



ICIRST-2021

THE INTERNATIONAL CONFERENCE ON Innovative Research in Science and Technology

25th – 26th March 2021

Regus – Tokyo Hibiya Centre , Japan



Organized By

Institute For Engineering Research and Publication (IFERP)



International Conference on Innovative Research in
Science and Technology

(ICIRST-21)

(Virtual Conference)

Tokyo, Japan

25th-26th March, 2021

Institute For Engineering Research and Publication (IFERP)

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IFERP-Explore

Editorial

We cordially invite you to attend the **International Conference on Innovative Research in Science and Technology (ICIRST-21) - Virtual Conference** which will be held at **Regus - Tokyo Hibiya Centre, Japan on March 25th-26th, 2021**. The main objective of **ICIRST** 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 Innovative Research in Science and 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 January 2021, the Organizing Committees have received more than 60 manuscript papers, and the papers cover all the aspects in Electronics, Computer Science, Information Technology, Science Engineering and Technology and Management. Finally, after review, about 17 papers were included to the proceedings of **ICIRST-2021**.

We would like to extend our appreciation to all participants in the conference for their great contribution to the success of **ICIRST-2021**. 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 Innovative Research in Science and Technology (ICIRST-21)** this year in month of March. The main objective of ICIRST-2021 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 make this conference successful.



Er. R. B. Satpathy
Chief Executive Officer
Institute for Engineering Research and Publication (IFERP)

Keynote Speaker



Dr. Naeem Hannon

Associated Professor
Consultant
University Technology Mara
Malaysia

Message

GREETINGS!!!

An impressive collection of technical papers will be presented at the 'International Conference on Innovative Research in Science & Technology' which is to be held on March 25-26, 2020 at Regus – Tokyo Hibiya Centre, Japan by a galaxy of eminent professors and researchers. The management and organizers of the conference have worked tirelessly, with great enthusiasm and the dedication, to make a stunning impact to enhance the technical breadth of the event and quality of the conference through their effort.

I am truly honoured and proud being part of ICIRST-2020. I convey my warm wishes to both participants and organizing members for success and good luck.

Keynote Speaker



Tetsuya Hiraishi, Dr.Eng.

Professor
Fluvial Disaster Research Center Disaster Prevention Research Institute (DPRI)
Kyoto University
Japan

Message

GREETINGS!!!

We have just had the maximum aftershock this February since the 2011 Great East Japan Earthquake which caused the loss of more than 20,000 lives and the meltdown of Fukushima Dai-ichi Atomic Power Station. The preparation and risk analysis of natural hazards is the urgent subject for present science and technology. Discussions in ICIRST- 2021 will become a strong tool to find a way to manage the future natural disasters. I would like to express sincere thanks to all participants and organizing members for giving this valuable opportunity to study on the innovative research in science and technology.

International Conference on Innovative Research in Science and Technology

ICIRST-2021

Tokyo, Japan
25th-26th March, 2021

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**International Conference on
Innovative Research in Science
and Technology**

Japan

25th - 26th March, 2021

PAPERS

ICIRST-21

Organized by

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Consumer Experience in Using Airline Services Indonesia during the Covid-19: Role Trust and Advocacy

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Abstract:

This study aims to prove the effect of information quality and service quality on customer experience and its impact on customer trust and customer advocacy. Customer experience is used as the primary assessment between behavior before making a purchase and behavior after purchasing. This type of research is explanatory research, which uses direct surveys of airline passengers in Indonesia through an online questionnaire to obtain primary data. Then it is processed using the smartpls3 application. The results showed that information quality and service quality had a direct effect on customer experience and indirectly had an impact on customer trust and customer advocacy. Service quality has the most dominant influence on customer experience than information quality. Information quality and service quality have an indirect effect on customer advocacy through customer experience and customer trust.

Keywords:

information quality, service quality, customer experience, trust, advocacy

1. INTRODUCTION

Lately, propels in innovation, particularly the web and e-Commerce, have changed the way individuals live. One of them is Mobile innovation, which has been at the front line of all mechanical improvements as of late. To give a manageable upper hand and adjust to the progressive changes occurring presently, organizations must stay aware of the distinctions in showcasing and restore themselves as indicated by this change [14]. The Coronavirus pestilence requires a few people to work at home where all work is done at home with the goal that a few exercises, for example, aircraft are compelled to encounter transitory stops. Aircraft give credit records to customers who have requested flight tickets and can be utilized again after the Covid-19 pandemic period closes. In the new typical period, a few specialists are compelled to do official positions outside the city because of significant issues, so they travel utilizing aircraft. A few carriers have engaged travelers to do data following wellbeing conventions. Because of this data, a few purchasers set out to make official outings via plane. For this situation, the carrier's data can help buyers uphold the exercises to be done. [40] Show that information quality is the user's evaluation of semantic communication and knowledge's systematic expression based on the information provided. Perception is the process of

accepting, selecting, arranging, and giving meaning to the received stimulus [42].

Notwithstanding the nature of the data gave via aircraft, for this situation, the administrations gave during the pandemic will be not quite the same as the time before the pandemic, so for this situation, it is crucial to think about the administration quality that is applied. Good service quality will make an advantage for service providers. Service quality is closely related to customer satisfaction, trust, and loyalty [2]. A few aircraft that have gone during the new ordinary time frame are the Garuda gathering in Indonesia. It is important to realize the client experience under the administration quality gave the data quality that has been educated. Given client experience, it tends to be anticipated that customer trust regarding data quality and administration quality given by Indonesian aircraft will affect promotion.

2. LITERATURE REVIEW AND THEORETICAL FOUNDATION

In this section, we provide an overview of the relevant literature as a theoretical basis for the proposed models and hypotheses. Drawing from various papers and studies, we explain and discuss the S-O-R framework and the theory of planned behavior, information quality and perceived service quality based on experience, trust, and advocacy.

A. The stimulus-organism-response (S-O-R) and theory of planned behavior as framework

SOR is a theory or framework used to measure Behavior in various fields. In this case, the stimulus can encourage someone to judge something and then produce a behavior [25]. In recent years, SOR developed as a research base for online purchasing behavior [23]. In studying consumer behavior, SOR can be used as a guideline for measuring Behavior. In this study, information quality and service quality are used as a stimulus. The assessment can be explained through customer experience, and the resulting response or Behavior is trust. It will later launch the theory of planned Behavior, which results from the resulting behavioral response that will lead to a planned behavior, namely advocacy. Theory of Planned Behavior (TPB) is a development of the Theory of Reasoned Action by developing this theory by adding a construct that does not exist in TRA, namely perceived behavioral control. This construct was added in the TPB to Control the Behavior of individuals who are limited by their shortcomings and the limitations of the lack of resources used to carry out their Behavior [19, 28, 30, and 31]

B. Effect information quality on customer experience

Customer experience is how a customer views his interactions with the facilities received and can be defined as the sum of all interactions a passenger has with the aircraft community. These interactions can be conveyed in person, via the internet, through self-service booths, or via other channels [15,37] stated that customer experience development has several basic characteristics, including knowledge, emotional, affective, and physical responses to users. All of this defines users, their thoughts, and values, which reflect their lifestyle, behavior, and relationships. One of the most important in marketing, to provide precise information were; providing as much information as possible to consumers will help them make better product evaluations and purchasing decisions, but information overload will lead to information overload and reduce the quality of consumer decision making [23], the quality of information captures content in e-commerce so that content must be personalized, complete, relevant, easy to understand, and safe if prospective buyers or suppliers make transactions via the internet and return to the site regularly [9]. This study aims to prove that airlines' information quality can create a customer experience and can create trust and advocacy.

C. Effect service quality on customer experience

Service quality is what consumers feel about their expectations of service companies' services [35]. Service quality is an abstract construct and is challenging to understand due to three features unique to services: intangibility, heterogeneity, and the inseparability of production and consumption [12], service quality is a

consumer's overall service excellence or excellence assessment. Studies on the quality of customer experience show that the physical environment and social interactions are dimensions of experience quality and can be seen through service quality [5,41] stated that in defining customer experience and the influence of consumer reactions, emotion is the most crucial function [15, 30]. This study aims to prove that customer experience can be formed based on consumers' perceived reactions to airline companies' service quality in Indonesia. highlights the importance of moments of truth that customers find during pre-experience and post-experience studies to determine the factors that shape the customer experience, namely brand experience, multichannel interaction, service interface, physical environment, and social environment, and price and promotion [10].

Effect customer experience to trust

The concept of customer experience as a subjective state of awareness with various symbolic meanings, hedonic responses, and aesthetic criteria that are influenced by environmental inputs, consumers, intervention responses, and output consequences [6, 30, 32]. Customer experience as affective and cognitive aspects resulting from service while visiting to lead to attitudes such as satisfaction and repurchase intentions and behavioral outcomes such as loyalty and word of mouth [33]. Experience quality is a subjective response from consumers who are towering in direct and indirect meetings with service providers [22]. This study aims to prove the impact of post customer experience, trust proposed in the research conceptual. The concept of trust is also one of the most critical elements in creating long-term relationships with customers, especially about maintaining the confidentiality of information relating to clients and concerning a commitment to provide the best service/product from time to time [2].

D. Effect Trust to advocacy

Trust is defined as an individual's belief in others' trustworthiness, which can be determined by honesty, affection, and perceived expertise [18]. A consumer who faces several transaction risk levels can turn to other people who are trusted by consumers to be trustworthy and kind; therefore, trust is the most import a crucial in a marketing context. Advocacy is an act that involves speaking positively or arguing for a purpose, supporting and defending, or pleading on behalf of others [34] Advocacy is an active defense and promotion of an organization through positive word of mouth [26]. Consumer advocacy is carried out by consumers who reflect the tendency to offer enthusiasm, and people will boldly make their voices heard to enable companies to quickly identify problems and provide solutions to minimize the effect of negative word of mouth [1]. This study aims to prove that trust will lead

consumers to create advocacy that is formed based on consumers' experiences.

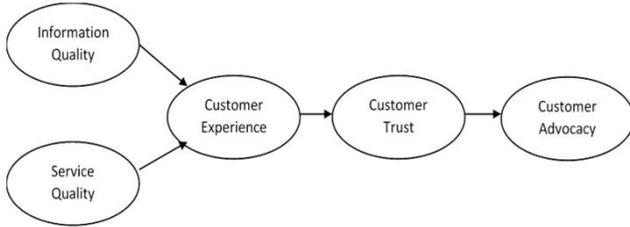


Figure 1. Conceptual Model

In this study, the SOR theory was used to predict behavior based on a Likert scale and then analyzed using Partial Least before the experience, and TPB was used to predict behavior Square (PLS). Instrument information quality is adopted after the experience was felt. In SOR theory, information from three measurement items [38], Service quality uses quality is a stimulus used to measure customer experience. seven measurement items [17], customer experience uses Service quality is an organism used to measure customer eight measurement items [27], Trust uses three measurement experience, which response to the perceived results. The items [42], and advocacy of four measurement items [20] The customer experience response is then based on planned entire measurement item is then processed using smart pls actions where after experiencing the customer experience, it and refers to the rule of thumb [16] and then interpreted can create trust and then impact the formation of advocacy as through the research results.

The final behavior is carried out based on the perceived experience. Based on the research conceptual, the following research hypothesis can be determined:

- H1: Information quality has a positive and significant effect on customer experience
- H2: service quality has a positive and significant effect on customer experience
- H3: customer experience has a positive and significant effect on customer trust
- H4: customer trust has a positive and significant effect on customer advocacy

3. METHODS

Explanatory research is used in this research through a quantitative approach by conducting direct online surveys of consumers who take domestic flights in Indonesia. The population in this study is unlimited due to the uncertain number of passengers. This research was conducted online during the new normal era and obtained a total sample of 380 respondents. The sample number was determined using a formula [24] Data were collected through primary data obtained from online questionnaires filled out by respondents.

4. RESULT AND DISCUSSION

Based on the respondent's profile results, it can see that the majority of respondents are male and are vulnerable to the age of 25-35 years. Most respondents are employees of state-owned companies who are on a business trip. The majority of respondents had a healthy certificate of rapid test results, and some had swab test results; they had been declared not infected with the Covid-19 virus.

Based on the results of instrument testing using the SmartPLS3 application, three interpretable results can be drawn:

about the outer model that can explain the instruments' validity and reliability as measurements [7]

The inner model, which explains the magnitude of the influence between research variables, can be explained through the R-square and Q-square values and AVE [16].

The third is that hypothesis testing is carried out using the bootstrapping method in the SmartPLS3 application to determine the path coefficient value and prove the proposed hypothesis.

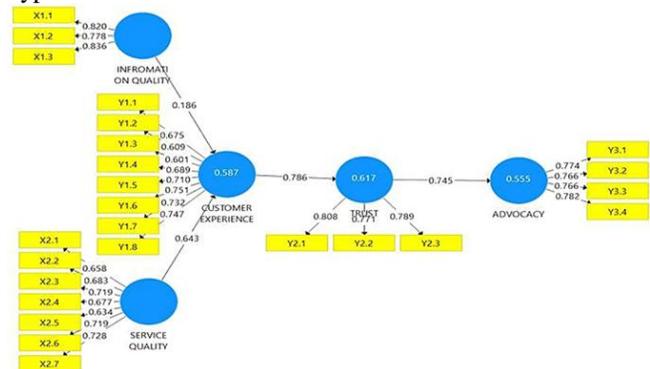


Figure 2. Outer and Inner Model Result

Based on Figure 2. It can see that the value of outer loading shows a value greater than 0.5 that it can be said valid; this is following the statement [13] that if outer loading shows valid above 0.5, then the instrument used as a measurement of the results can be stated valid and reliable, although the requirements to be declared valid and reliable are 0.7. AVE values produce numbers above 0.5 to be called ideal as a research instrument [16, 17]. Furthermore, the inner model results show that the customer experience variable's R-square value is 0.587; the customer trust is 0.617. The customer advocacy is 0.555, so it can be concluded that the majority of the influence of the variable is more than 50%, which can be explained that the magnitude of the influence of the variable information quality and service quality on customer experience is 58.7%, customer trust is 61.7% and customer advocacy is 55.5%. The rest is influenced by variables or other factors not examined in this study. Furthermore, the Q-square is used to see the diversity of research results based on the structural method, and it can

be calculated manually based on the results of the R-square value. The q-square formula can be calculated as follows:

$$Q^2 = 1 - (1 - R^2_1) (1 - R^2_2) (1 - R^2_3)$$

$$= 1 - (0.587) \times (0.617) \times (0.555)$$

$$= 1 - 0.201$$

$$= 0.799$$

The q-square result shows that the structural model diversity value has a value of 79.9%, so that it can be said to have excellent and robust goodness of fit [16]. The last one is the bootstrapping method, which interprets the hypothesis testing proposed by the research model. Hypothesis test results can be seen in table 1 regarding the path coefficient value.

Table 1. Path Coefficient Hypothesis

	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values
CUSTOMER EXPERIENCE -> TRUST	0,786	0,788	0,017	47,095	0,000
INFORMATION QUALITY -> CUSTOMER EXPERIENCE	0,186	0,184	0,045	4,169	0,000
SERVICE QUALITY -> CUSTOMER EXPERIENCE	0,643	0,645	0,035	18,188	0,000
TRUST -> ADVOCACY	0,745	0,745	0,024	30,904	0,000

Based on table 1, it can be seen that the results of hypothesis testing show that the effect of information quality on customer experience shows a coefficient value of 0.186 and a statistical value of 4.169 with a p-value of 0.000. The effect of service quality on customer experience shows a coefficient value of 0.643 and a statistical value of 18,188 with a p-value of 0.000. The effect of customer experience on customer trust shows a coefficient value of 0.786 and a statistical value of 47.095 with a p-value of 0.000. The effect of customer trust on customer advocacy shows a coefficient value of 0.745 and a statistical value of 30,804 with a p-value of 0.000. The results of smart pls testing automatically show the calculation of the indirect effect specifically, which shows that there is an indirect influence between the information quality variable on customer advocacy through customer experience and customer trust with a coefficient value of 0.109 and a t statistic of 4.106 with a p-value of 0.000. Then the indirect influence between information quality variables on trust through customer experience also shows a significant relationship with a coefficient value of 0.146 and t statistic of 4.134 with a p-value of 0.000. There is an indirect influence between service quality on customer advocacy through customer experience and customer trust with a coefficient value of 0.376 and a t statistic of 13,327 with a p-value of 0.000; then a specific indirect effect was also found between variable service quality on customer trust through customers—experience with a coefficient value of 0.505 and t statistic of 15,943 with a p-value of 0.000.

Finally, there is an indirect influence between the customer experience variable on customer advocacy through

customer trust with a coefficient value of 0.585 and a t statistic of 23.181 with a p-value of 0.000.

Table 2. Specific Indirect Effect

	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values
INFORMATION QUALITY -> CUSTOMER EXPERIENCE -> TRUST -> ADVOCACY	0,109	0,108	0,027	4,106	0,000
CUSTOMER EXPERIENCE -> TRUST -> ADVOCACY	0,585	0,587	0,025	23,181	0,000
SERVICE QUALITY -> CUSTOMER EXPERIENCE -> TRUST -> ADVOCACY	0,376	0,379	0,028	13,327	0,000
INFORMATION QUALITY -> CUSTOMER EXPERIENCE -> TRUST	0,146	0,145	0,035	4,134	0,000
SERVICE QUALITY -> CUSTOMER EXPERIENCE -> TRUST	0,505	0,509	0,032	15,943	0,000

Based on the table of hypothesis testing results, it can be seen that the entire hypothesis proposed is accepted. Information quality has a positive and significant effect on the customer experience. It can be concluded that if consumers' information quality is following the perceived customer experience, and it is proven that the results of the experience are positive. Information quality is proven to be a stimulus for consumer action that can be assessed based on the organisms received through customer experience; this is also under research [43] that it is true that information quality can be used as a stimulus for the formation of consumer behavior. The existence of the Covid-19 pandemic requires the public to always update information, especially in the morning. Some workers often do work out of town due to restrictions on leaving the region to benefit the community in terms of information quality. Information quality has a positive influence on customer experience, and this makes its novelty in the results of research conducted after the Covid-19 pandemic conditions.

Furthermore, service quality is proven to have a positive and significant impact on customer experience. This means that airline companies' service quality provides a positive customer experience, where after the Covid-19 pandemic, airline companies need to increase service quality intensively. It turns out that service quality can provide a good experience for consumers after the Covid-19 pandemic conditions. Several previous studies have also proven a positive and significant effect of service quality on customer experience before the Covid-19 pandemic conditions [36]. Several other previous studies have always linked service quality with customer satisfaction [17, 12,11]. However, in reality, satisfaction can be formed based on customer experience. Customer experience is an organism from the SOR theory, wherein in this study, customer experience is an organism of the stimulus (information quality and service quality). The response from customer experience can form customer trust and customer advocacy, which will be discussed later.

Customer experience has a positive and significant effect on customer trust; this proves that consumers' experience can create Trust in airline companies. The new normal era is a new experience for consumers after the Covid-19 pandemic

conditions where health is the most important thing for consumers who are airline passengers. Trust is the main thing that must be formed by airline companies based on consumer experience as a goal of long term success. Length of the airline company. Several studies also explain the positive and significant effect of customer experience on customer trust and a different research object [4] Furthermore, customer trust has a positive and significant effect on customer advocacy; this proves that consumers who already have a sense of Trust based on their perceived experience will create customer advocacy by discussing all the positive things they feel. The condition of the new normal era requires reliable information from the closest person regarding the experience felt by someone because it is a condition that has only occurred after the Covid-19 pandemic. Several previous studies have found that customer advocacy can be formed based on customer satisfaction [34] However, the results of this study prove that customer advocacy can be formed through customer trust. [5] Also explain that customer trust can form a behavior which in this study creates customer advocacy. Customer trust and customer advocacy are responses to the theory of SOR, where after assessing that based on the experience felt by consumers, they will give a positive response in the form of having Trust and talking about positive things. Based on TPB, customer trust and customer advocacy are formed by consumers based on their perceived experience of information quality and service quality. This is under research [8] that customer experience can form behavior, namely customer trust, and customer advocacy. Although the indirect effect is not used as a research hypothesis, this is something important that must be reviewed in this study because the indirect effect results also support the findings of the direct effect. Customer experience and customer trust are proven to have a role as a mediating variable in the relationship between service quality and information quality towards customer advocacy, which means that the service quality and information quality provided by airline companies can match the perceived customer experience and then create customer trust and in the end. Can have an impact on customer advocacy by providing positive reviews. Furthermore, the direct relationship between information quality and customer trust [39,43]. However, the results of this study indicate that information quality can create customer trust through customer experience [28,29, 30, 31,32] Customer trust can also be formed directly based on service quality, but this study shows that service quality of trust is mediated by customer experience. [11] Also explains the direct relationship between customer experience and customer advocacy. However, this study's results indicate that customer advocacy can be formed based on customer experience through customer trust following research Behavior formed based on customer trust, namely customer

advocacy in this study, can create behavior intention for other consumers[18].

5. CONCLUSION

This study aims to prove the influence of information quality and service quality on customer experience and its impact on customer trust and customer advocacy in Indonesia's aviation industry in the new normal era. The results showed that information quality and service quality had a direct effect on customer experience and indirectly had an impact on customer trust and customer advocacy. Based on the hypothesis test results, the service quality variable has the most dominant value than information quality; this means that in the new normal era, service quality is a significant consideration for airline passengers. Service quality can be used as consideration for airline companies as a long-term marketing strategy for the company, considering that airlines have a significant risk in Covid-19 pandemic conditions. Customer experience is an overall consumer assessment starting from the experience before and after using flight services and creates a positive impact, namely creating customer advocacy that benefits the company. This study's results can contribute to marketing theory, especially in consumer behavior theory (SOR and TPB) that customer experience is an organism and can have an impact on planned behavior such as customer trust and advocacy. This research was conducted in the new normal era so that the experience is something new for consumers after the Covid-19 pandemic condition. Future research might provide a comparison between the conditions before the Covid-19 pandemic and the results of this study, namely the new normal condition.

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Structural Analysis of Bamboo Wall Framed Structure – An Approach

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Abstract:

Structural applications of indigenous materials such as bamboo are considered as an integral part of the sustainable development. In the study, the author has tried to analyze bamboo wall framed structure using half strip bamboo anchored to a sheathing material. It has been modeled in STAAD Pro software and different load as- Dead Load, Live Load, Seismic Load, Wind load were applied on the frame. The material properties of bamboo were defined using the value of modulus of elasticity, Poisson's Ratio, density, and shear modulus obtained from the tests conducted here in laboratory.

Keywords:

Bamboo, half split bamboo wall, STAAD Pro, Framed Sturcture

1. INTRODUCTION

The insufficiency of construction in developing countries, motives the exploration for alternative substances that can be used to build affordable houses for different categories of citizens. The center of attention of researcher is on non – conventional materials and methods at time of such environmental situation. In recent years, use of timber for construction, has increased in demand but, on the other hand the forest resources are diminishing at a very high rate. Hence the usage of timber is being replaced by **BAMBOO**. In particular, it is a promising alternative, as for its less growing period, short rotational age, and great strength at the same time.

Always we have a requirement of affordable mass housing schemes for people of zone of earthquake and cyclone affected. **With an aim to utilize the strength properties of bamboo in low costing houses, an approach has been taken for construction of energy efficient and eco-friendly housing system using bamboo as wall framed structure.**

2. LITERATURE REVIEW

Sushil G Nikam A.C. Attar (2013), developed an walling system with bamboo fixed to timber as sheathing material by nailing, which can tolerate high values of deformations and deflection in the elastic range i.e., being able to sway back and forth during an earthquake, without any damage to the bamboo wall panel.

Maulik D. Kakkad, Capt. C. S. Sanghvi (2011), studied that as bamboo is very flexible material and also light weight material, the seismic force in bamboo is used as main structural element because of its ductility and performance.

Rushab A. Shah, Hitesh D. Bambhava (2013), stated that the whole stem, halved or strips of bamboo can be nailed to one or both the sides of the bamboo frame and split bamboo mates can be fastened to the bamboo posts or mats can be woven.

Amada (1997), investigated the mechanical and the physical properties of bamboo. They conducted a thorough investigation into the structure and the purpose of the nodes, which they found to strengthen the Bamboo Culm. They also commented on the advantage of Bamboo over other natural building materials, as its fast growth rate.

Jorge A. Gutierrez, in his technical report had mentioned that one of the most remarkable characteristics of the traditional bamboo housing is their lightness. When the walls are left as exposed esterilla without mortar, the weight of the house may be less than 10% of the weight of the similar masonry houses.

Sharma (2014), had studied that the properties of bamboo as peak grade building material and increased availability of bamboo in our country makes it potential to use bamboo on the field of construction broadly. Its high value consumption not only promotes the economic development but also saves forest resources to protect our ecological balance as a wood substitute.

D.K. Tamang (2013), carried out research on Bamboo's Diversity, Distribution patterns and its use in Himalaya (India) which has different species of bamboo found in different region.

B. Bhattacharjee and A. S. V. Nagender (2007), performed the analysis of the design of the multi-storied structure in The STAAD Pro software. In this they explained the various fundamental properties of the software and

developed the proper result of the structure using the software with possible factors of the materials used.

3. SIGNIFICANCE

The raw materials required for constructing a bamboo house needs to be available locally and accessible. Moreover, the bamboo-based housing system is of low and basic material. Bamboo can bear high values of deflections in the elastic range i.e., possesses high elasticity. Bamboo has no CO₂ emissions like of R.C. buildings. Some of the positive aspects such as a lightweight design, better flexibility, and toughness due to its thin walls with discretely distributed nodes and its great strength make it a good construction material. Hence bamboo houses with the alternate developed walling system when properly constructed will be ductile in nature i.e., being able to bear the sway movement horizontally during the earthquake, without any damage to the bamboo wall panel. This walling system is actually the alternative of cement mortar based bamboo grid wall used for the houses made today.

Not just the advantages of bamboo are being discovered but the researches have helped in knowing the demerits too. Bamboo fails in buckling. To rectify the failure the length is to be changed further or the cross-section in other words.

4. THE STRUCTURAL MODEL

A model of 1.22m x 1.22m x 2.44m is being developed with mono-sloped roof.

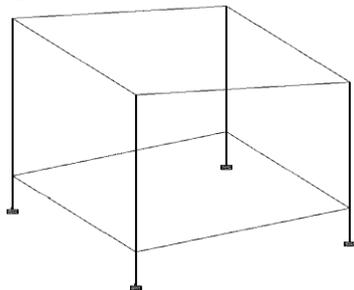


Fig 1: The schematic framed diagram

The wall of the frame is being designed as “Half spliced” bamboo placed side by side within a layer of Suitable Sheathing material.

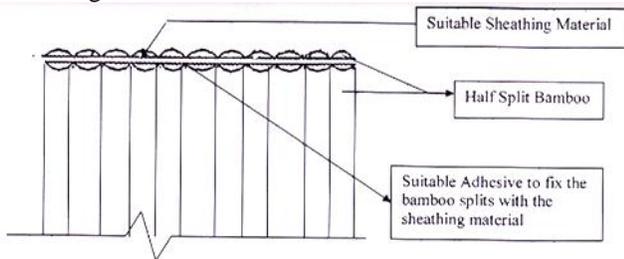


Fig 2: Diagram of the walling system of the model

Design analysis by staad pro software

STAAD Pro is computer-based software used to analyze any structure, frame or building mathematically. This software was first developed by the Research Engineers International at Yorba Linda, CA in the year of 1997. After 2005, the software was authorized by the Bentley Systems.

Frame making

First the frame is created with “system of nodes and Beams”. The nodes are placed where the center line of the structure lies. Each node is then connected by beams. After the skeleton structure is made in the software, the section dimension is selected. Supports are assigned as the requirement of the structure.

Table 1: Node placement in the software

Node	X m	Y m	Z m
1	0.000	0.000	0.000
2	2.440	0.000	0.000
3	0.000	0.000	-2.440
4	2.440	0.000	-2.440
5	2.440	2.440	0.000
6	2.440	2.440	-2.440
7	0.000	3.050	0.000
8	0.000	3.050	-2.440
9	0.000	-0.610	0.000
10	2.440	-0.610	0.000
11	0.000	-0.610	-2.440
12	2.440	-0.610	-2.440

Sections and Material creation

As this is completely a bamboo structure, hence providing a hollow circular section of aggregated wall thickness and a fixed diameter.

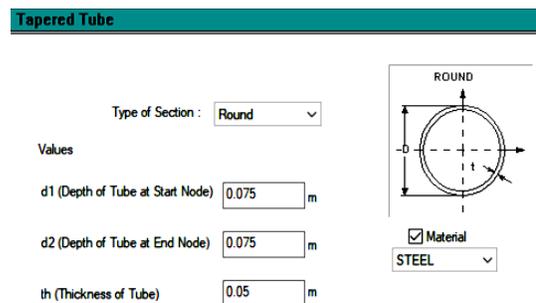


Fig 3: Tapered tube section using bamboo

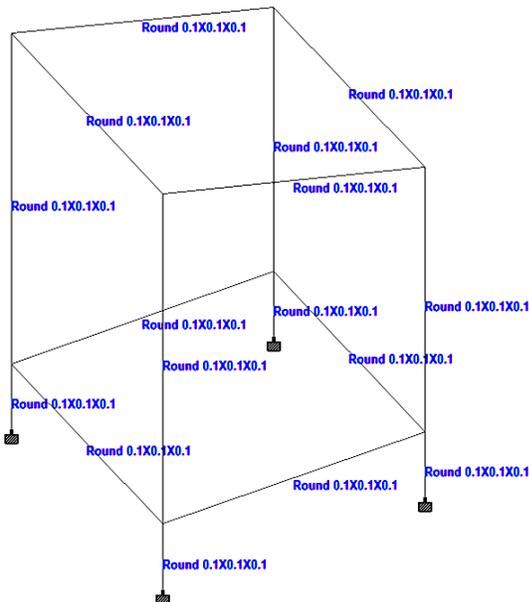


Fig 4: Section allocation to the frame

STAAD usually consists of four basic materials. The materials are namely- **Steel**, **Concrete**, **Timber** and **Aluminum**. The structure being bamboo based, a **Bamboo** material is created using the value of the test results obtained from the laboratory.

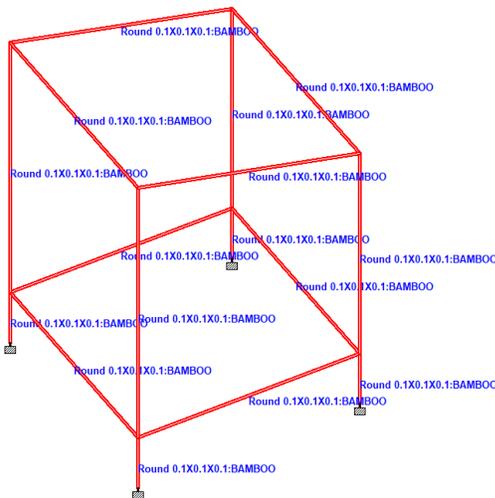


Fig 4: Material “Bamboo” assigned to frame

Load Cases and Defining of load

The load due the various factors are calculated and placed on the exact nodes or beams of the frame. While placing the nodal or member UDL or floor or roof loads, all the possible cases are taken. In this way both the Dead and the Live Loads are assigned.

But for the special cases such as Wind or Seismic or Snow Loads etc., requires to be defined first then provide the

factor to it in the Load Cases after the Dead Load and Live Load.

