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3.3.3.1. Total number of books and chapters in edited volumes/books published and papers in national/ international conferences proceedings year-wise during last five years

SL NO	NAME OF TEACHER	TITLE OF PAPER	TITLE OF BOOK PUBLISHED	TITLE OF THE CONFERENCE/WORKSHOPS/SYMPOSA	NAME OF THE PUBLISHER	YEAR OF PUBLICATION (ACADEMIC YEAR)	NATIONAL/INTERNATIONAL	ISBN NUMBER
1	Dr. Asha P Tom	Nanotechnology for sustainable water treatment - A Review		International Conference on Nanoelectronics, Nanophotonics, Nanomaterials, Nanobiotechnology & Nanotechnology.	Materials Today Proceeding Elsevier	2021	International	2214-7853
2	Dr. Ranju S Kartha	Mining High Utility Sequential Pattern using Lexicographic Utility Linked-List		International Journal of Engineering Research & Technology (IJERT)	ESRS&A Pvt.Ltd	2020-2021	INTERNATIONAL	
3	Dr. Ranju S Kartha	Perspectives of Business Management	Community Shopping		Archers and Elevators Publishing House	2020-2021		ISBN: 978-93-90996-03-2
4	Ms. Neelina Maria John	A review writing using sentimental analysis		International Journal of Engineering Research & Technology (IJERT)	ESRS&A Publications Pvt.Ltd	2020-2021	INTERNATIONAL	
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7	Ms. Sujitha M. Paluprith	Machine Learning Algorithms based Paluprith		International Journal of Engineering Research & Technology (IJERT)	ESRS&A Publications Pvt.Ltd	2020-2021	INTERNATIONAL	
8	Ms. Neema George	RFID based Smart Card for Campus Automation		International Journal of Engineering Research & Technology (IJERT)	ESRS&A Publications Pvt.Ltd	2020-2021	INTERNATIONAL	
9	Ms. Srimy Mary Kurian	Automatic Neonatal Padanters using CNN		International Journal of Engineering Research & Technology (IJERT)	ESRS&A Publications Pvt.Ltd	2020-2021	INTERNATIONAL	
10	Ms. Trinu Thomas	Real Time Face Mask Detection and Recognition using Python		International Journal of Engineering Research & Technology (IJERT)	ESRS&A Publications Pvt.Ltd	2020-2021	INTERNATIONAL	
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13	Ms. Kavitha Nair R	Emotion Recognition Systems and emotion correlation mining using Neural networks		International Journal of Engineering Research & Technology (IJERT)	ESRS&A Publications Pvt.Ltd	2020-2021	INTERNATIONAL	

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15	Ms. Kavitha Nair R	Emerging Research in Engineering and Technology	A machine Learning approach for Image Classification		Manglam Publications Delhi	2020-2021		ISBN 978-81-950722-9-3
	Ms. Jimsha K Mathew	Emerging Research in Engineering and Technology	Knowledge Transfer through Transfer learning- A machine Learning approach for Image Classification		Manglam Publications Delhi	2020-2021		ISBN 978-81-950722-9-3
16	Dr. T. D. Subash	"Modified Solar Generating Panel for High Efficiency Solar Power Station - Using Temperature Study"		Materialstoday: Proceedings (Elsevier)	Materialstoday: Proceedings (Elsevier)	2021	International	2262 - 2269
17								
18	Dr. T. D. Subash	"A Study of Novel Ethernet Interaction		ngs (Elsevier)	Proceedings	2021	International	2262 - 2269
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33	Jeepra K. J	Challenges of 2T		National Conference	Springer	2020-21	International	3275-3
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35	Dr. Ajin C Sajivan	NA						

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3.3.3.1. Total number of books and chapters in edited volumes/books published and papers in national/ international conference proceedings year-wise during last five years

AY: 2020-21

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36	Mr. Sumeah	Power efficient FFT circuit using low power multiplier circuit.		Proceedings of ICCIDT 2K21	ICCIDT 2K21	2021	International	
37	Ms. Jisnu Mohan	Modified Space Vector Modulation Strategy For Matrix Converter For Unbalance, Transients in Supply Voltage		Proceedings of ICCIDT 2K21	ICCIDT 2K21	2021	International	
39	Mr. Ajit Joseph	Self sustained Aquaponics deck for urban homes.		Proceedings of ICCIDT 2K21	ICCIDT 2K21	2021	International	
40	Mr. Reneesh C Zacha	A Novel ultra light weight block cipher for nanosensors		Proceedings of ICCIDT 2K21	ICCIDT 2K21	2021	International	
41	Ms. Simi P Thomas	Wi-Fi Enabled Security System with Camera		Proceedings of ICCIDT 2K21	ICCIDT 2K21	2021	International	
42	Ms. Riya Sara Joy	Low power, high speed, full-swing hybrid full adder		Proceedings of ICCIDT 2K21	ICCIDT 2K21	2021	International	
43	Ms. Neethan Elizabeth	Low power, high speed, full-swing hybrid full adder		Proceedings of ICCIDT 2K21	ICCIDT 2K21	2021	International	
44	Ms. Mariya Stephen	Wi-Fi Enabled Security System with Camera		Proceedings of ICCIDT 2K21	ICCIDT 2K22	2021	International	
45	Mr. Akhilkumar S	A Novel ultra light weight block cipher for nanosensors		Proceedings of ICCIDT 2K21	ICCIDT 2K22	2021	International	
46	Ms. Jisnu Mohan	A Novel ultra light weight block cipher for nanosensors		Proceedings of ICCIDT 2K21	ICCIDT 2K22	2021	International	
47	Ms. Jisnu Mohan	Wi-Fi Enabled Security System with Camera		Proceedings of ICCIDT 2K21	ICCIDT 2K22	2021	International	
48	Ms. Mariya Stephen	Low power, high speed, full-swing hybrid full adder		Proceedings of ICCIDT 2K21	ICCIDT 2K22	2021	International	
49	Ms. Simi P Thomas	A Novel ultra light weight block cipher for nanosensors		Proceedings of ICCIDT 2K21	ICCIDT 2K22	2021	International	
50	Aneesh K.S	Design & Fabrication of Ceria Zirconia Coated Diesel Particulate Filter		Proceedings of ICCIDT 2K21	ICCIDT 2K22	2021	International	
55	Mr. Benphil C Mathew	Experimental Analysis Of A Cylindrical Heat Pipe Under Varying Conditions		Proceedings of ICCIDT 2K22	ICCIDT 2K23	2022	International	
56	Mr. Jishnu M	Design & Fabrication of Ceria Zirconia Coated Diesel Particulate Filter		Proceedings of ICCIDT 2K23	ICCIDT 2K24	2023	International	
57	Mr. Rahul Krishnan	Design & Fabrication of Ceria Zirconia Coated Diesel Particulate Filter		Proceedings of ICCIDT 2K24	ICCIDT 2K25	2024	International	


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- Outline
- Abstract
- Introduction
- 1.1. Nanotechnology
- 1.2. Water treatment
- 1.3. Nanotechnology in water treatment
- 1.4. Nanotechnology in water treatment: A review
- 1.5. Conclusion
- 1.6. Acknowledgements
- 1.7. Declaration of competing interest
- References
- Appendix A

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- Application of nanotechnology in water treatment

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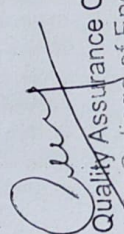
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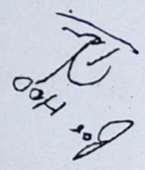
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3.3.3 Number of books and chapters in edited volumes/books published and papers published in national/international conference proceedings per teacher during last five years (10)

Sl. No.	Name of the teacher	Title of the book/chapters published	Title of the paper	Title of the proceedings of the conference	Name of the conference	National / International	Year of publication	ISBN/ISSN number of the proceeding	Affiliating Institute at the time of publication	Name of the publisher
1	Dr. Ranju S Kartha		Mining High Utility Sequential Pattern using Lexicographic q-Sequence Tree and Utility Linked-List	International Journal of Engineering Research & Technology (IJERT)	ICCIDD 2K21		2021		Mangalam College of Engineering	ESRSA Publications Pvt.Ltd
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13	Ms. Kavitha Nair R.	Trending Teaching and Learning Mechanisms in 21st Century.	Innovative Teaching and Learning Process during COVID 19				2020-2021	ISBN 978-93-89631-66-1 E-BOOK 978-93-89631-67-8	Mangalam College of Engineering	IOR International Press
14	Ms. Kavitha Nair R.	through transfer learning- A machine Learning approach for Image Classification	Emerging Research in Engineering and Technology				2020-2021	ISBN 978-81-950722-9-3	Mangalam College of Engineering	Manglam Publications Delhi


