikakulam Mandal in Srikakulam revenue division. the city had a population of 2,699,473. National Highway 16 (India), a part of Golden Quadrilateral highway network, bypasses the city.Area20.89Sqkm Population density 7000/km2

Details of accident data collected
1) Date and time of accident
2) Location wise details of accidents

3) Total number of accidents
4) Type of accidents
5) Total number of fatalities and non-fatalities

Table 1 Rate of road accident deaths during 2016 to 2018

year	No, of Road accident Deaths	Estimated mid-year Population	Fatality risk Col2*100/Col3
2016	79.6	203424	39.8
2017	67.9	240315	28.2
2018	63.6	267534	23.7

Year wise type of accidents:

Table 2 Type of accidents in the year 2016

Month	Fatal	Non-Fatal
Jan	0	2
Feb	0	3
Mar	0	4
Apr	0	3
May	0	2
Jun	1	0
Jul	1	5
Aug	4	7
Sep	3	0
Oct	0	1
Nov	1	5
Dec	0	7

Table 3 Type of accidents in the year 2017

Month	Fatal	Non Fatal
Jan	0	3
Feb	1	3
Mar	1	5
Apr	2	4
May	2	7
Jun	3	2
Jul	0	0
Aug	1	6
Sep	4	1
Oct	0	5
Nov	0	0
Dec	1	2

Table 3 Type of accidents in the year 2018

Month	Fatal	Non Fatal
Jan	2	2
Feb	0	4
Mar	1	6
Apr	2	3
May	2	2
Jun	2	3
Jul	0	4
Aug	3	2
Sep	1	2
Oct	2	1
Nov	0	2
Dec	2	2

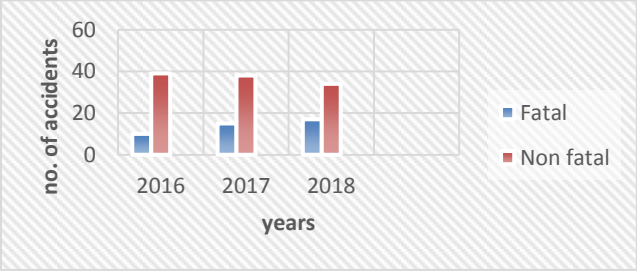


Fig.1-year wise distribution of accidents in Srikakulam

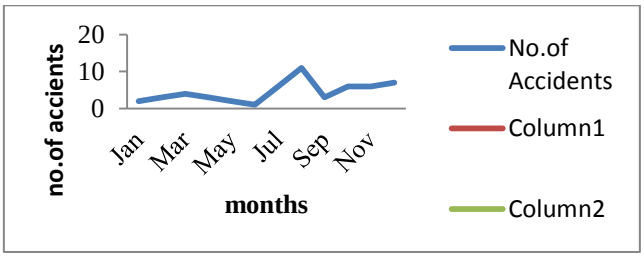


Fig. 2 Month wise distribution of accidents in the year 2016

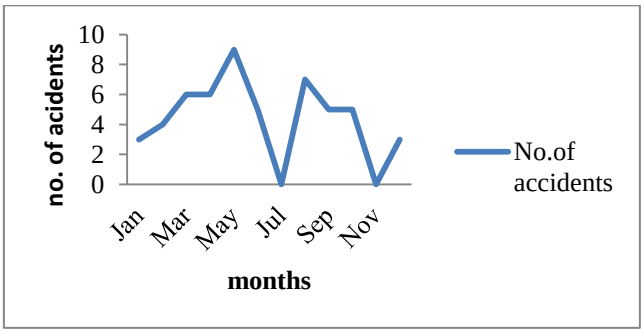


Fig.3 Month wise distribution of accidents in the year 2017

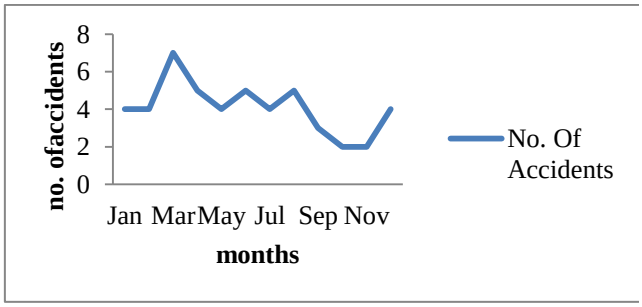


Fig.4 Month wise distribution of accidents in the year 2018

Accident Severity Index Method :(Persons killed for 100 accidents)

Accident severity Index Measures the seriousness of accidents and availability of medical facilities in the city[5]. The below figure shows the severity index shows the number of accidents per 100 accidents.

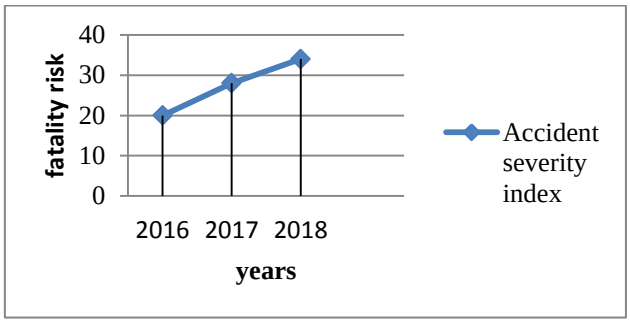


Fig. 5 Fatality risk in three years

Quantum of accident method:

Higher the number of accidents on any stretch, higher would be the accident proneness of the stretch. It has been advanced that two accidents in a year might be because of minor structure surrenders while at least three accidents in a year certainly demonstrate genuine insufficiencies in geometric of road stretch. Along these lines all stretches with at least 9 accidents amid multi year time frame were viewed as accident stretches.

Location wise distribution of accidents in National Highway:

Table 4. Quantum of accident method for Chilakapalem to Srikakulam District

Location	**No. Of accidents**		**Total**	**Priority for improvement**
	Fatal	**Non-fatal**		**Fatal+non-fatal**
Chilakapalem	5	15	20	2
Etcherla	10	22	32	1
Arch Jn	2	10	12	4
Navabharath Jn	0	10	10	8
Kesavaraopeta	3	8	13	3
Jalipinaidupeta	0	3	3	13
Bypass	0	4	4	12
Kinthalimill	3	5	8	6
Kusalipuram	1	2	3	11
Seepanaidupeta	1	2	3	11
Thamminaidupeta	1	3	4	7
Allinagaram	0	8	8	9
AAvalasa	4	3	7	5
Fareedpeta	1	3	4	10

Based on the quantum of accident method priority for 14 locations in the study area were analysed and mentioned in table 4. Priority for the location has marked based on fatal and then total no accidents with both fatal and nonfatal count.

II. Conclusion

In accident severity method higher rate of accident index

is observed as the year increases because of increase in population and vehicles. So, it is an alert that measures like extension of roads with proper road features need to be enhanced. In quantum of accident method locations are analysed based on fatal and then total no accidents with both fatal and nonfatal count. So based on financial resources it is necessary to develop road features based on high prioritize locations in the study stretch.

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3) Sanjay kumar singh and Ashish Mishra "Road accident data analysis"

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State-Of-The-Art of Constructing of Web Enabled Data Warehouse

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Abstract:-- **In the current world to get information the largest source is Web. Web has the ability to support different range of applications. Data warehousing and on-line analytical processing (OLAP) are essential elements of decision support in the database industry. Data Warehouse can be define as subject oriented, time variant, integrated and nonvolatile collection of data. The Data Warehouse supports the concept of Customer Relationship Management (CRM). In this paper, our main objective is to understand the concept of data warehouse and examine the various steps for constructing a web-enabled data warehouse. This new birth of data warehousing architecture can be defined as data web house. In order to get this new responsibility data warehouse must adjust itself. It also helps the stake holders to access the data warehouse by means of web using different security levels.**

Keywords: ETL(Extract Transform and Load) , Web data house, Extranet, Intranet, Internet

INTRODUCTION

Earlier, data warehouse users are managers, business analyst, high-level employees who used Data Warehouse as tool for analysis purpose and decision making. But today Data Warehouse is no longer confine to a group of users. Useful information from corporate Data Warehouse should not only be limited to the employees but also to the customers and all the stake holders of the company. So it is very essential to open Data Warehouse to the entire community of the users. This will change perspective of the user with respect to retrieve, analyze and sharing information through data warehouse.