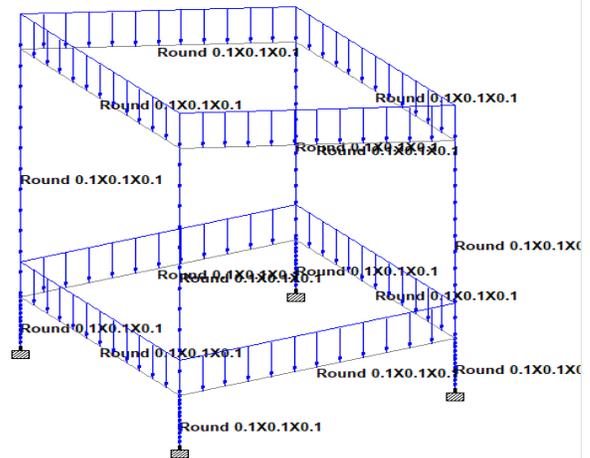


Fig 5 : Assigning Dead Load to the structure

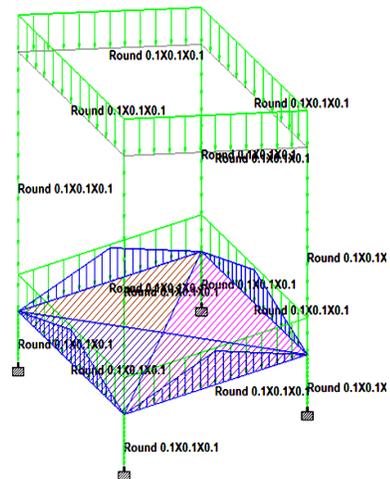


Fig 6: Assigning Live Load to the structure

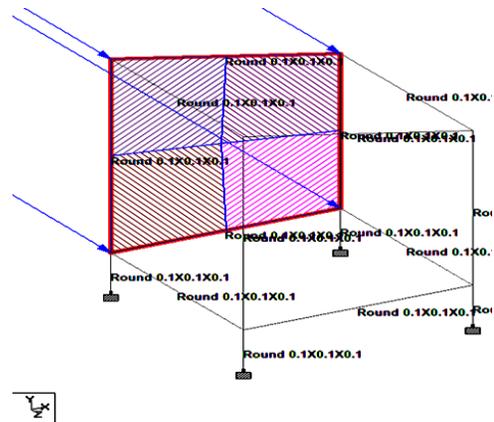


Fig 7: Assigning Wind Load on Windward side

Run Analysis and Output Results

After completing the following steps, the program of the entire structure needs to be checked for error. If, the run analysis completes with showing any error the model may be reopened as the post-processing mode. The results are henceforth shown there like- Displacement, support reaction, beam displacement, nodal displacement, deflections, stability of the structure etc.

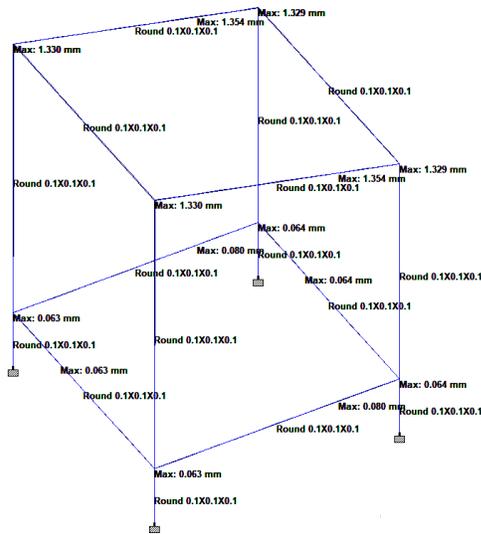


Fig 8: Displacement of the framed structure

The structure is stable as it has a max displacement of **1.330 mm**.

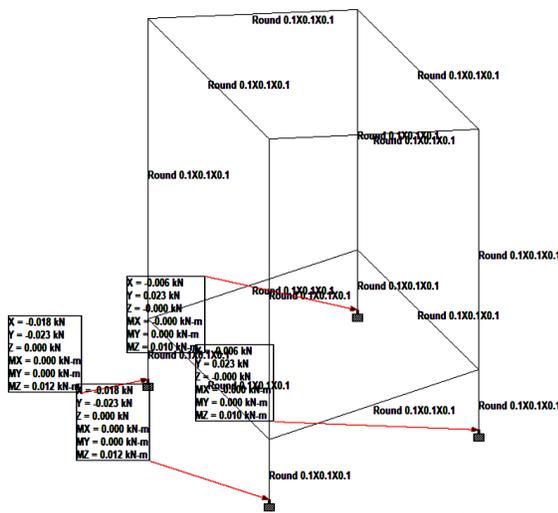


Fig 9: Support Reactions

5. CONCLUSION

Earlier, study has been done on walling system using bamboo strip-based **walling system with cement mortar** that has been used for bamboo-based housing system.

Hence a new design of houses with half split bamboo-based walling system can be an alternative to housing materials which is needed to meet the current challenge.

For buckling test of bamboo walling system, it has capacity to carry load arising out of **Wind Load, Dead Load, Live load and Seismic Load**. After calculating manually as well as through STAAD Pro software the **displacement** obtained is **1.330 mm (Ref Fig 6)** and there **no moment generation** (Ref Fig 8) on the nodal joints of the supports of the framed structure. This is a positive sign for an approach of this half-split bamboo walling system in future. Some of the positive of this type of walling system is that of better flexibility, and toughness with discretely distributed nodes of bamboo and its great strength making it as a good construction material. Hence bamboo houses constructed with alternate developed walling system when properly constructed will be ductile in nature.

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Adapting Smooth RTT and Stratified Sampling to New TCP Friendly Multicast Congestion Control (TFMCC) Scheme

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Abstract:

Nowadays, multicasting is an effective group communication method, widely used in various programs such as bloggers, Internet group, forums, conferences, YouTube and online TV. Due to the nature of the acquisition of recipients, when the network becomes congested, that leads to higher packet loss, less throughput and reduced QoS. An effective solution to deal with the problem of congestion where the acceptance rate is adjusted according to the response of the recipients. TFMCC is congestion control mechanism available in single rate sender. According to CLR (Current Limiting Receiver) sender adjust sending rate. In heterogeneous network, varying bandwidth, receivers have different RTT. Sampled RTT are sent to sender to adjust sending rate. In this paper we worked on stratified sampling instead of random sampling to send RTT to sender. Calculations and comparison shows Stratified sampling gives better results.

Keywords:

TFMCC, Congestion Control, Stratified Sampling

1. INTRODUCTION

Nowadays, due to the use of many services in everyday life, the amount of data generated from network devices is a challenge that creates congestion. Multiple items are used to transfer data from one source to the recipient group [1]. The demand for multicasting is growing rapidly due to the huge demand for video applications. However, it faces an open challenge known as overcrowding [2]. The main causes of congestion are heterogeneous link with connections, channel receivers (heterogeneous receivers), router processing, speed and buffer storage capacity [3]. The main components of the traffic control system are 1) Input response, 2) Measurement of large receivable large receivers, 3) Rotation Time (RTT) and Sampling 4) Packet Loss Rate for Multiple Recipients [4]. Multidisciplinary control (MCC) with only one method is needed to solve these problems. To understand the problem of multicast congestion, let's look at Fig. 1 where there is one source, one multicast router (1-4), and three receivers R1, R2, R3. considered as C1, C2, C3 rated Mega Bits Per Second (MBPS).

Suppose a recipient accepts a higher data stream, rather than a higher data quality for a particular application. The heterogeneity features of the multicast network create congestion in the system.

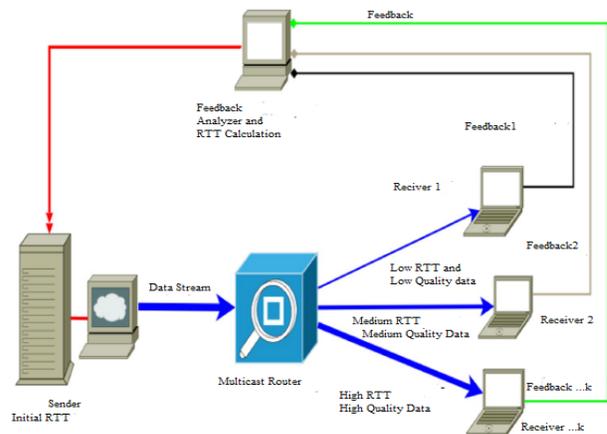


Figure 1 Proposed Architecture for congestion control

The reception capacity of each recipient is different, and the sender capacity exceeds the recipient's capacity. After that, it suffers from packet loss or delay which is an indication of congestion on the receiver. Normally, overcrowded recipients will send a response to the sender to change the rate of sending data and manage the congestion situation. In the event of congestion, it reduces the reception rate depending on the response of the recipients. If there is no congestion when the sender increases the shipping rate using multicast network service. There are many activities available that use a response method to solve this problem

such as Pragmatic General Multicast Congestion Control (PGMCC) [5,6], Bandwidth Delay Quality Parameter Based Multicast Congestion Control (BQMCC) [7], Equation-based End-to-End Single-Rate Multicast Congestion Control (ESMCC) [8] which is an advanced form of Transmission Control Protocol-Friendly Multicast Congestion Control (TFMCC) [9]. However, the related schemes are based on feedback received by recipients. Suppose there are a large number of groups and they send their feed to the recipients at that time, the resources may be less efficient. As an example in ESMCC [8], the source receives a refund for all recipients who are on the same route, Suffering from feedback lookup. If the multicast network suffers excessively, this situation will be exacerbated by response delays and shipping rate calculations. Specifically, existing single-level algorithms exist-MCCs [10,11,12,13] failed to meet the most important requirements (high penetration reduced packet loss, merging rate and failure) of networks. Of the many existing MCCs, only (Kammoun and Youssef et al. [2] Manjul and Mishra [4] specifically one MCC level developed to increase admission but still face various problems such as responsiveness, immaturity, justice, high packet loss, slow merging, etc. More data demand (especially video) requires, more bandwidth consumption that leads to congestion problem. An efficient MCC equivalent efficient scheme is seen as an effective tool to solve the congestion problem because it makes good use of bandwidth and provides performance guarantee. Therefore, we need a new approach, which can solve the above problem and provide better network performance. To remove the limitations of existing MCCs, we suggest that the MCC has a single rating scale that contains the following different elements to improve performance, efficiency, QoS during group communication.

2. RELATED WORK

There are many researchers tried to solve the multicast congestion control problem. We have studied various approaches related to the multicast congestion control, which employ the single rate approach and source control the congestion situation. The literature reviews of these schemes are as follows. Wang et al.[14] presented an application-based multicast network fairness as an extension of traditional networks to resolve the uneven allocation of a resource like bandwidth issues in TCP congestion control mechanisms. Kang et al.[15] proposed a new approach known as “TARA” focusing on traffic pattern, congestion type, and network topology. The capacity analysis model is a key part of TARA used to know the required topology capacity estimation to reduce congestion. Hence, they increased the capacity to reduce congestion by introducing more nodes with appropriate resource control strategies. TARA is distributed, energy aware and topology aware with ideal data delivery rate. A

graph colouring problem concept was used. Experimental results showed that this model easily handles the incoming traffic load. Zhu et al.[15] proposed a scheme for layered multicast known as E-FLID-DL to improve TCP fairness and throughput in critical network conditions by introducing the concept of congestion notification. One of the advantages of this proposed scheme is that it can work in both environments wired and wireless network with the high possibility of link loss.

It has been pointed out from the above researches that multicast congestion control (MCC) has become a motivating and challenging issue for researchers because of its requirement in various applications are comprehensive and focus on fundamental requirements (throughput, scalability, convergence, QoS) of Network but suffer from various limitations due to limited resource (Bandwidth, buffer space, processing speed) availability. We observe that an efficient MCC plays a significant role to improve the lifetime and reliability of any network. Therefore, we always require an efficient MCC.

3. RTT CALCULATION OF TFMCC

The implementation of TCP attempts to predict future return times by sampling the performance of packet-sent packages and to measure those samples at the return time, SRTT. When a package is sent via a TFMCC connection, the sender sets the times it takes to receive it, to produce sequence, S, of return time samples: s_1, s_2, s_3, \dots . For each new sample, s_i , the new SRTT is calculated from the formula:

$$SRTT_{i+1} = (\alpha \times SRTT_i) + (1 - \alpha) \times s_i$$

where $SRTT_i$ is the current estimate of the round-trip time, $SRTT_{i+1}$ is the new computed value, and α is a constant between 0 and 1 that controls how rapidly the $SRTT$ adapts to change. The retransmission time-out (RTO_i), the amount of time the sender will wait for a given packet to be acknowledged, is computed from $SRTT_i$. The formula is:

$$RTO_i = \beta \times SRTT_i$$

Where, β the constant, greater than 1, is selected in such a way that there is a small chance that the return and return time of the package will exceed the RTO_i .

3.1 General Observations

There are several things you should be aware of about the algorithm. First, it can be viewed as an attempt to guess the next value from function R, where $R(i)$ the actual time of package delivery i. Given the sequence of estimated travel times,

$$S = s_1, s_2, s_3, \dots, s_{i-1}$$

which correspond to the values of R:

$$s_1 = R(1), s_2 = R(2), \dots, s_{i-1} = R(i - 1)$$

We hope that the RTO calculated from those numbers will be a good estimate above $R(i)$, the time to and from the next package. Note that if the estimated turn-by-turn times, S,

are incorrect, the RTO may be incorrect; this problem is explored in the next section. One should also consider that the values of the elements α and β also have important effects on the behavior of the algorithm.

Number of control of α how SRTT changes rapidly in changing travel times. The Mills[11] estimated the return times of the network and recommended that there be two numbers depending, depending on the corresponding sample values, s_i , and $SRTT_i$, the Mills found that the return times were still distributed by Poisson, but shorter periods of maximum delay. In these cases, we have found that the standard method of using $SRTT$ and RTO is usually not fast enough, and the TCP sender will redirect unnecessarily packets because the RTO was set too low. As a result, it has raised a lineless filter where smaller is smaller where $SRTT_i < s_i$, allows $SRTT$ to change very quickly with a sudden increase in network delays.

Determining the value of the β hardener is very difficult because it has significant and contradictory effects on each user's performance and overall network performance[15]. Achieving perfect entry β should only be greater than 1. This keeps the RTO very close to $SRTT$ and ensures that packet loss will be detected quickly. Recovering lost packets quickly is important for good access, as end-to-end flow control measures for reliable contracts such as TCP will cause the sender to stop sending new packets if the package remains anonymous for longer than the round trip. Unfortunately, the good throughput is detrimental to effective network usage. If the RTO is almost equal to $SRTT$ (i.e if it is close to the union) a large amount of packets will be transferred unnecessarily because the sender is leaving too quickly. For example, consider the situation in which $RTO = SRTT$, (e.g., $\beta=1$), and $SRTT$ are an accurate partner for cycle times. In this case, about half of all packets will be delayed and forwarded to others because their approval has taken a long time, burdening the network with unnecessary retrieval. To reduce re-transfers, it should be preferred that the RTO be the maximum limit during round-trip times. TCP specification [21] recommends the value of $\beta=2$ as a reasonable balance.

3.2 Stratified Sample

An important objective of any measurement problem is to find a human parameter measurement that can take into account important human characteristics. If the population is consistent with the subject under study, then a simple random sampling method will produce a similar sample, and, then, the sample means that it will be a good measure of the population. Therefore, if the population is the same in terms of the subject under study, then a sample obtained with a simple random sample is expected to provide a representative sample. In addition, sample variability means not only the size of the sample and the fraction of the sample but also the quantity variation. To increase the accuracy of the measurement, we need to use a sampling

scheme that can reduce population variability. If the population varies in relation to the underlying aspect of the study, one such sample procedure is a set sample. In this paper we proposed stratified sampling to SRTT population as follows,

Notations

N:Population Size(Number of Nodes)

K:Number of state (RTT)

N_i :Number of sampling units in the i^{th} strates (Average RTT of each group)

$N = \sum_{i=1}^k N_i$

n_i =Number of samples units to be drawn from i^{th} stratum

$n = \sum_{i=1}^k n_i$:Total Sample Size Y_{ij} : Value of j^{th} in i^{th} states

$j=1,2,3,\dots,m_i$

$i=1,2,3,\dots,k$

$\bar{Y}_i = \frac{1}{N_i} \sum_{j=1}^{n_i} Y_{ij}$ Population mean of i^{th} Strata

Estimate of the populations mean and its variance.

Y: Character under study.

Population mean where $w_i = \frac{N_i}{N}$

Equation of Population

$$E(\bar{Y}_{sr}) = \frac{1}{N} \sum_{i=1}^k N_i E(\bar{Y}) = \frac{1}{N} \sum_{i=1}^k N_i \bar{y} = \bar{Y}$$

$$\bar{Y} = \frac{1}{N} \sum_{i=1}^k N_i \bar{Y}_i \quad \bar{Y} = \sum_i^k w_i \bar{Y}_i;$$

$$\bar{Y} = \frac{1}{N} \sum_{i=1}^k N_i \bar{Y}_i \quad \bar{Y} = \sum_i^k w_i \bar{Y}_i;$$

Then \bar{Y}_{sr} is an unbiased strata of \bar{Y}

Variance

$$\bar{Y}_i = \frac{1}{N_i} \sum_{j=1}^{n_i} Y_{ij} \text{ Sample mean of } i^{th} \text{ Strata}$$

$$\sigma_i^2 = \frac{1}{n_i} \sum_{j=1}^{n_i} (Y_{ij} - \bar{Y})^2$$

Table1 shows comparison of Sending Rate with Stratified and Random Sampling.

Table 1 :Comparison Stratified Sampling with Random Sampling

No. of Nodes	Random Sampling		Stratified Sampling	
	Accuracy	Sending Rate	Accuracy	Sending Rate
3	60%	72%	84.5%	83%
5	45.3%	53%	68.7%	71%
9	27.2%	37%	61.9%	54%

4. EXPERIMENTS AND RESULTS

The test is performed on a 64bits processor, Intel Core processor 5-2310 2.1 GHz, 8.0 GB RAM, 500 GB Hard Disk Drive (HDD) .The simulation topology shows these two sources: node (0) and node (1) while node (2) and node (3) represent routers. Recipients (4-6) join and leave the group using the online group management system (IGMP). We are modeled on the redesigned TFMCC in NS2.35 as shown in Figure 2, making a different TCL script in terms of variable bandwidth, a variable size package with a different number of recipients. We compare the results with

respect to existing Random sampling of RTT and Stratified Sampling of RTT. Comparative results are shown in Table 1. The results show that there is an improvement in throughput, Packet Delivery Ratio, and a decrease in packet loss rate.

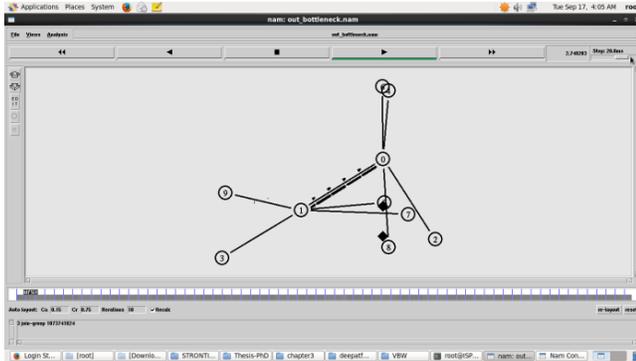


Figure 2 Multicast Topology

Figure 3 shows the throughput of TFMCC as using Random sampling RTT comparing with New TFMCC as using stratified sampling with increasing number of nodes.

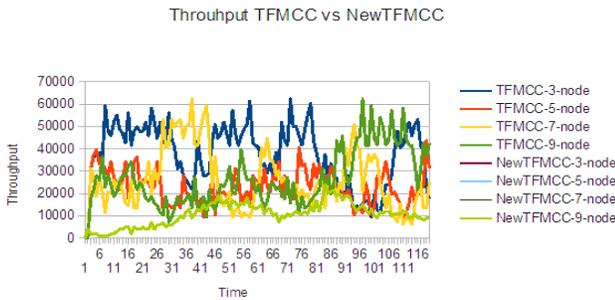


Figure 3 Throughput w,r,t Receivers

4.1 PDR Comparison (Package Delivery Rate)

Figure 4 shows a comparison of Package Delivery Packages (PDR) between ESMCC (Kammoun and Youssef 2010) and the proposed EAIMD approach. Results show that the Delivery Ratio package is longer by the time you use EAIMD.

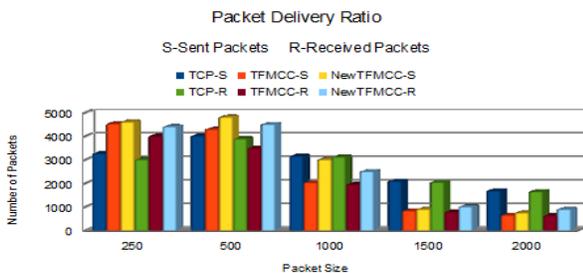


Figure 4 PDR w,r,t Packet Size

4.2 Throughput Comparison varying Bandwidth

Varying bandwidth 250Mbps,500Mbps,and 1500Mbps in three different execution in simulator TFMCC gives better throughput than TCP. Figure 5 shows simulation scenario.

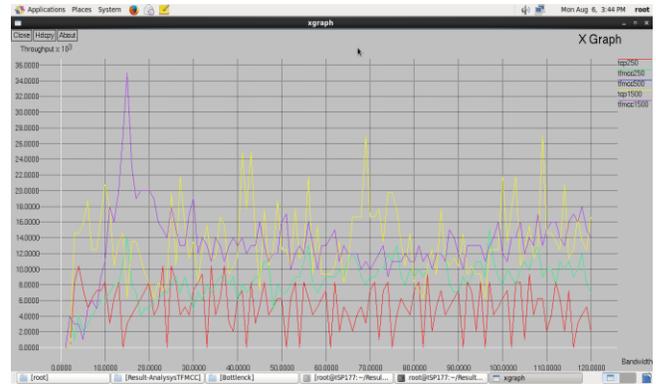


Figure 5 Throughput Varying Bandwidth

5. CONCLUSION

In this paper, we proposed RTT sampling calculation using stratified sampling method. The proposed approach maintains high utilization of link increases packet delivery ratio and throughput using feedback analysis such as RTT sampling to sender using Stratified Sampling.

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DDoS Attack Detection Using OpenDaylight in Internet of Things (IoT)

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Abstract:

Internet of Things (IoT) is a forthcoming analysis field and is being thought to be the revolution within the world of communication as a result of its prominent applications in various fields. These networks are highly vulnerable to attacks due to their transparent and self-assimilation nature. As a consequence, security is the highest concern in this framework and requires new types of strategies to be developed to counter different types of attacks in IoT. The aim of a Denial of Service (DoS) attack is to make server services inaccessible to the intended user, and a DDoS attack occurs when multiple DoS attacks are present in a network. As distributed denial of service (DDoS) attacks become more popular on the Internet, solutions to combat them are in greater demand. In this paper, our strategy is to utilize OpenDaylight as an SDN controller to find DDoS attacks in IoT networks by applying the Support Vector Machine (SVM) approach. Here we tend to create a Software-defined Network (SDN), that consists of 20- Devices, 4-Open Flow switches, and an Open Flow controller (OpenDaylight controller). The nodes/Devices are directly connected with switches. Our technique is to find DDoS assailant nodes victimization SVM by classifying the malicious and non-malicious data in the network. The detection rate for this SDN controller is remarkably very efficient as compared to the other SDN controllers.

Keywords:

Internet of Things, DDoS attack, OpenDaylight, Support Vector Machine

1. INTRODUCTION

Internet of things (IoT) is a paradigm shifting, imminent model in the subject of wireless communications. In layman's terms we can define IoT as a wireless system of interrelated objects that include devices like RIFD (Radio Frequency Identification Tags), sensors, mobiles, digital machines, animals or even people that are provided with UIDs (Unique identifiers) & have the capability to communicate over a network without the need of human to human computer guidance/interactions [1]. The applications of IoT implementations are vast & ever increasing. Some of the technologies that make heavy use of IoT include public security, infrastructure development, connected health, smart homes, smart cities, smart grids, wearable devices, agriculture, industry automation, business services etc. IoT has the potential to integrate production & service management & also to an extent integration of our physical world with the digital realm; which has been the end-goal feature desired in almost every type of interactive device or a service. Amongst the most significant characteristics of IoT is its ability to "Self-configure". IoT networks consists of several nodes & devices like sensors, actuators etc, configuration of such a system by a hand to hand method is complex but IoT can handle it efficiently, configuring as per the need of users and applications. This all translates to proper automated inter-connection between various devices making up the network system. To achieve this goal of self-

configuration unique addressing & communication components are leveraged [2].

The primary technological hurdles & problems while actualizing the idea of IoT is that wide range of gadgets/devices should be broadly used with wide acceptance, therefore giving inter-operability between them. They should have capability of adjusting to various different network systems during which their autonomous behavior should be maintained. Simultaneously, three major factors such as trust, security and privacy of the device connected to the network should be upheld. Since these networks are autonomous in nature, and performs auto-configuration of new device when entering into the network, this leads to open nature of IoT. However openness of IoT also makes it vulnerable to security attacks. These attacks may aim at denying the services provided by IoT or to take over the whole network. The approach attackers take can be varied, making use of variety of security attacks & exploit including physical attacks, eavesdropping etc. However, the most challenging attack for an IoT system would be DDoS attacks (Distributed denial of service). This attack overloads a network with repeated false requests with the aim of degrading the performance of the system, ultimately causing it to fail. If successful this would cause denial of services being provided by the network i.e., IoT here, to its legitimate users [3]. Distributed in DDoS refers to the fact that a DOS attack is being executed by multiple attackers/agents on the

network from various locations. Any IoT network will only have limited resources at its disposal. When a DDoS attack is executed on a network, it would start allocating its resources for serving the requests. However, when the number of requests increases above the threshold a network can handle, it won't be able to serve any more requests. At this point any request even if made by legitimate users would be denied & hence cause the disruption in the delivery of services being provided by IoT [4].

Many researchers have been extensively interested in designing SDN-based network security solutions as a result of recent advances in software-defined networking (SDN) and its rapid and high acceptance in the network community. After their adoption in large-scale wide area networks SDN-based solutions have gotten more recognition [5].

Many distinct features of SDN are essential in detecting and mitigating DDoS attacks. Separation of the control plane from the data plane, a logically centralized controller, network programmability by external applications, software-based traffic analysis, and the ability to dynamically change forwarding rules are among these features [6].

In this paper, we add to past studies by proposing a new method for detecting DDoS attacks in the Internet of Things by using OpenDaylight as an SDN controller to build a topology with 20 hosts, four OpenFlow switches, and an OpenFlow controller. Based on the threshold values assigned to each node, we used a Support Vector Machine classifier to identify the host as Normal or Attacker node.

The following is a breakdown of the paper's structure. Section II provides an overview of OpenDaylight as an SDN controller. Section III presents the related work. The proposed SVM-based DDoS attack detection algorithm using the OpenDaylight SDN controller is presented in Section IV. The experiments and results are described in Section V. Our conclusion and references are enumerated in this paper..

2. OPENDAYLIGHT AS SDN CONTROLLER

OpenDaylight is an open source framework for Software Defined Networking (SDN). Many other SDN controllers, such as Ryu, Pox, and others, were also designed in the past. As part of its framework, OpenDaylight also supports OpenFlow and provides ready-to-install network solutions [7].

The ODL controller is entirely software-based and runs in its own Java Virtual Machine (JVM). As a result, it can be installed on any Java-enabled hardware and operating system. Figure 1 depicts the architecture of OpenDaylight SDN Controller [8].

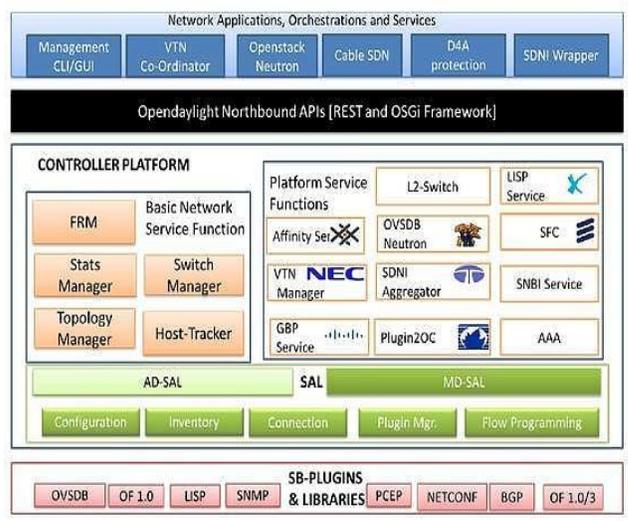


Figure 1: Architecture of ODL

There are multiple levels to the OpenDaylight SDN Controller. Business and network logic applications make up the top layer. The system layer is in the middle, and the physical and virtual devices are at the bottom. The context in which the SDN abstractions will manifest is the middle layer. This layer contains APIs that are both northbound and southbound. The controller exposes open northbound APIs that applications can use. For the northbound API, OpenDaylight supports the OSGi (Open Services Gateway initiative) system and bidirectional REST. Above the middle layer, the applications include the business logic [9]. Since ODL was developed with the aim of reducing vendor lock-in, it supports protocols other than OpenFlow. Multiple protocols, such as OpenFlow and BGP-LS, can be supported as separate plugins on the southbound interface. No matter what the controller's basic protocol, and the network equipment is, the Service Abstraction Layer (SAL) defines how to provide the requested service [10].

3. RELATED WORK

Due to the advancement in network technology, DDoS attacks are becoming more complicated. Typically, network traffic must be constantly monitored and analyzed to prevent authorized users from breaching network policies and to protect them from various types of attacks. In the recent past, there has been a lot of research performed in the field of network security in IoT by well-known authors. Since it is one of the most common research areas in the 21st century, we can easily find a large amount of research material on which to base this paper and suggest a new mechanism that will be more effective than current approaches.

The authors in [11] proposed Learning Automata (LA) ideas to defend against the DDoS attacks in IoT networks. Here, the authors used Service Oriented Architecture (SOA) as a framework model for IoT, acting as a middleware and

providing opportunities for developers to build applications. This model not only provides IoT facilities, but also ensures that the entire system is protected from DDoS attacks. The authors of this paper used a cross-layer model to counter DDoS attacks at any level, making it compatible with a wide range of artefacts. After discovering the DDoS attack in the IoT, the required measures are taken to restrict the number of incoming requests from the attacker. This scheme is very successful at preventing DDoS attacks in the IoT by maximising resource utilisation.

The authors in [12] suggested SDN as an efficient method to identify various DDoS attacks in IoT. Here, the authors proposed a sequential and concurrent approach for detecting possible and suspicious victims in the network using the SDN's flow monitoring capability. For high detection precision, these methods were used to capture both the flow volume and the flow rate asymmetry features. To capture these two characteristics, developers recorded the total flow rate coming in and out of any possible victim IP while keeping in mind TCAM's scale. Both strategies will try to keep IP ranges as limited as possible during the start-up phase. If you need to locate a victim quickly, the sequential approach is better whereas the concurrent method is better for finding both the victim and the attackers quickly. However, these approaches need to be evaluated in the real world and on the OpenFlow platform in the future.

The authors in [13] proposed a naive Bayes classifier with two frequency based methods (i) Discrete Fourier transform (DFT) and (ii) Discrete wavelet transform (DWT), thereby differentiating between malicious and non-malicious traffic using coefficients. The wavelet transform provides higher resolution information in the frequency domain, which improves detection accuracy. When compared to other classifiers, the Naive Bayes classifier is quick, simple to implement, and effective at classifying attack and normal traffic. As compared to DWT functionality, the device performs better when DFT attributes are used.

The authors in [14] introduced an intrusion detection system which utilizes Support Vector Machine (SVM) classifier to detect DDoS attacks in IoT, with high accuracy, less false positive rate and accurate classification as compared to other classifiers and the experiments conducted using DARPA dataset. The authors here intend to combine the traffic pattern built into SVM with the SDN controller in order to detect DDoS attacks in real time. SVM, on the other hand, may take longer to train and generate the detection model, which is then used to predict network traffic characteristics. The efficiency of the SVM classifier can be greatly improved by combining AVL tree and SVM and the testing time can be reduced comparatively by using the height balancing property of an AVL tree.

The authors in [15] suggested an innovative algorithm popularly known as IP Address Interaction Feature (IAI) algorithm based upon source address interaction of normal flow. The learning of margin based SVM classifiers

depends upon learning samples collected from both normal and flow attacks, which leads to identification of current network flow and DDoS attack flows. This method shows effective performance in identification of unusual phenomenon introduced by DDoS attack flows, especially when attacking traffic is masked by huge number of normal flows. The method has lesser number of false positives and is computationally time efficient as compared to other existing methods.

4. PROPOSED DDoS DETECTION ALGORITHM

DDoS attacks in IoT have been proposed by the researchers from time to time. Software Defined Networking (SDN), on the other hand is a modern network management technology that is attracting a lot of interest from research and business. According to research, the frequency of DDoS attacks has been increasing in recent times. As a result, one of the major challenges in network measurement is how to efficiently and rapidly detect DDoS attacks. SDN is an excellent platform for DDoS detection since the central controller can easily install and adjust measurement rules on all switches in a coordinated manner. A prominent role in our work is to investigate and choose a suitable OpenFlow controller. OpenDaylight, a Java- based open source controller has been chosen for detecting the attacker node in the network using Support vector machine (SVM) approach. The proposed algorithm is based on classical problem solving approach and works on the concept of detection of DDoS attacker node using a pre-defined threshold value.