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Mining High Utility Sequential Pattern using Lexicographic q-Sequence Tree and Utility Linked-List

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Abstract—High utility sequential pattern (HUSP) mining is an important field to discover high utility patterns in a sequence. Nowadays it becomes more relevant and important in real life applications like market basket analysis, e-commerce recommendations and bio informatics etc. Sequential Pattern Mining (SPM) is used to mine or extract sequential or frequent patterns from vast database. In traditional SPM certain factors like utility of product, profit are not considered. To improve its features, the process of SPM is generalized to HUSP Mining (HUSPM) which is used to discover the high utility patterns in a sequence database. Many algorithms have been proposed to find the high utility of a sequence database, but due to the large search space, the combinatorial explosion has been raised. This paper proposes a new algorithm, for mining HUSP-Utility Linked List (ULL). The objective of HUSP-ULL is to discover the sequential pattern and to find the utility of each pattern in the database, that meets or exceeds predefined minimum utility threshold. HUSPM make use of lexicographic q-sequence and UL (Utility Linked) list for identifying high utility patterns. The obtained output can be used in many applications like e-commerce, market basket analysis, healthcare industry, web mining, bioinformatics and mobile computing etc.

Keywords— Lexicographic q-Sequence, Utility Linked List structure, High Utility Pattern Mining, Pruning Strategy, Sequential Pattern Mining.

1 INTRODUCTION

Sequential pattern mining (SPM) [1],[7],[8] is an emerging and interesting area of research in extracting the knowledge or information in a database. Utility mining is a new approach in data mining where mining results must meet user's goals. Existing algorithms of association rule, mining does not consider interestingness measures for users. Previously many algorithms were proposed for frequent pattern mining, but most of them mainly based on the count or occurrence value of an itemset. In this paper, a new approach for high utility pattern mining has been proposed which uses pruning and bagging methods to improve the performance.

Utility based pattern mining in sequential database is more challenging than frequent itemset mining [1], [9] and ordinary SPM. Consider two products TV and milk bottle, when mining the database milk bottle may appear more frequent than TV but the utility of TV is more than that of milk bottles. So, in such situations mining became more complicated. High utility sequential pattern mining (HUSPM) [4][6][9][10] generalizes SPM and it is used for mining sequence pattern by considering the utility. So, HUSPM extracts high utility sequential patterns that can be used in many real time applications.

In market basket analysis it can easily identify the association between two products or pair of products purchased and also identify pattern of co-occurrence. It means that two or more process occurring parallelly. Consider an item X is purchased by customer and an item Y is likely to be purchased and that it will be based on the probability rules derived from frequency of co-occurrence. So, by applying various cross selling strategies, the selling such products can be improved. In e-commerce recommendation system, it helps the customer to find and purchase product using e-commerce sites. HUSP mining helps them to discover the most relevant search results and also helps to promote the products. So, this can be turned into a serious business tool. Consider an example- a book recommendation in a library. The student is spending a lot of time for searching a particular book in a library and sometimes it may not be available or it is difficult to find. The algorithm extracts the frequent pattern of books that may help the students to save their valuable time.

The main objective of the proposed algorithm is to:

- Discover the sequential pattern and find the utility of each pattern in the database, that meets or exceeds predefined minimum utility threshold.
- Reduce the time and memory required when compared to other algorithms.

In this paper, the remaining sections are organized as follows. Section II comprises of the literature review of

related works. Research Methodologies are presented in Section III. Result Analysis based on the proposed algorithm is provided in Section IV. Finally, conclusions are drawn in Section V.

II. LITERATURE SURVEY

Many algorithms are available to find the high utility of a sequence database. Finding the high utility pattern in a sequence database is a complex task. Efficiency and scalability are the major insight for all the algorithms. Earlier, the algorithms of HUSPM like UP and UL [11] which performs breadth-first-search and depth-first-search respectively. These algorithms discover patterns and high utility in two different phases. Also, these two algorithms are very time consuming and wastage of more memory spaces. Other algorithms like USpan [12], HUSP uses SWU (sequence-weighted utilization) and it generates too many candidates so the efficiency is very less. The major disadvantage of USpan is that it is not a complete algorithm for generating HUSP.

PrefixSpan [2] mines the complete set of patterns and it reduces the efforts of a person's subsequence generation. Prefix-projection substantially reduces the size of projected databases and leads to efficient processing. But there are some time related issues. Frequent pattern tree (FP-tree) [1] structure, which is an extended prefix tree structure for storing compressed and crucial information about frequent patterns. Here, the number of combinations to be found is comparatively less. The concept of UP_Growth (Utility Pattern Growth) [3] for mining high utility item sets were proposed. But the accuracy related issues are raised in this algorithm. Later an algorithm to mine Top-k high utility itemset [4] were proposed by Tseng V. S. et.al. It consists of two algorithms named TKU (mining Top-K Utility item sets) and TKO (mining Top-K utility item sets in One phase) for mining. Unfortunately, it is performing mining process of k-top high utility itemset only. A two-phase algorithm MHUH [5] were proposed by P. Fournier-Viger et. al. The first phase named Extension, the existing algorithm FHUSpan [5] efficiently mine the general high-utility sequences (g-sequences). The second phase named Replacement; the special high-utility sequences is mined with the hierarchical relation (s-sequences) as high-utility hierarchical sequential patterns from g-sequences. Here the accuracy related issues are the major challenge.

Projection-based Utility (ProUM) is an approach to find high-utility sequential pattern from a sequence of data [15]. The limitation of this approach is when dealing with sequence data since they are time-consuming and require large amount of memory usage. An algorithm named fast algorithm for mining discriminative high utility patterns (DHUPs) with strong frequency affinity (FDHUP) [16] is proposed to efficiently discover DHUPs by considering both the utility and frequency affinity constraints. Two compact structures named El-table and FU-tree and three pruning strategies are introduced in the proposed algorithm to reduce the search space, to discover DHUPs. But, it is not as much efficient as the algorithm proposed in this article. U. Yun, D. Kim, E. Yoon, and H. Fujita introduced a method called high average utility pattern mining (HAUPM)[18] approach, which discovers patterns that are related to one another.

Eventhough, this method provides important patterns, the search space cannot be reduced. An algorithm proposed by W. Gan called High Utility Occupancy Pattern Mining (HUOPM)[19] uses two data structures called utility occupancy list and frequency utility table for effectively finding useful patterns without candidate generation. But the issue is that it can be only used in static databases. An algorithm called High Incremental High Utility Itemset Mining (iHUM) [20] were proposed which incrementally updates and outputs the high utility itemsets and a dynamic dataset is used rather than a static dataset. But there is no downward closure property to reduce the search space.

In the case of top-k high utility itemset mining, where k is the desired number of high utility item sets to be mined. The proposed algorithms have good scalability on large datasets and the performance of the proposed algorithms is very close to the optimal case of the state-of-the-art of first and second phases of the existing utility mining algorithms. Although here it is proposing a new framework for top-k HUI [4] mining, it has not yet been incorporated with other utility mining tasks to discover different types of top-k high utility patterns such as top-k high utility episodes, top-k closed high utility itemset, top-k high utility web access patterns and top-k mobile high utility sequential patterns. These gives an opportunity for exploration as its future work.

III. SIGNIFICANCE, CONTRIBUTIONS AND METHODOLOGY

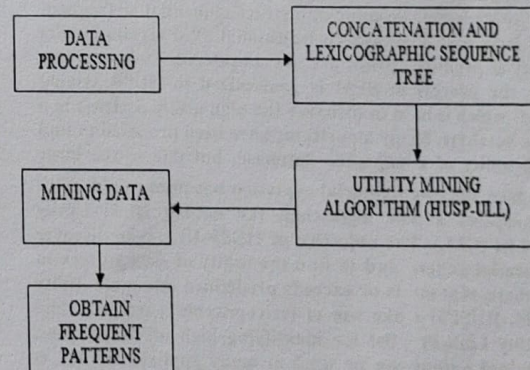


Fig. 1. Proposed System Architecture

Fig.1 shows the system architecture of the proposed system, it consists of following modules:

A. Concatenation and Creation of LQS- tree

LQS- tree is mostly used in most of the HUSPM algorithms to represent the search space [12] for HUSPs. In this case, each node is used to represent a candidate of HUSP whose utility value will be compared with the minimum threshold value to check whether it is HUSP or not. To add a new node to the LQS- tree, two operations [12][13] are performed and they are I- Concatenation and S- Concatenation.