Two crucial steps in order to change the warehouse into web-enabled ware house(i)Bring the warehouse into the web(ii)Bring the web to data warehouse.

When we bring data warehouse to the web from user point of view, the key requirements are data access, interactive analysis, high performance security and Meta data.

When we bring web to the data warehouse involves capturing the click stream of the visitors to our company web site and performing all functionalities of data warehousing. Extraction, Transformation and Loading (ETL) involve extracting data from external sources, adapting it to business needs and finally loading it into the data warehouse. Our effort will involve ETL of click stream data to the web house repository. When dimensions of DW are built from the click stream data and deploy information from web house. Click steam provides information about how people proceeded through the company's website, and also help to know what triggers purchases, what attract the people and what make them to return back. This enables analysis of key measure including

- Customer demand
- Marketing promotions
- Feedback of our website design
- Buying patterns of customers
- Demographic collection of data

A click stream web house may be the only tool for identifying, retaining and prioritizing e-commerce customers. The Web house can provide the following information

- Website statistics
- Analysis of best and worst customers
- Site navigation that results in orders
- Conversion of the visitors etc.

Basically Web-enabled data warehouse uses the web for collaboration among users and information delivery. As time goes on, more and more data from data warehouses are being connected to the web. Ultimately it increases the access of information in the data warehouse. Increase in access of information results in the increase of knowledge level of the enterprise. The rapid growth of web, with its network, servers, users and pages has taken internet, intranets, and extranets as information transmission media. Even it is easier to as many users as possible. Data warehouse is used by users for information and business partners use it for specific information. These are the reasons to support web- enabled data Warehouse.

Basically information delivery mechanism adopted by companies is based on web Technology. In every case users access information by means of web browsers.

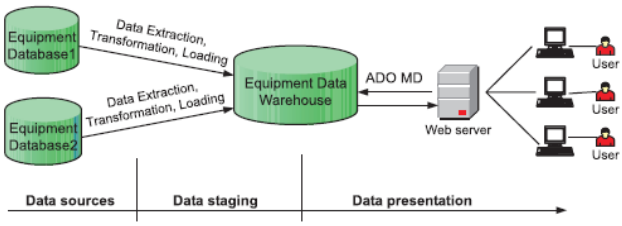

Fig 1. Equipment Data warehousing and Data Access

Internetwork allows different users at different geographical locations of an organization to share data, resources and to communicate. Modern businesses cannot even function without Internetwork. Internet, Intranet and Extranet are different types of internetwork.

TABLE I. TABULAR VIEW OF CASE STUDIES

Domain	Architecture	Methodology	Dataset	Method Description	Strength	Limitation
Healthcare	Enterprise Data Warehouse	Questionnaire	22 hospitals, 179 clinics, physician offices, home healthcare in Utah and Idaho	A computer program was for monitoring. Patient's identification according to score. Update EDW. Evaluation.	Proposed framework can be reused easily for new applications	No enterprise database with daily updated patient lists
Banking	Data Warehouse	Questionnaire	Banks of Taiwan i.e. from 50 banks and 30 valid responses with response rate 60%.	Questionnaire with six sections. Analysis about banks that adopted, in process of adopting or abandoned DWH technology. Analysis about	Identification of factors that can affect DWH adoption. Facilitate implementation in global or overseas branches.	Limited to domestic banks. Approach is restricted to banking industry only. Limited samples

Finance	VISION data warehouse	Interviewing of employees, examining documents and video tapes of key events.	Financial services company (FSC, US)	In first phase, top revenue producing customers are identified. Second phase provided, profitable information for all bank's customers and products.	Gives more clear and accurate picture of most important customers and products.	Limited to Critical Financial data Limited data samples
Manufacturing	Data warehouse	Interviewing of employees, examining documents and video tapes of key events.	Large Manufacturing Company	Transfer of data from 100 mainframes and 6 external data sources to DWH. From DWH data is transferred to dependent data marts.	Helpful in making better decisions and creating better information Quality information access. Performance and failure for all parts can be measured. Reason of failure detection becomes easier.	Limited data samples

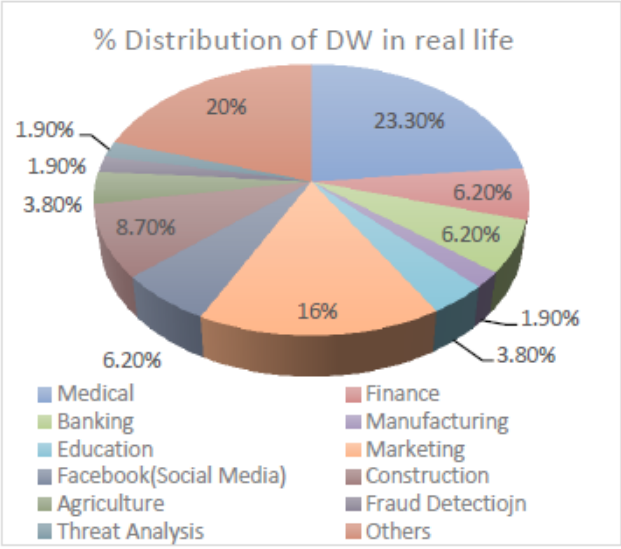

Figure Percentage Distribution of DW in Real Life

Internet: It is a network of networks that consists of private, public, academic, business, and government networks of local to global scope, linked by a broad array of electronic, wireless, and optical networking technologies. The Internet carries a vast range of information resources and services. Since the transmission is over public networks, requires addressing security concerns.

Intranet: An intranet is a private network that is contained within an enterprise. It may consist of many interlinked local area networks and also use leased lines in the Wide Area Network. Typically, an intranet includes connections through one or more Gateway computers to the outside Internet. The main purpose of an intranet is to share company information and computing resources among employees. An intranet can also be used to facilitate working in groups and for teleconferences

Extranet: an intranet that can be partially accessed by authorized outside users, enabling businesses to exchange information over the Internet in a secure way.

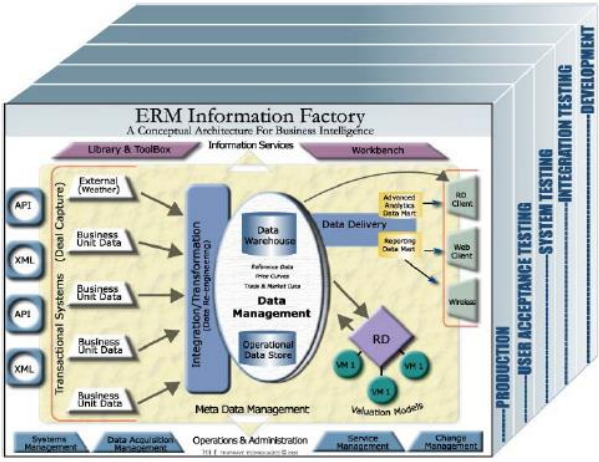

Figure 2. Conceptual Design Architecture

Illustrates how information delivered to web server from the data warehouse by using a common Gateway Interface (by means of some scripting languages like HTML).

Web-enabled data warehouse uses the Web for information delivery and collaboration among users. Users can be added very easily without any restriction. Infrastructure related to communication is always a big asset for web enabled data warehouse. Almost every user uses web browsers. No additional client software is required.

3. CONSTRUCTION OF WEB-ENABLED DATA WAREHOUSE

The designing and construction of Web-enabled data warehouse can be summarized as follows: Project Requirements, analysis Design, Construction (selecting and installing tools), Deployment and Maintenance

Building a web-enabled data warehouse relies on ETL (Extract, Transform, and Load). ETL is designed to process very large amounts of data as it copies complete data sets from the source systems; translates and often cleanses the data to improve its quality; and loads the resultant data set into a data warehouse.

Components of warehouse are developed iteratively as well as in parallel.

```
<target name='energy_setup' description='Runs extract for energy initalization'>
  <antcall target='000_extract_etvar_ref_tables'/>
  <parallel>
    <antcall target='000_extract_zainet_ref_tables'/>
    <antcall target='000_extract_openlink_ref_tables'/>
  </parallel>
  <antcall target='initialization'/>
</target>
```

In this example, the target name is “energy_setup”. This target doesn’t directly execute a task.