The ODL based DDoS Detection method is given below:

Algorithm 1: Detection of DDoS attack in an OpenFlow environment (ODL) using SVM approach;

Input: n: Number of nodes (k₁, k₂, ..., k_n)

X=20: Number of devices connected to the network (SDN)

Y=4: Number of OpenFlow

Switches (S₁, S₂, S₃, S₄)

Z: OpenFlow controller (ODL)

Threshold, $\lambda=0.5$

Output: Data Aggregation Tree DAT (V, E)

1: procedure Detecting DDoS AttackerNode (n, X, Y, Z, λ);

2: Create a Software-defined Network with parameters as X=20, Y=4 and Z=1;

3: Connect (k₁, k₂, ..., k_n) with (S₁, S₂, S₃, S₄) directly;

4: Choose k_s as Source Node and k_d as destination node;

5: Based on deep learning approach, assign each node a priority (p_i);

6: Transfer the data between the nodes, switches and other devices with {SIP, Po, Pi, DIP}

Where SIP = Source IP;

Po = Port;

Pi = Priority;

```

        DIP = Destination IP;
    7. for each Node (i=1 to n)
        {
            8. Classify the Node data using SVM approach to
            detect DDoS attacker Node;
            {
                9. if data[ni]> λ
                10. Classify [ni] as Normal node;
                else
                11. Classify [ni] as DDoS attacker node;
            }
        }
    12. end for;
    13. end procedure;
    
```

Since the nodes in the ODL environment are connected to each other as well as the openflow switches which are controlled by a common ODL controller, the nodes will receive the data at the rate proportional to the size of the network. While running the simulations, we observe the input data rates at each and every node. Whenever there is no attack, the simulations works perfectly with almost all the nodes having a comparable data entry rate. From the simulations over time and again, we can find out the maximum value of the data input rate at each node. Based on the history of the simulations carried out and the work of some eminent researchers in the field of SDN, it has been concluded that the threshold value needs to be set to the value 0.5.

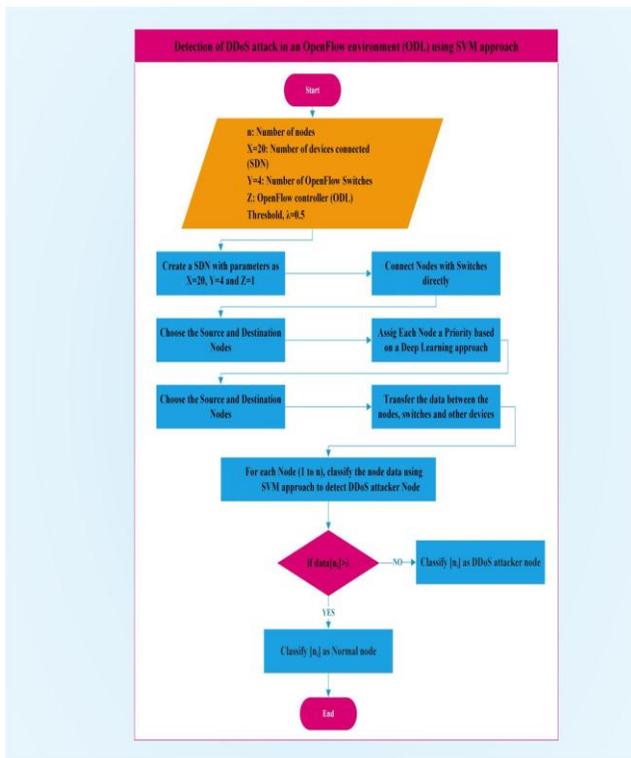


Figure 2: Flowchart for DDoS Detection using ODL

We exploit the same property of the threshold value being 0.5 to detect the DDoS attacker node. We can easily conclude this that during the normal data transmission between the nodes, switches and the ODL controller, the value of threshold never exceeds 0.5 at any node.

However, when the attacker node is present in the network, and launches a DDoS attack on the network, the node responsible for launching the DDoS attack has the value of the threshold value greater than 0.5. This way we can conclude that the attacker node is present in the network and can be detected as well since the data transmission between the nodes and the switches occurs using the parameters:

{SIP, Po, Pi, DIP}
 Where SIP = Source IP;
 Po = Port;

Pi = Priority;
 DIP = Destination IP;

Hence by this algorithm, not only we can conclude that an attacker node is present in the network, but can also detect it as well. The flowchart depicting the working of the proposed algorithm is shown in Figure 2.

5. EXPERIMENTAL RESULTS AND DISCUSSIONS

In order to implement the above described DDoS detection algorithm, the experiments in this work are implemented using OpenDaylight (version Beryllium) controller for creating the SDN network topology on an Ubuntu 14.04 VMware along with the java integration. Our VMware is implemented using dual core processor with 2GB or above of RAM. Here we created a simulation based process only and does not used any real time data sets or any realtime environment for experimentation. Our SDN testbed consists of 20 hosts (k1 to k20), 4-Open Flow Switches (S1 to S4) and one Open Flow controller (OpenDaylight controller) as shown in Figure 3.

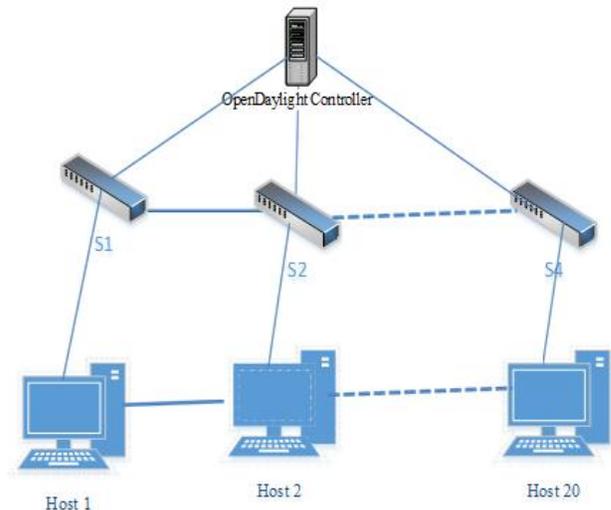


Figure 3: SDN Topology

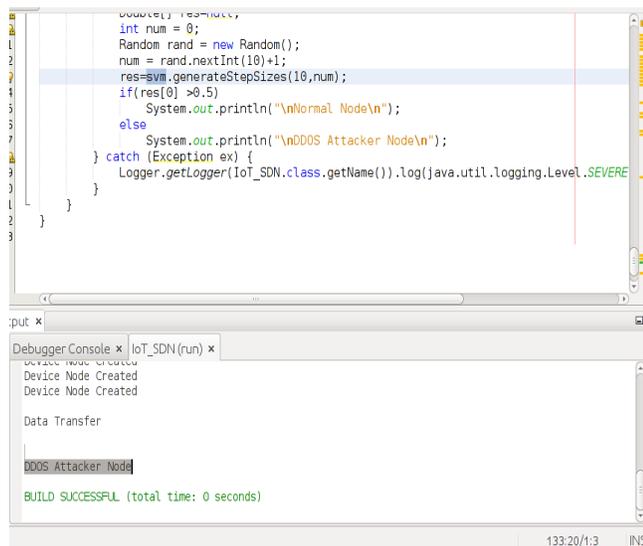
Next step is to select the source and destination Node from the created network topology and allocate the node scheduling priority based on the deep learning approach by using WARMUP_ITERATIONS along with the scheduling timeUnit based on the MILLISECONDS as shown in Figure 4.

```
public class IoT_SDN {
    private static final int WARMUP_ITERATIONS = 20;
    private static final int MEASUREMENT_ITERATIONS = 20;
    private static final int OUTER_LIST_SIZE = 20000;
    private static final int NoofDevice = 20;
    private static final int NoofSwitch = 4;
    private static final int Noofcontroller = 1;
    @Warmup(iterations = WARMUP_ITERATIONS, timeUnit = TimeUnit.MILLISECONDS)
    @Measurement(iterations = MEASUREMENT_ITERATIONS, timeUnit = TimeUnit.MILLISECONDS)
    public void Processwith20Devices04SwitchFree() throws DataValidationFailedException {
        for (int outerListKey = 0; outerListKey < Noofcontroller; ++outerListKey) {
            System.out.println("Controller Created");
        }
        for (int outerListKey = 0; outerListKey < NoofSwitch; ++outerListKey) {
            System.out.println("Switch Node Created");
        }
    }
}
```

Figure 4: Screenshot of Warmup Iterations

After this step, we transferred the data from source IP address to destination IP address within this network, for example, here from 192.168.1.080 (Source) to 192.168.1.180 (Destination).

Finally, the data is classified by using SVM java classifier and detected the DDOS attacker node in the network based on the threshold value of 0.5 as shown in Figure 5.



```
public void process() {
    int num = 0;
    Random rand = new Random();
    num = rand.nextInt(10)+1;
    res=svm.generateStepSizes(10,num);
    if(res[0] >=0.5)
        System.out.println("\nNormal Node\n");
    else
        System.out.println("\nDDOS Attacker Node\n");
} catch (Exception ex) {
    Logger.getLogger(IoT_SDN.class.getName()).log(java.util.logging.Level.SEVERE, null, ex);
}
```

Debugger Console x IoT_SDN(run) x

```
Device Node Created
Device Node Created
Device Node Created
Data Transfer
DDOS Attacker Node
BUILD SUCCESSFUL (total time: 0 seconds)
```

Figure 5: Screenshot of Data Classification

Here the threshold value for each node was assigned by using java.util.Random class and then invoked the method nextInt () by creating the instance of that class. The arguments were then passed to the method for setting an upper bound on the number range to be generated. NextInt(10), for example, will generate numbers in the range 0 to 10, both inclusive and exclusive. Once the threshold value for each node has been assigned, all those nodes having the threshold value lesser than 0.5 will be considered as a **DDoS Attacker node** while those having

greater than 0.5 threshold value will be considered as **Normal node**.

6. CONCLUSION

IoT) is a hot topic these days, and the number of devices connected is growing rapidly, resulting in an increase in the number of sources from which DDoS attacks can be launched. In this paper, we examined at how to employ OpenDaylight (SDN) for detecting DDoS attacks using Support Vector Machine (SVM) classifier. We proposed an algorithm for DDoS attack detection in IoT by creating a SDN in OpenDaylight and then transferred the data from the Source to Destination node in the network. In this method, priorities were allocated to each node using WARMUP_ITERATIONS and then finally classified the data using SVM and detected the attacker node in the network based on threshold value assigned to each node. Here the simulations were performed using the java packages and does not used any real time data sets or any realtime environment. The detection rate of this method by using OpenDaylight was significantly better compared to the other SDN controllers.

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A New Dynamic Hard Rock Cutting Technology: DCD

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Abstract:

This paper describes a novel hard rock cutting technology Dynamic Cutting Disc (DCD) in which the cutting forces acting on the disc cutter is reduced and the amount of rock excavated is increased. The importance of this novel method is that it allows hard and abrasive rocks to be excavated with lower cutting forces and specific energy without using high cutting forces that are experienced by conventional disc cutters used to cut these types of rock. The controlled rock cutting tests with both relieved and unrelieved cutting modes were carried out on two different rock types by using a 144mm diameter mini disc cutter. Comparative tests and results clearly showed that rock fatigue is effective damage mechanism on reducing the cutting forces and producing more excavated material by using DCD technology compared with the conventional non-dynamic disc cutting. The ratio of the energy supplied to the tools to the volume of rock removed is termed specific energy (SE) and SE is one of the most important parameters to determine the rock cutting efficiency. One of the most significant results obtained with this study is to achieve the decrease in specific energy with significant increase in the amount of excavated material with DCD technology instead of decreased cutting forces. The results of this study are believed to affect the future of mechanical cutting technologies.

Keywords:

DCM machine, rock fatigue, tunneling

1. INTRODUCTION

Mechanical excavation methods in tunnels have developed rapidly in recent years. Mechanical rock cutting, as opposed to rock drilling and blasting methods, has long been used by coal miners and other mining and civil engineering industries as the preferred method of especially hard rock excavation. Mechanical methods of tunneling also are significantly faster than drill-and-blast methods (Vogt 2016). Over the last two decades, there have been several proposed methods and developments for cutting rocks based on new technologies [1,2,3,4,5]. None of the proposed methods have yet gone beyond laboratory testing and have not been consensually accepted as a practical solution for use in the field [1,5].

Robbins has been one of the world's leading manufacturers of Tunnel Boring Machines (TBMs) and other types of drilling machines for decades. Today, TBMs find wide application in the excavation of long circular tunnels, especially highway and subway tunnels, and in some special construction projects. In the 1950s the Robbins Company precipitated the development of disc cutters which today are recognized as one of the most successful tools for cutting hard rock. Robbins Company was the world's leading manufacturer of tunnel boring machines (TBMs), raise boring and other types of boring machines for decades. There have been many laboratory and field-scale research and publications on the development of TBMs and disk

cutters. Most of these studies are about rock cutting techniques using conventional disc cutters using monotonic cutting forces. However, especially in the two last decades, it has become important to use dynamic/cyclic loading instead of using conventional cutting forces in disk cutters with hard rock cutting tools. Oscillating Disk Cutting (ODC) technology has become the most popular technology in the field of hard rock cutting in recent years. ODC employs disc cutters to undercut the rock by applying lower tensile forces due to the cyclic loading [3]. CRCMining research group has been developed ODC technology after being active in this field for over twenty years and the ODC technology was licensed to Joy Global in 2006.

The dragging action of drag picks produces tensile stresses in the rock. A disc cutter, on the other hand, applies compressive loading to the rock surface, creating a crushed zone beneath the tool. The tensile stresses in the elastic rock surrounding this crushed area occur as a result of increasing and continuing application of this compressive load [3,6]. Rock failure with rock cutting tools is a kind of fracture process due to discontinuous formation of rock chips.

It is a known fact that cyclic loading often causes brittle materials such as ceramics and rocks to fail at a stress level lower than their determined strength under monotonic conditions [7,8,9]. This phenomenon is commonly termed 'fatigue'. The mechanical behavior and failure mechanisms of rock and other brittle materials such as ceramics, concrete under static loading have been extensively studied.

However, the response and damage mechanism of brittle materials such as rock to cyclic, repetitive stresses resulting from dynamic loads have often been neglected, with the exception of a few studies in literature [7,11,12,13,14]. The effect of the fatigue mechanism on rock failure is still the subject of much research in fracture mechanics [15,16,17]. Researches have indicated that, under static loads, the largest or critical crack is responsible for the failure, while under dynamic loads, a single crack is not sufficient to result in failure of the rock [15,16].

Brittle materials such as concrete, ceramics and rocks fail under cyclic loading at a stress level lower than their strength determined under monotonic loading conditions [4,5,6]. This situation is termed ‘fatigue’. Bridges, dam and road foundations, faults, metro tunnel walls, excavation roofs are only a few of the natural and manmade structures that can be weakened by cyclic/repetitive loading. There is a well-known relationship between the number of cycles and the reduction of applied stress amplitude (the S-N curve approach) in fatigue researches in literature [5,7,8,9,10]. However, relatively little attention has been given to investigate the damage mechanism of rock fatigue [11,12]. A general feature of fatigue damage mechanism in tests is that the repetition of loading cycles leads a progressive accumulation of permanent strain in the specimen. Most of the studies on rock fatigue in the literature have been carried out on a laboratory scale, and quite a limited number of studies have been conducted on the relationship between hard rock cutting technologies and rock fatigue [13, 14,16]. In this study, this relationship is emphasized. It is only possible to reduce the damage of the underground openings to the environment and above ground structures by choosing the right excavation method. Mechanical excavation methods in tunnels have developed rapidly in recent years. In mechanical rock cutting, a crushed zone is developed in the rock beneath a disc cutter due to the high compressive stress generated by the penetration of the disc cutter. Tensile stresses and tangential cracks are developed just around this crushed zone. Then, tensile fractures initiate and propagate to the free surface to form rock chips.

2. ROCK CUTTING TESTS

Very large and heavy tunnel boring machines such as TBMs use very high energy and studies have been carried out for years to reduce the energy and cutting forces they use to improve their performance. The Dynamic Cutting Machine (DCD) technology is a dynamic hard rock cutting technology manufactured for the first time in the world using real size mini discs and vibration motors (Fig. 1). DCD is a unique technology where dynamic loading is achieved by vibrator motors and no vibration is transmitted to the rear parts of the machine. DCD is designed to investigate and analyses the relationships between rock fatigue and changes of some cutting parameters such as cutting forces, specific energy, chip size and size-

distribution under oscillating loading provided with DCD. The cutting forces are recorded in three dimensions during the dynamic cutting. DCD is controlled by a control unit instead of placing control buttons on the machine frame or providing movements with mechanical clamps. The vibration that occurs with DCD varies depending on the weight placed on the mechanism, the distance of this weight from the shaft and the speed of the motor. When two vibrators with the same electro-mechanical properties are mounted and operated so that their axes are in the same plane and their rotation directions are opposite to each other, a vibration force perpendicular to the connection plane and in the form of a sinusoidal curve in only one direction is obtained. Vibration motors generate vibration with eccentric weights (hammers) on both sides of the engine. This method used with two vibration motors is called ‘Single Line Method’.

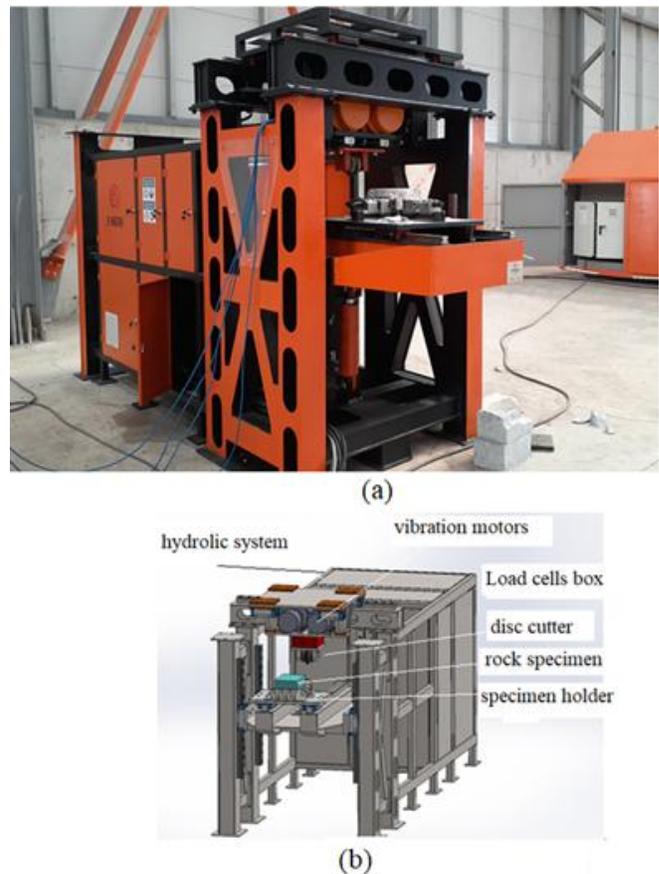


Fig.1. a) General view of the DCD (b) First design of DCD

Four Flat Type Load Cells (LS series) are used to read cutting forces in three dimensions. LS series load cells are used in many areas such as laboratory tests, tank and silo weighing, and construction earthquake tests. The cutting forces measured with the LS load cells are: F_s : side force,

F_n: normal force, F_d: cutting force. The values measured by the load cells were recorded with the TESTBOX 2010 dynamic data collection device. TESTBOX2010 dynamic data acquisition device is capable of faster and higher resolution signal processing than voltage output sensors such as accelerometer, protractors, strain gauges, displacement transducers, thermocouples etc. TESTBOX2010 performs sampling from 100Hz to 2kHz simultaneously with 24 bit resolution.

In the rock cutting tests with DCD, it was decided that it is appropriate to choose a medium-hard type rock in order not to force the machine and damage the dynamic parts. The relevance of the selected rock type with the DCD in terms of strength has been checked, and the abrasiveness of the rock has also been taken into consideration. Rock samples, which are granite type taken from İzmir-Bergama and Foça regions in Turkey, will be referred to as "Bergama Granite" in this research and are determined as rock samples to be used in all rock cutting experiments mostly.

In order to examine the major characteristics of the rock cutting tests with DCD, first cutting series has been done with the Bergama Foça granite samples. In rock cutting tests, the cutting speed (V_c) = 3cm/sec, cutting depths (d) = 3mm and 5mm, and the frequencies were determined as (F) = 10 Hz, and 45 Hz. The denomination of cutting test series refers to the following values: First data represents cutting depth, the second data is cutting frequency, the third data is cutting speed, and the fourth data is sample name in the nomenclature. For example; 3mm-30hz-3v-Gr means cutting test with a granite sample at 3mm cutting depth with 3 cm / sec cutting speed at 30 hz frequency. In the developed DCD rock cutting system, cutting experiments were carried out with a 142mm diameter constant cross section (CCS) type mini disc cutter as explained before. Each rock cutting test series was repeated at three times for the Bergama Granite (BG) rock cutting tests, however cutting tests made with marble (MB) samples were repeated twice due to not enough sample blocks. The rock cutting test program is given in Table 1.

Table 1. Rock cutting test program

Rock specimen	Cutting mode	Cutting Depth, d (mm)	Cutting Frequency, Hz	Parameters compared
BG	Unrelieved	3	10	F _N , F _R , F _S , SE, CI
BG	Unrelieved	5	10	F _N , F _R , F _S , SE, CI
BG	Unrelieved	3	45	F _N , F _R , F _S , SE, CI
BG	Unrelieved	5	45	F _N , F _R , F _S , SE, CI
BG	Relieved	3	10	F _N , F _R , F _S , SE, CI
BG	Relieved	5	10	F _N , F _R , F _S , SE, CI
BG	Relieved	3	45	F _N , F _R , F _S , SE, CI
BG	Relieved	5	45	F _N , F _R , F _S , SE, CI
MB	Unrelieved	3	10	F _N , F _R , F _S , SE, CI
MB	Unrelieved	5	10	F _N , F _R , F _S , SE, CI
MB	Relieved	3	40	F _N , F _R , F _S , SE, CI
MB	Relieved	5	40	F _N , F _R , F _S , SE, CI

3. ROCK CUTTING TEST RESULTS

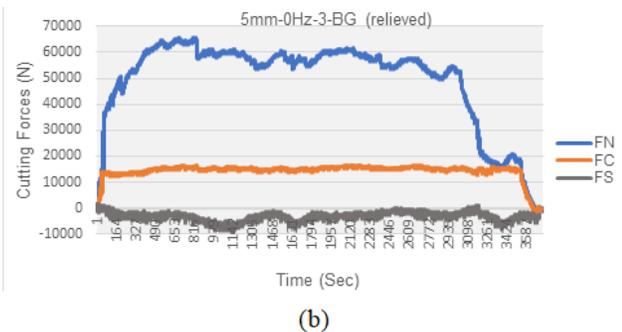
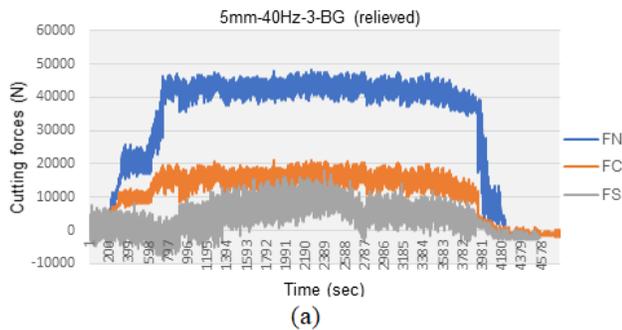
In the limited number of studies in the literature on dynamic, ie oscillating rock cutting, the reason for the decrease in cutting forces is breaking rock to fail in fatigue [3,18]. It is legitimate to ask the purpose of oscillating a cutter during a mechanical rock cutting. The answer is actually the desired aim, expecting a significant reduction in cutting forces and hence the energy used. This kind of desired aim is shown in Table 2 and Fig.2 where the components of cutting force of the DCD decreased for the cutting tests carried out with Bergama Granite, UCS 120 MPa. The cutting forces FN, FC and FS given in Table 3 represents the mean of the maximum values of each force component under the disk cutter in three dimensions. The cutting tests were carried out in unrelieved cutting mode first to determine the optimum cutting spacing between two cutting grooves. The aim here is not to find the optimum cutting spacing that gives the minimum specific energy, however to find the spacing that can interact between the two cutting grooves.

Cutting results and the values of three cutting force with the conventional cutting, which the oscillating frequency of the cutter was zero, i.e the cutter was simply performed through the rock surface, and the results of dynamic cutting, which the cutter was oscillated at a frequency of 10 and 45Hz are given in Table 2. It can be clearly seen that the mean normal force ,FN, was about 48 kN with 3mm depth of cut and 65 kN with 5mm depth of cut when the cutter was not oscillated in relieved mode and that this reduced to about 40.8 and 55.2 kN respectively when the mini disc cutter was oscillated at 10Hz. In the same way, a decrease was observed in mean cutting force,FC, values according to the results of cutting with oscillating mini disc cutter. According to the results obtained in general, while the decrease in the cutting forces obtained with 40 Hz vibration is approximately 24%, it is more than the decrease obtained with 10 Hz, which is 15%. In particular, the magnitude of the mean normal force FN is affected more by the higher frequency than the mean cutting force, FC, at which the cutter is oscillated with 40Hz. Accordingly, it can be concluded that the cutting force components can be reduced substantially as the oscillating frequency is increased. In the unrelieved cutting mode test results, while the decrease in FN cutting forces obtained with 40 Hz vibration is approximately 20%, it is more than the decrease obtained with 10 Hz, which is 10%. However, it is shown clearly with the obtained results that the oscillating cutting effect is more in decrease of FN values compared to the decrease of FC values. The reason for this reduction in cutting forces is the rock fatigue damage mechanism and the details of this mechanism are given in the following sections.

Table 2. Cutting test results with Bergama Granite

Cutting Condition	Frequency, Hz	Cutting forces, kN	
		F _N (kN)	F _C (kN)
-Relieved			
d=3mm	0	48.1	12.2
d=5mm	0	59.9	14.8
d=3mm	10	40.8	10.98
d=5mm	10	55.2	14.22
d=3mm	40	36.5	9.76
d=5mm	40	46.4	12.64
Unrelieved			
d=3mm	0	55	14.4
d=5mm	0	67	17.7
d=3mm	10	49.5	12.96
d=5mm	10	62.1	15.93
d=3mm	40	38.4	12.24
d=5mm	40	53.2	15.05

cutting and conventional cutting in terms of change in cutting forces and the amount of fragmented rock obtained. Therefore, the spacing is kept constant between 6-10 cm in relieved cutting mode. This spacing value range has been determined using the equation ($s/p = \sigma_c / \sigma_t$ where s is spacing, p is depth of cut σ_c is UCS value and σ_t is tensile strength of rock) suggested by Roxborough & Phillips [19]. In general, more small pieces, namely 'chips', were obtained with the dynamic cutting tests compared to the conventional cutting tests with zero oscillation (Fig.3). The damage mechanism of rock fatigue has been confirmed by this result since it is believed that the fractured crush zone called FPZ (Fracture Process Zone) is an effective parameter in obtaining more chips due to rock fatigue with the dynamic rock cutting. Further, large size rock chips have been obtained in dynamic rock cutting tests with oscillating disc cutter (Fig.3). Therefore, both the 24% decrease in the cutting forces and increase in the amount of excavated rock is an evidence that DCD, which is a dynamic rock cutting technology, is more successful than the conventional disc cutting. These results show that it is possible to cut hard rock using lower specific energy as described in the following sections.



4. CONCLUSIONS

In this study, it was not expected that the amount of reduction in cutting forces with DCD technology would be quite as high as in the ODC technology using undercutting mode. Hard rock cutting with the DCD technology is the first study in the literature. Therefore, investigating the changes between effective cutting parameters such as cutting forces and specific energy by using an oscillating disc is one of the aims in this study. According to the results, beyond achieving a 20-24% reduction in cutting forces, the effective increase in the amount of excavated material due to the interacting tensile chip crack and the decrease in specific energy are the most important outcomes in this study. The fact that the material excavated with DCD is much more than the material obtained with conventional dic cutting can be explained by both the rock fatigue effect and the increase in the number of tensile cracks obtained by load-unload cycles applied by DCD technology. Coarsness Index (CI) was found very important parameter to evaluate the effective damage mechanism since the

Fig.2 Plots of cutting forces (a) relieved cutting – depth of cut (d)=5mm, 40Hz frequency, 3cm/sec cutting velocity with BG samples and (b) conventional disc cutting at d=5mm cutting depth with zero frequency (zero oscillation)

The tests conducted on Bergama Foça Granite supplied sufficient reliable data for the all analysis. Tested rock samples and cutting grooves are shown in Fig.3. In this study, the spacing effect, which is one of the important parameters affecting the performance of disc cutters, has not been investigated. Because the main purpose of this research is to make the comparison between dynamic

relationship between rock fatigue and FPZ zone formed under disc cutter was approved by the size and amount of excavated rock fragments. Further, a high correlation was found between Specific Energy (SE) and CI, and it was found that the specific energy decreased with the increasing CI values.\

5. ACKNOWLEDGMENT

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The Relationship Between Rock Fatigue and New Tunnel Boring Technology DCM

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Abstract:

It has been investigated in this study that the effect of rock fatigue on rock strength and the feasibility of rock fatigue damage into the tunnel boring technologies by reducing the rock cutting forces and specific energy. The opening and closing of macro-scale fatigue cracks behave like a spring without causing failure in rock specimens, which is a highly brittle material, has been recorded for hours by video for the first time in the literature. The results obtained from this study are outstanding findings that challenge the fatigue damage theories of brittle geological materials. The fracture process zone (FPZ) has been studied in detail by using experimental and XFEM numerical analyses. Scanning electron microscope and computed tomography (CT) images clearly showed the development of FPZ in front of the crack tip and this zone was the reason of the macro-scale fatigue crack behaves like a spring in a brittle rock material without result in failure. Further, size of FPZ was found maximum when the crack inclination angle is 60°.

The dynamic rock cutting technology DCD is presented with this study. Cutting test results showed both cutting forces F_n and F_c and specific energy were found decreasing by the effect of rock fatigue. It is concluded that dynamic hard rock cutting is more effective with higher frequencies. Sieve analyses results obtained from the excavated rock fragments after oscillating disc cutting and conventional disc (zero oscillation) cutting tests show that there is no significant difference between the amount of dust size material when the sieve analysis results between $-4.12 + 2.0$ mm are compared.

Keywords:

DCM machine, rock fatigue, tunneling

1. INTRODUCTION

Rocks in nature are mostly brittle, and essentially, rock mechanics and general failure criteria are inadequate to describe the fracturing process of rocks. When a crack initiated in a brittle material, the stress state near the crack tip changes significantly. The stress distribution at a crack tip is crucial for predicting the crack propagation direction and direction of macro fracture in a brittle rock material [1, 2]. Griffith [2] realized the importance of natural defects or microcracks that cause a material to decrease in strength and failure. Griffith [2] argued that brittle materials have a large number of pre-existing small cracks and final failure occurs by propagation and coalescence of those pre-existing cracks. It is common for Griffith cracks to be found in brittle rocks as both intragranular and intergranular microcracks and as macroscopic cracks. In any material especially brittle materials, the non-linear process zone at the crack tip is caused by the initiation and propagation of the microcracks. This non-linear area is described as the crack tip crushed zone or Fracture Process Zone (FPZ). FPZ is an area that accompanies the growth of an stress-induced crack or pre-existing cracks in a brittle material. Schmidt and Lutz [3] developed a criterion to describe the shape of an advanced FPZ at the crack tip. This criterion assumes

that the local maximum principal stress value near the crack tip occurs when the rock reaches the uniaxial stress value (UCS), the FPZ zone is formed and takes its basic initial shape.

Brittle materials such as concrete, ceramics and rocks fail under cyclic loading at a stress level lower than their strength determined under monotonic loading conditions [4,5,6]. This situation is termed 'fatigue'. Bridges, dam and road foundations, faults, metro tunnel walls, excavation roofs are only a few of the natural and manmade structures that can be weakened by cyclic/repetitive loading. There is a well-known relationship between the number of cycles and the reduction of applied stress amplitude (the S-N curve approach) in fatigue researches in literature [5,7,8,9,10]. However, relatively little attention has been given to investigate the damage mechanism of rock fatigue [11,12].

A general feature of fatigue damage mechanism in tests is that the repetition of loading cycles leads a progressive accumulation of permanent strain in the specimen. Most of the studies on rock fatigue in the literature have been carried out on a laboratory scale, and quite a limited number of studies have been conducted on the relationship between hard rock cutting technologies and rock fatigue [13, 14,16]. In this study, this relationship is emphasized. It is only possible to reduce the damage of the underground openings

to the environment and above ground structures by choosing the right excavation method. Mechanical excavation methods in tunnels have developed rapidly in recent years. In mechanical rock cutting, a crushed zone is developed in the rock beneath a disc cutter due to the high compressive stress generated by the penetration of the disc cutter. Tensile stresses and tangential cracks are developed just around this crushed zone. Then, tensile fractures initiate and propagate to the free surface to form rock chips.