In I- Concatenation, the new item is appended along with the last item in the sequence. In S- Concatenation, the new item is appended to the sequence as the last element.

Therefore, the number of items in I- Concatenation remains the same while the number of items in S- Concatenation grows. So, the result of these two operations will generate a sequence which is the search space for mining HUSPs.

B. UL-List

Utility Linked List [13] is used to record the information about the utility of each sequence that has been generated during the concatenation operations. These UL - list consist of two parts: the first one is the Header Table, which is used to store set of items with its first occurring place in transformed sequence and, the second one is the Utility and Position (UP) information, which stores the details about utility of certain item

C. Closure Property of Upper Bound

This paper proposes a downward closure property called Sequence- Weighted Utilization (SWU) [12] upper bound to identify HUSP using the algorithm HUSP- ULL without any combinatorial explosion of search space. By creating an upper bound, each space can be reduced and it increase the speed of the mining process.

D. Pruning Itemset

A LAR Strategy [14] is used to remove candidate item from a sequence. So, only less number of item will be considered while concatenating two operations. This strategy reduces the execution time required by the algorithm.

E. HUSP- ULL Algorithm

HUSP- ULL algorithm [14] is mainly used for scanning the sequential database and generates the UL- list for each of the q- sequences. Further, the algorithm works based on the above provided factors. At last, the algorithm will provide the set of HUSPs that has been discovered as the output.

The algorithm firstly removes unwanted items and then recalculates the UL list. Each node in a lexicographic q- sequence (LQS)- tree represents a candidate HUSP, whose utility can be compared with the minimum utility threshold to determine if the candidate is a HUSP. For each node that the algorithm visits in the LQS-tree, a projected database is built, which consists of utility-linked (UL)-lists obtained by transforming transactions (q-sequences) of the original database. The algorithm utilizes the UL-lists of each node (candidate HUSP) present in the tree to calculate its utility and upper-bounds. Each UL-list represents a transaction (q- sequence). To add a new node to the LQS- tree, two operations are performed and are called as I- Concatenation and S- Concatenation, respectively. Then by using the LAR strategy, items having utility value less than minimum utility value are discarded. After, that using a Judge procedure, the candidates having utility values not less than minimum threshold value are generated and provided as the output.

Based on the LQS-tree and UL-lists, the proposed HUSP- ULL algorithm can successfully identify the complete set of HUSPs using a depth-first search that applies two concatenation operations. However, this process can lead to exploring a very large number of candidates in the LQS-tree, since there is a combinatorial explosion of the number of candidates in the mining process of HUSPs. To speed up the mining process and also to maintain the downward closure

property, a new property called sequence-weighted utilization (SWU) upper-bound was proposed to obtain a sequence-weighted downward closure (SWDC) property for HUSPs mining. This property greatly helps in reducing the search space and eliminate unpromising candidates early for reducing execution time.

IV. RESULT AND DISCUSSIONS

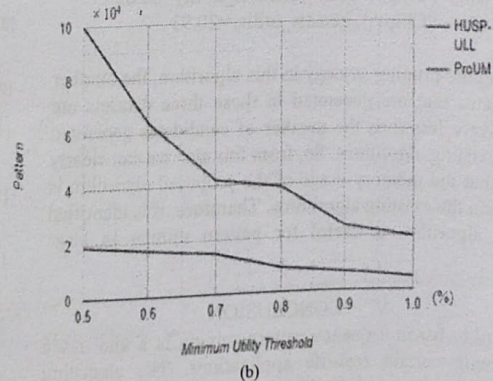
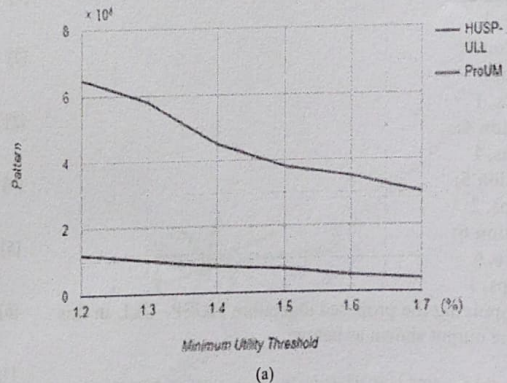
The proposed algorithm is used to obtain high utility sequential patterns (HUSPs). Here, three datasets were used for performing the experiments. Among the three datasets, all of them are real-life datasets. The datasets that are used are as shown in the following TABLE I:

TABLE I. DATA SET DETAILS

Dataset	No. of Sequence	Avg. no. of elements per sequence
Sign	730	52.0
Bible	36,369	21.6
Leviathan	5834	33.8

- Sign: It is a real-life dataset which contains sequence of sign language utterance.
- Bible: It is a real-life dataset that is prepared by converting the bible into a set of sequence of words.
- Leviathan: It is a conversion of one of the work of Thomas Hobbes' Leviathan to a sequence of words.

The Fig. 2 represents the pattern mined details from three datasets sign(Fig.2(a)), bible(Fig.2(b)) and Leviathan(Fig.2(c)) by using two algorithms, HUSP-ULL and ProUM.



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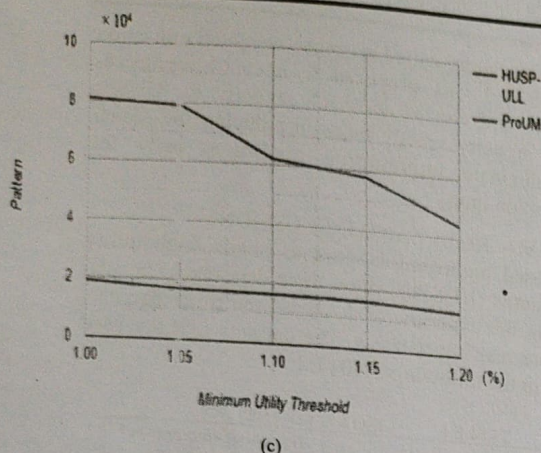


Fig. 2. Comparative Study on different Dataset

The HUSPs obtained from the proposed algorithm can be applied in various real-life applications that are already mentioned in this paper. Here the transaction done by the user is applied as the input to the proposed algorithm. The algorithm calculates the itemset utility value. The frequently made transactions can be found out from the output. Suppose, Products Purchased in a supermarket:

Transaction 1:

- Coke, 6
- Chips, 2
- Dip, 1

Transaction 2:

- Coke, 1

Transaction 3:

- Coke, 2
- Chips, 1

Transaction 4:

- Chips, 1

Transaction 5:

- Chips, 2

Transaction 6:

- Coke, 6
- Chips, 1

After applying the proposed algorithm HUSP- ULL in this dataset the output shown as below:

Frequent Items=('Chips', 'Coke'), itemset_utility=30.02
 Frequent Items=('Chips'), itemset_utility=20.93

By using the pruning strategy in this algorithm, the number of candidates that are generated in these three datasets are comparatively less than the number of candidates generated by other existing algorithms. So, from this also we can clearly say find that the memory usage of the proposed algorithm is far less than the existing algorithms. Therefore, it is identified that this algorithm is useful for pattern mining in large datasets.

V. CONCLUSION

The utility-based sequence pattern mining is a vital issue seen among certain real-life applications. The algorithm HUSP- ULL, proposed in this article provide an efficient

output as desired. Experiments done on different datasets using the proposed algorithm showed the efficient and effective identification and retrieval of HUSPs. Also, this algorithm reduces the search space by the use of pruning strategy. The only concern that arises in this scenario is the accuracy variation depends on the datasets that are available. This article also provides certain ideas that can be used for future developments in this sequential pattern mining field.

VI. FUTURE SCOPE

The proposed algorithm in this paper is a pattern mining algorithm and here it can be used for classification purpose. Here it is used to recognize the patterns and chooses the frequently made transactions. So, in the future it can be modified by including performance matrix and comparative study of various algorithms. So the data can be divided as training and testing sets and by using the performance matrix and resultant graphs the classification of data can be done more accurately and efficiently.