Instead, it calls other targets, in the following order:

1.'000_extract_etvar_ref_tables'

2.000_extract_zainet_ref_tables' AND '000_extract_openlink_ref_tables', which are executed simultaneously (because they are enclosed within the <parallel> </parallel> tags), and finally,

3) 'initialization'

3.1 Tool selection & installation

Basically tools selection is carried out using sample of data of real type.

Here's a list of common batch run/incumbent ETL tools: IBM Info sphere Data stage, Informatica Power centre, Microsoft SSIS and Oracle Data Integrator.

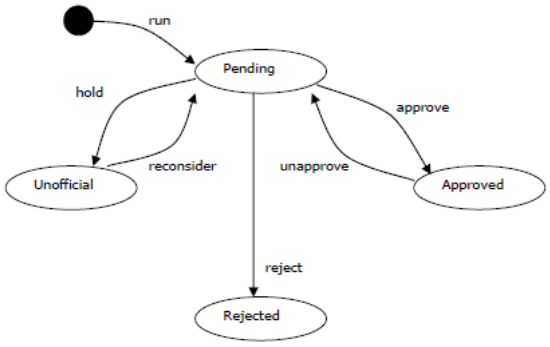

Figure 3.Tool Selection Process

Implementing the six operations (run, approve, unapproved, hold, reconsider, and reject)involved some complexity. In particular, insuring that the slowly changing dimension rules are correctly applied to the reporting data mart's dimensional data model and that all updates can be undone were significant challenges both for initial software development and on-going administration of the system. However, the end result is a set of tools that cover the needs of the typical business scenarios and operational issues. The next section will present these tools in more detail, as experienced by the administrative users. This can help the development team to evaluate the tools to test

problems related to their organization and to test the performance. It require to define standards and configure the development and testing as soon as tools are installed, rather than waiting until development is well underway. It requires time to solve any problems that arise, preprocessing of data and validation of the data before they are ready to use.

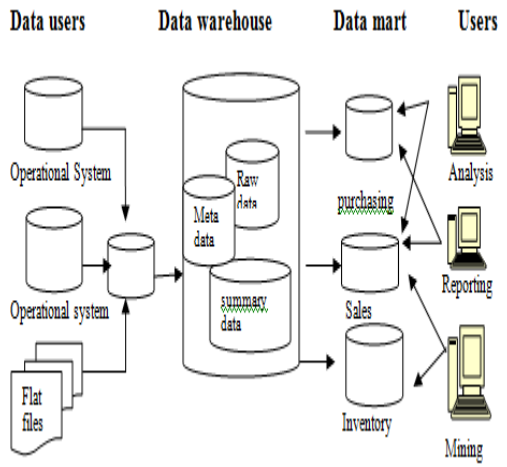

Figure 4.Architecture of User Interaction process

3.2 Security for Web based access

Web enabled data warehouse provides easy access to organization data and enables distribution of information worldwide. These two capabilities play a vital role of its usage in e-commerce. However combination of these technologies brings risk of exposing sensitive data of the organization.

Many vendors a enables web access to databases in general and some vendors to data warehouse in particular. This makes concern for

- Data warehouse security in general
- Web access to organization data associated security issues

If the choice is to display on web, it requires extra money and time on authentication and authorization of both external customers and internal staff.

- Authentication— is the process of identifying a person, usually based on a logon ID and password. This process is meant to ensure that the person is who he or she claims to be.
- Authorization— is the process of granting or denying a person access to a resource, such as an application or a Web page. In security software, authentication is distinct from authorization; and most security packages implement a two-step authentication and authorization process.
- Encryption— is the "translation" of data into a secret code. It is the most effective way to achieve data security. To read an encrypted file, you must have access to a secret key or password that enables you to decrypt it.

The bottom line on security is that we need to define our requirements related to the seuciryt early in order to have time to consider all factors.

3.3Adjusting the Data Warehouse for the Web

Expectation from a web-enabled data warehouse is high; it requires adjustment in data warehouse. Many tasks need to be carried out for data warehouse to make changes accordingly to enhance to web-enabled data warehouse. The following are the list of requirements for adjusting the warehouse to web. Information "PUSH" technique:

The design of data warehouse was based on PULL technique. The information is provided to the user based on the pull technique from data warehouse. Web has another technique "PUSH" to users without any request from the users.

Easy to Use: behavior of the user at the site can be easily identified because of click stream data.

Quick response: basically data warehouse takes long time to produce the results but when it comes to the web model, there is no compromise in terms of speed.

Output in the form of Multimedia: web pages support the concept of different kind of data types that include sound, video, animation, graphic etc. All these types are expected to be the outputs in the information delivery system of web enabled data warehouse.

Scalability: a web model can help us to add as many no of user, data. Therefore scalability will be of primary concern.

Time to kill: web model designed makes a system to be available all the time. So no downtime is possible in the web-enabled warehouse.

In 1999 "data Web house" term was popularized by Dr. Ralph Kimball .He believed that the data warehouse is taking crucial in the Web revolution. According to him it is necessary to adjust the thinking about data Warehouse.

The main aspects of the data Web house. Web house concept is based on distributed system. Independent nodes make up it complete. There is no particular center to the data Web house will support data of all kinds that include textual, graphical, audio, video etc.Design of user interface is of more importance for effective communication on the web. A web house is beyond the client server system. Web browser is the most important aspect of information delivery. Only concern is its openness, security is a serious concern. The response time for a request is reasonable. Web-

enabled warehouse can be used to form a virtual community, where participants in remote locations can exchange ideas in electronic formats. Web services will be available all the time so web house is expected to be up all the time.

The architecture of warehouse is based on a "bus" of linked data marts, it is important to define all the dimension and facts. The above factors supports for the implementation of a web enabled data warehouse. Each factor listed above insists adjustments of implementation principles from data warehouse to web. Few important implementations are crucial for web enabled data warehouse.

- The architecture of data warehouse should be "bus" architecture, that consists fully conform dimension and complete facts
- Since data warehouse is in distributed environment, it is necessary to centralize dimensions and facts. Physical centralization need not be required.
- Since data web house is a distributed set of dimension and facts, so it requires a query tool or report writer which can help us to establish connection from remote users.

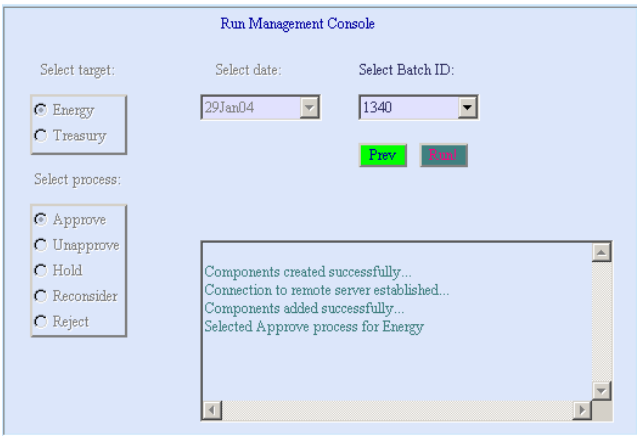

Figure Run Management Interface

Conclusion:

If we look at the architecture of Web, it looks to be more complex when compare with two or three tier client- server architecture .it requires additional adjustments in the form of tiers to ccommodate the requirements. This paper presents the dimensional modeling and design of an integrated data warehouse for construction equipment management; a technological platform for deploying the data warehouse to the web is also proposed for quick application development from a security perspective, it is always prudent to align the data warehouse design to implement security measures right from the phase of planning to deployment. A firewall needed to protect data from outside intrusions. Because security is always the main concerned. This will cover the entire architecture. Figure 5 shows model of delivering information. The above illustrates of transferring HTML pages to SQL queries using Common Gateway Interface (CGI) scripts.