2. EXPERIMENTAL AND NUMERICAL METHODS

Two types of experiments, which are widely used in rock mechanics researches, have been carried out in this research: the Brazilian indirect tensile strength test (BTS) and fracture toughness test. Both experiments were done in five replicates with both static and cyclic loading tests. A series of BTS was done using rock specimens, which are granite type taken from İzmir-Bergama and Foça regions in Turkey, will be referred to as "Bergama Granite" in this research and are determined as essential rock samples to be used in rock strength tests and both Bergama granite and some limestone specimens from Ankara region in Turkey were used in rock cutting tests. General mineral composition and percentage values of Bergama Granite used: quartz (20-25%), plagioclase (35-38%), orthoclase (18-20%), hornblende (10-12%), biotite (6-8), chlorite (1-2%), sphene (trace), apatite (trace), zircon (trace), calcite (trace), sericite (trace) and opaque mineral (1-2). The UCS value of the specimens is 123 MPa. The Brazilian discs test specimens were prepared according to the ISRM standards with a diameter of 51 mm (a diameter to thickness ratio of 0.5). The loading rate was 200 N/s which was suggested by ISRM [15]. The Cracked Chevron Notch Brazilian Disc (CCNBD) specimen geometry, which is ISRM suggested method, was used in both the static and cyclic tests (Fig.1). In the CCNBD method recommended by ISRM has advantages over other test sample geometries because it is easier to prepare specimen and less test material is used.

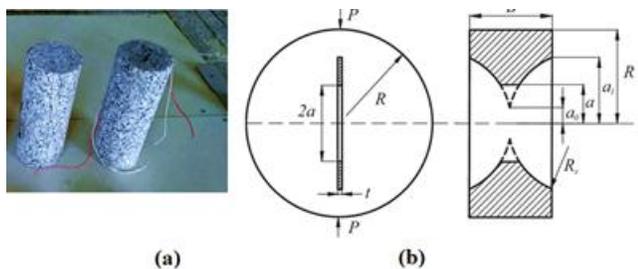


Fig. 1. Some prepared and tested UCS specimens (a), and (b) geometric parameters of CCNBD specimens used in fracture toughness tests

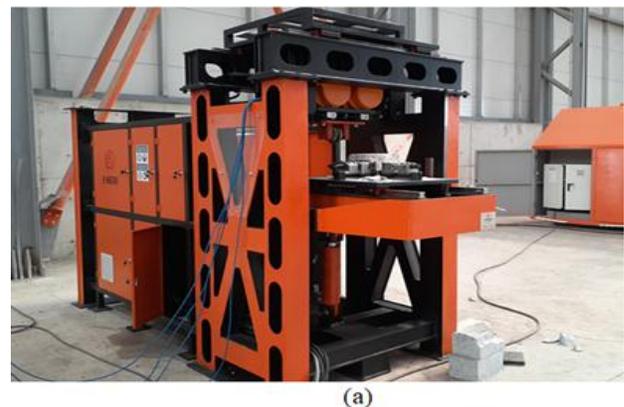
Some numerical analyses series have been performed using ABAQUS software to interpret and explain the experimental findings and cutting test results.

Inhomogeneity was described with XFEM with Simpleware software, which is used to implement the experimentally tested and failed surface of specimens including many inhomogeneities, such as bedding planes, micro and macro-scale flaws cracks, into the meshing of XFEM analyses.

Rock cutting tests with DCM technology

Tunnel boring machines (TBM) are used to excavate underground tunnels by using disc cutters embedded in their cutting head. Very large and heavy tunnel boring machines such as TBMs use very high energy and studies have been carried out for years to reduce the energy and cutting forces they use to improve their performance. The Dynamic Cutting Machine (DCD) technology is a dynamic hard rock cutting technology manufactured for the first time in the world using real size mini discs and vibration motors (Fig. 2). DCD is a unique technology where dynamic loading is achieved by vibrator motors and no vibration is transmitted to the rear parts of the machine. DCD is designed to investigate and analyses the relationships between rock fatigue and changes of some cutting parameters such as cutting forces, specific energy, chip size and size-distribution under oscillating loading provided with DCD. The cutting forces are recorded in three dimensions during the dynamic cutting. DCD is controlled by a control unit instead of placing control buttons on the machine frame or providing movements with mechanical clamps.

Four Flat Type Load Cells (LS series) are used to read cutting forces in three dimension. LS series load cells are used in many areas such as laboratory tests, tank and silo weighing, and construction earthquake tests. The cutting forces measured with the LS load cells are: F_s : side force, F_n : normal force, F_d : cutting force. The values measured by the load cells were recorded with the TESTBOX 2010 dynamic data collection device. TESTBOX2010 dynamic data acquisition device is capable of faster and higher resolution signal processing than voltage output sensors such as accelerometer, protractors, strain gauges, displacement transducers, thermocouples etc. TESTBOX2010 performs sampling from 100Hz to 2kHz simultaneously with 24 bit resolution.



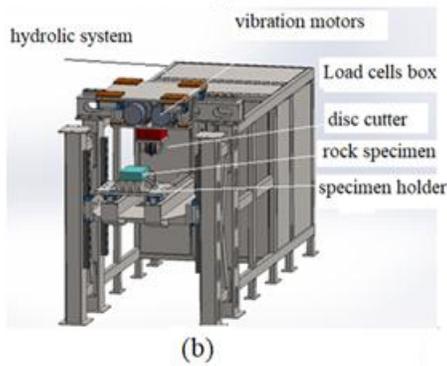


Fig.2. a) General view of the DCD (b) First design of DCD

3. RESULTS OF EXPERIMENTAL AND NUMERICAL ANALYSES

At least 5 disc samples were used to find average Brazilian indirect tensile strength value of the specimens under monotonic loading. The obtained BTS of the specimens was found 11 Mpa. 5 CCNBD specimens were tested to find the static fracture toughness value of the rock specimens. The obtained mode I (tensile) fracture toughness value is 1.48 MPa√m.

Fatigue and sub-critical crack tests were conducted with rock specimens successfully. The obtained S-N curves for Brazilian disc and CCNBD specimens shows that as the applied maximum load amplitude decreases, the strength of CCNBD sample increases. However, the S-N curve test results show that the final load decreased by 30% (from 1.48 kN to 1.21 kN) due to the fatigue mechanism formed under cyclic loads.

The central fatigue crack opening and closing during the cyclic loading test, which is the most crucial part of this research. The failure of brittle materials such as rocks and ceramics takes place suddenly in just a few seconds after a long elastic deformation. The importance of this article is that the opening and closing of a macro-scale crack in the center of the rock sample like a spring without failure could be recorded in real time (Fig.3). In general, the crack formation recorded in the literature is captured and recorded immediately before failure takes place, however a macro-scale fatigue central crack shown in this study was recorded for hours while opening and closing like a spring under cyclic loading without result in failure of the specimen. This is a unique observation that challenge the failure theories and criteria of brittle materials.

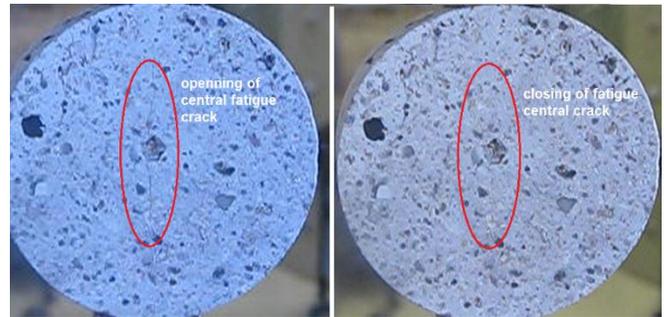


Fig.3. Figures taken from the video of central fatigue crack opening and closing in the specimens

Numerical analyses with XFEM has been done to investigate the principle stress distribution at the tip of chevron notched cracks in CCNBD specimen. The CCNBD specimen geometry was modelled for static and cyclic loading cases separately by using XFEM method in order to show the effect of cyclic loading and fatigue damage (Fig.3). A high tensile stress intensity and developed FPZ took place around the notched crack both under monotonic and cyclic loading. Fig.3 shows that the high tensile stresses intensity at the tip of the crack within the specimen tested under cyclic loading are lower than the tensile stress concentration in the specimen under static loading. This means that the development of an FPZ is possible with the lower ultimate loading than the determined static strength values. Moreover, XFEM analyses showed the high tensile stress concentration takes place just in front of the chevron crack whereas effective high tensile stress concentration took place around the crack beside the tip due to the extensive FPZ under cyclic loading (Fig.3).

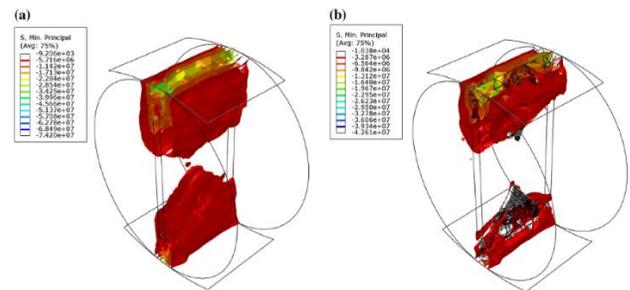


Fig.3 Stress distribution and development of FPZ at the tip of notch crack within CCNBD specimen (a) under static loading (b) under cyclic loading [14]

Results of Rock Cutting Tests

In the limited number of studies in the literature on dynamic, ie oscillating rock cutting, the reason for the decrease in cutting forces is breaking rock to fail in fatigue (Hood and Alehossin 2000, Hood 2004, Ghamgosar et al. 2017). It is legitimate to ask the purpose of oscillating a cutter during a mechanical rock cutting. The answer is actually the desired aim, expecting a significant reduction in

cutting forces and hence the energy used. This kind of desired aim is shown in Table 1 and Fig.4 where the components of cutting force of the DCD decreased for the cutting tests carried out with Bergama Granite, UCS 120 MPa. The cutting forces FN, FC and FS given in Table 3 represents the mean of the maximum values of each force component under the disk cutter in three dimensions. The cutting tests were carried out in unrelieved cutting mode first to determine the optimum cutting spacing between two cutting grooves.

Cutting results and the values of three cutting force with the conventional cutting, which the oscillating frequency of the cutter was zero, i.e the cutter was simply performed through the rock surface, and the results of dynamic cutting, which the cutter was oscillated at a frequency of 10 and 45Hz are given in Table 3. It can be clearly seen that the mean normal force FN, was about 48 kN with 3mm depth of cut and 65 kN with 5mm depth of cut when the cutter was not oscillated in relieved mode and that this reduced to about 40.8 and 55.2 kN respectively when the mini disc cutter was oscillated at 10Hz. In the same way, a decrease was observed in mean cutting force, FC, values according to the results of cutting with oscillating mini disc cutter. According to the results obtained in general, while the decrease in the cutting forces obtained with 40 Hz vibration is approximately 24%, it is more than the decrease obtained with 10 Hz, which is 15%. In particular, the magnitude of the mean normal force FN is affected more by the higher frequency than the mean cutting force, FC, at which the cutter is oscillated with 40Hz.

**TABLE 1
CUTTING TEST RESULTS WITH BERGAMA
GRANITE**

Cutting Condition - <u>Relieved</u>	Frequenc y,Hz	Cutting forces, kN	
		F _N (kN) (avr.of two repeats)	F _C (kN) (avr.of two repeats)
d=3mm	0	48.1	12.2
d=5mm	0	59.9	14.8
d=3mm	10	40.8	10.98
d=5mm	10	55.2	14.22
d=3mm	40	36.5	9.76
d=5mm	40	46.4	12.64
<u>Unrelieved</u>			
d=3mm	0	55	14.4
d=5mm	0	67	17.7
d=3mm	10	49.5	12.96
d=5mm	10	62.1	15.93
d=3mm	40	38.4	12.24
d=5mm	40	53.2	15.05

Three of the typical cutting force plots after relieved and unrelieved cutting mode tests are shown in Fig.4.

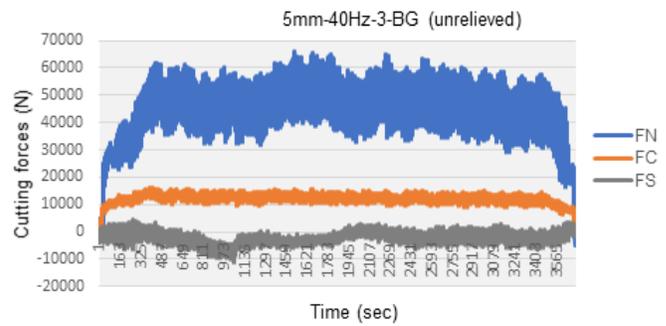


Fig.4. Plots of cutting forces:unrelieved cutting – depth of cut=5mm, 40Hz frequency, 3cm/sec cutting velocity

In general, more small pieces, namely 'chips', were obtained with the dynamic cutting tests compared to the conventional cutting tests with zero oscillation (Fig. 5). The damage mechanism of rock fatigue has been confirmed by this result since it is believed that the fractured crush zone called FPZ (Fracture Process Zone) is an effective parameter in obtaining more chips due to rock fatigue with the dynamic rock cutting. Further, large size rock chips have been obtained in dynamic rock cutting tests with oscillating disc cutter (Fig. 5). Therefore, both the 24% decrease in the cutting forces and increase in the amount of excavated rock is an evidence that DCD, which is a dynamic rock cutting technology, is more successful than the conventional disc cutting.



Fig.5. Cutting grooves after the cutting tests with DCD and conventional disc cutter

Specific Energy (SE) refers to the energy required to cut a unit volume of rock and greater SE means lower rock cutting efficiency. The specific energy (SE) of rock cutting was calculated as:

$$SE=0.278(RL\rho/m) \tag{Eq. 1}$$

R is mean rolling force (kN), L is the length of cut (mm), ρ is the rock density (g/cm³) and m is the mass of chips (g). Similar to the studies presented in the literature, it was found that there is a significant relationship between CI value and SE, and it is seen that SE decreases with an moderate linear correlation with the increasing CI values (Table 2 and Fig.5). In fact, these results should be analyzed

whether reduction in cutting forces or reduction in specific energy needed is more important for efficient rock cutting at the field scale. Also, it should be questioned that the reason of decreasing the specific energy whether the decreasing cutting forces or the increasing amount of excavated volume of rock.

TABLE 2
SPEFIFIC ENERGY AND COARSNESS INDEX
VALUES

Cutting Conditio n - Frequ ency, d Hz	F _N (kN) (avr.of two repeats)	Cutting forces, kN		
		F _C (kN) (avr.o f two repeat s)	SE (kWh/ m ³)	CI
d=3mm 0	48.1	12.2	18.4	177
d=5mm 0	59.9	14.8	16.6	195
d=3mm 10	40.8	10.98	14.0	210
d=5mm 10	55.2	14.22	8.5	233
d=3mm 40	36.5	9.76	7.4	216
d=5mm 40	46.4	12.64	7.6	241

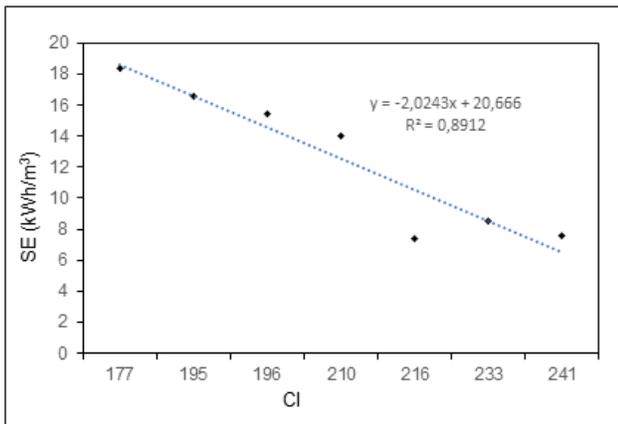


Fig. 5. The relationship between SE and CI

4. CONCLUSIONS

The fracture toughness and indirect Brazilian tensile strength obtained under cyclic loading were found different from that under static loading. The average maximum reduction of the static KIC of 35% was obtained with the cyclic loading tests and average maximum reduction with the indirect Brazilian strength was found 30% under cyclic loading compared with found under static strength. These reductions clearly show the fatigue effect on tensile strength of rocks.

The SEM and CT results provided an explanation of some qualitative features of the fatigue damage process in the rocks. FPZ, which is stated to cause fatigue mechanism, was analyzed in detail with both experimental and numerical analysis with this study. Results show that the

failure of Brazilian disc and CCNBD specimens tested under cyclic loading includes an extensive FPZ due to coalescence of many microcracks, instead of the growth of a single macrocrack. SEM and CT images clearly showed the developed FPZ in front of the notch crack tip and this zone clearly leads the macro-scale fatigue crack behaves like a spring in a brittle rock material without final failure. In FPZ, a clear crushed region including small particles and dust in front of the chevron notch crack tip in CCNBD specimen tested under cyclic loading, whereas no small particles were observed at the crack surfaces of failed specimens tested under static loading. Maximum dimension of FPZ was also calculated and results showed that the FPZ_{max} was achieved when the notch crack inclination angle becomes 60°. It means the fracturing mode is mixed mode I-II (opening and shear) not just opening mode (mode I). In fact, this situation, the presence of both tensile and shear stresses, is clearly obtained with the SEM images of the experimental failure zone and CT scanning. The opening and closing of a macro-scale fatigue cracks behave like a spring without causing failure in rock specimens, which is a highly brittle material, has been recorded by video for the first time in the literature.

The development and evaluation of the dynamic rock cutting technology DCD is presented in this study. The main innovation lies in combining the rock fatigue effect with dynamic disc cutters, one of the robust cutter technology, to increase the hard rock cutting efficiency by obtaining accurate full-size rock cutting test results. From the cutting test results of DCD technology with Bergama granite specimens, it was concluded that both cutting forces F_n and F_c and specific energy were found decreasing by the effect of rock fatigue fracturing. According to the results, while the decrease in the cutting forces obtained with 40 Hz vibration is approximately 24%, it is more than the decrease obtained with 10 Hz, which is 15%. It is concluded that dynamic hard rock cutting is more effective using higher frequencies to decrease the cutting forces and specific energy. Sieve analyses results obtained from the excavated rock fragments after oscillating disc cutting and conventional disc cutting tests show that there is no significant difference between the amount of dust size material obtained with DCD and conventional disc cutter when the sieve analysis results between -4.12 + 2.0 mm are compared. In addition to the sieve analyses, CI was found very important parameter to evaluate the effective damage mechanism since the relationship between rock fatigue and FPZ zone formed under disc cutter was approved by the size and amount of excavated rock fragments. Further, a high correlation was found between SE and CI, and it was found that the specific energy decreased with the increasing CI values.

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Firecracker Graph and Friendship Graph and Its Chromatic Number in Harmonious Colouring

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Abstract:

In this paper, our aim is to give the achromatic colouring and harmonious colouring of the line graph of subdivision of firecracker graph and Friendship Graph. Also we will discuss few applications of the line graph of subdivision of firecracker graph and Friendship graph and its properties. Here we will summarize and discuss some important theorem and examples on the same.

Keywords:

The line graph of subdivision of firecracker graph, Friendship Graph, Harmonious colouring, Central Graph, Middle Graph

1. INTRODUCTION

Harmonious colouring number is used in the different families of graph such as trees, cycles, complete bipartite graphs etc. In this topic more than fifty papers are published.

A harmonious Colouring of a simple graph G is a proper vertex colouring such that each pair of colours appears together on at most one edge. The harmonious Chromatic

number $\chi_h(G)$ of a graph is the least number of colours in such a colouring, where G is a finite un directed graph with no loops and multiple edges.

A subdivision of a graph G is a graph resulting from the subdivision of edges in G . The subdivision of some edge e with endpoints $\{u,v\}$ yields a graph containing one new vertex w , and with an edge set replacing e by two new edges, $\{u,w\}$ and $\{w,v\}$. The explicit expressions, for the Shultz index of the subdivision of the tadpole graph, wheel graph, helm graph and ladder graph have been calculated by Ranjini et al. in 2011.

2. DEFINITIONS

1. Vertex Colouring

A k -vertex colouring of a graph G , or simply a k - colouring is an assignment of k colours to its vertices. The colouring is proper if no two adjacent vertices are assigned the same colour.

A graph is k - colourable if it has a proper k - colouring.

2. Edge Colouring

A k -edge colouring of a graph G , or simply a k - colouring is an assignment of k colours to its edges. The colouring is

proper if no two adjacent edges are assigned the same colour.

A graph is k -edge colourable if it has a proper k -edge colouring.

3. Chromatic Number

The chromatic number of a graph G is the least k for which G is k -vertex colourable and it denoted by $\chi(G)$. A graph G is k -chromatic if $\chi(G) = k$.

The chromatic number of a graph G is the least k for which G is k -vertex colourable and it denoted by $\chi'(G)$. A graph G is k -chromatic if $\chi'(G) = k$.

4. Line Distinguishing Colouring

Let $G(V,E)$ be a graph. A colouring $\phi: V \rightarrow N$ of the vertices is a line distinguishing colouring iff for every edge $(u, v) \in E$ the edge colour $(\phi(u), \phi(v))$ is unique, (i.e.) it appears at most once.

5. Harmonious Colouring and Harmonious Chromatic Number

A harmonious colouring of a graph $G(V,E)$ is a line-distinguishing colouring which is also proper. The harmonious chromatic number of G (denoted by $\chi_h(G)$) is the smallest number k such that there exists a harmonious colouring of G of k colors.

6. Central Graph

The central graph of a graph G , is obtained by subdividing each edge of G exactly once and joining all the non-adjacent vertices of G . It is denoted by $C(G)$.

7. Subdivision Graph

The subdivision S obtained by replacing each edge of G by a path of length 2. The subdivision of some edge e with endpoints $\{u,v\}$ yields a graph containing one new vertex w , and with an edge set replacing e by two new edges, $\{u,w\}$ and $\{w,v\}$.

8. Middle Graph

Let G be a graph G , with vertex set $V(G)$ and edge set $E(G)$. The middle graph of G is denoted by $M(G)$ and is denoted as follows. The vertex set of $M(G)$ is $V(G) \cup E(G)$. Two vertices x,y in the vertex set of $M(G)$ are adjacent in $M(G)$ if one of the following cases holds.

- (i) x,y are in $E(G)$ and x,y are adjacent in G .
- (ii) x is in $V(G)$, y is in $E(G)$ and x,y are adjacent in G .

9. Fire cracker Graph

An (n,k) -fire cracker is a graph obtained by the concatenation of n copies of k -stars by linking one leaf from each and it is denoted by $F_{n,k}$.

10. Friendship Graph

The friendship graph f_n is a collection of n triangles with a common vertex. It may be also pictured as a wheel with every alternate rim edge removed. The generalized friendship graph $f_{q,p}$ is a collection of p cycles (all of order q), meeting at a common vertex.

3. OBSERVATION [Ref. 1,2,3,4,5]

1.Structural properties of subdivided graph of firecracker graph $F_{m,n}$

- (i)Number of edges in the graph $F_{m,n}$ is $q=mn$
- (ii)Number of vertices in the graph $F_{m,n}$ is $p=mn-1$
- (iii)Maximum degree in the graph $F_{m,n}$ is $\Delta=m$
- (iv)Number of vertices in the graph $CF_{m,n}$ is $p[C(F_{m,n})]=2(mn-1)$
- (v)Maximum degree in the graph $CF_{m,n}$ is $\Delta[C(F_{m,n})]=mn$

The firecracker graph $F_{m,n}$ is the graph obtained by the concatenation of mn -stars by linking one leaf from each as shown in Figure 1.

Example of the subdivision of $F_{m,n}$ for $m=4, n=7$ has order $2(mn-1)$ and size $2(mn-1)$ has shown in Figure 2.

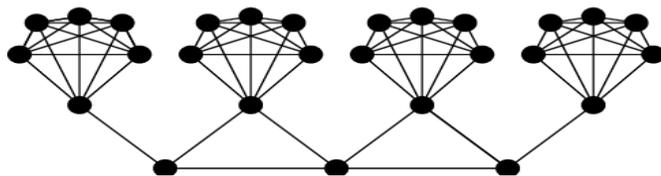


Figure 1.The firecracker graph . $F_{4,7}$

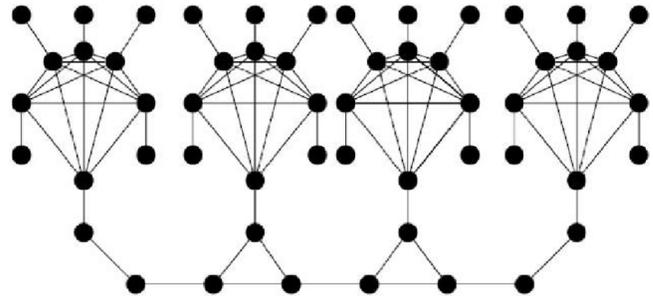


Figure 2. The line graph of subdivision of firecracker graph . $F_{4,7}$

3. Friendship Graph

Theorem. 1 (Friendship Theorem)

Every friendship graph is a windmill graph.

Proposition 1:

A friendship graph G contains no C_4 as a subgraph, as well as the distance between any two nodes in G is at most two.

Theorem 2 :

Friendship graph f_n is harmonious except $n \equiv 2 \pmod{4}$.

Proof:

We consider the following three cases

Case (1): If $n \equiv 2 \pmod{4}$, then f_2 is not harmonious according to a theorem. Since number of vertices is 5 and number of edges are 6. Which is not divisible by 4 or 8. Therefore, this is not divisible by 4 or 8.

Case (2): If $n \equiv 0$ or $1 \pmod{4}$, then the numbers $\{0,1,2,\dots,2n\}$ may be partitioned into n pairs (a_r, b_r) with $b_r - a_r = r$ for $r = 1,2,\dots,n$. then a harmonious labeling is obtained by labeling the vertices of the triangle with $(0,r, n+a_r)$ for $r = 1,2,\dots,n$.

Case (3): If $n \equiv 3 \pmod{4}$, then $\{1,2,3,\dots,2n-6\}$ may be partitioned into $n-3$ pairs (a_r, b_r) with $b_r - a_r = r+2$ for $r = 1,2,\dots,n-3$. We label the triangles of F_n with $(0,1, 3n-1)$, $(0,2, 3n-6)$, $(0,3n-2, 3n-3)$ and $(0,r+2, n+a_r)$ for $r = 1,2,\dots,n-3$. Thus, f_n is harmonious except $n \equiv 2 \pmod{4}$.

Example 1.

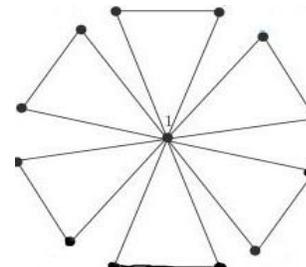


Fig.3 The flower $f_{3,6}$

The Dutch windmill graph $D_3^{(m)}$, also called a friendship graph, is the graph obtained by taking m copies of the cycle graph C_3 with a vertex in common (Gallian 2007), and therefore corresponds to the usual windmill graph $W_3^{(m)}$. It

is therefore natural to extend the definition to $D_n^{(m)}$, consisting of m copies of C_n .

3. Special cases:

By construction, the windmill graph $Wd(3,n)$ is the friendship graph F_n , the windmill graph $Wd(2,n)$ is the star graph S_n and the windmill graph $Wd(3,2)$ is the butterfly graph.

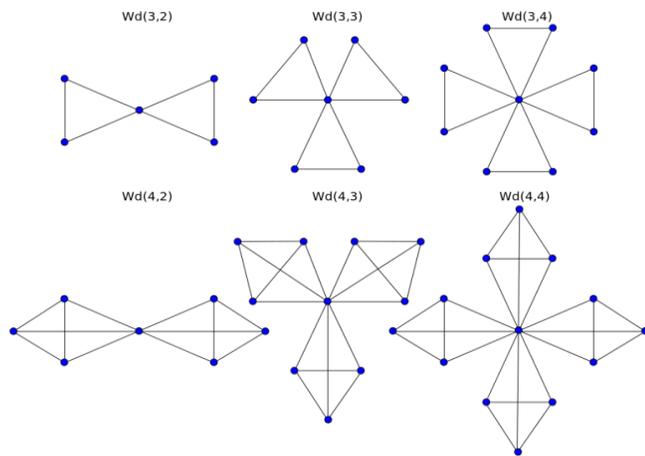


Fig.4 Small Windmill graphs

The wind mill graph Wm_n is obtained by joining n - copies of the complete graph K_n with a vertex in common.

4. ILLUSTRATION

We were apply line graph of subdivided graph of firecracker graph $F_{4,7}$ in harmonious coloring

Theorem 3.

The Harmonious chromatic Number for $C(F_{4,7})$ is $(mn - 1)$

$$3 \text{ for } m, n \geq 2.$$

Proof:

- In general an (n,k) -fire cracker is a graph obtained by the concatenation of n copies of k -stars by linking one leaf from each and it is denoted by $F_{n,k}$. Now subdivide the each edge into two equal parts.
- Structural properties of line graph of subdivided graph of firecracker graph $F_{4,7}$ shown in Figure.5.
 - (i) Number of edges in the graph $F_{4,7}$ is $q=4*7=28$
 - (ii) Number of vertices in the graph $F_{4,7}$ is $p=28-1=27$
 - (iii) Maximum degree in the graph $F_{4,7}$ is $\Delta=4$
 - (iv) Number of vertices in the graph $C(F_{4,7})$ is $p[C(F_{4,7})]=2(4*7-1)=54$
 - (v) Maximum degree in the graph $CF_{m,n}$ is $\Delta[C(F_{4,7})]=mn=28$
- Let u_i, u_i^1, u_i^2 and u_i^3 where $1 \leq i \leq 9$ be the vertices of the edge connecting the 4 copies of 7-stars by linking one leaf from . Consider three colour class

$C=\{C_1, C_2, \dots, C_9\}$, $1 \leq i \leq 9$. Using minimum colours assign C_i to u_i , assign C_i to u_i^1 , assign C_i to u_i^2 and assign C_i to u_i^3 for the harmonious colouring. Therefore Harmonious chromatic Number for $C(F_{4,7})$ is

$$\frac{(mn - 1)}{3} \text{ for } m, n \geq 2.$$

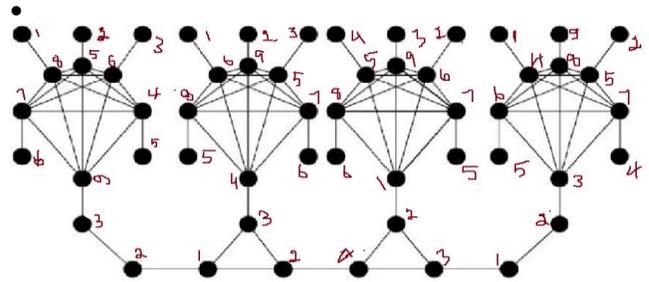


Fig.5 The harmonious colouring of line graph of subdivision of firecracker graph $F_{4,7}$

5. CONCLUSION

In this paper, we were discussing few applications of the line graph of subdivision of firecracker graph and Friendship graph and its properties. Also we have illustrated the harmonious colouring of line graph of subdivision of firecracker graph $F_{4,7}$. Here we will summarize and discuss some important theorem and examples on the same.

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New Method for Generating Schemes of Arabic Language Using Generative Forms

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Abstract:

The purpose of this work is to generate models of generation using in the speech synthesis of Arabic language based on reduced number of units, which conduce us to use reduce number of sequence of Arabic language. The aim of this study is to develop a spoken communication aid system for the visually impaired in the Arab world. We can generate basic units; verbs, names and particles. We can also generate all speech sequences (syllable sequence, word sequence and sentence or text sequence) depend on different generated schemes.

Keywords:

text-to-speech; Arabic scheme; speech synthesis; concatenative synthesis; generated scheme; generation of Sequence

1. INTRODUCTION

Arabic is the fourth most spoken language in our world with more than 442 million speakers spread in 23 countries as an official language [1]. Furthermore, it carries a religious value for more than 1.6 billion Muslim according to Ref. [2].

Speech synthesizer or as it is known Text-to-Speech system (TTS system) is one of the important technology in the present time due to the expanding field of applications. It is used in multimedia applications to read e-mail, mobile messages, or in any kind of human-machine interaction. It is helpful and common among visually impaired people as a simple reading machine, gives the deafened and vocally handicapped an opportunity to communicate with people who do not understand the sign language. It can be used also in many educational tasks like spelling and pronunciation teaching help for different languages.