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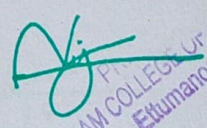
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SRUTHI.S

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MANGALAM COLLEGE OF ENGINEERING
Ekkamanoor

PERSPECTIVES ON BUSINESS MANAGEMENT

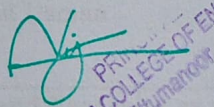
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COMMUNITY SHOPPING

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ABSTRACT

Technology is at the centre stage now. All the tech companies are giving their guidance that we are going to witness a multiyear technological transformation cycle. This is going to impact in every wake of life. Adapting to this new technological landscape is the key to ones survival. One can not find an area where the influence of the technology is avoided. Every wake of life has a touch of modern technology. It can be easily said that the impact of technology is influencing every wake of life. This book chapter deals with "SHOPPING". Especially after this pandemic, the way we are shopping witnessed a huge change in its landscape. It is witnessing a huge change in its pattern. The needs are changing. The way & style by which we do shopping is also changing. The modes of shopping are changing. Also this provides immense potential for future in terms of investment, job opportunities. India's journey towards 5 trillion economy is incomplete without the contribution of shopping. This book chapter proposes a concept called community shopping for connecting community and shopping with technology.

INTRODUCTION

Pandemic corona has shaken the world beyond anyone's expectation. Be it in health, economy, personal life, job, technology, transportation, energy, digital payments, shopping, entertainment, education or anything, there is a complete reorientation of the things. It is obvious that the post Covid world will be entirely different from the pre-Covid world. The way we do business has witnessed a complete turn around. It has been devastating days for many. Equally it is boon for many too. While some sectors like tech, telecom and shipping were stable, small family businesses have been hit hard, and there are disastrously high unemployment rates among youth (Rich Karlgaard, 2020)

Before going to the concept, one should know the evolution of shopping in India. India is a country of 1.25 billion population. By this sheer size of population, the vast geography and its vastly different cultures it has its own strength and weakness. This huge population also offers a highly lucrative market. Finding Jobs for such a big population is also a big s huge challenge.

This market is equally attractive to domestic and international players. The shops mainly small scale shops were a source of income for many. Also it was providing jobs to huge section of population. One can easily find one or two small scale shops at a throw away distance. Usually a local person starts these small shops and over a period of time a mutual relation ship is established. Mostly one can find items which are mostly pertaining to the needs of that particular area. The items we find in these shops are mostly determined by demand generated in that particular area. Thus these small shops are governed by the demands from that particular local area.

It is well suited to the demands and requirements of the society. The competition is very limited and it is basically among the very local players. These shops were very essential to and was very integral part of our society. This was the scenario happening

in our nation before the liberalization. Except the very few big metropolis, the nature of the shops and shopping were very similar to the one described above.

Slowly things started changing with the introduction of Liberalization of Indian Economy. The entire nation started witnessing a tremendous change due to the liberalization. This was evident in all the fields. GDP, FDI, Disinvestment, Special Economic Zone, Privatization, Infrastructure etc. became the common words. Slowly it was found that Government became a facilitator of things instead of provider. Things started changing at a very dramatic pace in the case of shopping. Slowly big malls started coming to the picture. Big, splashy and very attractive shops became the integral part of an average Indian. More than shopping, it became an experience and fun too. Visiting malls, watching a movie and having food outside became a norm of a common man now a days. This was aggressively happening especially at urban areas.

But the above developments came at the cause of the other. Small traders, shop keepers and merchants especially at the Urban areas can not withstand the onslaught from big players. Slowly the small players have to give way to big guys. The big players were able to provide products at a very discounted price. The above developments can be termed as the next phase of our shopping scenario. This happened during the period 1995 to 2010.

It is a universal phenomenon that the things do not stay static. There is a continuous evolution of things. As introduced in the beginning of this chapter, technology started taking the centre stage of every aspects of life. With the advent of technology, the shopping space is witnessing a tremendous transformation.

The mode of shopping is changing. Every thing is going online. Every thing is now available at home with a click in mobile screen. India's top company Flipkart was taken over by Walmart. Amazon's battle with Reliance shows how lucrative the market is. Tatas, Bigbasket, Myntra are all big players. It is such a big market that the big fishes started eating away the small ones. Reliance plans to tie up with whatsapp for retail business.

DILEMMA OF THE SMALL SCALE TRADERS

Now what will be the condition of small scale traders, merchants and shoppers. They will not be able to withstand the onslaught from bigger players. They lose competitive edge in terms of the pricing, logistics, offers to the customers and direct delivery to the customer's home.

The COVID pandemic has been more catastrophic for these traders. Due to the restrictions imposed due to lock down, the small scale traders and shop keepers were at the receiving end. Many of them were not able to survive, many had given up. Since the mobility was highly restricted there was no business transactions. Neither there was any way for delivering the goods to the customers. Basically there was a disconnect between the shops and the customers. This was the perfect vacuum created for the bigger players by the pandemic. Customers prefer not to have contact with a second person for the fear of contracting the virus. The fast-changing context in which companies are currently operating yields new markets for those who are able to quickly re-invent themselves and adapt to the new situation – such as offering online shopping or digital service consulting instead of physically visiting stores (Joerg et. al., 2020). With the vast infrastructure and help of technology the bigger players

could perfectly fit in to the vacuum space created by the pandemic and there by smaller players could be chucked out. Also availability of the mobile network, cheap data and high degree of easiness also paved the way for the rapid migration of the customer base to the bigger players. In the short-term, there will be opportunities arising from the COVID-19 crisis, such as developing hygiene or digital work solutions. The long-term consequences of the COVID-19 pandemic are, however, not yet foreseeable, but it seems inevitable that broader opportunities will arise (Andreas Kuckertz, 2020).

PROPOSED CONCEPT-COMMUNITY SHOPPING:

The proposed concept called as community shopping is based on the concept “United we stand divide we fall”. Consider a small town with numerous shops & establishments. Each shop be it small or big becomes a part of a single entity. Thus the shops, traders and all business activities are each linked each other by way of a special software or application so that the entire each unit club together to form a single entity. On a simplified version the above concept comprises the following

- a) Formation of the single entity
- b) Formation of the interface.
- c) Storage optimization
- d) Logistics Optimization
- e) System monitoring & control.

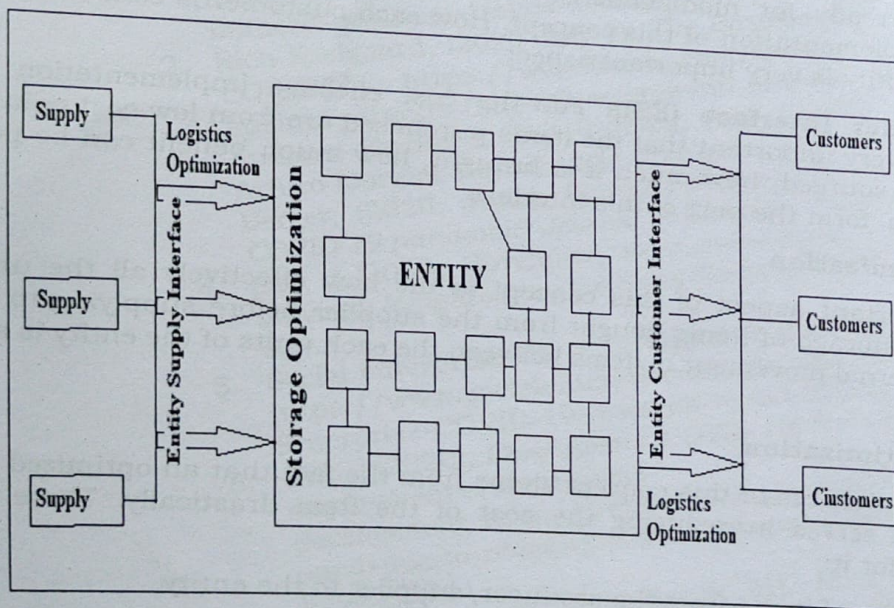


Fig: Proposed Concept: Community Shopping

The above components are just for the elementary introductory purpose only. A brief analysis of the components is provided below.