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Privacy-Preserving Content Based Image Retrieval in Cloud Computing

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Abstract:-- **Content-based image retrieval (CBIR) is one among the elemental image retrieval primitives. Its applications may be found in varied areas, like art collections and medical diagnoses. With Associate in nursing increasing prevalence of cloud computing paradigm, image owners need to source their pictures to cloud servers. So as to contend with the danger of privacy leak of pictures, pictures are generally encrypted before they're outsourced to the cloud, which makes CBIR a very difficult task. Existing studies concentrate on the situation with solely one image owner, effort the matter of CBIR with multiple image sources (i.e., owners) unaddressed. During this paper we have a tendency to propose a secure framework for outsourced privacy-preserving storage and retrieval in massive image repositories. Our proposal is predicated on IES-CBIR, a completely unique Image secret writing theme that displays Content-Based Image Retrieval properties. Our answer allows each encrypted storage and looking exploitation CBIR queries whereas conserving privacy. We've designed an example of the planned framework, formally analysed and proved its security properties, and by experimentation evaluated its performance and exactitude. Our results show that IES-CBIR is incontrovertibly secure, permits additional economical operations than existing proposals, each in terms of your time and house complexness, and allows additional reliable utilization eventualities.**

Keywords: Cloud Computing,Content-Based Image Retrieval, Privacy Preserving

INTRODUCTION

In the recent days, visual information is to blame of 1 of greatest offers of overall web activity in each company and individual utilize. A live of images, illustrations, and photos being created and shared every day is increasing at an oft extending rate. The capability conditions for such a good deal of {information} has been a driving issue for information outsourcing administrations, for example, exploitation Cloud Storage and Computing arrangements. Such administrations are accounted for to be among the best making between internet administrations. Additionally, the accessibility of a good deal images in each open and personal archive prompts the need for content-based picture recovery (CBIR). CBIR strategies show the aptitude of helpfulness in some certifiable applications. For instance, clinicians will use Content primarily based Image Retrieval (CBIR) to seek out comparative instances of patients and encourage clinical basic leadership forms. In any case, substantial image information unremarkably contains 1,000,000 of images. On these lines, CBIR advantages notice high warehousing and calculation complexities. Cloud computing offers associate degree open door for the on-request access to adequate calculation and capability assets that settles on that associate degree enticing call for the image warehousing and CBIR readying. By deploying CBIR administrations to the server, the knowledge man of affairs is alleviated from overseeing neighbourhood image storage and connecting with storage shoppers on the online. all the same the method that data outsourcing seems a characteristic account facilitate expansive scale image warehousing and recovery frameworks, it very brings new difficulties up as so much as data management and protection. This is often associate degree after-effect of outsourcing data, that a lot of usually than not infers discharging management over it. Late news has given clear verification that protection ought not to be relied upon to be safeguarded from Cloud suppliers. Additionally, deadly framework promotion directors doing for the vendor have entire access to data on the facilitating machines of the cloud. At long last, programmers will mishandle programming vulnerabilities to extend unapproved air con server access. This prevalence within the iCloud image warehousing administration and massive name photograph spillage shows, in some half, the importance of those dangers for cloud primarily based visual data stores.

II. LITERATURE SURVEY

1. "Private Content based mostly Image Retrieval [02]", this deals with the retrieval of comparable pictures while not revealing the content of the question request to the info. They achieved it by exchanging the

messages between the user and also the info. They developed a way during which the info doesn't get to understand something concerning the question however the user gets the result for his or her question. Here question was in encrypted type however info was unencrypted.

2. "Enabling Search over Encrypted Transmission Databases [03]", this paper focuses on retrieval of comparable pictures over encrypted databases, wherever each the question and info documents are encrypted and their privacy is protected. To attain this, they projected some techniques that modify economical retrieval of pictures within the encrypted domain, while not multiple rounds of communications between user and server. They in contest able the projected techniques victimization pictures.

3. "Towards Privacy-preserving Content-based Image Retrieval in Cloud Computing [04]" this paper centred on providing privacy to the photographs that were uploaded to the cloud server. For this purpose, they projected a privacy conserving and retrieval theme that permits the information owner to source the photographs associate degreed its info to the cloud in an encrypted type, while not revealing the particular content of the info to the cloud server.

4. "A demonstrably Secure Anonymous Buyer–Seller Watermarking Protocol [05]", centred on providing a copyright protection to digital content. For this they projected buyer-seller watermarking protocol. Here the client chooses a secret key and sends that key to the vendor. Then emptor and vendor execute a protocol at the top of that the client obtains a watermarked content with the buyer's secret, whereas the vendor doesn't get any info this secret key.

5. "Reversible knowledge activity in encrypted image [06]", centred on reversible knowledge activity theme. Here they use to make a duplicate of target image from original image and so use to introduce a notation to focus on image, and sends this target image to the user.

6. "Protocols for Watermark Verification [07]" centred on adding a watermark to the digital image that may later be extracted or detected within the image. There are 2 sorts of watermark: visible and invisible. Visible watermarks mean a specific content contains visible messages or company logos indicating the possession of the image. Invisible watermarks, on the opposite hand are retiring modifications to the image and also the invisible watermarked image visually seems like the initial image.

III. A PRIVACY-PRESERVING CBIR FRAMEWORK

In this work we tend to propose a framework for the privacy-preserving outsourced storage, search, and retrieval of pictures in large-scale, dynamically updated repositories. Our framework consists of 2 main parts: a picture coding component, dead on shopper devices; and a storage, indexing, and looking out part (in the encrypted domain), dead within the outsourcing server (e.g. a cloud provider). We tend to base this framework on a brand new coding theme specifically designed for pictures, known as IES-CBIR. IES-CBIR permits U.S. to style outsourced image repository systems that support content-based image retrieval (CBIR) supported colour options, whereas protective the privacy of each image house owners and alternative users provision queries. comparison with state-of-art, IES-CBIR shows comparable retrieval exactitude and better machine performance than previous approaches as perceived by the purchasers, since it firmly moves classification computations to the cloud provider's infrastructure and avoids public-key and homomorphic cryptography. IES-CBIR additionally minimizes cipher text enlargement and consequently information measure and outsourced house necessities, reinforcing the positive impact on user-perceived latency.

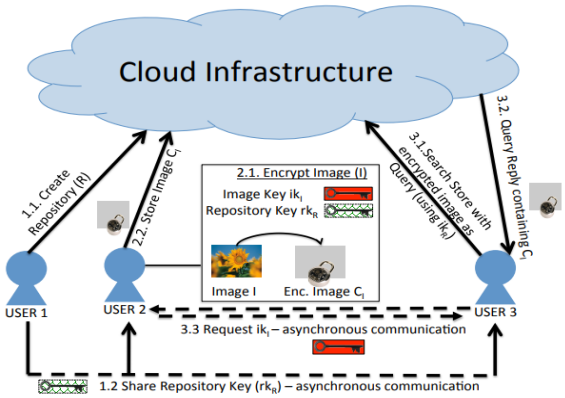

Fig. 1: System Model Overview

We currently describe Associate in Nursing example system model and design visualised for exploitation our framework and IES-CBIR. During this model, we have a tendency to contemplate 2 main entities: the cloud and (multiple) users (Fig. 1). Pictures square measure outsourced to repositories managed by the cloud. Every repository is employed by multiples Users, wherever they'll each add their own pictures and/or search employing a question image. Users also can request access to keep pictures from their creators/owners. Our objective is to make sure the privacy of users, therefore all information sent to the cloud is encrypted. Repositories square measure created by one user. Upon the creation of a repository, a replacement repository keys generated by that user then shared with different sure users, permitting them to look on the repository

and store new pictures. To add/update pictures, a user more desires a picture key (locally) generated for that image. Image keys square measure unbroken secret by their users, that means that even users capable of looking out during a repository (i.e. with access to the repository key) ought to raise the house owners of specific pictures for access to them. Note that exploitation specific keys per-image ought to be seen as no obligatory in our framework, i.e. if the users of a repository value more highly to avoid more key management work and square measure willing to sacrifice fine-grained access management, they'll use identical image key for all pictures or in teams of pictures. Once the cloud receives Associate in Nursing encrypted image for storage it extracts its relevant options (in our framework, we have a tendency to use international colour options [33]) and indexes the image supported these options. Identical action is performed for a question image, that when being encrypted by a user with a repository key, is then processed by the cloud and have its options extracted and matched with the repository's index. The reply to a question can contain a (configurable) k range of encrypted pictures and various information, that embody every image's id and also the id of the user that owns every of the pictures. to completely decode and access the contents of a picture, besides the repository key, the querying user can more need the image key for that specific image.