Many researches have been carried out to synthesize speech by different means and for different languages. In 1987, Sejnowsky and Rosenberg [4] constructed a neural network that learns to pronounce English text. The system, which they called NETtalk, was built using a large number of parallel network systems that can capture a significant number of the regularities and many of the irregularities in English pronunciation to convert strings of the English text into strings of phonemes. Some researchers used different approaches other than the NETtalk. For example, Karaali *et al.* [5] constructed a rule-based system that uses two neural networks. The first one is a Time-Delay Neural Network to convert a phonetic representation of speech into an acoustic representation and then into speech. The other one is used to control the timing of the output speech.

The primary technologies for generating synthetic speech waveforms are formant synthesis and concatenative synthesis [3]. Each technology has strengths and weaknesses and the intended uses of a synthesis system will typically determine which approach is used. The speech synthesizer concerned in this work deals with the concatenative synthesis approach. In concatenative synthesis the waveforms are created by concatenating parts of natural speech recorded by humans.

Among the concatenative speech synthesis methods, there is based method diphone which uses diphones as the speech unit [7]. A diphone consists of two connected half phones starting in the middle of first phone and ending in the middle of second phone. In diphone based synthesis only single instances of all speech units are available in the speech inventory [8], hence to obtain good quality synthesized speech with the desired prosody, various signal processing methods are applied [9]. Some of the signal processing methods such as PSOLA, TD-PSOLA, and LP-PSOLA etc. are detailed in [10].

Elshafei *et al.* [6] proposed a concatenative Arabic text-to-speech synthesis system that uses diphone/sub-syllable method to construct the spoken utterances. The speech units they used were chosen where the co-articulation effect of the classical Arabic is minimal.

Concatenative synthesis is well suited for different applications. Concerning the length of the selected units then? The most common choices are phonemes and diphones because they are short enough to attain sufficient flexibility and to keep the memory requirements reasonable. Using longer units, such as syllables or words, is impossible or impractical for several reasons.

There are currently several approaches for Arabic speech synthesis; the Allophone method [28], the syllable and sub-syllable method [29] and the diphone method [30], these approaches vary in complexity, memory requirement and speech quality. The combined Arabic/English allophone set in [28] contains about 150 allophones and consonant-vowel combinations to simplify computer voice production.

Another important aspect of text-to-speech applications relates to services for the disabled. In this field, the coupling of speech synthesis with automatic character recognition techniques has enabled the development of real "reading machines" for the blind.

Speech synthesis and coding are among the new technologies for assisting the disabled. Various sensory functions can be performed using these techniques. For example, the development of a voice communication support system for a patient living in an Arab environment could involve coding, compression and synthesis systems, in particular that carried out from text or TTS (Text-To-Speech).

For a concatenative synthesis approach, the size of the database is necessarily large (often greater than 100 MB for a given voice). Thus, the segmentation of this base is carried out using PRAAT software which is a manual segmentation tool which makes it possible to obtain boundaries between the different base units (some systems use very small base units such as the half-phone). This approach makes it possible to build new synthetic voices quite simply since it suffices to record a new speaker (or a new speaker).

However, in practice, we find that while some speakers will produce excellent synthetic voices, others will result in poor quality synthesis. Currently, there is no way to know in advance whether a speaker has a voice suitable for synthesis and it is therefore often necessary to record several voices and choose the best one after listening to the synthesized voice. These systems are the ones that produce the most natural quality of voice. It should be noted that the synthesizer here has "the voice of its master" since the synthetic voice will be very close to that of the original speaker.

2. NEW TECHNIQUE TO GENERATE SCHEMES:

The study of the speech action of the Arabic language can be presented by the written part of a few sentences of the corpus used. Arabic grammarians have made several studies on this language which is used by a quarter of the inhabitants of the globe [3]. We are interested in this study in the different syllables of the Arabic language which have been classified into six categories which are: CV, CVV, CVC, CVVC, CVCC and CVVCC which is seldom existed except in the end of sentences which end in a doubled consonant preceded by a long vowel (Ex. Haarr).

The idea here is to put in a method capable of generating all the syllables from a syllable which is called the referential

unit. The choice of the latter element is subject to several conditions which may make the use of this method very satisfactory to make a rule-based generation of speech synthesis with good results and which will guarantee its validity.

The conditions for choosing the referential unit depend on the characteristics of this language, well determined in the sequences of speech in the successions of consonants and vowels. We always find that the beginning is a consonant followed by a vowel (CV) (short or long), we also find that the succession of consonants can reach two identical or different consonants (CC) at most is not three in all situations that involves the Arabic language.

In this study, to put mathematical models, we will have to illustrate the variables and constants of our data. What distinguishes the variable from a constant is the number which equals 3 for vowels and 29 for consonants which forces us to take consonants as variables and vowels as constants. We take the upper (maximum) cases for the variables and the lower (minimum) cases for the constants. Based on these data, we obtain that the referential syllable is CVCC.

The following expressions can give the generative forms (generation models) of the secondary syllables from the referential syllable $C_n V_n C_{nn} C_{nnn}$:

1. $CV = \sum((C, V, C, C) \times (C, V, 0, 0)^T)$
2. $CVC = \sum((C, V, C, C) \times (C, V, C, 0)^T)$
3. $CVV = \sum((C, V, C, C) \times (C, V, 0, 0)^T, (C, V, C, C) \times (0, 0, V, 0)^T)$
4. $CVCC = \sum((C, V, C, C) \times (C, V, C, C)^T)$
5. $CVVC = \sum((C, V, C, C) \times (C, V, 0, 0)^T, (C, V, C, C) \times (0, 0, V, C)^T)$
6. $CVVCC = \sum((C, V, C, C) \times (C, V, 0, 0)^T, (C, V, C, C) \times (0, V, C, C)^T)$

3. STAPES OF SPEECH SYNTHESIS:

The steps of the speech synthesis of the Arabic language using the generated schemes are illustrated in the following figure:

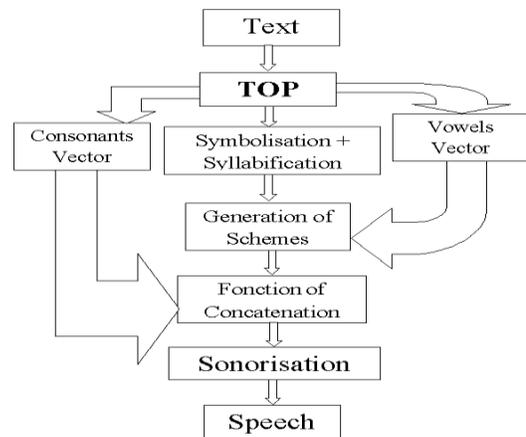
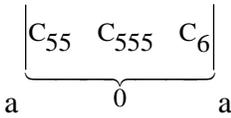


Fig1. Schéma général de la synthèse de la parole utilisant les schémas

For the third case (between V5 and V6):

In this case we have no consonant, it is the realization of a long vowel / aa /, it is the case of Fatha language, in this case the of all consonants are equal to zeros.



Through this representation we can conclude:

1. For the case of two consonants between two successive vowels V_n and V_{n+1}:

$$\begin{cases} C_{nn} = C_1 \\ C_{nnn} = 0 \\ C_{n+1} = C_2 \end{cases}$$

2. For the case of a single consonant between two successive vowels V_n and V_{n+1}:

$$\begin{cases} C_{nn} = 0 \\ C_{nnn} = C_1 \\ C_{n+1} = 0 \end{cases}$$

3. For the case of no consonant between two successive vowels V_n and V_{n+1}:

$$\begin{cases} C_{nn} = 0 \\ C_{nnn} = 0 \\ C_{n+1} = 0 \end{cases}$$

These are the known cases for the consonant sequences that exist in the Arabic language. The case of two successive vowels is the realization of a long vowel or generation of diphthong phenomena which is achieved by the sequence /au / or /ai /.

Through the previous results, we can put the following table:

Generat ed state	C _n	V _n	C _n	C _{nn}	Concatenation Resultant
CV	1	1	0	0	C _n V _n 00
CVC	1	1	1	0	C _n V _n C _{nn} 0
CVCC	1	1	1	1	C _n V _n C _{nn} C _{nnn}
CVV	1	1	0	0	C _n V _n 00+0V _{n+1} 00
	0	1	0	0	
CVVC	1	1	0	0	C _n V _n 00+0V _{n+1} C _{n+1,n+1} 0
	0	1	1	0	
CVVC	1	1	0	0	C _n V _n 00+0V _{n+1} C _{n+1,n+1} C _{n+}
C	0	1	1	1	C _{1,n+1,n+1}

Tableau de génération de toutes les syllabes de la langue arabe

From this table we can give the generation functions of the different existing syllables in the Arabic language as follows:

$$f_{CV}(C) = \Sigma(CVCC \begin{pmatrix} C_n \\ 1 \\ C_{nn} \\ C_{nnn} \end{pmatrix}) = \Sigma(C_1, V_1, 0, 0)$$

$$f_{CV}(C) = C_1V_1$$

To generate the sound of a written expression, in this method, we have to go through the following steps:

1. Phonetic orthographic transcription:

[taqaʕul ʔaqTaarul ʕarabiyyatu ʕinda multaqaʕa 0alaa0i qaarraat]

2. Extraction of the vectors of values of:

a. vowels :

V_v=[a,a,u,a,a,a,u,a,a,i,a,u,i,a,u,a,a,a,a,i,a,a,a,a],
27 vowels.

b. consonants:

V_c=[t,q,ʕ,l,ʔ,q,T,r,l,ʕ,r,b,y,y,t,ʕ,n,d,m,l,t,q,0,l,0,q,r,r,t],
29 consonants.

3. Syllabification: this is the segmentation into syllables:

[ta|qa|ʕul|ʔaq|Taa|rul|ʕa|ra|biy|ya|tu|ʕin|da|mul|ta|qaa|0a|laa|0i|qaar|raat]

4. Generation of syllables from the CVCC referential unit:

Through the number of vowels in this sentence, it will be represented by 27 CVCC type units, which will create the following expression:

$$Ph = \Sigma(C_1V_1C_{1,1}C_{1,1,1}, C_2V_2C_{2,2}C_{2,2,2}, \dots, C_{27}V_{27}C_{27,27}C_{27,27,27})$$

$$Ph = \Sigma(C_1aC_{1,1}C_{1,1,1}, C_2aC_{2,2}C_{2,2,2}, \dots, C_{27}aC_{27,27}C_{27,27,27})$$

The following table gives the generative form of all the syllables that make up the preceding sentence:

Syllable to generate	generative syllable	Vector of values	Resultant of concatenation
ta	CaVV	[t,1,0,0]	ta00
qa	CaVV	[q,1,0,0]	qa00
ʕul	CuVV	[ʕ,1,1,0]	ʕul0
ʔaq	CaVV	[ʔ,1,q,0]	ʔaq0
Taa	CaVV	[T,1,0,0]	ta00+0a00
	CaVV	[0,1,0,0]	
ru l	CuVV	[r,1,1,0]	ru00
ʕa	CaVV	[ʕ,1,0,0]	ʕa00
ra	CaVV	[r,1,0,0]	ra00
biy	CiVV	[b,1,y,0]	biy0
ya	CaVV	[y,1,0,0]	ya00
tu	CuVV	[t,1,0,0]	tu00
ʕin	CiVV	[ʕ,1,n,0]	ʕin0
da	CaVV	[d,1,0,0]	da00
mul	CuVV	[m,1,1,0]	mul0
ta	CaVV	[t,1,0,0]	Ta00

qaa	CaVV	[q,1,0,0]	qa00+0a00
	CaVV	[0,1,0,0]	
θa	CaVV	[θ,1,0,0]	θa00
laa	CaVV	[l,1,0,0]	la00+0a00
	CaVV	[0,1,0,0]	
θi	CaVV	[θ,1,0,0]	θi00
qaar	CaVV	[q,1,0,0]	qa00+0ar0
	CaVV	[0,1,r,0]	
raat	CaVV	[r,1,0,0]	ra00+0at0
	CaVV	[t,1,t,0]	

The concatenation is made by the substitution of the variables in the sound-generating syllables by the vector values of the consonants, in this way we will obtain the sounds presented in the column of "concatenation result" for each syllable, and the sound of the sentence is the concatenation of all these results which gives:

$$f(Ph) = \sum (ta00, qa00, \zeta u0, 'aq0, Ta000a00, ru0, \zeta a00, ra00, biy0, ya00, t u00, \zeta in0, da00, mul0, ta00, qa000a00, \theta a00, la000a0, \theta i00, qa000ar0, ra00 0at0)$$

From these results, we can put the following matrix:
For the sequence: ph = (taqaʕul 'aqTaarul ʕarabiyya) which contains 11 vowel, it will be generated by 11 CVCC type syllable as follows:

In the case of concatenation, we use the array values (nn), so the values of all the C_n variables go to the value of 1 which indicates a generation of the case (n), for this we find:

$$f(Ph) = \sum \begin{pmatrix} 1 & a & 1 & 1 \\ 1 & a & 1 & 1 \\ 1 & u & 1 & 1 \\ 1 & a & 1 & 1 \\ 1 & a & 1 & 1 \\ 1 & a & 1 & 1 \\ 1 & u & 1 & 1 \\ 1 & a & 1 & 1 \\ 1 & a & 1 & 1 \\ 1 & i & 1 & 1 \\ 1 & a & 1 & 1 \end{pmatrix} \begin{bmatrix} t & q & ? & ' & T & 0 & r & ? & r & b & y \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 0 & 0 & 1 & q & 0 & 0 & 1 & 0 & 0 & y & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

So :

$$f(Ph) = \begin{pmatrix} t+a+0+0 \\ q+a+0+0 \\ \zeta+u+1+0 \\ ' + a + q + 0 \\ T+a+0+0 \\ 0+a+0+0 \\ r+u+1+0 \\ ?+a+0+0 \\ r+a+0+0 \\ b+i+y+0 \\ y+a+0+0 \end{pmatrix} \cdot \underbrace{[1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1]}_{\text{indicator of concatenation}}$$

$$f(Ph) = \sum (ta00, qa00, \zeta u0, 'aq0, Ta000a00, ru0, \zeta a00, ra00, biy0, ya00)$$

Assuming that the values of zeros in the concatenation do not affect the signal of the sound that matches the given phrase, we will get:

$$f(Ph) = / taqaʕul 'aqTaarul ʕarabiyya/$$

6. SCHEMES OF THE GENERATIVE FORM OF SOUND:

To generate the schemes of the previous example, we need to give the schemes of the referential unit.

This part is based on a single unit of type CVCC, so it contains three variables that we can represent it by a trilateral scheme using the variables F, ζ and L, and depend on the values of the vowel that constitutes this unit, we can extract three qualities of this unit: CaCC, CuCC and CiCC, and three corresponding trilateral schemes which are: FaζL, FuζL and FiζL, as the following manner:

C _n	V _n	C _{nn}	C _{nnn}	Scheme	
F	Fat'ha	a	ζ	L	FaζL
	Dhamma	u			FuζL
	Kasra	i			FiζL

Through this table, everything that was expressed in CVCC will be expressed by these three schemes, therefore; we can generate an infinite number of schemes for the sound generating forms of any written input of the Arabic language, following steps and rules that we must follow to achieve the desired and suitable results for the studied case. Through this change (form-scheme), we can put a new table which expresses the generation of schemes corresponding to all the generating forms of the syllables of the Arabic language:

Generated state	F	a	ζ	L	Result of concatenation
CV	1	1	0	0	F(a√u√i)00
CVC	1	1	1	0	F(a√u√i)ζ0
CVCC	1	1	1	1	F(a√u√i)ζL
CVV	1	1	0	0	F(a√u√i)00+ 0(a√u√i)00
	0	1	0	0	
CVVC	1	1	0	0	F(a√u√i)00+0(a√u√i)ζ0
	0	1	1	0	
CVVCC	1	1	0	0	F(a√u√i)00+0(a√u√i)ζL
	0	1	1	1	

From table 2, we can generate the diagrams of the different lexical units of the Arabic language, in the following table we will illustrate this generation which corresponds to real examples of Arabic language in the case of Fatha as follows:

Type of syllable	Real Example	Generation Scheme	Vector of values	concatenation Equation
CV	Harfl ζaTf [wa]	Fa ζ L	[w,1,0,0]	wa00
CVC	D'interrogation [kam]	Fa ζ L	[k,1,m,0]	kam0

CVC	Harf	Fa ζ L	[H,1,r,f]	Harf
CVV	[Laa] et [kaif]	Fa ζ L+F a ζ L	[1,1,0,0]+[0,1,0,0]	la000a00
CVV	[qaal]	Fa ζ L+F a ζ L	[q,1,0,0]+[0,1,1,0]	qa000al0
CVV	[Haarr]	Fa ζ L+F a ζ L	[H,1,0,0]+[0,1,r,r]	Ha000arr

The precedent example: Ph=[taqa ζ ul ζ aqTaarul ζ arabiyatu ζ inda multaqa ζ θ alaa θ i qaarraat] will be generated as the following table :

Ph	t	a	Q	a	ζ	u	L	?	a	q	T	a	a	r	u	l	ζ	a	r	a	b	i	y	y	a	t	u
Sc	F	a	ζ L	a	ζ L	u	ζ LF		a	ζ LF		a	a	ζ L	u	ζ LF		a	ζ L	a	ζ L	i	ζ LF		a	ζ L	u
DS	F	a	00	a	00	u	ζ 0F		a	ζ 0F		a000a		00	u	ζ 0F		a	00	a	00	i	ζ 0F		a	00	u
RS	F	a	0L	a	0L	u	ζ 0F		a	ζ 0F		a000a		0L	u	ζ 0F		a	0L	a	ζ L	i	ζ 0F		a	0L	u

ζ	I	n	D	a	m	u	l	t	a	q	a	a	θ	a	l	a	a	θ	i	q	a	a	r	r	a	a	t
ζ L	I	ζ LF		a	ζ L	u	ζ LF		a	ζ L	a	a	ζ L	a	ζ L	a	a	ζ L	i	ζ L	a	a	ζ LF		a	a	ζ L
00	I	ζ 0F		a	00	u	ζ 0F		a	00	a000	00	a	00	a000	00	00	00	i	00	a000a	ζ 0F		a000a		ζ	0
0L	I	ζ 0F		a	0L	u	ζ 0F		a	0L	a000	0L	a	0L	a000	0L	0L	0L	i	0L	a000a	ζ 0F		a000a		ζ	0

The generator scheme of the sentence (Ph) depends on the syllable is:

$$Sch_{syll}(Ph) = (Fa00Fa00Fu\zeta0Fa\zeta0Fa000a00Fu\zeta0Fa00Fa00Fi\zeta0Fa00Fu00Fi\zeta0Fa00Fu\zeta0Fa00) \\ Fa000a00Fa00Fa000a00Fi00Fa000a\zeta0Fa000a\zeta0) \\ \text{Représented by 29 variables.}$$

And the generated scheme of the sentence (Ph) depends on the symmetric representation is:

$$Sch_{repsy}(Ph) = (Fa0L0a0L0u\zeta0Fa\zeta0Fa000a0L0u\zeta0Fa0L0a0L0i\zeta0Fa0L0u0L0i\zeta0Fa0L0u\zeta0Fa0L0a000a0L0a000a0L0i0L0a000a\zeta0Fa000a\zeta0) \\ \text{Représented by 29 variables too, but with a small change in representative variables.}$$

The vector of values is: $V_c = [t, q, \zeta, l, ?, q, T, r, l, \zeta, r, b, y, y, t, \zeta, n, d, m, l, t, q, \theta, l, \theta, q, r, r, t]$, contains 29 consonants, therefore; this method gives a good representation to generate the sound of the units of the Arabic language.

We can extract from this study the scheme of each lexical unit:

Schème généré par type syllabe	Schème généré par représentation symétrique
Sch(taqa ζ ul) = fafafa ζ	Sch(taqa ζ ul) = falalu ζ
Sch(ζ aqTaarul) = Fa ζ FaaFu ζ	Sch(ζ aqTaarul) = Fa ζ Faaluu ζ
Sch(ζ arabiyatu) =	Sch(ζ arabiyatu) = Falali ζ Falu
Sch(ζ inda) = Fi ζ Fa	Sch(ζ inda) = Fi ζ Fa

FaFaFi ζ FaFu	Sch(multaqa ζ) = Fu ζ Falaa
Sch(ζ inda) = Fi ζ Fa	Sch(θ alaa θ i) = Falaali
Sch(multaqa ζ) = Fu ζ FaFa	Sch(qaarraat) = Faa ζ Faa ζ
Sch(θ alaa θ i) = FaFaaFi	
Sch(qaarraat) = Faa ζ Faa ζ	

We can improve the form of the obtained schemas, to become a little close to the schemas exist in the Arabic language and for a simplification to store the variables to express the generative form of the written entries, it is a method to fill the boxes and obtain a good expressive form in a scheme close to grammatical schemes known in the Arabic language (called real), it gives these forms as follows:

For the word (taqa ζ u), which generated as the next:
Sch(taqa ζ u) = fa00+ fa00 + fu00 = fafafa

Or :

$$Sch(taqa\zeta u) = Fa\zeta L \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix} + Fa\zeta L \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix} + Fu\zeta L \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}$$

If we have the consonants represented between the vowels in the topmost empty boxes, i.e. the consonants which are between the vowel V_n and the vowel V_{n+1} must take or represent by C_{nn} and C_{n+1} better than by C_{n+1} by the

symmetrical technique or depend on the type of syllable, it leads to organize this representation and find a scheme close to reality either in expressive form or in a generated scheme.

$$Sch(\text{taqaʕu}) = FaʕL \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix} + FaʕL \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix} + FuʕL \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}$$

In expressive or generative form will be like:

$$f_{ph}(C) = C_1V_1C_{11}C_{111} \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix} + C_2V_2C_{22}C_{222} \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix} + C_3V_3C_{33}C_{333} \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix}$$

With the priority of the higher boxes we find:

$$f_{ph}(C) = C_1V_1C_{11}C_{111} \begin{pmatrix} 1 \\ 1 \\ 1 \\ 0 \end{pmatrix} + C_2V_2C_{22}C_{222} \begin{pmatrix} 0 \\ 1 \\ 1 \\ 0 \end{pmatrix} + C_3V_3C_{33}C_{333} \begin{pmatrix} 0 \\ 1 \\ 0 \\ 0 \end{pmatrix}$$

In this case, the generated scheme will be:

$$Sch(\text{taqaʕu}) = FaʕL \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix} + FaʕL \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} + FuʕL \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix}$$

$$Sch(\text{taqaʕu}) = Faʕ+ aʕ+ u = \mathbf{Faʕaʕu}$$

If we change the second value with the third value in the

third vector $\begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix}$, we will have the vector $\begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix}$, this value will create a new scheme generating the lexical unit (taqaʕu) which is:

$$Sch(\text{taqaʕu}) = FaʕL \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix} + FaʕL \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} + FuʕL \begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix}$$

$$Sch(\text{taqaʕu}) = Faʕ+ aL+ u = \mathbf{FaʕaLu}$$

This representation is very close to the real scheme of unity which has a trilateral root from the Arabic language, for the verb (daʕala), with this representation we will find:

$$Sch(\text{daʕala}) = FaʕL \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix} + FaʕL \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} + FaʕL \begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix}$$

$$Sch(\text{daʕala}) = Faʕ+ aL+ a = \mathbf{FaʕaLa}$$

This scheme is the same that exists in the Arabic language, so this representation is closer to reality but the problem here is the points which have zero values which were created during the generation of the generative form or the generator scheme which reach three successive zero points, these points can create a discontinuity in the speech signal depending on their audible discontinuity time in the speech signal which will change the meaning of the expression or give an intelligible speech.

7. VACUUM TIME CALCULATIONS:

The technique proposed in this part of the work is that each syllable of the Arabic language is presented according to the referential syllable CVCC, this means that the sequence is made by a concatenation of a limited number of referential syllable CVCC, this number is equal to the number of vowels which includes the sentence to be sounded. If the sentence comprises for example 10 vowels, the sequence is made by a concatenation of 10 CVCC referential syllables which will each be represented by its scheme depends on the vowel which comprises as we have seen (FaʕL for the CaCC syllable, FuʕL for the CuCC syllable and FiʕL for the syllable CiCC). For the sentence we saw previously (qara'a muʕallimun darsan) contains 9 vowels so we can generate the scheme of 9 referential syllables of CVCC types as follows:

Vowel indication: vector of values

$$VV_v = [a \ a \ a \ u \ a \ i \ u \ a \ a]$$

Syllable vector:

$$V_v = [CaCC \ CaCC \ CaCC \ CuCC \ CaCC \ CiCC \ CuCC \ CaCC]$$

Indication of consonants: vector of values:

$$VV_c = [q \ r \ ' \ m \ ʕ \ l \ l \ m \ n \ d \ r \ s \ n]$$

Phrase an Arabic	قَرَأَ مُعَلِّمٌ دَرَسًا									
Phonetic writing	qara'a muʕallimun darsan									
Segmentation to lexicals units	qara'a			muʕallimun				Darsan		
by variable (C)	CaCaCa			CuCaCCiCuC				CaCCaC		
Representation by CVCC	CaCC	CaCC	CaCC	CuCC	CaCC	CiCC	CuCC	CaCC	CaCC	
Scheme depend syllables	faʕl	faʕl	faʕl	fuʕl	faʕl	fiʕl	fuʕl	faʕl	faʕl	
By function of consonants	CaCaCa			CuCaCCiCuC				CaCCaC		
Values of zeros of consonants	CaC0	0aC0	0a00	CuC0	0aCC	0iC0	0uC0	CaCC	0aC0	

Codage en fonction de consonnes	CaC00aC00a00	CuC00aCC0iC00uC0	CaCC0aC0
Décodage	qar00a'00a00	muᶑ00all0im00un0	dars0an0
Scheme of generation	faᶑlfaᶑlfaᶑl	fuᶑlfaᶑlfiᶑlfaᶑl	faᶑlfaᶑl
Insertion of zero values in schemes	faᶑ00aᶑ00a00	fuᶑ00aᶑl0iᶑ00uᶑ0	faᶑl0aᶑ0
Remarque	* ᶑ]2pt(0)[a	* ᶑ]2pt(0)[a * l]pt(0)[i * ᶑ]2pt(0)[u	* l]pt(0)[a
Time of silence	* $\frac{2}{11025} s < 0.2ms$	* $\frac{2}{11025} s < 0.2ms$ * $\frac{1}{11025} s < 0.1ms$	* $\frac{1}{11025} s < 0.1ms$
Elimination of silences	faᶑaᶑa	fuᶑaᶑliᶑuᶑ	faᶑlaᶑ
Stape of synthesis by schemes using consonant vector	(f,ᶑ,ᶑ,f,ᶑ,ᶑ,l,ᶑ,ᶑ,f,ᶑ,l,ᶑ)=(q,r,m,ᶑ,l,l,m,n,d,r,s,n)		

8. CONCLUSION

This method gave a good representation for the generation of the schemas of the lexical units of the Arabic language to create an intermediate phase for the automatic synthesis of the speech of the Arabic language, although it created new forms of these schemas, but the desired goal is always the good results obtained with these representations.

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Survey of Triangle Security in Cloud

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Abstract:

Cloud computing remains the world's most demanded development trend. It is one of the most important topic whose application is currently being explored. The distributed storage has been one of the apparent administrations in distributed computing. Instead of providing the engaged worker for conventionally organized storage, the distributed storage sets various outsider individuals with the knowledge. The customer does not care about any details on various external employees and no one knows exactly where information is spared. The distributed storage supplier asserts that the information can be secured, but no one trusts in it. Security risk is information placed in the plain content configuration over cloud and across the organization. This document offers a method that allows customers to securely store and access data from the distributed storage. It also ensures that neither the distributed storage provider, apart from the verified customer, can get details. This technique ensures the safety and confidentiality of cloud-related information. Another favorite position is that if the cloud provider breaks down, the information of the client remains safe as all information is encoded. Customers must also not stress that cloud providers have illegal access to their data.

Keywords:

Cloud storage, third party audit, digital security, Encrypted file System

1. INTRODUCTION

At the moment, data protection is one of the most important data frameworks problems. Privacy (confirmation that data are distinctly shared by approved people and associations), honesty (confirmation that the data is real and complete), accessibility (confirmation that the frameworks responsible for conveying, removing and processing data are open to the individual who needs it when needed) and recognizability are the most commonly used security policies (capacity to sequentially interrelate remarkably recognizable substances in a manner that is evident). The problem is even more troubling when a few organisations are cooperating with a company and when the specific data structures in the various repositories are "leaving." We suggest a structure in which the records themselves guarantee their safety, so unregulated resources such as distributed storage could be exchanged along the same lines. In order to achieve autonomous reporting, we insert those security sections inside the record itself (e.g. access control, usage control). Triangle cloud security issues

A. Confidentiality

Secrecy implies assurance of information from unapproved divulgence. It relies upon different factors, for example, encryption strategies, Cloud Service Provider and length of key (in symmetric calculation). Privacy assumes a significant part in distributed computing by safeguarding control on associations' information arranged over various workers

B. Integrity

Honesty of information is the assertion that advanced data are not compromised and have to be obtained or modified by those accepted as such. Properness involves ensuring that knowledge remains consistent, accurate and reliable over its entire life cycle.

C. Availability

Accessibility is determined as the level of time an application and its administrations are accessible, given a particular time span. One accomplishes high accessibility (HA) when the administration being referred to is inaccessible under 5.25 minutes out of every year, which means at any rate 99.999 % accessibility ("five nines"). HA frameworks are shortcoming open minded frameworks with no single purpose of disappointment; at the end of the day, when a framework part fizzles, it doesn't really cause the end of the administration gave by that component, high accessibility in Clouds stays a major test for suppliers since Cloud foundation frameworks are unpredictable and must address various administrations with various necessities. So as to arrive at a specific degree of high accessibility, a Cloud supplier should screen its assets and conveyed benefits persistently.

2. D. CREDIBLE STORAGE SYSTEM FOR CLOUD

The primary errand of is "A Credible stockpiling system "not just putting away the information just as it needs secret putting away additionally and uprightness of the information would be kept up. To accomplish secrecy and

respectability of the information, cryptographic strategies can be utilized to scramble information. Encoded record frameworks (EFS) can be utilized to scramble the customer's information inside the cloud. A scrambled record framework is utilized to encode the client's information, oversee and make keys which are utilized for information encryption and unscrambling. Integrity of the information inside the cloud is created. Conventions are created which guarantee that the customer's information is put away just on confided away workers, duplicated distinctly on confided away workers, and assurance that the information proprietors and other advantaged clients of that information access the information safely. The systems are dependent on confided in processing stage innovation.

In cloud climate, validation of client is a significant factor, since it ensures that the imparting substance is the one guaranteed. Numerous techniques are being utilized to verify clients in cloud computing environment. Single Sign On (SSO), username and secret key, multifaceted validation, Mobile Trusted Module (MTM), Public Key Infrastructure (PKI), just as biometric confirmation are the principle strategies being utilized today.

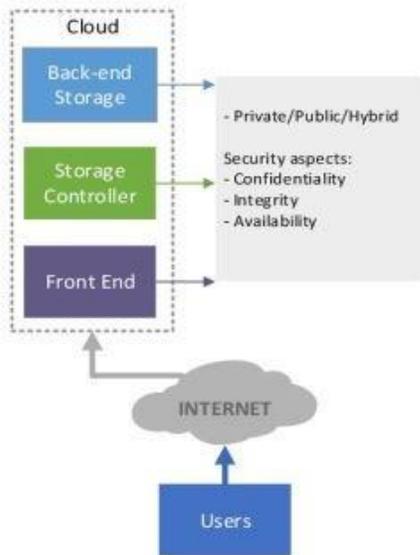


FIGURE 1: CLOUD SECURITY

3. IV CHALLENGES

A. Risk in Audited -Data Manipulation

The arrangement of the revision by a supplier itself of essential information is a problem for them: the risk of data control. Suppliers can modify the information provided to ensure progressive adherence to the affirmation. Foreshadowing the control or euphemisation of cloud specialist organizations by relevant information is essential to ensure CA is reliable and robust. Suppliers therefore have to create reliable logging systems that fulfill a significant degree of log-on privacy. To achieve that, we can build on findings from the cloud law research area. Cloud legal

studies are described as the use of logical standards, creative practices for restoring the past distributed software structures through evidence, assortment, security, evaluation, interpretation and disclosure of computerized evidence [20]. Analysts have proposed different methodology to manage difficulties of cloud criminology (i.e., malignant cloud specialist organizations controlling log records), eventually empowering outsider agents to gather and break down pertinent information [21]. Cloud specialist organisation, to focus log passages and transfer them from different logging sources (e.g. hypervisors), to a focal-logging component [22], will perform appropriate log connectors. In a safe, scratche and consistent log-type, this focused logging section changes log passages. For the prevention of internal log management, an external module (e.g. device or virtual module[21]) that provides a safe capability for log encryption may be updated. Comparative proposals for the use of open source distributed computer stages to guarantee protection and classification of log-based data are suggested (i.e. homomorphic encryption) and evaluated [23], [49]. Further on, one method of uncovering information control is to set up a chain of guardianship for computerized proof [25], which speaks to a guide that shows how information was gathered, investigated, and saved so as to be introduced as proof in court. In addition, a few strategies are prescribed to accumulate confided in review significant information, including distant knowledge about confident and stable networks, the use of board aircraft and the preparation of live legal sciences about frames in the running state, as well as an image clone (cf., [21] for an itemized examination). In any event, investigative structures for the cloud crime scene will fluctuate according to the distributed computer management and arrangement model [24]. For example, software-as-a-service and platform models have a restricted authority over cycle or organizational checks, even though some scientifically beneficial logging aspect may be expressed in infrastructure-as-a-Service settings. Future exploration should determine how current cloud review techniques can be used to motivate CA. Workshop participants and customers examined a low likelihood of internal change as continuous change is strong in use. In addition, information management allows a provider to store data volumes multiple times; initial information is unmodified for interior evaluations; and, subsequent information altered for reviewers and customers. At long last, clients may uncover altered information when utilizing the administration (e.g., altered accessibility rate). However, clients just as suppliers suggest that evaluators ought to haphazardly perform approval tests on routinely premise to forestall information control or uncover altered information.