FORMATION OF SINGLE ENTITY

The single entity is the core of this proposal. The success of this concept lies in the effective implementation of this particular single entity. This single entity is the one going to take on the bigger players. This is developed on the basis of the mutual respect & understanding among the individual shop keepers. The design phase of this

Single Entity is the key to its success. The underlying idea that the shop keepers (of the small town considered) will be communicating to a particular society is 'Help us to help you'. The USP of this single entity is the highly customized approach to which you are targeting. Including all the shops will increase the effectiveness of this concept. The implementation of a perfect logic which is acceptable to all is the daunting task of this approach.

The following list is only for representation purpose. It should include all shops. The software is the binding factor which integrate Shops, Mini marts, Coffe shops, Theatres, Vegetable shops, Eateries, Coffee shops as a single entity. This is only one of the aspects of the soft ware.

FORMATION OF THE INTERFACE

The next aspect is the interface of this single entity. A simplified version should have atleast two interface. Both are mentioned below.

1. Entity- Customer Interface.(ECS)
2. Entity Supplier Interface.(ESI)

Entity Customer Interface (ECS): This is the interface through which the customers interact with entity. This should be user friendly, accommodative of all options, technology oriented, consistent with the entity design features, simple features oriented and ready for modifications. The outcome of ECS is very key for the successful implementation of this concept. How each customer is connected to each units of the entity is very important aspect.

Entity Supplier Interface (ESI): For the cost effective implementation of this concept, it is very important that the items purchased are from low cost points. How the items are sourced, how much it is brought, how much benefit can be passed o the customers form the part of this interface.

Storage Optimization

Another important aspect of this concept is the how effectively all the units can optimize the storage of items bought from the supplier before supplying to the end user. The internal movement of items between the each units of the entity is a critical one.

Logistics Optimization

The cost effectiveness of this concept stems from the fact that an optimized logistics of the goods serves in reducing the cost of the item drastically. There are two components for it:

- a) Transfer of items from the producer/supplier to the entity.
- b) Transfer of items to the customer from the entity.

How well all the entities are clubbed together for an effective movement of the goods, both in the above components are decisive factor in reducing the overall cost. The main concept is the clubbing of the items of each unit of the entity for the smooth flow of items.

System Monitoring & Control

The entire system should be highly technical. It should be under constant monitoring for its effective performance. Use of artificial intelligence and machine language to adapt to the fast changes in the demand, requirements, entity formation, logistics and interface is a must. It should be glitch free and must be ready to take over the newer approaches of the competitor. There should be a control centre for monitoring the entire activities.

CONCLUSION

The COVID-19 crisis calls for a rethinking of the balance of the objectives of efficiency and resilience in different areas of economic and social systems. Post-crisis efforts can be turned into an opportunity to improve people's lives and stimulate innovation (OECD, 2020). In short the entire units of an area collectively contour the aggressive business activities of a very dominant player, who is a threat to the small scale player's existence through a collective approach using technology. The desired outcomes of these approaches includes highly customized service, cost effective shopping, delivering directly to home, maintaining the flavour of the society and community and effectively countering the aggressive players.

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A Review Mining using Sentimental Analysis

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Abstract - Internet business stage has achieved a progressive change in the manner individuals direct shopping. In India, the number of advanced purchasers in 2016 was 130.4 million and by 2021 the number is assessed to increment to around 400 million. In this paper we propose an opinion order motor that peruses the audits across various sites for a given item, ultimately giving a metric that would help the client in settling on an educated decision regarding item.

Keywords: *Sentiment classification, product review, NLP, Levenshtein distance.*

I. INTRODUCTION

Internet shopping is an essential angle in the current everyday human way of life. In the IT world we have various internet business stages to meet the shopping needs. Each web based business stage permits clients to refresh the item survey for the buy. Each internet business client today has the privilege to see the audit of a similar item in various shopping locales. By and large these are named as item evaluations. Item appraisals are only a size of qualities from 1 to 5. Higher the rating implies better the nature of the item. Aside from the rating the purchasers also express their views on the product. Every client survey has three primary viewpoints feeling, experience and notion. Our goal is to construct a canny dynamic framework by executing estimation investigation methods, accordingly assisting the purchasers with having a smooth internet shopping experience. Feeling investigation essentially gets the emotional data from text and arranges them as good, negative or impartial. Feeling examination is for the most part related with assessment mining. It is a methodology in Natural Language Processing (NLP). From suppositions the framework assesses the articulation credits known as

- i. Polarity: it basically relates to what is the speakers opinion: Positive or Negative
- ii. Subject: The matter being talked about.
- iii. Opinion Holder: who is expressing the opinion the entity or person.

The subject assumption examination presently is of more prominent interest as it is connected with numerous useful applications. Numerous com use feeling investigation to

consequently break down the reactions from the overview, item surveys and online media to have significant bits of knowledge about their image and administrations. Extension can be applied to the levels referenced underneath:

- i. Document Level: The investigation acquired from a total arrangement of record or a square of section
- ii. Sentence level: Analysis obtained from a single sentence
- iii. Sub-Sentence level: Analysis obtained from a set of sub expressions within the sentence .

It has been assessed that 75% of the entire information is unstructured. This straightforwardly implies we are managing a bunch of information which isn't coordinated in a pre-characterized way. Assessment investigation framework assembles such gigantic measure of unstructured content and permits organizations to bode well via mechanizing business measure, decreasing long stretches of manual information preparing there by making more effective work results. A portion of different benefits of Sentiment examination are versatility regarding information, continuous investigation of information, diminished blunders and expanded consistency. The remainder of the paper is coordinated as follows. Segment II and Section III depicts about the proposed model. Segment IV examine about the outcomes. Finally, Section V finishes up the paper with end.

II. RELATED WORKS

To start the work we need to zero in on the goal of the system. Nostalgic extremity classification is a significant issue in wistful investigation with induction from different sources. Web rejecting for information assortment is gone through and afterward the distance of expressions is assessed. A word can address comparing activity. Feeling examination can be utilized to screen and investigate the social wonders for discovering possibly hazardous circumstances and the overall state of mind centers around audit mining and feeling investigation on Amazon site. Clients can buy different items and rate their view about those items from internet shopping destinations like Amazon. Amazon utilizes a 1-to-5 scale for all items, paying

little heed to their classification and it is hard to decide the benefits and disservices to various pieces of an item. In [3], presents various approaches to mine item includes in assessment sentences. SentiWordNet based calculation is utilized to discover assessment of the sentence. In [4], summed up certain and negative highlights about items are given, laws or strategies by mining audits, conversations, gatherings and so on Utilizing this strategy it can check each line of information, and creates a synopsis of each audit alongside different graphical representations In [5], proposes rule based crossover approach. It discovers consecutive examples and Normalized Google Distance (NGD) to get unequivocal and verifiable viewpoints. "Viewpoint put together assessment mining centers with respect to extraction of perspectives from client audits and positioning these angles as sure or negative". In [6], points is to mechanize the way toward social occasion online end client audits for some random item or administration and dissecting those surveys as far as the assumptions communicated session explicit highlights. In [7], web based business sites, customers ordinarily disturb remarks, which those properties of the item, those attitudes of the merchant, express transport lion's share of the information following buying the outcomes. Most of the information gives a basic reference to the moment that others buy brings about the site. On presumption investigation and better grained thought digging approach concentrates for the subsequent highlights. Past related investigation focuses on the unequivocal objective mining regardless disregards that got ones. Though, those got highlights, which need help hinted toward a bit articulations or expressions, need help thick, as gigantic and genuine with express clients' presumption. The scientific metric planning of significant undertaking relating to watchword based methodology is the development of the word vocabularies. This order depends on the presence of effect words like cheerful, wonderful, tragic, exhausted [8]. Vocabularies can be made by number of systems based on frequencies. Yet, this strategy has some downside for instance, in the event that one sentence has nullification, it won't revamp the effect of refutation "yesterday was pitiful" it tends to be effectively arranged, "yesterday was not a dismal day by any means" this technique is neglected to group in these kind of sentence. Second issue is essentially any place we have the influence words its essence makes the issue. There are sure proclamations from which we can derive the importance straightforwardly instead of depending on the presence of effect words. Forceful feelings are being passed on from this sentence doesn't have any utilization of effect words. "My spouse just applied for separation and she needs to deal with my children" The arrangement bring all around constructed feeling yet here not utilizing any influenced words [9] [10]. Such sentences won't ever be arranged by information based methodology. B. Idea based methodology The fundamental center elements relating to this methodology is on web ontologies and semantic organization for accomplishing the semantic investigation of the account [11]. By the use of this technique structure the characteristic language sentiments, framework removes mental ideas and full of feeling insights. Thusly the fundamental point will be on the component

related or the construed importance with the normal language ideas. Considering the above factors this technique is undeniably more quality giving than watchword approach and word simultaneousness tallies. Notions can be recognized much preferred in idea based methodology over linguistic procedures. We can even discover the multi word articulation regardless of whether the articulation isn't giving any inclination clearly. Information base is the key for the idea based methodology.