Algorithm Search with an Image as Query

1: **procedure** USER(ID_U).SEARCH(ID_R, Q, rk_R, k)
2: $C_Q \leftarrow$ IES-CBIR.GenTrp(Q, rk_R)
3: $rankedImgDistances \leftarrow$ cloud.Search(ID_R, C_Q, k)
4: **return** $rankedImgDistances$
5: **end procedure**

6: **procedure** CLOUD.SEARCH(ID_R, C_Q, k)
7: $qr \leftarrow$ InitiateQueryResults()
8: $fv_{C_Q} = \{hist_H, hist_S, hist_V\} \leftarrow$ ExtractFeatures(C_Q)
9: $vw_{C_Q} = \{ID_{vw_i}, freq^{C_Q}_{vw_i}\}_{i=0}^{|vw_{C_Q}|} \leftarrow CB_R$.Stem($fv_{C_Q}$)
10: **for all** $\{ID_{vw_i}, freq^{C_Q}_{vw_i}\}_{i=0}^{|vw_{C_Q}|}$ **do**
11: $PL_{vw_i} = \{ID_{I_j}, freq^{C_{I_j}}_{vw_i}\}_{j=0}^{|PL_{vw_i}|} \leftarrow Idx_R[ID_{vw_i}]$
12: **for all** $\{ID_{I_j}, freq^{C_{I_j}}_{vw_i}\}_{j=0}^{|PL_{vw_i}|}$ **do**
13: $score^Q_{I_j} \leftarrow$ ScaledTfIdf ($freq^{C_Q}_{vw_i}, freq^{C_{I_j}}_{vw_i}, |Rep_{ID_R}|, |PL_{vw_i}|$)
14: $\{C_{I_j}, ID_{U_j}\} \leftarrow Rep_R[ID_{I_j}]$
15: $qr[ID_{I_j}] \leftarrow \{C_{I_j}, qr[ID_{I_j}].score + score^Q_{I_j}, ID_{U_j}\}$)
16: **end for**
17: **end for**
18: **return** resize(k, Sort(qr))
19: **end procedure**

The input for this operation on the user side is IDR, Q, repository key rkR and parameter k (the number of most similar results to be returned). User U starts by generating Q's searching trapdoor CQ, through IES-CBIR.GenTrp algorithm (2). Then he sends it to the cloud server, along with k and IDR, as parameters for the Search remote invocation (3). The cloud starts by extracting CQ's feature-vector, stems it against CB R to determine its visual words vwCQ , and accesses Idx R with them to retrieve the respective posting lists PLvw (8-11). Then, for each image referenced in each of the posting lists retrieved, the cloud calculates its scaled tf-idf score [17] and adds it to the set of results for the query (12-15). In the set of results, scores for the same image but different visual word is summed. Finally, the cloud sorts this set by descending score and returns the top k to the user (18)

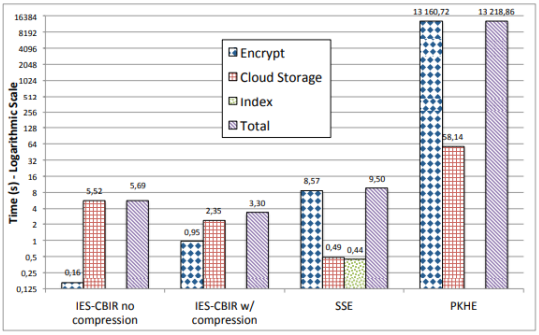

Fig2: Performance of the Search with Query Image operation, for all analysed alternatives (log2 scale).

To evaluate the retrieval precision that can be achieved with IES-CBIR, we extracted two metrics: an interpolated recall-precision graph, built with the Wang dataset and all its images as queries; and the mAP of the Holidays dataset, for a group of queries pre-defined by the authors of the dataset. Regarding the first experiment, we used a workload where each image in the dataset is used as query over all others in the repository. We then computed the average precision and recall, for all possible response sizes ([1.....,..1000]). Similar to the previous section, we compared the precision of IES-CBIR with its competing alternatives, SSE and PKHE. We also assessed the precision that an adversary would achieve if he was to search in the repository with a randomly chosen repository key. Figure 6 summarizes the results. Our framework shows similar precision and recall as the compared alternatives, with a small variation of about 6% in precision compared to SSE and PKHE systems. This small difference is the advantage gained by these alternatives through the sacrifice of performance and scalability. Nonetheless, the reader should note that our approach can be extended to also consider texture information in its CBIR algorithm, increasing retrieval precision at the expense of increased information leakage. Regarding the IES-

CBIR with wrong key baseline, results show that a malicious user using the framework to search repositories with an incorrect repository key would achieve similar precision as if he was choosing random images from those repositories as answer.

IV. CONCLUSION

The planned watermarking methodology can't be thought to be a really strong one. During this future, we'll create additional efforts to style watermarking rule with higher lustiness and embedding capability. We tend to conferred a privacy protective on secure AES and content primarily based image retrieval theme in cloud computing. The secure AES rule is applied to write the visual options. The similarity scores are often directly calculated with the encrypted options by the cloud server that permits the cloud server to rank the photographs while not the extra communication burden. The vicinity sensitive hashing is employed to enhance the search potency. For the primary time, we tend to take into account the dishonest users in SE schemes and propose a watermark-based protocol to discourage the non local distribution of pictures. Overall, the image options area unit secure against Cipher text-only Attack model, the image contents area unit secure against Chosen-plaintext Attack model, and therefore the search potency is improved from O (n) to O (n′).

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Detection of Ranking Fraud for Mobile Apps

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Abstract:-- **Finding of Ranking Fraud for Mobile Apps important in approval of Mobile App World and there is less considerate and study in this field to avoiding ranking deception. Mobile App market refers to duplicitous happenings, which have a persistence up the Apps in the acceptance list. In addition, this become more and more popular for App developers to use sheltered means, such as filling their App's sales or posting phony App ratings. To obligate ranking fraud in this, we provide full view of ranking fraud and propose ranking scam exposure system for mobile Apps. Furthermore, we examine three types of suggestions, i.e. ranking based indications, rating based indications and review based indications, by modelling Apps' ranking, rating and review behaviour is through arithmetical propositions tests. In addition, we propose and optimization based aggregation method to integrate all the evidences scam detection. Finally, we valuate the proposed system with real-world App data composed from iOS App Store for long time.**

Keywords: Mobile Apps, Ranking Fraud Detection, Evidence Aggregation, Historical Ranking Records, Rating and Review, Recommendation app.

I. INTRODUCTION

The quantity of mobile Apps has developed at a tremendous rate within the course of recent years. For instances, the expansion of apps was exaggerated by 1.6 million at Apple's App store and Google Play. to extend the event of mobile Apps, several App stores launched daily App leader boards, that demonstrate the chart rankings of most well liked Apps. Indeed, the App leader board is one in every of the foremost vital ways in which for promoting mobile Apps. the next rank on the leader board sometimes ends up in a large range of downloads and million greenbacks in revenue. Therefore, App developers tend to explore varied ways in which like advertising campaigns to push their Apps so as to own their Apps hierarchic as high as attainable in such App leader boards. However, as a recent trend, rather than hoping on ancient promoting solutions, shady App developers resort to some fallacious means that to deliberately boost their Apps associated eventually manipulate the chart rankings on an App store. this can be sometimes enforced by mistreatment therefore known as "bot farms" or "human water armies" to inflate the App downloads ratings and reviews in a {very} very short time [10]. There are some connected works, for instance, net positioning spam recognition, on-line survey spam identification and moveable App suggestion, however the difficulty of distinctive positioning untruth for mobile Apps remains below investigated. the matter of detective work ranking fraud for mobile Apps remains underexplored. to beat these necessities, during this paper, we have a tendency to build a system for positioning untruth discovery framework for moveable apps that's the model for detective work ranking fraud in mobile apps. For this, we've to spot many vital challenges. First, fraud is happening any time throughout the full life cycle of app, that the identification of the precise time of fraud is required. Second, thanks to the massive range of mobile Apps, it's troublesome to manually label ranking fraud for every App, therefore it's vital to mechanically discover fraud while not mistreatment any basic info. Mobile Apps don't seem to be perpetually hierarchic high within the leader board, however solely in some leading events ranking that's fraud sometimes happens in leading sessions. Therefore, main target is to discover ranking fraud of mobile Apps at intervals leading sessions. First, propose an efficient rule to spot the leading sessions of every App supported its historical ranking records. Then, with the analysis of Apps' ranking behaviour's, conclude the fallacious Apps usually have completely different ranking patterns in every leading session compared with traditional Apps. Thus, some fraud evidences are characterised from Apps' historical ranking records. Then 3 functions are developed to extract such ranking based mostly fraud evidences. Therefore, more 2 kinds of fraud evidences are projected supported Apps' rating and review history, that mirror some anomaly patterns from Apps' historical rating and review records. additionally, to integrate these 3 kinds of evidences, associate unsupervised evidence-aggregation methodology is developed that is employed for evaluating the believability of leading sessions from mobile Apps.