B. Integrity Issues

Giving trustworthiness alludes to guarding data against inappropriate adjustment or pulverization and incorporates

guaranteeing data nonrepudiation and validness [76]. With regards to CA, guaranteeing trustworthiness and guarding data against inappropriate adjustment by outer just as inside subjects must be thought of. Aggressors may be keen on focusing on interfaces and frontends to adjust provisioned and introduced information. An alteration of information may influence an evaluator's appraisal of measures adherence, and subsequently may bring about confirmation non-adherence or client disappointment. In like manner, assailants may alter information, which is introduced to clients to demonstrate awful help conduct. Finally, the loss of notoriety or cancelation of the agreements may be prompt in such attack situations. Providers and evaluators therefore need to achieve the highest level of degree for data integrity and develop security instruments.

C. Confidentiality Issues

Guaranteeing classification alludes to Saving authorised access and disclosure limits, including maintaining personal and exclusive data protection [26]. At the point when information is moved to inspectors or introduced to clients, protection of review pertinent information must be guaranteed to forestall spillage of delicate or security-applicable data. Thusly, information must be anonymized or sifted individually. In this sense, suppliers need to unequivocally separate framework checking information and cloud clients' information. Uncovering delicate client information may break administration level arrangements and subsequently lead to monetary remuneration. Additionally, trade of applicable information through utilizing Interfaces enable suppliers or inspectors to update strong and stable information transmission control systems and encryption tools. Assailants may execute wild power or center attacks to recover sensitive information. At long last, giving delicate cloud administration information bears the danger of vindictive evaluators, whomight misuse review pertinent information. Along these lines, inspectors need to demonstrate that information is kept private

D. Availability Issues

Guaranteeing accessibility alludes to guaranteeing opportune and dependable admittance to and utilization of data [36]. With regards to CA, accessibility of cloud frameworks and gave interfaces must be guaranteed. To begin with, performing nonstop observing and examining measure (e.g., continuous information social event, examination and collection activities) may have a generous exhibition sway on cloud administrations. In like manner, disappointments in these activities may prompt unsettling influence of cloud administration activity. Subsequently, CA may undermine cloud administration accessibility. Second, when review significant information is given through characterized interfaces, suppliers need to guarantee accessibility of them. Assailants may target interfaces, for instance, by performing disseminated refusal

of administration assaults to upset the cycle of CA. In most pessimistic scenarios, this may prompt non-adherence of CSC models, since inspectors are missing comparing review data. At long last, suppliers need to guarantee that gave UIs to clients are accessible

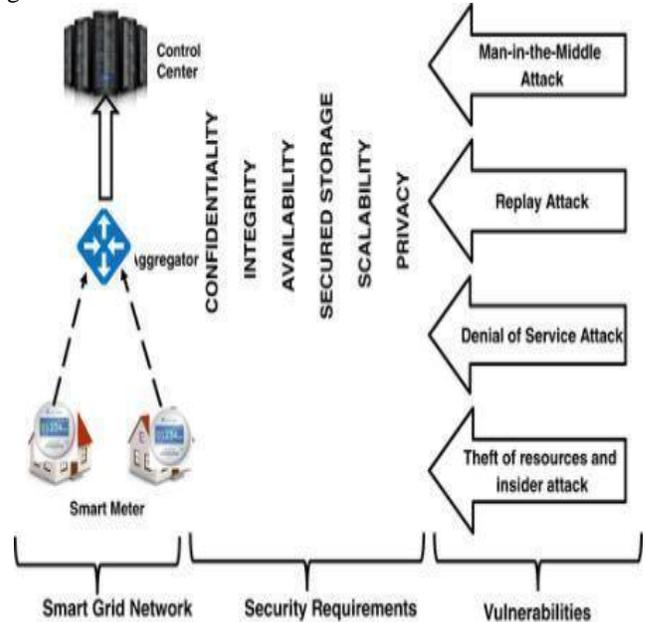


FIGURE 2: CLOUD SECURITY CHALLENGES

4. V INFORMATION SECURITY CONCERNS

The insurance targets incorporate equipment, programming and data. This part chooses three commonplace parts of PC security, including attack forms, access control and encryption. 1) Type of attack: In this section, we summarize several average kinds of attacks, including denial of service (DoS), jack-clicking, listening in, caricaturing, social designing, altering, benefit heightening, and indirect access assaults. Each assault is explicit or vague to the systems administration association layer or operating system.

5. INTEGRITY WITH BLOCKCHAIN

A. Verification of Data Integrity in Public

The significant thought of the communal check procedure [33], [34], [35] is that the client (i.e., information proprietor) parts the information into different squares, registers a mark for every one, and redistributes the information obstructs just as relating marks to the cloud worker. The Inspector selects an arbitrary subset of all blocks (i.e. 300 squares of 10,000) and sends the square files (as a complicated signal) to the cloud operator when the information is confirmed to be honest. With the comparison validation, the cloud worker reactions and the examiners verify the honesty of the measured squares by examining the credibility of the examination. The correctness of the entire knowledge index is ensured in the absence of validation. The main strategy here is accumulated mark [39], that enables the examiner, without

downloading the details, to confirm different places. After re-appropriating details, the customer sets a check period for open confirmation plans (i.e., the recurrence at which the examiner plays out the confirmation). The examiner would then verify the redistributed correctness of the details at the time of reference. The examiner provides a confirmatory report of different findings from time to time (comparing to numerous periods, we consider these periods an age). If the check result is reject in any time, this means that the information could be contaminated and the inspector must educate the customer on a double basis. Something else, the examiner produces a check log and furnishes the client with the log toward the finish of every age. Since the reviewer can check the information trustworthiness without the client's interest, the client can appoint the inspector to play out the confirmation with any period varying. At the end of the day, from the client's viewpoint, if the re-appropriated information is ruined, the longest deferral inside which she/he needs to discover the information defilement ought to be the check time frame. We stress that the recurrence at which the inspector checks the information trustworthiness would not be extremely high by and by, because of the accompanying reasons. To start with, the reviewer serves various clients all the while. On the off chance that clients require the evaluator to perform the information trustworthiness check with a high recurrence, e.g., playing out the confirmation consistently, the reviewer would bear a substantial correspondence and calculation trouble. Moreover, the higher recurrence to play out the information uprightness confirmation, the more expenses to utilize the reviewer. In an ordinary way, customers will not need the inspector to conduct a reliability check for information in current circumstances. Secondly, a trustworthiness review of information with high recurrence will also cause the cloud worker to have serious problems with confirmation. According to [37], if security instruments can be incorporated into established cloud frames and the costs are impressive for cloud experts, large parts of the suppliers may not recognize the danger that their Service Level Agreements (SLAs) can have comparable security to ensure access to the management.

B. The vulnerability against procrastinatory auditors of verification schemes

In the greater part of prevailing community check plans [16], [14], [30], reviewers are thought to be straightforward and dependable. This implies that the reviewer would sincerely tail the recommended plots, and plays out the check reliably to, these plans can't avoid malevolent reviewers. The most insignificant assault a noxious reviewer can perform is that it generally creates a decent uprightness report without checking the information honesty to evade the confirmation trouble. To defeat such assaults, the client can review the reviewer's conduct toward the finish of every age. Nonetheless, a more precarious

assault actually exists in the component: the evaluator conspires with the cloud worker, and consistently creates inclination testing messages to such an extent that solitary the information blocks which are very much kept up are checked, this abstains from uncovering the information defilement. To oppose this assault, the difficult messages ought not be foreordained by any member. Existing plans [20], [21], [22] use Bitcoin to produce the moving the communications to guarantee the irregularity of tested information blocks, where the inspector removes the hash estimation of the most recent square from the Bitcoin blockchain, and creates the difficult message as per the security boundary and the separated hash esteem. Since in the Bitcoin blockchain the hash estimation of a square produced at a future time is erratic, this guarantees that the reviewer can't create an inclination provoking message to misdirect the client, and empowers the client to proficiently review the evaluator's conduct. Notwithstanding, such instrument is helpless against a dawdling inspector. Expecting the concurred confirmation time frame is 1 day, and an age is multi month (i.e., 30 days), this implies that the reviewer checks the re-appropriated information respectability one time for every day, and the client reviews the examiner's practices one time for each month. In general, the examiner will consistently play confirmation and generate a control report such as clockwork. The test did not occur for a hesitant examiner on the first 29 days and would repeatedly search on the last day, where the challenging messages were sent in every check on the first 29 days. Some works [18], [35] and [36] are accepting that inspectors are clear yet inquisitive, but there is no contrast between the suspicions from the point of view of knowledge reliability validation, as the inspectors are not distracted from the endorsed plans. The 30th day could be recovered. In this capacity, the review report only reflects the latest (30th day) state of respect for redistributed material. This is not due to the particular goal of the public check: If the new information is contaminated, the owner of the information will find it within 1 day (i.e., one confirmation period). An obvious agreement against the delaying inspector is for the client to examine the practices of the inspector arbitrarily in time. In any case, before the client reviews the accuracy of examiner's practices, she/he needs to connect with the evaluator to acquire the information that records the reviewer's practices for the inspecting, this adequately offers ascend to fashion the information for the inspector and cloud worker. In that capacity, a tarrying reviewer can pass the client's evaluating by conspiring with the cloud worker. Another direct arrangement is to present a confided in specialist co-op who gives a period stepping administration [33]. After every confirmation, the inspector is needed to inquiry the time-stepping on the data, which is utilized to check the information respectability, and is utilized to be evaluated by the client to demonstrate the rightness of its conduct. This empowers the data to be time-

touchy, and along these lines can oppose the dawdling reviewer. By and by, the security of such instruments depend on the security and dependability of the time stamping specialist organization, and the supplier here turns into a solitary purpose of disappointment. Besides, the supplier needs to hold up under weighty correspondence and calculation trouble on account of different clients and evaluators. Thusly, how to oppose the delaying examiner without presenting any believed substance is a difficult issue.

C. In the incompetence of PKI-based public verification schemes

The vast majority of prevailing public check plans are based on the public key framework (PKI), wherever a completely confided in endorsement authority gives the members' testaments, and the reviewer needs to deal with clients' authentications to pick the right open keys for the confirmation. In any case, endorsement the board, which incorporates repudiation, stockpiling, dispersion, and check, is expensive and awkward by and by [18], [28]. Along these lines, eliminating the declaration the executives issue could be financial and great by and by.

6. LITERATURE SURVEY

Shen, W [1] In this paper, suggest an uprightness review plan focused on characteristics for safe distributed storage that maintains information providing sensitive data storage. Our plan allows others to share and use the records that are placed in the cloud, depending on the condition that the document's sensitive data is secure, and they also use the SSig marking as their character to make sure that their identification name is respectable and that their confirmation is correct. Accept ssk is the private key that creates SSig signature record tag and is maintained by the customer. Our proposal is all the more straightforward and basic under such an assumption. [4] intended to defend the proposal by using a homomorphic undeniable label for the examination of careful shared knowledge. In order to facilitate professional client repudiation,[2] the intermediary resignation suggested a general knowledge integrity strategy to audit the customer's rejection. With Shamir mystery sharing[8], a popular knowledge viability analysis plan has been developed to help customers renouncement. The previously mentioned plots all depend on Public Key Infrastructure (PKI), which causes the impressive overheads from the convoluted declaration the board. To disentangle authentication the executives, Wang et al. [4] proposed a character based distant information honesty examining plan in multicloud capacity. This plan utilized the client's character data, for example, client's name or email address to supplant the public key. Wang et al. [5] planned a novel personality based intermediary situated far off information respectability evaluating plan by acquainting an intermediary with measure information for clients. Yu et al.

[6] built a far off information trustworthiness evaluating plan with amazing information protection safeguarding in personality based cryptosystems. Wang et al. [7] proposed a character based information uprightness reviewing plan fulfilling unrestricted secrecy and impetus. Zhang et al. [8] proposed a character based distant information uprightness examining plan for shared information supporting genuine proficient client renouncement. Different perspectives, for example, protection safeguarding authenticators [9] and information deduplication [10] in far off information uprightness examining have additionally been investigated. Notwithstanding, all of existing far off information respectability examining plans can't uphold information imparting to delicate data covering up. In this paper, we investigate how to accomplish information imparting to touchy data stowing away in character based respectability examining for secure cloud storage [12] proposed Another remote information verification plan that supports complete information elements with Merkle Hash Tree. In order to alleviate harm caused by key customer presentation, Yu et al. [13–15] suggested strong remote information respectability review plans based on the key update protocol. [16]. In distributed storage situations, knowledge sharing is an essential application. Wang et al.[17] planned a strategy for protecting the safety of customers by changing the ring mark for secure distributed storage to protect the shares of knowledge. Yang et al. [18] have developed a professional data sharing confidence evaluation strategy to underpin the defense of character and to achieve the users' personality recognition. For distributed computing, Wang et al.[1] have proposed a record-scale system-based ABE conspire. Progressive documents using a coordinated admission structure are encrypted in this scheme. The traits are divided between the ciphertext bits. It does not, however, offer truthful details. It also depends on a single TA that may be deceptive. EntaoLuo et al [2] suggested a radical multi-authority and CB-ABE-based complementary divulgation. It uses character property subsets to keep a strategic distance from single point deception and overhead performance. This job, however, does not provide confidence in facts. CP-ABE conspired by Tran Viet Xuan Phuong et al [1]. The entrance strategy is characterized by an AND-door with trump cards. The strategy of entry is secured by means of a covert chip text. The main problem of escrow is not resolved, however. YindongChen et al[3] the developer tests the MAC conspires to be upright. In this condition, there is no outsider. Their work is resistant to attacks and assaults from people from the center. There is no repetitive information in their work.

Wang et al [4] The developer proposes a plan to provide safe cloud-based biological framework ensuring information security and safety from customer verification to the disclosure of cloud-based information. The results used in their work are RSA and AES for encryption and

scrambling of information, SHA512 and hash bcrpyting capacities and HMAC for key administration. Their work offers the benefit of both symmetric and lopsided encryption to the hybrid cryptographic system (HCS). The developer uses the ChainFS system that secures the cloud capacity using blockchain, QiwuZou, Yuzhe et al.[5]. On Ethereum and S3Fs ChainFS is executed with customers based in Fuse, and storage that is additionally distributed through Amazon S3 is also evaluated in the ChainFS system and also demonstrated with a low overhead. ChainFS requires a client, a worker who has a cloud supervision and blockchain facilitation. Customers from Breaker work together on two planes with remote meetings. After verifying the use of the Merkle verification peruse activity is transmitted, and new root hash is used instead of the nearby state generated before it is sent. The intermediate web server loop between the FUSE-blockchain is terminated in ChainFS, where the breaker customer requests the CURL of a web server. In the execution of a hash job here, SHA256 calculation is used. After record creation and the execution of the document read, Framework performance is tested.

J. Yu et al[8] introduced a strong revision for stable distributed storage in 2017, with a proposal for strong key implementation. The strategy uses a competent key updating process and the key presentation does not affect the safety of the exam in other timeframes in a single time period. The TPA creates an update message each time it sends it to the customer, particularly in a specific way. By using the private key and upgrades post, the customer refreshes the mystery key. If the key is not uncovered, the harmful cloud cannot get the markup mystery key. Moreover, at first the details re-appropriated should not be fixed. Whatever the case, the proposal does not maintain community evaluation or information elements that have more space for further review. Zhang et al. [16] proposed a public confirmation conspire for the distributed storage utilizing indistinctness obscurity. Vagary confusion is uses to ensure protection and reduce the evaluator hand, which is the point of the strategy, overhead postponement and measurement. The evaluator does not have a strong calculation capability to verify the correctness of information and is only enough to enter a MAC tag. The cloud is designated for most calculations. The plan is expanded to support cluster monitor and complex knowledge tasks that use the technique of the Merkle hash tree. The assessor can handle different orders from various customers simultaneously and customers can refresh their redistributed details. While the overhead calculation is directly with the size of the information index tested, the overall calculation is not the size of the information index in the plan. On the other hand, the muddled software is not generated by clients and the jumbled Program is not carried out by cloud staff. The proposal cannot stop malicious auditors, in addition. Holy Mother Aldossary et al.

According to the creators, the correctness of the information, but also of the opposition, should be tested. Computational confidence refers only to licensed applications, so that the information can be accessed and used for calculation. Any irregularities arising from normal registration should be avoided. A effective Identity and Access Management (IAM) will keep the classification and respectability of the project strategically remote. Accessibility losses can occur by loss of information and unavailability. Distributed computing uses hardly any approach such as simplicity and high design usability. Different policies and methods are adopted to enhance the protection of information classified by three CIA levels in different stages of the cycle of information. Encrypt information if the information is very still and if the information is still on the way. Apart from the Advanced Encryption Standard (AES) and Rivest Shamir Adleman (RSA) strong encryption computation. Various types of methods of encryption. In general, encryption techniques provide confidentiality against attacks by a cloud provider, but information cannot be secured against design errors and programming bugs. Inadvertent and purposeful changes in information can be discovered using hash techniques. In any event, they burn more power and tedious data transfer. External audits can be used to verify the correctness of details.

Liu, H et al [19] They suggested the mapping of convention and characteristic admittance control instrument, which are based on mutual authority security. This construction is based on the bilinear matching technique and on the concept of number hypotheses, which is responsible for the high computational costs. The classification of information can also be achieved through an open key system in which each customer wills his character, a public coding key and a private coding key. Due to the bilinear mixing strategy and the complexity of every customer's endorsement which results in high computing costs. [10] Debnath et al. The goal is to represent each cloud administration exchanging the data inside the cloud that can lead to privacy disclosure issues. The issue of confidentiality is mainly opened or spread through cloud administrations for a customer or a business. The center planned a number of secret security plans using blockchain

7. CONCLUSION

There are various areas discussed in this article. Presentation, the highlights and circumstances in distributed computing. Writing audits as basis function in distributed computing, problems with cloud, traditional security plans The imaginative novel ultimately suggested responses to these questions. This study shows that no legitimate arrangement is available covering all cloud layers. Many of the existing creators concentrated on the protection of their cloud management clients and not the security of suppliers. All problems in the cloud layers would appear in a single

arrangement in this proposition. Privacy, integrity and authentication of data were the key factors in determining the efficient use of our hybrid blockchain algorithm used in the infrastructure. Users can access their private keys as one of the key system deliverables and user data is well formed, transparent and authenticated to protect against threat to a data center. In addition, encrypted data is held away from the hands of cloud vendors or attackers, and data confidentiality is maintained when verification has been carried out by cloud auditors on a decentralized network. In protecting privacy within the cloud and in balance the requirements of the customer and the service provider, the proposed architectures plays an important role. It show the use of decentralization in comparison with previous research in effects to efficiency. The framework therefore underlines the emerging activities within the cloud infrastructure layer and paves the way for a standard scale of privacy for consumers and companies in order to create a higher degree of trust with third parties in order to ensure long-term storage data reliability.

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Deep Learning for Automatic Stress Recognition in Real-Life Situations

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Abstract:

Stress recognition is important for facial acknowledgment which is acquiring prevalence and the requirement for it increments massively. Even though there are strategies to perceive feeling utilizing AI procedures. The Deep Learning Methods to perceive pressure to group the feeling as indicated by outward appearances. Stress Recognition manages the investigation of deriving feelings, strategies utilized for gathering. Stress Emotion can be perceived from outward appearances, discourse signals, and so on Applying the Convolution Neural Network [1] calculation and Hidden Markov Model calculation, the model consequently perceive the individual if the person in question in pressure. This Model first catches the outward appearance, then sends picture to the Convolution neural network first, perceives the facial highlights, and afterward the model acknowledgment whether the individual in pressure or neural dependent on facial highlights.

Keywords:

Face features, Classifier, Selection, Suitable Crop

1. INTRODUCTION

Artificial intelligence has had increasing involvement in any scope of human life. The technologies are adapted to the needs of the human being and artificial intelligence is what makes this adaptation between technology and humans possible.

These techniques are used in algorithms for the recognition of human emotions. When humans try to communicate with other people a very high percentage is represented by non-verbal communication. Many studies show that facial expressions have a connection with human emotions. The ability of human beings to detect and identify these emotions makes it possible for us to understand each other. The main objective of this part of artificial intelligence is to use learning techniques in order to get the machine capable of identifying these emotions.

Robots do not feel any emotion, they do not have empathy with humans, they cannot recognize the emotions that a person is feeling compared to their own, as humans do. The information available is large matrices that represent the images captured and other additional information they might have like sensors or microphones. It is from that point where need to begin working. For this reason, the recognition of emotions by computer is so complicated.

To achieve this, basically discover what emotions the human being really feels, what technology is the most appropriate to capture them, and which models and algorithms are the most effective. It is for all these variables that this problem has not yet been sufficiently solved. In this

thesis, estimate some machine learning and deep learning models including Support Vector Machine (SVM) [2], Multilayer Perceptron (MLP), and Convolutional Neural Networks (CNNs) [1].

The evaluation focuses on the task of emotion recognition through facial expression has been used by the algorithm Convolutional Neural Networks (CNNs) and Speech recognition using Hidden Markov Model (HMM).

2. LITERATURE SURVEY

As humans, with age, individually learn to react to situations with empathy, personally learn new emotions and behavior skills but machines are not capable of doing things on their own so, let us to train the machines to capable of recognizing by using machine learning or deep learning. In present days, machines are capable of accomplishing many tasks that humans can do. In fact, machines perform more complex tasks than humans but recognizing mien and facial expressions is challenging. The first paper is the detecting emotional stress from facial expressions for driving safety in this paper they developed a real-time non-intrusive monitoring system, which detects the emotional conditions of the driver by dissecting outward appearances. In this project, the index terms are emotion, stress, detection, facial expressions technique used Support Vector Machine, Supervised descent method (SDM) and future scope is important to explore further the definition and subject ward qualities of passionate pressure. The example of worldly elements of outward appearances and activities can likewise be coordinated into the model preparing. Different prompts,

for example, head movement and acoustic signs could likewise be incorporated to accomplish better execution [3]. The other paper is about Facial Expression Recognition Method Using Convolutional Neural Networks Based on Edge Computing in this paper they found the imbalanced number and the high likeness of tests in the appearance information base can prompt overfitting in facial acknowledgment neural organizations. To defeat the deficiency that the roundabout agreement ill-disposed organization model must be planned coordinated, then build a compelled roundabout agreement generative antagonistic organization by adding a class limitation data. Technique used edge computing, deep convolutional neural networks, Generative adversarial networks (GAN) and future scope is to upgrade the information without restricting the articulation condition of the info picture is likewise a bearing that can be improved [4]. Picture Based Stress Recognition Using a Model-Based Dynamic Face Tracking System this paper presents a technique to identify pressure from dynamic facial picture successions. The picture groupings comprise of individuals exposed to different mental tests that instigate high and low-stress Hidden Markov Models (HMMs) are a compelling instrument to display the fleeting reliance of the facial developments technique used Hidden Markov Models (HMMs) and future scope is they have introduced a DDDAS for the acknowledgment of stress from outward appearances. Our strategy depends on the utilization of deformable models and HMMs that can manage the powerfully changing information and fluctuations in the outflow of stress among individuals [5]. Next paper is based on FER is one of the applications in the human-PC communication. In this model, they train the facial expression recognition (FER) by using the deep network as a CNN algorithm. Technique used CNN, Facial Expression Recognition (FER) and future scope is required to apply the proposed network alongside the preparation procedures to different areas with little datasets [6].

3. METHODOLOGY

In this paper the proposed model was to initially give images as input to image preprocessing. In that haar feature based cascade.xml is to extract facial feature and those facial feature [7] was to send model.h5 in that model the facial features was predicted as neutral or stress and that predicted value was send as output shown in figure -1.

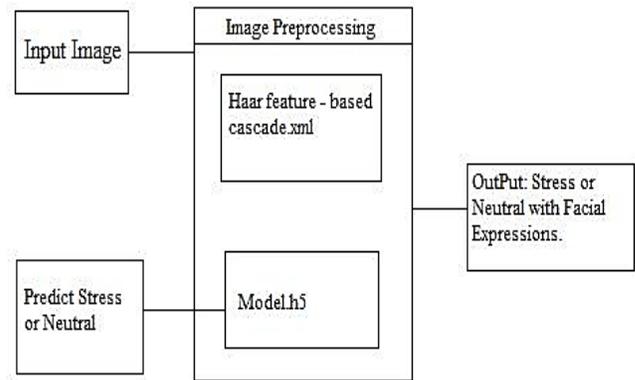


Figure – 1: Block Diagram of Proposed Model

3.1 Data base:

In this paper used database is FER2013 [8] consists of 48*48 pixels sized face images. In this database, it contains 7 types of images labelled as:

4593 Angry images, 547 Stress images, 5121 Fear images, 8989 Happy images, 6077 Sad images, 4002 Surprise images, 6198 Neutral images are there in this Model, in that only two types of emotions are used in this paper those are stress and Neutral emotions. The trained dataset consists of two columns emotion and pixels. The emotion column consists of 0 and 1, 0 is represented as stress and 1 is represented as Neutral.

3.2 Preprocessing:

Image pre-processing is a crucial process in any image analyzing system [9]. Without proper pre-processing, the recognition will be ineffective or may give improper results in later stages. Here to improve the quality will be processed further. Various processes that in this model going to apply converting an RGB image to Grayscale image, etc.

The convolution activity is utilized with certain channels for identifying edges. Assume you have a grayscale picture with measurements 6 x 6 and a channel of measurements 3 x 3(say). At the point when 6 x 6 greyscale pictures convolve with 3 x 3 channel, then result is 4 x 4 pictures. Most importantly 3x3 channel network gets duplicated with the initial 3 x 3 size of our greyscale picture, at that point move one segment straight up to the end, after that, move one column, etc.

3.3 CNN classifier:

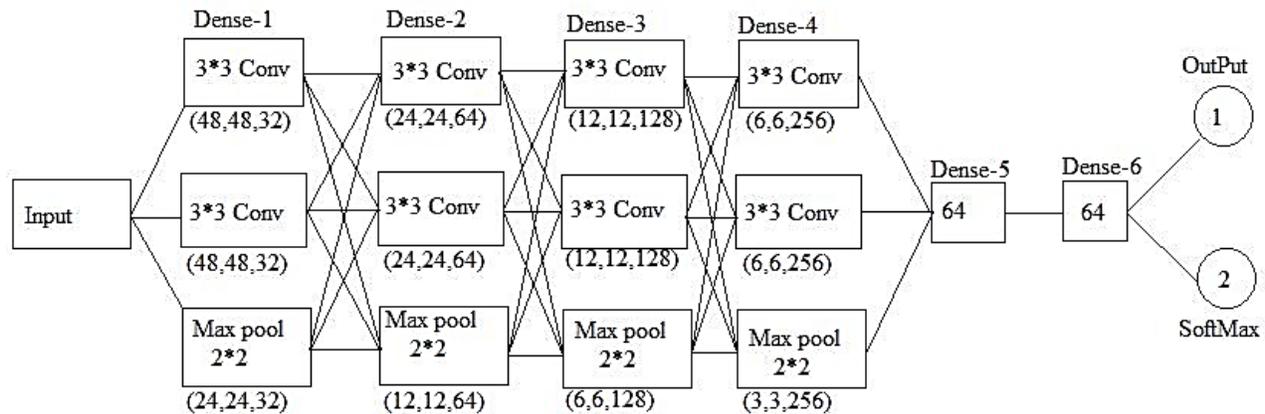


Figure – 2: Flow Chat of the Model

In this model, create an application that takes the face of the person of the image as an input and for the format module, as input, then detect whether he or she in stress or neutral. This paper for recognition of the input images the algorithm used is CNN.

CNN is a neural network algorithm. The Convolution neural network extricates the highlights of the picture and diminishes the measurement without losing its highlights. Convolutional Layer is the principal layer in a CNN. The algorithm takes the input image as a matrix form of height*width*depth. Kernel mean matrix which has smaller the size of an Image it is named as convolution matrix. The kernel matrix also in a format of height*width*depth for each kernel have respect bias which is of a scalar quantity. The dot product of the convolution matrix (kernel) and the input image give the convolved feature. From the above image fig-1 the convolution activity is utilized with certain channels for identifying edges. Assume you have a grayscale picture with measurements 6 x 6 and a channel of measurements 3 x 3(say). At the point when 6 x 6 greyscale pictures convolve with 3 x 3 channel, then result is 4 x 4 pictures. Most importantly 3x3 channel network gets duplicated with the initial 3 x 3 size of our greyscale picture, at that point move one segment straight up to the end, after that, move one column, etc.

MaxPool layer is utilized to diminish the size of the convolved pictures. When apply a fully connected layer without applying the Max pool layer between two convolutional layers then the values are computationally expensive so apply fully connected after applying max-pooling of two convolution layers.

ReLU is an actuation function that is in a non-straight structure that has picked up prominence in the profound learning area. The principle favorable position of the ReLU actuation work is it doesn't enact all the neurons simultaneously. This sort of actuation work is direct in the positive measurement, however zero in the negative

measurement. Subsequently, this initiation work returns 0 at whatever point it gets negative info, yet in the event that any sure information x it restores that esteem. So numerical spoke to as $f(x) = \max(0, x)$.

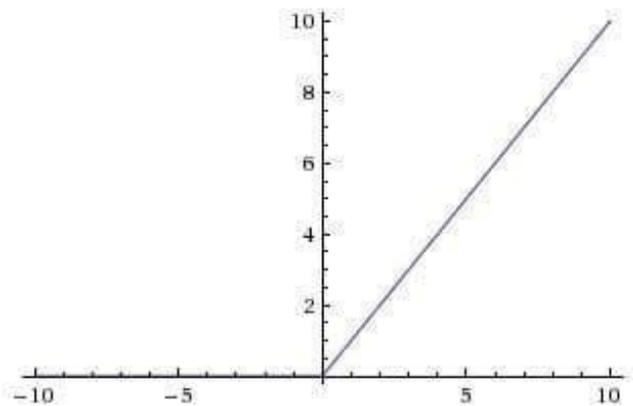


Figure – 3: RELU activation function graph

The completely associated layer is the feed-forward layer in the Convolution neural network these layers are in the last couple of layers in the network the yield of the maximum pool layer is the contribution of the completely associated layer. The utilization of a completely associated layer is to order the picture into a mark.

The softmax is the enactment work which is as calculated relapse that standardizes an information esteem into a vector of significant worth that follows a likelihood circulation whose absolute summarizes to In this paper softmax function is to yield the layer for the CNN calculation in light of the fact that for the most part, softmax created values are between the scope of 0,1 can be away from double arrangement and added the same number of classes in our neural organization model. The softmax work is utilized to process misfortune that can be normal when preparing a dataset. In the event that one of the information sources is little, the softmax transforms it into a little

likelihood, and in the event that the information is huge, at that point it transforms it into an enormous likelihood, yet it will consistently stay somewhere in the range of 0 and 1. That's why it is also known as multinomial logistic regression. The mathematical represented as:

$$\sigma(\vec{z})_i = \frac{e^{z_i}}{\sum_{j=1}^K e^{z_j}}$$

Where

σ = SoftMax

\mathbf{Z} = Input Vector

K = No. of multi class classifier

e^{z_i} = Exponential function of input vector e^{z_j} = Exponential function of output vector

4. EXPERIMENTAL RESULT:

4.1 Recognition Model:

Model is saved as Model.h5 so this Model.h5 is used as a classifier. The input image is trained with this model and predict the output. At the recognition stage, in this paper use Haar feature-based cascade classifier XML by using this XML then extract the facial features in the image. Haar feature-based cascade classifier XML depends on AI where course work is prepared from a lot of pictures where Model.h5 is a deep learning model because in this model uses CNN algorithm as classification algorithm.