Without the presence of the human information it turns out to be extremely hard for the framework in understanding the semantics of the regular language text. The ability to deal with the semantic contrasts gets restricted since the information base contains commonplace date [12]. Because of which the fixed portrayal at long last gets restricted to the limits of result deduced to the semantic and full of feeling highlights related with the thoughts. C. Lexical liking strategy Lexical partiality technique is to some degree progressed than the past technique which we talked about here. Here they have set a probabilistic comparability to irregular words for certain inclination as opposed to straightforwardly make out the words in the arrangement. Accept on the off chance that we appoint a likelihood worth of 0.75 to the word 'mishap' to depict the adverse consequence. Essentially a similar word 'mishap' will be rehashed in an auto collision or somebody gets injured by a mishap. For such terms or words the probabilities allocated by the framework is being prepared from the approach etymological corpora [13]. Nearly this methodology is superior to watchword based methodology however has a few constraints. This strategy basically focuses on the word even out and can without much of a stretch be made flawed or precarious by sentences [14]. On the off chance that we look through the principal sentence the word 'mishap' has invalidation or negative influence where's as in the second sentence it has an alternate word faculties or significance. Also lexical affinities are being impacted by explicit areas as portrayed by the etymological corpora source [15]. Subject to this constraints a reusable area autonomous model can't be created.

III. PROPOSED METHODOLOGY

This paper focuses on mining surveys from the sites like amazon.com, which permits client to openly compose the view. It consequently separates the audits from the site. It likewise utilizes calculation like Naïve Bayes classifier, Logistic Regression and SentiWordNet calculation to order the audit as sure and negative survey. A standard based framework is utilized to form choices dependent on certain pre existing statements. As we referenced before, there are numerous difficulties in assumption examination. A portion of those difficulties incorporate the accompanying. During preprocessing images may be lost. It is very conceivable that models may not get emoticon's and words like 'don't', 'shouldn't' in the right sense. After pre-handling these words may become 'do' and 'ought to' which totally change the extremity of the sentence that may seriously influence the final products. Nowadays individuals are utilizing short structures while remarking or composing audits. For instance, 'gud' rather

than great, 'luv' rather than adoration, 'alr8' for okay and so forth All the supposition scores of each audit is considered and the normal of those scores address the nature of the item procured from the encounters of the past clients

A. Scraping

To assemble information for the proposed model, sites, for instance, amazon.in, having item surveys are crept and the information is saved in the neighborhood PC.

B. Pre processing

Frequently, it is seen that the information acquired from scratching may not be prepared for taking care of into a calculation. The scratched information may comprise of information with spelling blunders, Regularly, it is seen that the data procured from scratching may not be ready for dealing with into an estimation. The scratched data may contain data with spelling botches, data that may not be useful for the estimation, data having an others data type, stop words, etc One of the demonstrations of Pre getting ready incorporates tokenization and removal of stop words. Tokens can be words in a sentence or even sentences from a report can go about as tokens. For example, a given sentence 'Ordinary language planning is one piece of programming, will be tokenized into 'Typical, 'language', 'dealing with, 'is, etc Now and afterward, some standard words which would radiate an impression of being of minimal worth in picking reports which match a customer need are stayed away from the language totally. These words are called stop words. One of the huge kinds of pre-taking care of is to filter through data that doesn't change in accordance with the limits of the estimation. Stop words can't avoid being words that happen too once in a while in a given report or a segment, for example, words like 'a', 'the, etc Crawlers in some web files ignore these words, to reduce the proportion of memory ate up by data. Therefore such forestall words are taken out from the substance information by contrasting them and a previous arrangement of stop words. The content information acquired subsequent to cleaning it of stop words is utilized for assessment.

C. Phrase matching

After the handling of information is finished, an expression coordinating with measure is embraced. We have a dataset is dissected. This period of the proposed model is for examination of the current expression with that of the current dataset. Levenshtein distance is used to analyze the various expressions. This implies that the more expressions we have broke down already improves the whole dataset and permits expressions to be all the more precisely scored against authentic information.

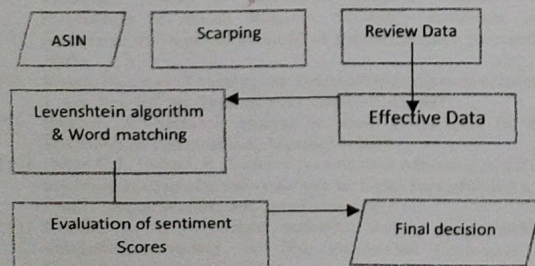


Fig : 1.1 Block Diagram

D. Levenshtein Distance

The Levenshtein distance is a string metric for measuring difference between two sequences. Informally, the Levenshtein distance between two words is the minimum number of single-character edits (i.e. insertions, deletions or substitutions) required to change one word into the other, in Natural Language Processing, it is often a requirement that strings be compared with each other. Levenshtein distance is a method to observe the difference between two strings. It looks at the number of characters which needs to be changed for one string to resemble the other. Primarily it looks at single characters that can be can inserted, substituted or deleted for one word or string to change to another. For example, the Levenshtein distance among "comparable" and "silver" is 4, since it takes 4 alters for the words to change starting with one then onto the next it is highly unlikely to do it with less than three alters. A couple of additional models are given beneath

- a) silver and similar - Levenshtein distance is 4 property and properly - Levenshtein distance is 1
- b) congruent and congruous - Levenshtein distance is 3 There are upper and lower bounds of Levenshtein distance,
- c) It is at least the difference of the sizes of the two strings
- d) It is at most the length of the longer string.
- e) It is zero if and only if the strings are equal