II. RELATED WORK

This paper aims to spot users generating spam reviews or review spammers. during this establish many feature behaviours of review spammers and model these behaviours' to find the spammers. particularly, this seeks to model successive behaviour's. First, spammers might target precise merchandise or product teams so as to maximise their impact. Second, they be doubtless to show from the opposite reviewer in their ratings of merchandise. In this, propose rating strategies to live the extent of spam for reviewer's associate degreed apply them on an Amazon review dataset. understand then choose a sub-set of extremely uncertain reviewers for additional scrutiny by our user evaluators with the assistance of an internet primarily based sender valuation software package specially developed for user analysis experiments. Our results show that our planned ranking and supervised strategies area unit helpful in discovering sender swish break different baseline methodology supported helpfulness votes alone. In this, finally show that the detected spammers have impact that's additional vital on ratings compared with the disconfirming reviewers. From this paper be have referred: - • construct of extracting of rating and ranking. • construct of extracting of review [1]. Advances in GPS following technology have enabled U.S.A. to put in GPS following devices in town taxis to gather an oversized quantity of GPS traces beneath operational time constraints. These GPS traces give alone opportunities for U.S.A. to uncover taxi driving fraud activities. during this paper, be develop a taxi driving fraud detection system, that is in a position to consistently investigate taxi-driving fraud. during this system, propose 1st give functions to search out 2 aspects of proofs: travel route proof and driving distance evidence. what is more, a 3rd gathering is meant to unite the 2 aspects of evidences supported dumpster-Shafer theory. To implement the system, during this 1st establish attention-grabbing sites from an oversized quantity of taxi GPS logs. Then, this propose a parameter-free methodology to mine the travel route evidences. Also, during this introduce route mark to correspond to a typical driving path from a remarkable web site to a different one. supported route mark, this develop a generative applied mathematics model to characterize the sharing of
driving distance and establish the driving distance evidences. Finally, will this assess the taxi driving fraud detection system with large-scale real-world taxi GPS logs? within the experiment, behave verify some regularity of driving fraud activities and investigate the drive of drivers to commit a driving fraud by analysing the created taxi fraud information. From this paper be have referred:-• construct of fraud detection [2] appraising texts on the online became a valuable basis of opinions on merchandise, services, events, persons, etc. Recently, several researchers have studied such opinion sources as product reviews, meeting posts, and blogs. However, existing analysis has been targeted on organization and outline ovation of opinions mistreatment traditional language process and data processing techniques. a crucial subject that has been neglected to date is judgment spam or trustiness of on-line opinions. during this paper, be study this issue within the context of product reviews, that area unit opinion made and area unit broadly speaking utilized by shoppers and products makers. within the past 2 years, many start-up firms conjointly appeared that collective opinions from product reviews. it's therefore time to review spam in reviews. To the most effective of our information, there's still no revealed study on this subject, though internet spam and email spam are investigated exuberantly. during this can see that opinion spam is somewhat completely different from network spam and email spam, and therefore needs completely different detection techniques. supported the analysis of five.8 million reviews and a couple of.14 million reviewers from amazon.com, during this show that opinion spam in reviews is widespread. This paper analyses such spam activities and presents some recent techniques to find them [3]. several applications in info retrieval, normal language process, data processing, and connected fields would like a ranking of instances with reference to specified criteria as against a classification. what is more, for several such issues, multiple recognized ranking models are well studied and it's engaging to hitch their results into a joint ranking, formalism denoted as rank aggregation. This work presents a unique invalid learning formula for rank aggregation (ULARA) that returns a linear mixture of the person ranking functions supported the quality of profitable ordering agreement between the rankers. In adding to presenting ULARA, we have a tendency to show its success on a knowledge union task across unintended retrieval systems [4].

III. EXISTING SYSTEM

The number of mobile Apps has full-grown at a breath-taking rate over the past few years. as an example, as of the tip of April 2013, there square measure quite one.6 million Apps at Apple's App store and Google Play. To stimulate the event of mobile Apps, several App stores launched daily App leader boards, that demonstrate the chart rankings of most well liked Apps. Indeed, the App leader board is one in every of the foremost necessary ways in which for promoting mobile Apps. a

better rank on the leader board sometimes ends up in a large variety of downloads and million greenbacks in revenue. Therefore, App developers tend to explore varied ways in which like advertising campaigns to push their Apps so as to possess their Apps hierarchic as high as doable in such App leader boards.

A. Drawbacks of Existing System

The matter of police investigation ranking fraud for mobile Apps remains under-explored because of the large variety of mobile Apps, it's tough to manually label ranking fraud for every App.

IV. PROPOSED SYSTEM

We planned a straightforward nevertheless effective algorithmic rule to spot the leading sessions of every App supported its historical ranking records. Then with the analysis of Apps' ranking behaviours. we discover that the deceitful Apps typically have completely different ranking patterns in every leading session compared with traditional Apps. Thus, we have a tendency to characterize some fraud evidences from Apps historical ranking records and develop 2 functions to extract such ranking based mostly fraud evidences. In Ranking based mostly Evidences by analysing the Apps historical ranking records. In Rating based mostly Evidences, user rating is one amongst the foremost necessary feature of App packaging. associate App that has higher rating might attract a lot of users to transfer and might be hierarchical higher within the leader board. Thus, rating manipulation is additionally a very important perspective of ranking fraud.

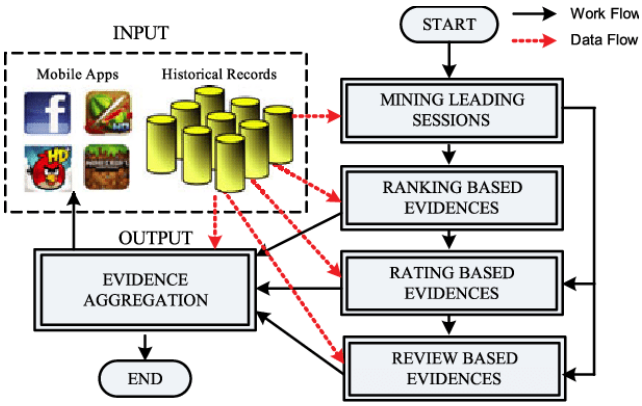

Figure 1. Architecture diagram

Mobile app stores launched several apps daily within the leader boards, that shows the chart ranking of common apps. The leader board is that the vital for promoting apps. Original application grade level decreases thanks to the arrival of faux apps. The users World Health Organization square measure recently work to the app stores, they decide supported the prevailing ranking, rating, and reviews for the individual apps. In recent activities, duplicate version of associate degree application not burned or blocked. this is often the main defect. high status leads large variety of downloads and also the app developer can get additional profit. In this, they permit faux Application conjointly. User not understanding the faux Apps then the user conjointly offers the reviews within the faux application. precise Review, Ratings, or Ranking share aren't properly Calculated. during this paper, we have a tendency to introduce admin to manage the ranking proof to reduce the arrival of faux apps, then the rating and reviews square measure properly calculated.

V. MODULES

5.1. ADMIN LOGIN during this module the Admin has got to login by mistreatment valid user name and watchword. when login winning he will do some operations like add apps, read all applications, read ranking fraud details read all search history, lists all users, list leading applications, read proof for the frauds and logout[2].

5.2. ADD APP during this module, the admin will add the applications. If the admin wish adds the new app, he can enter application name, app description, mobile sort, users, file name, application pictures and click on register. the main points are going to be keep within the info.

5.3. READ APPLICATION during this module, once the admin clicks on read application, application name, app description, mobile sort, users, file name, application pictures are going to be displayed.

5.4. RANKING FRAUD DETAILS during this module, once admin clicks on ranking fraud details, ranking fraud count, user name, mobile sort, application name, application ID, date and time are going to be displayed [2].

5.5. PROOF FOR FRAUDS during this module, once admin clicks on proof for fraud details, user name, mobile sort, application name, application ID, fraud IP address, fraud system name, date and time are going to be displayed [3].