4.2 Analyze Model:

In this model the input image is train with the model.h5 it predict the output the output is show by the xml file the facial features. Finally, conclude with the result by generating the Stress or Neutral and display the facial features which extracted.

Precision means exactness is the proportion between the True Positives and all the Positives. Accuracy additionally gives us a proportion of the significant information point shown in table-1.

Recall means the review is the proportion of our model accurately recognizing True Positives. Review likewise gives a proportion of how precisely our model can recognize the applicable information shown in table-1.

F1-score is the Symphonious mean of the Exactness and Review. This is simpler to work with since now, rather than adjusting exactness and review, simply focus on a decent F1-score and that would be demonstrative of a decent Accuracy and a decent Review incentive too shown in table-1.

Support means scores relating to each class will disclose to you the precision of the classifier in grouping the information focuses on that specific class contrasted with any remaining classes. The help is the number of tests of the genuine reaction that lie in that class shown in table-1.

	precision	recall	f1-score	support
Stress	0.72	0.65	0.68	1018
neutral	0.73	0.79	0.76	1216
micro avg	0.73	0.73	0.73	2234
macro avg	0.73	0.72	0.72	2234
weighted avg	0.73	0.73	0.72	2234
samples avg	0.73	0.73	0.73	2234

Table - 1) Accuracy of output quality

The training information well, however it can't sum up and make precise forecasts for information it hasn't seen previously. while the validation set is simply used to assess the model's presentation. The validation set that let you get a proportion of the nature of the model show in figure-4.

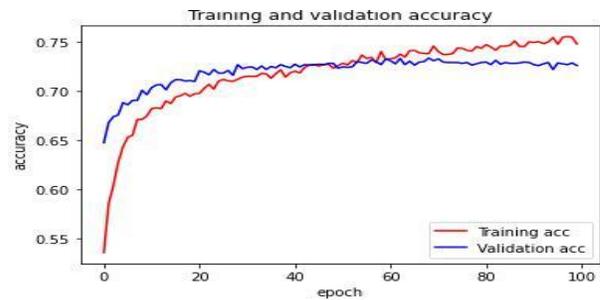


Figure-4) Difference between the Training and Validation accuracy

Training misfortune is the blunder on the training set of information. Validation misfortune is the mistake in the wake of running the validation set of information through the prepared organization. Train/substantial is the proportion between the two. Startlingly, as the ages increment, both validation and training mistakes drop. Validation misfortune is similar measurement as training misfortune, yet it isn't utilized to refresh the loads show in figure-5.

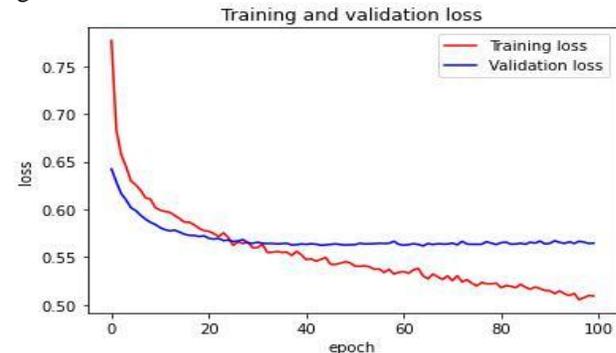


Figure-5) Difference between the Training and Validation Loss.

A Confusion matrix is a N x N matrix utilized for assessing the exhibition of a characterization model, where N is the number of target classes. The matrix contrasts the real objective qualities and those anticipated by the machine

learning model. The columns speak to the anticipated estimations of the objective variable shown in Figure-6.

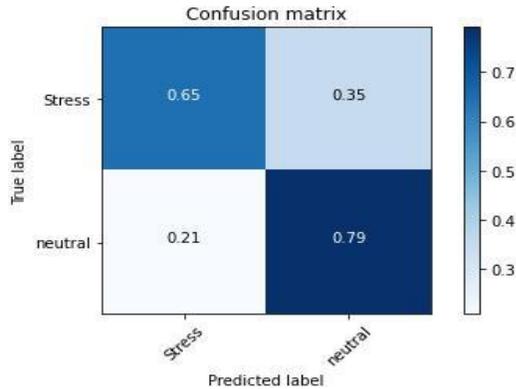


Figure-6) Confusion Matrix

```
Epoch 100/100
182/182 [=====]
45/45 [=====] -
[INFO] accuracy: 72.61%
[INFO] Loss: 0.5647209286689758
Time: 0:01:34.466356
```

Figure-7) Accuracy and Loss



Figure-8) Predicted Outputs

5. CONCLUSION AND FEATURE SCOPE:

Stress recognition is actualized utilizing various calculations and procedures. Each technique has its preferences and drawbacks. Our proposed model at first does the pre-processing in that step it converts every image into a grayscale image. After the extraction of facial expression by using Haar feature-based cascade classifier. XML in this paper used CNN algorithm model. Training our system with the help model automatically recognition

whether the face is stressful or neural efficient to recognize the class correctly.

New findings are up to now FER2013 database was not used for stress recognition so in this paper FER2013 used for stress. The accuracy given by this database was 72.61 percentage. Although let us see that so many algorithms have been implemented in various previous projects, in order to make a robust system for automatic Stress recognition, there are still many loop holes left in the model. Allows us to increase the accuracy by adding more epochs and by adding more input images in the database.

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Computer Pointer Controller Using Gaze Estimation

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Abstract:

Computer pointer Controller regulates the application centers around changing the situation of the mouse pointer from the course of the eyes to the head present. It can take a video record or webcam as information and afterward perform appropriately. It utilizes a blend of various models to give us an ideal output. In this undertaking, you will utilize a Gaze Detection Model to control your PC's mouse pointer. You will utilize the Gaze assessment model to appraise the look of the client and change the mouse pointer position in like manner. This task will exhibit your capacity to run various models in a solitary machine and organize the progression of information between those models. The motivation behind mouse cursor developments and snap location depends on skin discovery strategies. It is savvy continuous working framework.

Keywords:

face detection, Eye-Gaze, Edge-AI, Head-Pose-Estimation, Facial Landmarks Detection Model

1. INTRODUCTION

Computer pointer Controller used a look discovery model to control its PC's mouse pointer. By utilizing the look estimation model to appraise the look of the client's eyes and change the mouse pointer position in like manner. The capacity to run various models in similar machine and facilitate the progression of information between those models. This application accepts video as information and afterward the application gauges eye-course and head-pose and dependent on this gauge it moves mouse pointers. In registering, a pointer or mouse cursor (as a feature of a PC WIMP-style discussion) is an image or graphical picture on a PC screen or other showcase gadget that focuses to the developments of the pointing gadget Echoes. Is, normally a mouse, touch pad, or pointer pen. This demonstrates where the client's activities occur. It can be utilized to choose and move different components in a content based or graphical UI. It is not the alike as the pointer, which responds to console input. The cursor can likewise be changed utilizing a pointer. A pointer is utilized when the info technique, or pointing gadget, is a gadget that can move liquid on the screen and select or feature objects on the screen. In GUIs where the info technique depends on hard keys, for example, the five-route key on numerous cell phones, no pointer is utilized, and rather the GUI depends on unequivocal center state. This paper depicts a wearable remote mouse-cursor regulator that tracks the level of tilt of the client's head to move the mouse relative distance and consequently tilt degree. Crude information can be prepared locally to a wearable gadget before the mouse-development report is sent remotely over the Bluetooth Low Energy

(BLE) convention to the host PC; But for looking through calculations, crude information can likewise be handled on the host. The utilization of a standard human-interface gadget (HID) profile empowers attachment and play of proposed mouse gadgets on current PCs without the requirement for independent establishments. It very well may be utilized in two unique modes to move the cursor, joystick mode and direct planned mode. Exploratory outcomes recommend that this head-controlled mouse is natural and is viable in taking care of mouse cursors with fine control of the cursor by unaffected clients.

2. LITERATURE REVIEW

Commonly, eye following estimates the situation of the eyeball and The speed of an individual decides the course and speed Eye following should be possible utilizing different techniques. The fundamental objective of motion acknowledgment research is to assemble a framework that can distinguish explicit humans. Use hand motions and control them for data or gadget control just as applications. Hand Gesture Recreation System is a part of human PC cooperation with human hand signals Recognized by PC framework and afterward do pre-decided undertakings as per application for control Software just as hardware. Many scientists in the field of mechanical technology and human PC communication have attempted to control the mouse Movement utilizing video gadgets. In any case, different strategies were utilized to make the clicking occasion. A demeanor, Finger tip following was utilized to control mouse development, by Erdem et al. The significance of PCs has expanded by and large nowadays. At that time it tends to be used normally. Any reason or place of work..

There is additionally an interest for increasingly more application based gadgets where the most recent are a model can be a brilliant phone. The developments of the eye can be followed utilizing various advances.

This framework relies on the position of the client's head to control the mouse cursor position. The sporadic development of client's head would influence the precision of snap work. The entirety of the eye following control frameworks referenced above were proposed with self-planned equipment and programming. Oneself impelled horticultural machine is an extraordinary mechanized or followed machine with in any event two axels proposed for farming. Mostly, we have prefer self-planned equipment and programming Because we easy managed the tools and concept of learning. we have instructed to our PC by writing some command then executed after this open our PC camera. After all these process we can check demo test of our project. This project run on different hardware for testing which is successfully run. This project run with the help of CMD prompt. In CMD prompt we can write some command , then run the project.

3. PROBLEM FORMULATION

What sort of PC mouse cursor issues have you experienced? The PC mouse pointer can't run completely? PC mouse cursor is clearly more slow than previously? Can not the PC mouse pointer additionally be introduced on the PC screen? Or then again really require to change the PC mouse pointer look? sort out the potential causes behind and take useful answers for fix them all with ease. Here are some basic PC mouse issues and arrangements.

Problem1: The PC mouse cursor reactions truly moderate

- 1) Close all superfluous destinations, projects, records and foundation measures
- 2) To Change mouse speed with Windows mouse properties. Essentially open the PC Control Panel interface to pick Mouse alternatives and afterward, click the "Pointer Options" tab to unreservedly change the pointer speed there.
- 3). Update PC drivers.

The obsolete PC mouse drivers additionally can bring individuals moderate reaction issue. Accordingly, quickly find and update the PC mouse drivers additionally can helps a great deal.

Problem2: The PC mouse pointers doesn't move

- Step1: Go check whether it is brought about by dead or flawed mouse associations.
- Step2. When you are using a remote mouse, check the mouse battery.
- Step3. Check the mouse cushion thoroughly.
- Step4. Check if your mouse is bolted.

The PC mouse cursor can likewise out of nowhere quit working when you coincidentally click the mouse lock

button which is regularly found simply over the mouse. Discover it and open your mouse.

Problem3: Don't realize how to change PC mouse cursor look?

- 1). Replace the mouse cursor with the Windows mouse settings.

Follow these tools to physically set:

Step1: To Open the "Control Panel" show like this: Start => Settings => Control Panel.

Step2. Search for "mouse" from other recorded symbols

Step3. Snap the "pointer" tab to open its ideal form and press "OK".

Change the mouse pointer by changing the programming of the mouse cursor In any case, on the off chance that you are as yet not happy with the recorded Windows mouse pointer, you can likewise download some mouse cursor substitution programming to help you.

Problem4: Discover no mouse pointer on the PC screen

You can't in some cases discover a mouse pointer on a PC screen? Never frenzy Such mouse cursor issues additionally happen for reasons. We may simply run this project with the use of these tools. Their are Ordinary Steps to Fix Computer Mouse Cursor Problems:-

Step1. Check the mouse associations and the PC USB ports.

If there should arise an occurrence of dead or broken association issues, the primary thing you are frequently proposed is to check the mouse association altogether.

Step2. Check the mouse settings.

As you read over, the "mouse" choice in the "Control Panel" can help you change numerous settings identified with your PC cursor. Change to mouse checking can assist with conquering numerous basic issues, for example, slow/quick mouse cursor reaction. when mouse cursor quick movement then its faces some issue. But, mouse cursor slow its run smooth.

Step3. Check the recently added program.

Some recently added programming can likewise influence the utilization of your mouse cursor and cause issues, particularly some infection tainted programming. You can all the more likely output the downloaded programming prior to introducing it with antivirus programming and furthermore uninstall it every now and then when it really brings you issues. Artificial intelligence is Play important role of our research.

4. REQUIRED TOOLS

1. Intel® Distribution of OpenVINO™ toolkit.
2. OpenCV-mainly aimed at real-time computer vision.
3. Language- Python.
4. Numpy
5. face detection model.

- 6. Gaze estimation model.
- 7. Facial Landmarks Detection Model.
- 8. Head Pose Estimation Model.

Project Set Up and Installation Setup

Prerequisites

We require to install openvino successfully. follow this process for installing openvino.

STEP 1

Clone the repository:-

```
https://github.com/gyanprakash7/computer-pointer-controller
```

STEP2

Initialize the openVINO environment:- source /opt/intel/openvino/bin/setupvars.sh -pyver 3.5/3.6/3.7

STEP3

We have been downloaded the following models by using openVINO model downloader:-

1. Face Detection Model

```
python "C:\Program Files (x86)\IntelSWTools\openvino\deployment_tools\tools\model_downloader\downloader.py --name "face-detection-adas-binary-0001"
```

2. Facial Landmarks Detection Model

```
python "C:\Program Files (x86)\IntelSWTools\openvino\deployment_tools\tools\model_downloader\downloader.py --name "landmarks-regression-retail-0009"
```

3. Head Pose Estimation Model

```
python "C:\Program Files (x86)\IntelSWTools\openvino\deployment_tools\tools\model_downloader\downloader.py --name "head-pose-estimation-adas-0001"
```

4. Gaze Estimation Model

```
python "C:\Program Files (x86)\IntelSWTools\openvino\deployment_tools\tools\model_downloader\downloader.py --name "gaze-estimation-adas-000"
```

After this set up, we can ready to demo our project on personal computer.

5. RESULTS

We have run the model in 5 different hardware. These are given below:-

- 1. Intel Core i5-6500TE CPU
- 2. Intel Core i3-6006U CPU
- 3. Intel Core i3-9100F CPU

4. Intel Xeon E3-1268L v5 CPU

5. Intel Atom x7-E3950 UP2 GPU

It is programmable per prerequisites not at all like different equipment types.

It has additionally longer life expectancy.

Likewise thought about their exhibitions by derivation time, outline every second and model stacking time.

As we can see from above chart that FPGA set aside more effort for derivation than other gadget since it programs each entryway of fpga for viable for this application. It can require some investment however there are focal points of FPGA, for example,

It is strong importance it is programmable per prerequisites not at all like different fittings.

It has additionally longer life expectancy.

GPU processed more edges every second contrasted with some other equipment and uniquely when model accuracy is FP16 in light of the fact that GPU has several Execution units and their guidance sets are streamlined for 16bit gliding point information types.

We have run models with various exactness, yet accuracy influences the precision. Model size can diminish by lowering the exactness from FP32 to FP16 or INT8 and surmising turns out to be quicker but since of lowering the accuracy model can lose a portion of the significant data in view of that precision of model can diminish.

So when we apply lower precision model then we may acquire lower exactness than higher exactness model.

6. FEASIBILITY ANALYSIS

Human PC collaboration has improved with propels in eye-following innovation. Controlling the PC with no sort of actual cooperation is included. Actualizing a pointer that just requires eye developments of the client confronting the PC screen. The GPU appraises a larger number of edges every second than some other equipment, and particularly when the model is precise FP16 on the grounds that GPUs have critical execution units and their guidance sets are improved for 16bit skimming point information types. We have run models with various exactness, however precision influences exactness. Model size can be decreased by diminishing the exactness from FP32 to FP16 or INT8 and quickening assessment however some significant data might be lost as the exactness model is low in light of the fact that the exactness of the model might be reduced. So when you utilize a low accuracy model you can accomplish a lower exactness than a high exactness model. Examination study regions are based on AI, IOT and using python.

7. COMPLETE WORK PLAN LAYOUT

Phase 1:-

If for no good reason the model can't recognize the face, it can't perceive the face and examines another packaging until it distinguishes the face or closes the customer window.

On the behalf of PC "mouse description" interface, you are likewise permitted to change different settings about your PC mouse, including whether the cursor shows up, the mouse wheel setting, the mouse button setting, and the comparing mouse pointer setting, etc.

The best model accuracy mix is that of Face discovery 32 pieces exactness with different models in 16 pieces. This diminish the model size and burden time, in spite of the fact that models with lower exactness gives low precision yet better surmising time.

As we can see from the above outcomes, models with lower exactness gives us better surmising time yet they free in precision. This occurs because lower exactness model uses less memory and they are less computationally exorbitant.

Phase 2:-

In case that more than one face is perceived in the edge, the model extracts the as of late identified face to control the mouse cursor.

It is vigorous significance it is programmable per necessities not at all like different durable goods.

It has likewise longer life expectancy.

In case that you have utilized Asynchronous Inference in your code, benchmark the outcomes and clarify its impacts on force and execution of your undertaking.

The application can run induction in the coordinated and offbeat modes. In the coordinated mode program execution can't proceed until induction demand is finished.

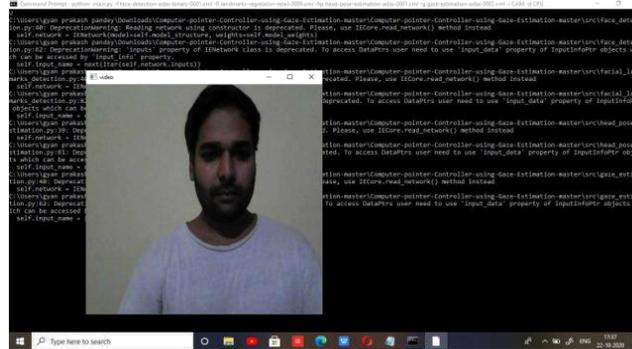
In the offbeat mode the program can proceed without hanging tight for derivation results as long the quantity of synchronous deduction demands doesn't surpass a specific breaking point.

We can get good outcomes by using cursor of PC, that can managed smoothly and easily run system.

8. PROJECT DEMO

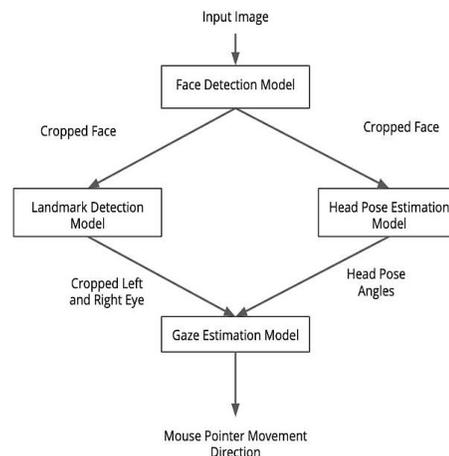
Source Code:-

```
C:\ProgramFiles
(x86)\IntelSWTools\openvino\binsetupvars.bat
cd <project-repo-path>/src
python main.py -f face-detection-adas-binary-0001.xml -fl
landmarks-regression-retail-0009.xml -hp head-pose-
estimation-adas-0001.xml -g gaze-estimation-adas-
0002.xml -i CAM -d CPU
```



9. CONCLUSION

The proposed framework is utilized to control the mouse cursor and execute its capacity utilizing ongoing Camera. We actualized mouse development, determination of symbols and its capacities like right, left, double tap And scroll. We can expect that in the event that the calculation can work in all The climate will, at that point make our framework work all the more effectively. This framework can be helpful in introductions and Reduce work space. Later on, we intend to add more highlights, for example, extending and contracting windows, closing down Window. Moving Mouse Pointer out of the greatest window width.



In this task exhibit the capacity to utilize human look to control PC mouse however there are a few constraints:

This venture possibly work better when just a single individual has been distinguished in the edge. In the genuine condition, if use webcam, we should manage distinguished different individual. To manage condition, we recommend to distinguish the fundamental individual exclusively by consolidate Spreaker or Speech acknowledgment to discover principle individual who play out the PC pointer control job.

A few circumstances induction may break, for example, when Facial Landmark discovery model returns void picture or the mouse move to the side of the casing.

To improve the application, it is proposed to check if there is another accessible face recognition model that could arrive at comparable execution, in light of the fact that now the greatest issue is the time taken for this model.

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A Survey: Benefits of Mango Leaves and Techniques Used For Evaluation of Diseases Affecting Mango Leaves

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Abstract:

Agriculture plays a vital role in day to day life for the living organisms in all over the world. There are many plants are identified as medicinal plants in India. This survey aims to give a clear picture of the benefits of mango leaves, how it can be considered to be herbal medicine or home remedy for various diseases. But in spite of its numerous benefits these leaves are subjected to various types of diseases that are caused due to fungal infections. Along with the fungal infection there are climatic factors that affect the growth of these leaves resulting in less production, growth and quality. The factors such as light, temperature, nutrients, rainfall directly or indirectly influence the growth of the tree. Hence the mango leaves has been survived with detailed explanation of techniques in order to detect the diseases based on the factors and techniques that addresses all the existing issues and help in predicting the diseases well in advance.

Keywords:

Fungal Infection, Machine Learning, Prediction

1. INTRODUCTION

Mango is the classic fruit available during summer which is liked by everyone irrespective of the age [25]. Along with the taste mangoes are considered to be very healthy which many of them are not aware. The fruit contains magnesium, copper and potassium also it's rich in Vitamin in A and C. May be some of them probably know this, but along with this healthy fruit there are much more benefits with its leaves. They act as an herbal medicine for a variety of diseases as it has immense mechanism in healing and curing infections in our body. Due to his medical value it has importance in eastern medicines too. Initially they look reddish, tender during younger stage of growth thereby keeps moving to dark green color under which the color seems to be pale. Their looks seem to be fresh and shiny always and it is rich in various amounts of proteins. [8] These leaves have high content of phenols and flavonoids due to which it has a high antioxidant nature. Due to these properties, the mango leaves are allowed to be boiled in water and made as a decoction which acts as a cure for certain diseases. In southern parts of Asia these leaves are powdered and taken, along with this in some parts they are cooked and taken as a part of normal food. There is some amazing cure done by these mango leaves. Along with the

proteins it has antimicrobial and oxidant properties which help to treat various infections.

In Tamil Nadu have a traditional approach of using mango leaves to be hung on home, in weddings to bring up health and wealth to newly wedded couple. When coming for pooja, in "Purna Kumba" mango leaves are used which resembles and symbolizes the blooming of life. Whether it's to consume the leaves or for decoration it serves its purpose at all places. The fruit having it daily helps in improving digestion, eyesight, makes our immunity stronger, makes our heart stable, able to treat anti-cancer effects. [18] The lists of benefits that are supported by mango leaves are listed below:

Blood Pressure - The leaves have antihypertensive properties which maintain the blood level at a stable rate. It is possible to make tea from the leaves which help to strengthen the blood vessels thereby lowers the blood pressure and helps in treating varicose veins.

Diabetes - Young and fresh tender mango leaves are rich in anthocyanins and tannis. This property helps in treating and managing diabetes. The leaves are taken, dried, powdered and used as infusion to maintain the same. The leaves are soaked in water at night, then morning it is taken in an empty stomach so that it controls the sugar level in blood. The other benefits including this are that they help in treating hyperglycemia, diabetic angiopathy and diabetic

retinopathy. This all happens because ethyl acetate and 3beta-taraxerol is present in the leaves which react with insulin present in the blood and glycogen is stimulated.

Oral Problems - Oral hygiene or loosen gums often leads to bad smell by breathing. Take matured leaves and put them in water and boil for some time until it becomes yellow color, then add salt and let it settle down for some time. Once after it is settled down rinse the mouth with this water. When it is done the germs present in gums are been removed and helps to control bad smell from mouth.

Restlessness - Adding the leaves to the bath tub while bathing helps to removes the restless feel in our body, anxiety and refreshes our body. It is good home remedy to relax ourselves.



Fig 1.1 Tender mango leaves

Kidney & Gall bladder Stones - The leaves are dried and powdered. This powder is mixed with water in a tumbler and kept full night. Next day morning intake of this water helps in flushing out the stones present by breaking them.

Dysentery - When a person is suffering from bleeding dysentery, then he/she can take up water mixed with powdered leaves. By taking this water two or three times per day help in stopping this problem. It is better to take a bunch of leaves dry them in shade and powder them together so that it can be used whenever it is needed.

Ear Aches - No one would be expected that these leaves can heal ear aches. [26] Juice extracted from the leaves, slightly heated and one or two drop inside the ear relieves all sorts of ear pains.

Skin Burns - Painful or sun burns can be healed by applying the ashes of mango leaves on the affected area. It heals the burn thereby makes the skin to look soft and shiny.

Respiratory Problems - These leaves are used to treat all sort of respiratory problems especially like cold, asthma and bronchitis. Mango leaves can be put inside water and allowed to boil until decoction is made. Honey added to this decoction helps in reducing the cough and ultimately recovers loss of voice.



Fig 1.2 Matured Mango leaves

Hiccups - Inhaling the smoke of mango leaves burnt, it helps to address the throat problems. People who are having throat issues and used for frequent hiccups can inhale this smoke which cures them in short span of time.

Stomach - Extracting juice from mango leaves and consuming it helps to eliminate radicals from body and act as protection for oxidative damage since it's rich in Vitamin C. Soaking the leaves in warm water, by closing the lid and allowing it full night. Next day morning this water can be consumed in an empty stomach. By doing this process regularly it helps to clear the stomach by flushing out all toxic from stomach and keeps it clean.

Plenty of leaves are available in and around us but most of them are still not aware of these medical benefits [24]. Having so many advantages, it's pathetic to know that they suffer from various fungal diseases. Hence values of mangoes available here is reduced due to so much use of pesticides, so researchers take this as challenge to identify the diseases early in advance so that pesticides can be controlled. Section II and III gives an overview of leaves with its factors and occurring diseases. In sections IV, various existing techniques are analyzed. Finally in section V, challenges to be addressed with respect to various diseases and techniques to identify these diseases well in advance.

2. DISEASE AFFECTING MANGO LEAVES:

Normally agriculture production reduces due to the diseases that affect the plants. When considering different types of diseases fungal diseases are most high which the leaves of the plants [18]. Irrespective of particular part it affects the stem, fruits, vegetables, fruits and all products. The factors considered to be the key for these diseases can be categorized into two: Disorder and Disease. Diseases are caused due to the factors such as bacteria, fungi or algae but disorders are caused due to factors such as deficiency of nutrient, moisture level in soil, rainfall, temperature etc. Many diseases are common in mango leaves. [24] These diseases are identified if the cultivation is done in smaller rate. In case of larger area of cultivation farmers are not able to identify the diseases and hence it affects the crop

and loss is at greater rate. To stop this effect farmer's use a large amount of pesticide which in turn makes causes threat for life. [26] Certain main fungal diseases are elaborated in detail:

Powdery Mildew Diseases – Oidium Mangiferae: This type of disease is caused by the fungi Oidium Mangiferae, a plant pathogen. The mango tree is set to be the host of this. This can be identified when the leaves are found to develop a white powdered growth on the leaves. It can be seen on inflorescence, leaves and in young growing fruit. Due to this disease flowers keep falling immediately, fresh young fruits present in tree for long time and drop before maturing. This affects the crop loss in a range of 20%-80%.

Anthraxnose/Blossom Blight - This disease is mainly caused by Glomerella Cingulata. In leaves, it is seen as brown or black irregular shape or oval spots on both upside and down and large form is formed near the leaf margins [3]. Leaves when affected very severe starts to curl. The young, tender and fresh leaves are more affected when compared to the matured, old leaves. This cause's heavy damage to crop loss as it takes around 10% - 90% of loss.

Alternaria Leaf Spot – Alternaria Alternata -On the surface of the leaves a small, circular brown color spots are identified. More than the upper sides of the leaf a large amount are founder at the bottom of the leaves. This is found over the leaf lamina and fresh leaves gets affected more when compared to old leaves.

Bacterial Canker – Xanthomonas mangiferae - This infection is caused by xanthomonas mangiferae. In apex, lesions are crowded which are seen to be water soaked irregular shapes. [18] In young fresh leaves they are more whereas at old leaves they are visible only in light. When this condition is sever the leaves turn into yellow color and fall from tree.

Die Back – Lasiodiplodia Theobromae - This type of diseases is seen throughout the year but found to be very severe during the month of October and November. They can be identified by symptoms such as; the leaves at upper end keep losing the color gradually, finally dry and fall from the trees. When drying is done at last extent the full leaf is rolled upward the leaf margin.



Fig 1.3 Powdery Mildew



Fig 1.4 Anthracnose



Fig 1.5 Alternaria Leaf



Fig 1.6 Bacterial Cankers

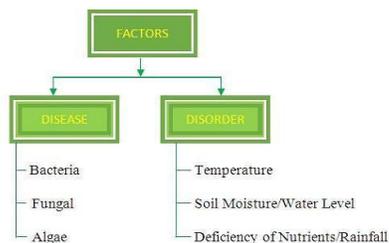


Fig 1.7 Die Back Spot

Fig 1.8 Factors affecting the crop

3. FACTOR INFLUENCING FUNGAL DISEASES

The key factors that cause these types of diseases can be broadly categorized into two ways. They are Disease and Disorder.



From the above diagram it is very clear that disease and disorder are two different regions which affect the overall growth of mango production. [3] Various means or sources that bring in diseases are due to bacteria's, fungal activity or algae production. Previous sections we briefly saw what are the different fungal attacks on trees and their outcome diseases in detail. In this section the remaining factors that cause the disorder are dealt in detail. Major four things considered here which will be influenced by the climatic factors are;

- Photosynthesis
- Vegetative Development

- Flowering and Fruit Set
- Growth and Quality

There are three main factors [27] that are considered to be main factors that have effect on Photosynthesis, they are temperature, CO₂ Concentration and Light.[11] When incase of CO₂ Concentration and high temperature there will be equal balance of process of photosynthesis process and respiratory losses.

Temperature - Fruit maturity and quality is the main two features that are influenced by this factor. When the temperature stands <12°C and >44°C the ovules of mango fruit gets aborted. The temperature decides the stability of entire tree, withstanding nature of leaves without withering. This varies from region to region and cannot be fixed to certain degree stating that in this temperature the mango trees, leaves and fruits are not affected.

Light -The major development of fruit and leaves lies in this factor. This is sole responsible for photosynthesis, which determines the carbohydrates to be accumulated. When there is enough amount of light there is increase amount of leaf which is directly proportional to cultivation of fruits. It is stated that enough amount not excess amount of light.

Rainfall - This factor influences the stability nature of the entire tree including its leaves and fruits. The leaves and fruits to be matured depend on this factor majorly. When the range of rainfall is from 75cm to range of 350cm the growing is said to be successful. But the rainfall should not be in time of blooming season and setting of fruit. In case of water logging the leaves start to spoil thereby directly affects the entire set of production. The weather is set to be dry atleast for a period of four moths during which flowering and harvest can be focused more.

Soil moisture is an added sub factor to be considered [8]. If the moisture level is 60% then there will be good quality of fruit produced along with retention of fruits and their yield. Due to the successful nature the leaves are guarded from any fungal infections.

Nutrients -Young growing trees need enough nutrients so that they can go rapidly thereby produce flowers and fruits. But incase of excess nutrients such as nitrogen, it affect the leaf: fruit ratio that makes the fruit color to be affected. When the ratio increases the severity of diseases increase and all parts of the tree are prone to be diseased.

If potassium is added to trees to balance this excess nitrogen then it will be able to manage the taste and color of the fruit. Incase if the same happened vice versa that is potash deficiency is present then it yields very poor quality of fruit. Similarly this is checked for calcium and phosphorous. Hence an imbalance of nutrients directly affects all the parts of the tree and makes it get affected by various fungal diseases easily [25].