Algorithm 1 Minimum distance algorithm

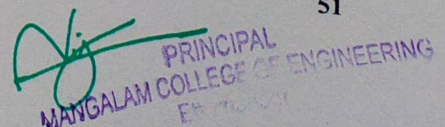
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Input: string P, string Q Output: int distance if P == "" then
    return Q.len()
if Q == "" then
    return P.len() end
end else
    addD = editD(P, Q.substr(0, Q.len() - 1)) + 1 rmvD =
    editD(Q, P.substr(0, P.len()-1), Q)+1 chngeD = editD(P,
    Q.substr(0, Q.len() - 1), Q.substr(0, Q.len() - 1)) +
    (P[p.len() - 1] == P[p.len() - 1]) ? 0 : 1 return
    min(min(addD,rmvD), chngeD)
end
  
```

V. PERFORMANCE ANALYSIS

Last assumption score decides the nature of the item. The opinion score range is taken from 0 to 5. In the event that the conclusion score is under 2.5 then the item quality is poor what's more, the purchaser ought to think about this and don't accepting that item. In the event that the supposition score is 2.5, the nature of the item is normal and it is his own danger to purchase that item. On the off chance that the opinion score is more prominent than 2.5 then the nature of the item is acceptable and the customer can go ahead and purchase that item. The more the conclusion score, the more it is prescribed to purchase an item. Estimation score is straight forwardly corresponding to nature of the item. An item with estimation score of in any event 3 or above is suggested for the government assistance of the customers.

S	Preferred result of analysis	Sentiment	Dataset
	Sentiment analysis	278	man ujust man
	Sentiment analysis	426	stunning headphone great
	Sentiment analysis	323	don
	Sentiment analysis	288	ncc
	Sentiment analysis	363	worth-85\$



Sentiment analysis	338	amazing sound quality
Sentiment analysis	443	asm-literally awsm
Sentiment analysis	389	stars super
Sentiment analysis	412	nice nice
Sentiment analysis	383	thing I love product
Sentiment analysis	26	perfect product
Sentiment analysis	25	best wired
Sentiment analysis	35	value money
Sentiment analysis	25	not working
Sentiment analysis	45	best price
Sentiment analysis	492	great sound

Fig 2 : Results

An input box where the consumer should give ASIN code (Amazon Standard Identification Number) as input. By scraping, all the review data is collected and displayed. After the reviews are processed, the results are displayed shown in figure 4.

IV. CONCLUSION

Feelings that individuals have to specific articles or circumstances around them are of much significance in fields of promoting and media. An investigation of the feelings of individuals are assessed through the conclusion examination. The sensations of individuals can be communicated in sure or negative manners. Presently a days, everything is digitalised, so opinion examination motors assume a colossal part in the coming future. The proposed framework looks to sort the notion and score of the given information. Our model principally centre around Amazon items yet in addition is summed up for the wide range of various information as well. Our model considered the difficulties that conclusion investigation looked in the past models as emoji invalidation, assumption enhancers and so on.

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Save The Drowsy Driver Drowsy Driver Detection

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Abstract - AI procedures are these days to anticipate the state of a driver to give data which can improve wellbeing out and about. It is a use of man-made consciousness. frameworks can naturally learn just as improve without being expressly modified utilizing Artificial Intelligence. A driver's condition can be assessed by bio-pointers utilizing monochrome cameras while driving just as the appearances on the substance of a driver. In this paper we present a comprehensive and complete study of ongoing works identified with driver languor recognition and ready framework. We additionally present the different AI procedures like PERCLOS calculation, HAAR based course classifier, OpenCV which can be utilized to decide the driver's condition. At last, we distinguish the shortcomings looked by the flow arrangements and present our examination results.

Keywords - Artificial Intelligence, Autonomous Vehicle Technology, Drowsiness Detection, Machine Learning.

I. INTRODUCTION

Resting is one of the essential requirements of the person. Lack of rest need makes the body become wastefully, lessening both response time and energy, additionally produce low readiness and absence of fixation which decreases the capacity to play out a few exercises dependent on care that is fundamental on account of driving a vehicle. Sleepless driving is a significant reason for vehicular mishaps. As indicated by numerous explores sleepiness is identified with a great many car crashes every year, the mishaps create roughly half of death or genuine wounds, as they will in general be impacts at high velocity in light of the fact that the driver who has nodded off can't break or go astray to stay away from or decrease sway. To alleviate these mishaps, makers have created sleepiness discovery frameworks that perceive indications of conceivable tiredness, making the driver aware of their condition. This framework is created as an application for an Android-based cell phone, where estimating security-related information that doesn't need extra expenses.

The system has an efficiency of 96% to detect that the driver is awake and 97% to detect that he is asleep. This information allows knowing the signs that shows a sleepy driver. The following contains a concise description of the papers we studied. The paper presents an arithmetic based method to solve the problem related to the detection of drowsiness. Three stages are involved here. They are Face detection, Eye position detection and Eye tracking. This paper provides an efficient method for the detection of the state of the driver. This framework uses the motion of the eyes to detect the state of the driver and gives an alert within 0.5 seconds. The performance of the driver is transcribed in the form of a graph. A new method for fatigue detection is presented. YCbCr color space and canny edge detection methods are used here. These methods help to determine if the driver is under fatigue. When the driver is drowsy or sleepy, an alarm system is turned on. A distinct system which utilizes the concept of computer vision and imaging is designed. A software algorithm is developed. This algorithm is partially tested and is found to be working effectively. Research is in progress in order to develop a full-blown system. The developed system is capable in identifying the state of drowsiness quickly. The system is capable of differentiating between normal eye blink and the eye blink associated with drowsiness. It is capable of performing under low light conditions and when the driver is wearing spectacles. This can further be developed by adding different sensors. The developed system is based on computer vision. The system utilizes Viola Jones algorithm as well as the CAMSHIFT algorithm. This paper is concerned with the development of a software framework for the timely and precise detection of drowsiness. Multiple facial features were considered as inputs.

It depends on the idea of picture preparing. The framework gives a non-intrusive methodology. This framework likewise proposes the joining of yawning as a boundary to identify sluggishness. To assess a driver's condition, certain facial highlights were distinguished. Utilizing python libraries, they were inspected. These highlights were pace of eye conclusion, ECD, per conclusion, head positions and pace of yawning. Certain limits were likewise featured.

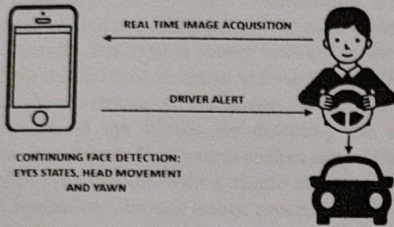


Fig. 3. General scheme of the drowsiness detection system.

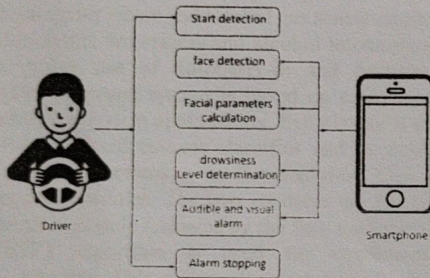


Fig: Use case diagram

II. PROPOSED SOLUTION TO DETECT DROWSINESS

This part portrays various parts of the framework considered in its execution; they incorporate the practical necessities just as the instruments utilized and gadgets chose for framework testing in various investigation cases. The pre-owned calculation measures the shading data present in the picture, changing it over to grayscale. To decide the face in picture, the picture is isolated in sub areas deciding if the subregion is a face or not. The utilization of this calculation implies an efficient and just the subregions that contains a face are prepared. The motion location is done from the lingering mistake that is demonstrated considering a direct mix of facial development models. A comparable model is considered to distinguish the position and tendency of the face. It incorporates a framework that permits recognizing facial motions within the sight of head development. Figure shows the flowchart of the framework. The code used to carry out the calculations was made considering the restrictions that have cell phones like the restricted substance or highlights in the interface, moderate or restricted equipment and use circumstances. Their achievement in usefulness depends in transit they are planned and advanced by organization that possesses Android. The application is introduced on driver's gadget running Android working framework (OS). The cycle begins with catching of live pictures from camera and is

therefore sent at nearby worker. At the worker's side, Dlib library is utilized to recognize facial tourist spots and a limit esteem is utilized to identify whether driver is sleepy or not (T. Soukupova and J. Cech,2016). These facial milestones are then used to process the EAR (Eye Aspect Ratio) and are returned back to the driver. In our specific circumstance, the EAR esteem got at the application's end would be contrasted and the edge esteem taken as 0.25(T. Soukupova and J. Cech,2016). In the event that the EAR esteem is not exactly the limit esteem, this would show a condition of weakness. If there should be an occurrence of Drowsiness, the driver and the travelers would be cautioned by an alert. The ensuing area subtleties the working of every module.

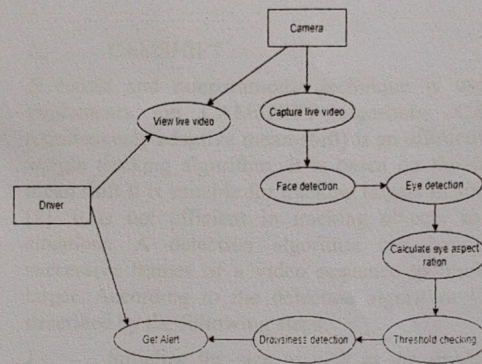


Fig: System Architecture

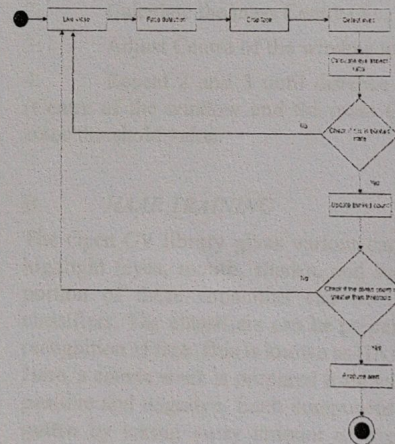
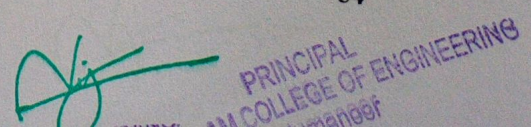


Fig: Flowchart

III. RELATED WORKS

The created framework is a constant framework. It utilizes picture preparing for eye and face discovery. HAAR based course classifier is utilized for face identification. A calculation to follow objects is utilized to follow the eyes persistently. To recognize the tired condition of the driver, the PERCLOS calculation gave [2]. The paper centers around building up a non-nosy framework which can distinguish weariness and issue an admonition on schedule. The framework will screen the driver's