5.6. USER LOGIN during this module, there square measure n numbers of user's square measure gift. User ought to register before performing some operations.

when registration winning he has got to login by mistreatment licensed user name and watchword. Login winning, he can do some operations as if search mobile apps, search prime K apps, read my details, list my search history, request for secret key, logout. If user clicks on my details button, then the server can offer response to the user with their tags like UID, user name, password, e-mail, contact no, location, DOB, gender, pin code details.

5.7. SEARCH AND TRANSFER MOBILE APPS during this module user will search the mobile app sort and click on search then he can enter application name, application pictures, read details of mobile app, enters application ID enter the key and transfer the file and send response to user[4].

5.8. EXPLORE FOR PRIME K APPLICATIONS during this module user enter the appliance name and choose the highest N details then leading app details are going to be displayed like application name, app description, mobile sort, users, file name, application pictures and ratings are going to be displayed.

VI. CONCLUSION

In this paper, developed a ranking fraud detection system for mobile Apps. Expressly, this 1st showed that ranking fraud happened in most main sessions and provided a technique for mining leading sessions for every App from its historical ranking records. Then, we have a tendency to recognized ranking based mostly evidences, rating based mostly evidences and review-based evidences for detective work ranking fraud. Moreover, during this projected associate degree optimisation based mostly aggregation technique to hitch all the evidences for evaluating the standing of leading sessions from mobile Apps. a singular read of this approach is that everyone the evidences will be modelled by applied mathematics hypothesis tests, therefore it's straightforward to be absolute with different evidences from field data to discover ranking fraud. Finally, this validate the projected system with general experiments on real-world App information collected from the Apple's App store. Experimental results showed the effectiveness of the projected approach. within the future, we have a tendency to attempt to study more practical fraud evidences and analyse the latent relationship between rating, review and rankings. Moreover, during this propose can extend our ranking fraud detection approach with different mobile App connected services, like mobile Apps recommendation, for enhancing user expertise.

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Survey on Intelligent Transportation Vehicles Analysis and Prediction of Traffic Based on Big Data

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Abstract:-- **Big data is turning into an exploration focus in intelligent transportation systems (ITS), which may be seen in several comes round the world. Intelligent transportation systems can turn out an outsized quantity of information. The created huge information can have profound impacts on the planning and application of intelligent transportation systems, that makes ITS safer, a lot of economical, and profitable. finding out huge data analytics in ITS could be a flourishing field. The paper analyses very well the most causes of traffic jam in huge cities and therefore the classification and analysis of traffic jam. Utilizing the web of Things and trendy communication technologies, large-scale traffic information and connected information supported GPS arenon-heritable, and information analysis is disbursed to construct a traffic prediction vehicle prediction model. The foretelling model is employed to predict the traffic flow in every direction of traffic intersections at a particular time, predict the likelihood of congestion at a particular time at a particular intersection, the traffic flow and congestion chance of a particular section at a particular time, and therefore the travel flight and travel habit forecast of pedestrians. At an equivalent time, take into account the impact of non-motorized vehicles and pedestrians on traffic jam. Use foretelling results and period of time traffic data observation to resolve traffic jam issues. Combined with management and improvement strategy control for traffic cooperative management, it provides valuable reference for decision-making in metropolitan traffic jam solutions.**

Keywords: Traffic Congestion, Big Data, Intelligent Transportation System, Road Capacity.

I. INTRODUCTION

Recently, massive information has become a hot topic in each domain and business. It represents massive and sophisticated information sets obtained from all types of sources. several of the foremost in style information method techniques contain massive information techniques, together with data processing, machine learning, computer science, information fusion, social networks so on [1]. many of us use massive information analytics in varied fields, and have achieved nice success [2]. as an example, in business field, thus me enterprises use massive information to grasp the buyer behaviour a lot of accurately so on optimize the merchandise value, improve operational potency and cut back personnel prices [3]. In social network field [3], through massive information analytics of instant electronic communication, on-line social networking, microblog and sharing area, some firms like Facebook, Twitter and LinkedIn will perceive the user's current behaviour, social connections and rules of social behaviour, and so promote some merchandise. In health care field, by process, and querying of health care information, doctors will analyse the infective characteristics, assessment of the patient's physique thus on develop a lot of humane treatment plans and suggestions and cut back incidence of patients [4]. In good grid field, via the analysis of good grid information, grid operators will recognize that components of the electricity load and power frequency ar too high, and even will diagnose that lines are in failure state. The results of those information analysis is contributed to the upgrading of the electrical grid, renovation and maintenance work [5]. With successful application of massive information analytics in such a big amount of fields, intelligent transportation systems additionally begin gazing massive information with nice interests. Intelligent transportation systems (ITS) are developed since the start of Nineteen Seventies. it's the long run direction of the transportation. ITS incorporate advanced technologies that embody electronic sensing element technologies, information transmission technologies, and intelligent management technologies into the transportation systems [6]. the aim of ITS is to supply higher services for drivers and riders in transportation systems. In ITS, information is obtained from numerous sources, like positive identification,

GPS, sensors, video detector, social medias, and so on. mistreatment correct and effective information analytics of ostensibly unstuck information will give higher service for ITS [10], [11]. With the event of ITS, the number of knowledge generated in ITS is developing from Trillion-byte level to computer memory unit. Given such quantity of knowledge, ancient processing systems are inefficient, and can't meet the info analytics demand. this can be as a result of they are doing not foresee the rise of knowledge quantity and quality. massive information analytics provides ITS a brand new technical technique. ITS will get pleasure from massive information analytics within the following aspects. 1. Brobdingnag an amounts of numerous and sophisticated information generated in ITS is handled by massive information analytics. massive information analytics has resolved 3 problems: information storage, information analysis and information management. massive information platforms like Apache Hadoop and Spark ar capable to process huge amounts of knowledge, and that they are wide employed in domain and business [12], [13].

2. massive information analytics will improve the ITS operation potency. several subsystems in ITSs have to be compelled to handle great deal data or provide call to manage traffic. Through quick information assortment and analysis of current and historical huge traffic information, traffic management department will predict traffic flow in real time. Public transportation massive information analytics will facilitate management department to be told the riders journey patterns within the transportation network, which may be used for higher public transportation service designing. massive information analytics of transportation APP developers will facilitate the users to achieve their destination in a very best suited route and with the shortest potential time.

II. OVERVIEW OF INTERNET OF VEHICLES

Worldwide, the quantity of vehicles for each personal and industrial use was one billion in two010 and is anticipated to be 2 billion by 2030 [1]. The abstract plan of transport spontaneous Networks (VANETs) emerged over a decade agony, and since then it's been an extremely active space of analysis [7], [2]. the fundamental plan of VANETs considers vehicles as mobile nodes which will communicate to make a network [2]. Basically, because of quality constraints, VANETs are thought of as conditional networks, wherever their performance is littered with the transport density and distributions [2], and varied different factors like unhealthy drivers behaviours and tall buildings [2]. additionally, the vehicles are thought of as unstable, temporary and random nodes. Thus, VANETs cannot guarantee the property of applications/services for patrons on massive scale areas. Therefore, VANETs are additional appropriate for restricted scale applications that need spontaneous services like preventing collisions or notifying drivers of hazards on roads. However, because of the web of Things (IoT) technology development and also the increase within the range of Internet-connected vehicles new VANETs communication necessities are rising. an additional weakness of VANETs is their restricted capabilities to method all the knowledge that's captured by themselves and close actors (such as mobile devices and sensors) [2]. To serve the new necessities of ITSs, vehicles should work as a sensible platform of multiple sensors with IP-based net property, many communication technologies, powerful machine elements, and also the ability to speak with different vehicles and ITS devices [24]. during this context, the evolution of the abstract plan of VANETs resulted within the introduction of the web of car (IoV) construct [8]. Thus, as a special case of IoT, IoV has distinctive characteristics and special necessities to serve the intelligent transportation systems. associate degree IoV is outlined as a platform that realizes in-depth the mixing and also the info exchange between humans, vehicles, things, and also the surroundings [25]. the most goal of IoV is to reinforce the security and potency of transportation, improve the service level of cities, save the surroundings, and make sure that humans are glad with the transportation systems services [3]. In distinction to VANETs, IoV integrates vehicles intelligence with vehicles networking, which ends in intelligent networks with communication and computing capabilities that offer transportation services on massive scale areas [3]. In IoV surroundings, as vehicles have permanent net connections, they'll offer info for the varied ITS applications classes (i.e. road safety, management and management of traffic, and infotainment). Consequently, info exchange is enabled among sensors and electrical actuators, road infrastructures, and vehicles still as drivers and passengers [2]. IoV collects massive volume of knowledge with varied structures from an oversized scale space, that conforms with the massive information heterogeneousness construct [26]. With several benefits that IoV has over VANETs many new opportunities are opened. IoV offers varied advantages to drivers, societies and economies. Moreover, traffic jam reductions and road safety enhancements will yield to major money savings publically health sector. moreover, utilizing period of time traffic solutions through connected vehicles can result in disbursal less time in traffic jams and increase productivity.

additional significantly, through IoV readying, service suppliers can realize opportunities to introduce new transportation services like period of time traffic news, locating parking tons, and site based mostly client service. Such services have high price not just for users however additionally for businesses.