4. ANALYSIS OF EXISTING TECHNIQUES:

In tool learning (ML), deep studying (DL) profits a good deal hobby inside the last few years and finished promising consequences on big datasets. This deep learning is used to to examine various tool learning with health benefits, monitoring of surveillance and in need of agriculture. In crop based cultivation, this display advanced standard overall evaluation by means of correctness, overall performance on large datasets. Learning in deep is just like neural networks that consider the facts of theory of convolution based on dependencies flow. In this, the capabilities are retrieved from the given facts and research more green as compared to hand-crafted features. Similarly, it solves complicated problems more successfully and decreases the mistake fee. This version holds a several techniques which include various techniques that manipulate and find the exact situation present [21]. In this, authors delivered connectivity in accordance with neural networks that totally technique it truly is relies on these methods which include alexnet, VGG, AlexNetOWTBn, overfeat, and googlenet. The brought models are assessed which makes on a cutting-edge storage container that includes different illnesses of leaves that is considered for wholesome and perilous. The AlexNetOWTBn approach carries out nicely in properly as examine to extraordinary strategies in phrases of sophistication accuracy. Further image processing, Segmentation of a image manner to section the picture into several components. The most commonplace meaning of dividing is to find out the location of hobby (ROI) in the photograph. The identical pixels are mixed as part, the section occur is within the input image. In cultivation of crops, numerous sicknesses are holding inside the leaves and end result.

K-mean clustering approach is used for dividing the parts. This is carried out into different parts [1]. The group is a fixed of pixels which can be near to each other and stands different with exclusive cluster values. Further other techniques are done by researchers to find optimal values. This technique consist of an Otsu method for picture firmness, cutting and grouping based on k-means algorithm to category and asses the images holding out lesions[12]. The NN classifiers inclusive of different methods are applied to categorize different illnesses. The opposite sicknesses which include different types of tree illness that can be applied and detected using various classifier techniques. Shiv affords a system for apple fruit illnesses popularity the usage of nearby binary styles technique. The proposed method is blended along the principle foremost points consisting of approach that are used for partition of features retrieved through different techniques such as CCV, LBP and GCH through which the captured photos is then labeled, further educated with the use of multi-class SVM Classifier.

K-Nearest Neighbor is used to process the negligible separation the different genuine situations to the next job.

The position is to figure the hole of question picture to all tutoring pics and chooses the near factor for example having insignificant separation. Further, appraisal paper of various kind plans utilized for leaves of plant infections personality comprehensive of KNN, ANN, SVM, PCA, PNN, fluffy rationale and hereditary calculations. The class is a plan while leaves are distinguished dependent on remarkable genetically capacities. The infections characterization to have an immense utility specifically zones which incorporate agribusiness and natural examinations, and so on [13]. The creator present another plan principally based at the mechanized white dependability in pictures. For division, the influenced area used the Euclidean Distance approach and afterward did the K-Nearest mates classifier for the classification thought process. In this the creator [18] depicts another procedure for leaves illness to analyze dependent on the shading space change structure. Inside the division, the influenced region applied the alright methodology grouping after which actualized the GLCM and Gabor Wavelet adjust highlights, which moreover the use of this classifier for the characterization design [14]. Other researchers present a fresh out of the box new methodology utilizing subjective covering capacities and the excited region of pics used the utilization of K- Nearest companions and Adaptive Bayes classifiers. A group of specialists put in power a fresh out of the box new plan for vegetation sore acknowledgment the utilization of the shading change (HSV). For division way, the minute segments are utilized for area influenced area after which using the vibe, shading and shape capacities for the trademark retrieval, which on whole applied using this particular technique. Specialists gave another technique to mechanized harvest leaf illnesses on this research. Most importantly; depictions are accumulated under the circumstance of the profundity of mellow. For division framework, the region of increment technique is completed on the sectioned pics and PNN is utilized to the classification thought process.

Support Vector Machine is utilized for working with non-directed values. Further can be said for two instructions elements; but, unfortunately growth of this method represents to stand as for variant-class aspect via competition of every kind [14]. It's likewise used for the selecting the choice. SVM worked about levels. The first is a disconnected area, where training framework is introduced the utilization of the association of cells needing to be showered or now not splashed and furthermore the decision activity is done. Next as second most is the segment, where determination making process is introduced for all most recent approaching cells, relies upon the choice activity finished in disconnected segment. Some other MSVM classifier is made use of on par with SVM for categorization and education technique. Yuan along with set of researchers [15] came up with ID for device that helps of wheat leaf afflictions the utilization of SVM based

absolutely different classifier machine. Major four sicknesses are accumulated which incorporates leaf rust, Puccinia striiformis, leaf scourge and fine buildup on this examination artworks. The tinge, surface and shape trademark is registered which further used in instruction set for the three classifiers. This system is isolated into three first segments which incorporate enter realities, trademark extraction, and classifier. MC-SVM machine incorporates the assortment of the classifier which may also convey effective class exactness.

Segmentation and Classification of images using classifiers - Pictures of different leaves are gained utilizing an advanced camera. At that point picture preparing methods are applied to the gained pictures to separate helpful highlights that are vital for additional examination [17]. From that point onward, a few expository strategies are utilized to arrange the pictures as indicated by the particular issue within reach. To start with, initially pixels holding the values of RGB moved or converted to the portrayal such that it can take up values of HIS shades. By doing so, the region of influenced area makes in determining the hues based on standard term, by and large acknowledged ways. HSI (shade, immersion, force) is a best described model that makes it as fit since it considers the discernment values as on par with human [18]. Shade is shading ascribe that alludes to the predominant shading as seen by a spectator. The region of spaces that are shaded keeps moving over when compared to other in given space. Then considering change steps, the H part is taken as assumption as or for additional examination. S and I parts are dropped since we won't get extra information. In this movement we recognize the generally green tinted pixels. Starting their forward, taking into account demonstrated breaking point regard that is prepared for these pixels, the generally green pixels are hidden as follows: if the green portion of the pixel power isn't actually the pre-figured edge regard, the red, green and blue sections of the this pixel is assigned to an estimation of zero. This is done in sense that the green shaded pixels generally address the sound regions of the leaf and they don't add any noteworthy burden to disease conspicuous confirmation. Additionally this basically diminishes the dealing with time.

The shading co-event surface investigation technique is created through this technique. Further dark category co-event procedure brings factual method for depict the methodology for factually examining paths at limited dark category happen corresponding for comparison with dim category. Then considering lattices estimate likelihood about each pixels considering at one specific dark ratio which happen during unmistakable separation along direction toward a pixel stating which related to subsequent specific dark section.

Image Processing is the process where the digital images are captured from the environment using a digital camera. Then image-processing techniques are applied to the

captured images to extract its useful features which are necessary for analysis in future. After that different analytical techniques are used to classify the images depends on the specific problem in our hand. The total concept which is the framework for any computer vision based algorithm is almost the same.[28] Mango disease are identified and classified by the image processing technology. This process involved image acquisition, image pre-processing, image segmentation, feature extraction.

Image Acquisition, the leaf image is captured using the digital camera the image is acquired from a certain distance within sufficient lighting. The image background should provide a proper contrast and shadow to the leaf color. [28] **Image Preprocessing** is a common for operations with image at the lowest level of both input and output are intensity images. Pre-processing is required for improvement of the image data that suppresses unwanted distortions. Image captured using the digital camera is pre-processed using the noise removal with averaging filter, color transformation and histogram equalization. Histogram based methods are very efficient and effective compared to other image segmentation methods because they typically require only one pass through the pixels. In this technique, a histogram is computed from all of the pixels in the image, and the peaks and valleys in the histogram are used to locate the clusters in the image. **Image segmentation** is the process of partitioning digital image into multiple segments for ease of analysis. Image segmentation can be done using k-means algorithm. K-means algorithm is a least-squares partitioning method which divide a collection of objects into k groups. **Feature extraction** starts from an initial set of measured data and builds derived value or features intended to be informative and non-redundant, facilitating the subsequent learning and generalization steps, and in some cases leading to better human. There are many feature extraction techniques implemented like texture features based on gray-level co-occurrence matrix (GLCM) and spatial gray-level dependence matrices (SGDM), texture features are Contrast, energy, local homogeneity, cluster shade and prominence are used as features.

This review incorporates four most important advances, for example, preprocessing, division, work extraction, and classification. The evaluation is executed for each progression in expressions of their strategy, generally execution, favors, and disadvantages. During the study, finish set of screening procedures support for expanding the division exactness. Furthermore, conclusion of K-means seems noticeable methodology for division of aggravated blossoms. Furthermore, the vibe distinguished is generally recognized for portrayal of ailment inside the image and these capacities are utilized by SVM and NN.

Considering neural system is the profound learning model utilized for fixing entangled example acknowledgment and groupings issues with an immense amount of databases. The

model significantly contains of four remarkable layers in particular convolution, max-pooling, totally connected, and yield layer stacked more than each other. The curiosity of the engineering lies in its adaptability to its setup depending at the strategic outcomes. [29] There are numerous stand-out CNN models accessible like AlexNet, VGG, GoogLeNet, ResNet, etc. These styles vary basically dependent on their profundity, designs, the nonlinear component, and the scope of gadgets. There are various customizable parameters like the dropout rate, the acing cost used in convoluted handling for fixing class and test ubiquity inconveniences [22], [23].

5. CHALLENGES TO BE ADDRESSED

The essential detriment in the front line works of art is the history relied photo handling, for example for the term of the picture securing, leaf legacy should composed in this kind of way that it presents adequate appraisal to the leaf and the ailing piece of the leaf with the goal that a legitimate division might be performed. The predetermination work interests at continuous picture procurement immediately in the agrarian control and the execution must be competent to recognize the legacy and the leaf zone. Execution of the automated arm is intentional as fate advancement to this exploration topic. This execution gives an independent robot which may be fit for overview the rural field and recognize the sickness of the verdure. The recognized sicknesses can be consequently refreshed to the turmoil database which would be imparted to the rancher. The vehicle conveying the mechanical arm will be a tractor if there should be an occurrence of the fields with roomy vegetation like mango. If there should arise an occurrence of the elective yields where the tractor can't move in the order, a line following robot is completed [mini undertaking of the course] to hold the robot arm. There is no uncommon course of action expected to make the strains in the field for mechanical movement, trickle water system pipes utilized inside the order will give the course to the automated movement inside the control.

6. CONCLUSION

In existing, various machine learning algorithms are used to predict the type of diseases occurred in the plants. A set of data is taken as training data and system is trained with various classification algorithms. Once after training it is applied and tested with test data which predicts the type of diseases occurred. Other way the image processing methods are utilized where the system is preloaded with various set of images in which both affected and non affected leaves are present. When an image is given as input it extracts the features of input image matches with the image in database and predicts the disease occurred. Hence all these approaches help out in predicting the type of disease rather than prior prediction.

Understanding various medical effects of mango tree leaves it has become a challenge for researchers to come up with various solutions that can be used for the early detection of these diseases and to work with the factors at a sustainable environment. But it is well known that the climatic factors cannot be changed as it is not in our hand. Whereas other factors that causes the diseases can be controlled and can be predicted at an early stage.

We propose a system for future work that will be able to address the existing problems. The proposed approach will be able to address the following features; Nutrients level for prediction, monitoring levels, threshold value, prior prediction and prediction accuracy. The system will be able to analyze the nutrient levels for each diseases then fixing up threshold value so that above and below may rise to a set of problems. By doing this process we will be able to predict the type of disease may occur well in advance. The results can be compared to measure the accuracy level.

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Mental Health and Psychosocial Aspects of Coronavirus Outbreak in India: A Survey on Psychological perspective on the benefit of college students through Data Mining Tool

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Abstract:

In the fast mechanical world, people find no time to think about attaining happiness. Happiness really means being happy from one's mind. The shape up of humans rightly begins from the adolescence stage. Every day a human's timeslot is divided into two halves. The technological advancements grasp half a day while the working environment stresses the human for the rest half day. Ultimately the core objective is deviated. Today's education pattern and the rapid technological advancements prevents the youth in involving them in constructive work. Corona virus makes the humans to understand what is life? Life is simple and the real benefit of human is only present life. Data Mining tools play an important role in data collection of student's mindset in the present COVID era.

Keywords:

Happiness, adolescence, corona virus, data mining

1. INTRODUCTION

A compelling, vigorous and invigorating psychosocial condition is base to learn and to grow for achieving individuals goals in day-to-day life. With the developing needs and worries of understudies originating from various foundations, various requirements and goals, an all-encompassing and exhaustive direction framework through guiding administrations for psychological wellness and prosperity of college/undergrads is basic. The focus of such administrations is to guarantee understudies carry on with their lives adequately and beneficially and get tough after some interval with the help of fundamental abilities, even notwithstanding difficulties, difficult situations and barriers. Day by day presentation of COVID-19 (Coronavirus) news may bring about a scope of reactions, especially to the persons who are directly affected or influenced by the infection or by getting genuinely influenced from the friends and family. Responses can be enthusiastic, substantial, and additionally social, and can affect mental and physical wellbeing of the young nationwide. To give Psychosocial Support to college/undergrads, guardians and the personnel to manage the present conditions and abrupt changes in life because of this pandemic are a lot of fundamental.

The core objective of the human life is to lead a happy and peaceful life. In the fast mechanical world, people find no time to think about attaining happiness. Happiness really means being happy from one's mind. The shape up of humans rightly begins from the adolescence stage. Every day a human's timeslot is divided into two halves. The technological advancements grasp half a day while the working environment stresses the human for the rest half day. Ultimately the core objective is deviated. The shapeup of humans rightly begins from the adolescence stage. Academic performance of a college student is concerned with the quantity and quality of learning attained in a subject or group of subjects after a long period of instruction. Excessive stress hampers students' performance. Improvement in healthy social psychology and alertness is required in every youth to make our India a powerful one.

With numerous colleges suspending the classes and shutting the grounds for wellbeing reasons, understudies needed to out of nowhere leave the grounds, face surprising changes in their scholarly and public activity with more noteworthy sentiments of vulnerability and disappointment because of classes being held online for broadened timeframe and lessened open doors for experiential realizing whether inside the grounds or outside the grounds as temporary jobs.

The unordinary and sudden changes in life following the worldwide pandemic flare-up, challenges the originations of solidness, structure, and regularity the same number of understudies would feel that they are not getting full an incentive from their instruction, with restricted to no open doors for work once they graduate.

The different data mining techniques such as classification, clustering, association rule mining, decision tree etc. are used for analyzing student's mindsets forecasting the result and grouping them as per the defined category.

2. RELATED WORKS

The monstrous growth of the COVID-19 has provoked different researchers, specialists, labs, and associations round the globe to steer enormous scope exploration to assist create immunizations and other treatment systems. within the months following the COVID-19 episode, a couple of papers watching changed parts of the COVID-19 are distributed [16] – [22].

To decide the clinical qualities of the COVID-19, Dawei Wang et al. have considered 138 tainted patients in Wuhan, China [21]. The creators have considered particulars, for instance, socioeconomics, signs and side effects, and clinical history of the multitude of patients to survey their cases cautiously. The creators have likewise introduced the lab discoveries of those patients to exhibit the impacts of the SARS-CoV-2 infection on various fundamental organs of the body. Nanshan Chen et al. considered 99 patients with the COVID-19, 49 of whom had an instantaneous connection to the Huanan fish market in Wuhan, known to be the COVID-19 focus. Their discoveries of the epidemiological, clinical, and radiological qualities of the infection are distributed in [22]. In their discoveries, they report that among all the patients that were examined, 17% created ARDS, and among them, 11% kicked the bucket of MODS.

Fang Jiang et al. have audited six distributed examinations perceiving the clinical attributes of the COVID-19. In their work, they need summed up these examinations and, in doing intrinsically, gave a concise review of clinical highlights and medicines of the COVID-19 [23]. The creators of [24] have looked into the present writing on registered tomography (CT) attributes of COVID-19 accessible on stages, for instance, PubMed, Google Scholar, and Elsevier, among others. The essential issue with both these works is that they survey a touch subset of tons more extensive subject. to the present end, the creators of [3] and [8] provides a concise diagram of the COVID-19 flare-up as far as its clinical highlights, avoidance, conclusion, and treatment. In spite of the very fact that these studies shed some light on the present situation of the COVID-19 flare-up, they provide a quick and restricted thought regarding the precise circumstance.

In spite of the plenitude of examination within the area of COVID-19 trademark investigation and antibody advancement, at the hour of composing, not a solitary study is accessible that provides a faraway from of the present situation of the COVID-19 episode and its likely ramifications. Moreover, no add the present writing endeavors to feature the mechanical endeavors being made during the planet to forestall and affect the flare-up. This presents the need for a nitty gritty overview that provides both the vertical and therefore the level perspective on the COVID-19 regarding its clinical highlights, finding, treatment, avoidance, financial effect, and mechanical arrangements being received to lighten the effect of its episode. to the present end, we present a far-reaching audit of the COVID-19 pandemic which will assist per users with increasing a more profound comprehension of the present worldwide circumstance due to the COVID-19 pandemic.

3. PSYCHOSOCIAL SUPPORT FOR STUDENTS

Challenges during COVID 19 Pandemic:

Everybody responds diversely to upsetting circumstances especially an irresistible infection episode that requires social removing as well as self-disconnection. Experiencing such encounters as portrayed underneath is very regular, yet on the off chance that they are excessively overpowering, in the sense, if such feelings and encounters start to make any obstacle one's typical every day working, it is smarter to look for help convenient and recover.

- Worry on individual's prosperity status.
- Worry on managing effectively on life demands while choosing to separate for individual's prosperity and security of others.
- Dejection related with assessment of being alone separated from the outside world especially from relatives, friends and family.
- Slandered or left-alone.
- Outrage and disillusionment on not having the choice to achieve the endeavors or complete one's work or subject allocated on time.
- Weariness and disillusionment considering not having the choice to perform duty or participate in standard routine works.
- Vulnerability or internal clash about the condition.
- A need to use unhealthful adjusting rehearses that intrude with regular daily schedule, for instance, irrational going to bed late and eating too much.
- Work pressure and stress on the fear of forthcoming tests.
- Worries on the checking system on normal conditions and assessments.
- Concern on the information assortment for carrying out research works.

- Accommodation of definitive assessment task and the output.
- Worries on extending the assessment time slot and the level of satisfaction.
- Failing to open entryways for studying and contribution with the level of experience getting ready for associations/undertakings on breaking time period.
- Missing the open entryways for position in associations and sad on the issue of repayment of understudy advance.
- Pressure on the forthcoming outcome of an imminent worker meeting.

Suggestions for Students

- Recognize, Identify and agree with the individuals feeling:

Basic on knowing and watching an individual to perceive the contemplations and sentiments are influencing every person to understand the time to search for help.

- **Figure out how to improve effective Communication:**
Most of the time in our life, self-talking will be carried out by the individual and it is purely depending on the tape that run in the psyches of one's self. On the off chance that we don't put forth an attempt to avoid negative occasions and thoughts, we will undoubtedly impart similar pessimism through our musings, temperament and conduct to others.
- **Keep Connection and communicate with the Family:**
Discuss the interests with others in the family and examine the considerations and openly the concerns. The critical stage is to consider from others point of view, to check whether the things are seen in the correct sense.
- **Maintain Balance in Diet and take Nutritious Food:**
Routinely eating composed food and keeping ourself especially hydrated is essential. On eating splendidly is critical for the body and cerebrum. Deficiency in the body show perspective and taking rest changes in the addition. Along these lines, pick sound and take the food prepared in house.
- **Assign a regular leisure time to relax:**
Working on quality-based aptitudes is required professionally. Watch out for your territories of progress however don't let them abrogate you.
- **Exposure to Media can be limited:**
Twofold investigate the news that is seen or heard. Abstain from deceiving news and communicatory tidbits.
- **Practice a day-to-day activity to maintain the fitness of the Body:**
 - Always follow a reserved everyday observe for rest, study, diversion and sustenance.
- **Take solid and dodge extreme utilization of caffeine, liquor, or completely different substances.**
 - Regularly do some selection into daily activities like:
 - Book reading habit of our interest can be practiced.

- Keep in touch with professors through email and google meets and always enhance through category works and home works.
- Reduce the time usage on social media.
- Cultivate a habit of spending some time in hobby

- **Identify Your Strengths:**

Advise our self that you have experienced troublesome occasions previously and you have achieved numerous things. Recollect the troublesome occasions throughout the life and the previous victories with empathy and an openness in mind and consider and conclude about the special qualities.

- **Work with societal support:**

Assemble compensating associations with people and gatherings. Remain associated with your relatives anyway troublesome it might appear.

- **Handle problems with Safety measures:**

Find out the realities and data from solid sources and discover the measures to keep our self and our family sheltered. In the event that, discover the circumstance excessively overpowering and crazy, converse with an instructor and look for help.

- **Ask for Professional Help:**

Associating with an instructor doesn't imply that you have an emotional wellness issue. You are just attempting to carry on with a powerful life and indeed, everybody needs assistance in one zone or the other eventually in their lives.

- **Always follow the relevant self-help tips:**

- Hardcopy/Softcopy on practicing positive mindfulness
- Work on exercises to manage stress.
- Take online courses that are available to be wellbeing.
- Regularly follow few modules in the area of life skills.
- Watch YouTube channel on therapies and exercises video.

- **Form Groups to support the activities:**

Understudy can join any accessible companion uphold programs online to help and underscore with different understudies who are experiencing pressure or confronting trouble in adapting because of this pandemic.

- **Keep an eye on the university website regularly:**

Keep visiting the site routinely to have the update on tests, tasks or any other appraisals. Try to discover many valuable assets for help, which may be helpful if necessary and in need.

Suggestions to disabled Persons

Handicapped people, especially those having extreme or different incapacities, find it difficult to comprehend their day by day schedules and to establish contact with others becomes a problematic task. It is an extremely upsetting scenario and it can prompt for many testing practices. They

also have an overall sentiment on losing the command over the lives and it lead to restless mindset on facing drastic changes, for example, visiting new places or the conceivable outcomes to remain in house for a significant stretch. In this way, the accompanying down to earth tips and proposals can be utilized to make them mindful, feel balanced and help them to adjust to the progressions due to COVID-19 pandemic circumstance:

Make the students to understand that they are not left- alone by putting effort of reassurance in regular intervals

- Indulge the persons with clarifications or adjusted clarifications concerning the occasions which it's therefore essential to require self-security measures. divulge heart's contents to them well the various manners by that they'll feel abundant improved and embody them in some recreational action a day.
- Render the support in completing the task and give helping hand to create approaches to adjust to new schedules and make plans.
- Help the persons in settling on choices and show empathy, sentiments and feelings on them, for instance by using composed texts, figures or images.
- Conduct a discussion forum with on any forthcoming events well ahead of time:
- Elaborate any further plans and changes to students in advance and support the students to actively participate and make necessary arrangements.
- Look out for any adjustments in their conduct that may assist you with understanding their feelings just as any indications.
- Plan about how to get to assets for any passionate or clinical assistance: Some individuals with inabilities who likewise have an emotional well-being condition may locate the current vulnerability especially troublesome. In the event that they are more focused on, their conduct and psychological wellness needs may change. Plan ahead of time to interface with their current specialist or any specialist if at any time the need emerges.

Suggestions for families

- Stick to dignity & keep privacy:
Permit protection and provide some space to the adult as they are grown-ups and can get necessities in their own space. Speak regarding make a sound domain at house.
- Have knowledge about the signs of warning:
It tends to be laborious to get whether or not your ward is managing a real concern or not, however there are positive nonverbal signals and signs you'll be able to keep a watch out for. A few signs

incorporate limited eating, sleeping late or depletion, extraordinary emotional episodes, to specify a couple.

- Keep in touch with the adult and speak to them concerning on the apprehensions:

Discuss transparently on the passionate wellbeing worries with the adult, that is the needed ideal approach to fabricate trust. Speak straightforwardly with the children on problems, and let them realize which is right and wrong and not to shout on what they're experiencing.

- Motivate your children to be transparent and support the children to cope with the ideas:

At the point the children come openly on their battles, keep patience, and at one stage give time for them to realize that on any emergency or disappointment is a short time span of troublesome stage, that will soon go off.

- Always practice healthy and hygienic Lifestyle:

The life style plays a major role in bringing up the wards. Both physical and mental fitness is necessary for a person to fight the battlefield of life. Following a healthy life style brings down the emerging up of unnecessary problems.

- Maintain a healthy home environment:

As we all know, it is difficult for everyone to manage particular difficulties, it is indispensable for everybody's passionate and physical wellbeing to maintain a quiet climate at house.

- Update you with current issues and information:

In and around us, a lot of information is quiet shared in various newspapers, YouTube channels and online media, which frequently makes us to doubt to comprehend that data to accept or that not to accept. During that time, it is very much essential to get to genuine sources and make our self-refreshed.

- Keep our self always connected with society:

During these pandemic occasions, it isn't fitting to interface with others face to face, it is consistently conceivable to associate with your friends and family through web. Staying in contact consistently assists with inspiring your state of mind and feel associated.

- Don't fail to download authentic apps in the system:

Keep following the rules and recommendations set by the administration and download Aarogya Setu App to think about the influenced regions and know the details of individuals who may have opportunities to spread the disease dependent on their movement data.

Suggestions for faculty

- Preplan and then start the task:

The change in the mode of working style to online mode sometimes be boring and trying to adjust and cope up with the current scenario make us not to point out any drawback on the working environment and our goal can be clearly reached. Notwithstanding, we have to acknowledge the current method of working and plan our timetable

accordingly it suits and balance the proficient and local work.

- Be wise in using information:

Every day is an opportunity to find out additional. Timetable your day by day movement and see what new all-encompassing data you can process today. Weariness on occasion prompts fixation and related undesirable adapting.

- Establish a good communicative environment:

Upgrade the knowledge of the understudies with all the most recent data and help them in all the right aspects of online assets or any most recent data being posted online about the scholastics, tests, tasks and so on. Guarantee whatever data you spread experiences a solitary stage and doesn't coast through various channels of correspondence.

- Ask students' wellbeing and comfort regularly:

Ask the understudies every now and then about how they are feeling and in the event of having any need in assistance for psychosocial uphold. Offer the students digital source for their support.

- Sustaining a healthy and happy lifestyle is default:

An excessive number of changes in work plan, workplace and overseeing errands at home while finishing various tasks of work might be debilitating. Ensure you deal with your own physical and enthusiastic prosperity.

- Focus on working with social support:

Assemble remunerating associations with people and gatherings. Remain associated with your relatives anyway troublesome it might appear.

- Encourage to initiate & empower:

Enable your understudies and others to look for help for trouble and emotional well-being support with no disgrace.

Data Mining Tool

Bootstrap Averaging technique is used for classification clustering and of data through decision trees and online bagging. Decision trees employs single filtering model and online bagging employs Naïve Bayes, J48 and Random forest filtering techniques.

4. CONCLUSION

This paper present a complete survey of the COVID-19 pandemic. We have secured practically all the various perspectives identified with the pandemic and episode. In the perspective on proceeded with viral episodes around the globe and explicitly in India that influences a huge number of individuals, it is basic to assess and create methodologies to address mental wellbeing and mental deviations brought about by immediate or backhanded presentation to the circumstance. These procedures are explicit to focus on the networks or whole populace just as the people with mental indications coming about because of the activities taken by the administration against coronavirus scourge, viral disease, and dread of contamination. For the most part focusing on the whole populace or enormous networks isn't

useful in this manner focusing on individual-based treatments ought to be given need. In view of its involvement with a wide scale before, mental versatility can be a successful technique during the times of pestilence or flare-up. Notwithstanding, perception based treatment will be viable after the scourge is finished. For the most part, mental questioning is suggested for the individuals who addition stress promptly while brief intellectual conduct treatment is suggested for individuals with serious pressure indications not many weeks after the episode. The people ideally understudies are encountering elevated levels of pressure and are defenseless against create genuine mental irregularities as they are dumped inside the four dividers in house. Other than these methodologies, other mental medicines ought to likewise be assessed and utilized. There are potential outcomes that an enormous populace creates serious mental manifestations by disturbance of atomic pathways, consequently, the organization of prescription is suggested. Generally, the people who are experiencing the pressure and inclined to create genuine side effects of mental issues in later stages must be tended to appropriately. Notwithstanding everyone presented to the viral flare-up, social insurance laborers need genuine consideration and mental directing. The technique and tool discussed for collecting the survey will provide a clear cut idea about the mindset of college students during this corona era.

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Geotechnical Mapping of Expansive Soil Problems Associated With Damages in Low Rise Buildings along East Coast of India

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Abstract:

This topic is involved in the subsurface site investigation to characterize different soil formations with particular emphasis on the swelling characteristics of the clays. The data were input into a geographic information system GIS with interactive maps. These maps are used to identify the swelling potential at various locations of puducherry with the study of damages in the form of cracks identified. The efficiency is very high when using computer techniques. Engineering properties of an expansive soil are investigated using in situ and compacted samples. The objective of the topic is to discuss the factors influencing the swelling behaviour and the associated damage in low rise buildings. The allowable and prediction of such damages in residential buildings is presented in terms of engineering properties and associated damage. Presence of high plastic clay indicates the existence of expansion soil problems. Expansive soils all over the world cause serious problems on civil engineering structures which lead to lakhs of amount to rectify the damage problems associated in the buildings. Soil properties mapped in this study which influence the damage potential of the engineering structures are clay mineralogy, liquid limit, plastic limit and initial water content, plasticity index, dry density. Environmental factors and initial moisture content, climate, Ground water and drainage conditions and vegetation. Stress conditions mapped are in-situ conditions, type of loading and soil profile of clay soil of the study are made in the database. So knowledge of this characteristic soil to the public will be useful to choose correctly the right type of foundations and right time to progress the stages of constructions.

Keywords:

Swelling characteristics, Damages, Low rise Buildings, GIS with interactive maps

An Overview: Drugs and Green plant extracts used as Corrosion Inhibitors

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Abstract:

Corrosion is the process in which any material deteriorates because of chemical reactions with its environment. It occurs due to the exposure of metal surface and comes in contact with a gas and a liquid and it becomes a major problem as it causes tremendous economic loss. To overcome this problematic and dangerous issue of corrosion, some researchers and scientists discover some method to control corrosion, such as use of chemical inhibitors, protective surface coatings, cathodic protection, modify corrosive environment but the presence of toxic material is high in all the methods which affect environment so there is an urgent need of environmental friendly inhibitors like expired drugs or green plant extracts which attracting great interest in the corrosion field thanks to its safety, biodiversity, ecologically acceptability and renewability. Literature review disclose that various types of drugs (Antibacterial, Antifungal, Antibiotic, Anti-malarial, Analgesic, Anti-depressant, Anti-hypertensive, Antihistamine) and green plant extracts have been efficaciously vibrant as feasible inhibitors for decreasing the effect of corrosion on metals and alloys. The imminent sections deliver comprehensive overview of the application of drugs and green corrosion inhibitors and the literature on their corrosion inhibition studies.

The Influence of Portable Water Filtration System (PWFS) in Reducing The Particulate Matter 2.5 (pm2.5) in Cooking Smoke

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Abstract:

Unmanageable and untreated cooking fumes by any pollution control devices and lack of awareness among food handler is well identified as one of the sources correlatively affect the quality of life. Exposure to indoor or outdoor air pollution either long or short term has been associated with health impact which can lead to increased mortality and morbidity. There are several global environmental issues that come to our attention and the concern on air pollution-related to the releasing of Particulate Matter 2.5 (PM 2.5) has led to the existence of the innovative product that related to this study. Malaysia is one of the developing countries but seen to still lack awareness and concern towards this issue. Therefore, the objective of this study is to observe the effectiveness and influence of Portable Water Filtration System (PWFS) towards the level of PM2.5 contained in cooking smoke. PWFS introduced a self-developed water filtration system to treat cooking fumes and measure the changes of PM2.5, before and after treatment using air quality detector device. The three functional sections of PWFS responsible to perform cleaning, filtration and purification processes. Result shown that PWFS is significantly affect the quality of released air that responsible in reducing the level of particulate matter (PM2.5). The results from this study are responsible for contributing to the improvement of the air quality which able to be transformed to the safe level and overcome the identified problems such as health status.

Importance of Waste Water Management in Urban Areas

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Abstract:

At the beginning of the 21st century, the world faces a water quality crisis resulting from continuous population growth, urbanization, land use change, industrialization, food production practices, increased living standards and poor water use practices and wastewater management strategies. It is essential that wastewater management be considered as part of an integrated, full life cycle, eco-system-based management system that operates across all three dimensions of sustainable development, geographical borders, and includes both freshwater and marine waters.

This study comprises of three chapters in which the first chapter deals with the basic concepts of wastewater management; the second chapter discuss about the case studies on different sustainable methods adopted in wastewater management such as the NEWater Technology in Singapore, Activated sludge method with waste stabilization pond in Avadi- Chennai and the sewage fed system of wastewater management in Kolkata; and the third chapter compares the three case studies, also compares the effluent standards of generated sewage in three case studies with the global and national sewage effluent limits and finally certain recommendations are suggested for developing a sustainable approach of wastewater management. From all these we can conclude that the sustainable approach will be the future of wastewater management systems and also promotes reuse and recycling of the wastewater, considering wastewater not as a burden but as a resource.

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