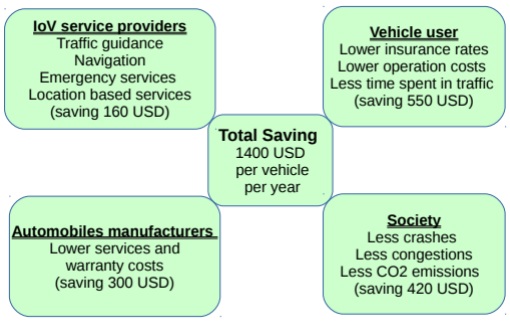


Fig1: Some financial benefits of employing IoV

III. THE ARCHITECTURE OF CONDUCTING BIG DATA ANALYTICS IN ITS

The design of conducting massive information analytics in ITS is shown in Fig. 1. It will be divided into 3 layers, that area unit information assortment layer, information analytics layer, and application layer. • information assortment layer: information assortment layer is that the basis of the design, since it provides the required information for the higher layer. the information come back from numerous sources like induction loop detectors, microwave radars, video police investigation, remote sensing, frequency identification information, and GPS, etc. Details regarding assortment of huge information are going to be introduced in next sections. • information analytics layer: information analytics layer is that the core layer of design. This layer is primarily to receive information from the information assortment layer, so apply numerous massive information analytics approaches and also the corresponding platform to finish information storage, management, mining, analysis, and sharing. Details regarding the large information analytics approaches and platform are going to be introduced in next sections. • Application layer: Application layer is that the uppermost layer during this design. It applies the information method results from the information analytics layer in several transportation circumstances, as an example, traffic flow prediction, traffic steering, signal management, and emergency rescue, etc.

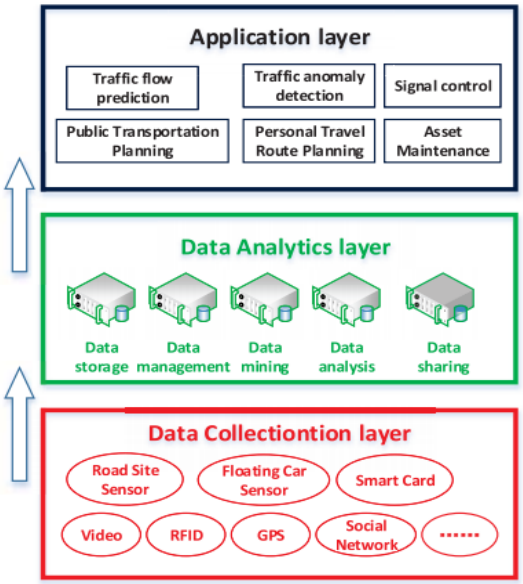
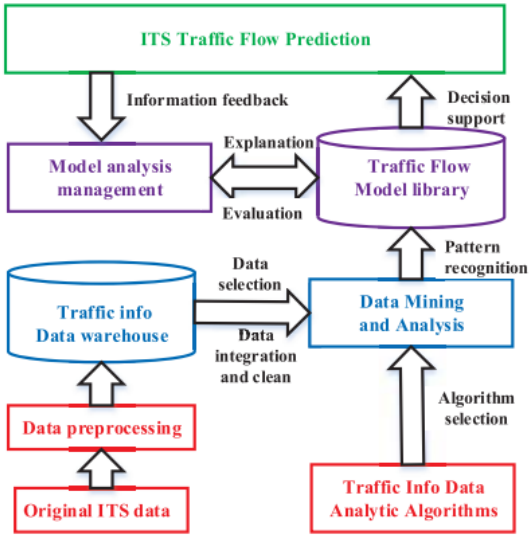


Fig. 2. Architecture of conducting Big Data analytics in ITS.

A. Road Traffic Flow Prediction

Timely and correct traffic flow data is crucial for transportation management. huge information analytics in ITS has a plus in traffic flow prediction [101]–[103]. in step with [9] ITS information is first pre-processed to induce the effective information set. victimization designated data processing or analysis technique, traffic flow model is established with the preprocess information. The traffic flow model provides call supports to traffic management department and obtain feedback from real traffic flows to calibrate the model. several students have studied traffic flow prediction victimization huge information analytic. Lv et al. [85] propose a deep learning based mostly. traffic flow prediction technique that use the greedy layer wiseunsupervised learning rule. Stacked machine encoder (SAE) model is employed to find out generic traffic flow options. The results show that the deep learning based mostly model has superior performance for traffic flow prediction. Liu et al. [104] analyse flat parameters and therefore the traffic flow prediction models is developed from totally different dimensions supported SVMs. Dong et al. [105] propose a pre-selection house time model to estimate the traffic flow at locations with very little information detectors. Canaud et al. [106] gift a likelihood hypothesis density filtering based mostly model for period traffic flow prediction. Pan et al. [107] advocate a changed random cell transmission model to support short traffic flow prediction. Antoniou et al. [108] propose AN approach for native traffic flow state estimation and prediction

supported data-driven process approaches. victimization the apparently unrelated time-series equation (SUTSE), Ghosh et al. [9] gift a replacement variable structural time-series (MST) model to predict traffic flow. The SUTSE model will severally track the amendment of every traffic flows and their elements as time goes by, and therefore the results show it's a superior prediction accuracy. Xu et al. [10] propose a completely unique on-line rule that may be a context-aware adjective traffic prediction rule. The rule will learn from the present traffic condition and use the historical traffic information to predict the long run traffic flow. The experiments indicate that this rule do higher than the present solutions. Lu et al. build a traffic flow state bunch model that adopts the simulated hardening genetic rule victimization fuzzy c-means (SAGA-FCM). This model relies on traffic speed information and occupancy information that comprehensively considers the temporal, spatial, and historical correlations of traffic flow huge information.



B. Traffic Congestion Forecast

At present, several analysis results of holdup prediction are primarily targeted within the knowledge domain, primarily supported statistic correlation prediction analysis, neural network prediction, Bayesian network prediction, and multiclassifier combination prediction [3]. The traffic flow feature vector is built by summarizing the fundamental information like the traffic flow parameters, the environmental state, and also the fundamental quantity, and also the four expected states are determined (then the amount aredetermined in keeping with completely different driving speeds, like smooth: V≥30; Crowded: 10≤V≤30; Congestion: 3≤V≤10; Blockage: V≤3, V stands for speed and is measured in metric linear unit / h). A self-encoding network technique victimisation deep learning learns from the untagged information set to get hidden layer parameters which will characterize deep options of the information and generate new feature sets. Softmax regression is employed to find out the new feature set with label to come up with prophetical classifier, and also the model predicts the polymorphism of holdup [34].

C. Pedestrian and Non-Motorized Vehicle

Flight Prediction supported GPS information At several traffic intersections, the collision of pedestrians and non-motorized vehicles with automobiles has light-emitting diode to holdup. supported GPS information, the moving flight of a pedestrian or a non-motor vehicle at bound time is expected by victimisation relevant cluster algorithmic program. during this method, the amount of pedestrians and non-motorized vehicles are often expected at a precise traffic intersection at a selected time.

IV. CONCLUSION:

By use of huge information technology to induce the traffic data of the whole town, and supply sensible information and solutions for traffic steerage and concrete designing, it will solve the subsequent problems: holdup prediction analysis and processing; traffic flow forecast; scientific designing of transport infrastructure. By the technology of the web of Things to gather information, get period information and historical information, victimization massive information technology, the info is cleansed and pre-processed, and therefore the acceptable rule is chosen to ascertain a traffic prediction model. With the widespread use of driverless technology in giant cities, intelligent transportation systems supported massive information will give correct and extremely reliable traffic data for the web of Vehicles.

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