eyes utilizing a camera. By building up a calculation, the side effects of driver weakness can be recognized early enough to keep away from mishap. At the point when the indications of exhaustion have been distinguished yield as sound and safety belt vibration is given to alarm the driver. Cautioning will be deactivated physically as opposed to consequently. This paper utilizes a quicker calculation than PERCLOS. This framework will recognize driver's weariness by the preparing of the eye area. After picture obtaining, the principal phase of preparing is face identification. If the eyes are blinking without any delay and if the eyes closed more than 0.5 seconds, this system issues warning to the driver. The warning is in form of an alarm and vibration. MATLAB is used for the processing of the image. System makes use of the number of eye blinks for detecting the state of drowsiness in a driver. The system makes use of Open CV and Raspberry Pi module with a single camera view. The eye status is obtained through image processing algorithms. This paper takes into account only the state of the eyes, it does not focus on the frequency of yawning. In them computer vision and alcohol gas sensor combination is used to detect drowsiness and alcohol intoxication. This system makes use of Raspberry-pi and Arduino UNO with. The proposed system is based on computer vision and embedded system applications. Eye closure is detected using HAAR based cascade classifier and an alcohol gas sensor which functions as a Breathalyzer. This system includes two modules. The two modules are the face and eye detection module followed by the face tracking module. CAMSHIFT algorithm is used for continuous face tracking. This system also uses cascade classifiers in order to improve the accuracy of face detection. The system is a real time non- intrusive model. To reduce the number of accidents caused by drowsiness, various methods for detecting drowsiness automatically have been developed. Three ideas are discussed in this paper; the first idea is creating a dataset of drowsy facial expressions. The second idea is to combine visual, non-visual, and vehicular features into one. The last idea is to develop wearable hardware such as smart watches in order to detect drowsiness. The framework will screen the driver's eyes utilizing a camera. By building up a calculation, the side effects of driver weakness can be recognized early enough to keep away from mishap.

IV. METHODOLOGY

After surveying a number of different papers, the following methodologies have been identified:

A. PERCLOS

Initially, in order to identify the driver's drowsy state using PERCLOS, we need to perform the following steps as per [2]:

- Perception of face and face pursuit.
- Position of eye and eye pursuit.
- Identification of the state of the eyes.
- Calculation of percentage of eyelid closure.

- Identification of the drowsy state.

PERCLOS is one of the measures to notice the wstate of drowsiness. The PERCLOS (Percent of the time Eyelids are shut) measurements is utilized to measure sluggishness in the work "Eye following based driver weakness observing and cautioning framework" [9]. The framework gauges with a non - parametric techniques for recognizing laziness, the vehicle directing wheel changeability is considered to decide the measure of sleepiness since drivers makes inconstancy more noteworthy as driver become more sluggish. The PERCLOS measurements for cautioning driver is utilized in [10] to identify tiredness in hefty vehicles, to screen and caution the driver [11], for line takeoff admonitions [12] and to identify languor conditions in drivers [13].

A. CAMSHIFT

A robust and nonparametric technique is used [2]. It implements the CAMSHIFT algorithm. CAMSHIFT (continuously adaptive mean-shift) is an efficient and light weight tracking algorithm. It is based on the concept of mean shift It is suitable for tracking targets in simple cases [2]. It is not efficient in tracking objects in complex situations. A detection algorithm can be applied to successive frames of a video sequence to track a single target. According to the detection algorithm [2] can be described by the following steps:

1. Initialize the size as well as the position of the search window.
2. Calculate the mass Centre (X_c , Y_c) of the window.
3. Adjust Centre of the window to mass Centre.
4. Repeat 2 and 3 until distance of the two centers (Centre of the window and the mass Centre) is less than some threshold value.

B. HAAR TRAINING

The Open CV library gives various capacities to face and highlight (eyes, mouth, shades, and soon) recognition. A portion of these capacities can be utilized to prepare classifiers. The classifiers can be prepared for the cycle of recognition of face This is known as HAAR preparing. Here, a course work is prepared from various pictures, both positive and negative. Each component is a solitary worth gotten by taking away amount of pixels under different areas of the pictures [3]. The pixels utilized for extraction is distinctive for each component. Every one of the extricated highlights will not be helpful for the necessary cycle.

C. VIOLA JONES ALGORITHM

Viola Jones algorithm uses the following techniques in its algorithm [8]. They are:

- HAAR based features
- Integral Image Formation
- AdaBoost Technology
- A cascade of classifiers

Highlights are chosen dependent on the pixel powers in HAAR based component portrayal. It doesn't mull over, the upsides of the pixel. HAAR based highlights are scalar item between the picture and some HAAR layouts. Essential picture development is utilized for highlight estimation. It thinks about just four corners of the picture. Versatile boosting (AdaBoost) is utilized to choose the necessary highlights. Because of the utilization of Adaptive Boosting there is a decrease in the computational season of the calculation. A course of classifiers is utilized to build up a solid classifier chain. The OpenCV library gives an order brief preparing utility called HAAR-preparing which produces a classifier in XML design when given positive and negative instances of the item to be distinguished.

V. RESULT

Using this system, we can ensure an efficient system which can be used prevent accidents due to drowsiness to a large extend. This system can be implemented in all kinds of car. We can also add additional implements which can include a message sent to another person which can be pre-selected by the user, and the message can include details like GPS location, driving speed etc. at the point of a drowsiness detection. All these can be combined so that a large number of accidents can be reduced and a lot of people can be saved from severe injuries and death.

VI. CONCLUSION

This paper gives a similar report on papers identified with driver laziness recognition and ready framework. To give an answer for the issue of recognizing the condition of languor, a math based strategy is utilized [2]. This framework utilizes eye development to identify exhaustion. Eye development is distinguished utilizing a camera. This is done to perceive the indications of exhaustion to stay away from mishaps [6]. It depends on the idea of eye-following. To acquire better outcomes, hundred and fifty pictures of various individuals have been utilized. In the event that the condition of weakness has been recognized, a caution framework is turned on [9]. PC vision with installed frameworks are utilized. A product calculation is created. It was halfway used and discovered to be compelling. There is a lot of extension for additional upgrades [4]. The proposed framework recognizes laziness if the eyes have been shut for a time of at least four edges. The recognition framework separates the ordinary eye flicker from sleepiness. The created framework is a non-obtrusive framework. The framework can be additionally evolved by adding different sorts of sensors [5].

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Automated Attendance System Based on Face Recognition & Live Video Processing

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Abstract:- Tremendous growth in the Face Recognition Technology paved a new way for making the normal life easier and more secure. Face Recognition can be used as a Security & Privacy authentication factor and at the same time, it can be used as an identification methodology. Here, an automated attendance marking system based on face recognition technology has been made with the aid of live video processing. The video will be captured using a camera module and that live video will get processed at the same time. The processing means nothing but searching for a human face in the captured video. If there is a human face in the live video, that face will be detected by the face detection module and will be given to the face recognition module. The face recognition module is connected to a database which contains multiple images of a person's face with various facial expressions. Each face in the database has a unique identification number. After the face has been detected, it will be compared with each and every face in the database system. If the detected face is present in the database, the unique value of the image will be popped out and the name of the person whose face which is identified will be marked. This popped out name will be given to the attendance marking module so that the attendance can be marked real time.

Keywords – Face Recognition, Linear Discriminant Analysis, Face Identification, Attendance System

I. INTRODUCTION

The objective is to build an automatic face recognition attendance system using machine learning method. The detection & recognition of face will be carried out using an algorithm called as Fisher LDA (Fisher Linear Discriminant Analysis). These process are trained using Haar Cascade implementation. Haar Cascade implementation is a machine learning methodology with which both the positive and negative images are gets used to train the identifier aka classifier module or system. The positive image consists of the images that the system wants to detect and recognize. That is in this case, the positive images consists of human faces that are to be detected by

the system. But in the case of negative images, it consists of the images that the system wants to be neglected, that is faces other than human faces. Images of various animals, various buildings, trees etc. can be included in this. The main aim of haar cascade implementation is to train the system to easily distinguish between a human and non-human face. Thus by the accuracy of the system will get increased and the error rate will be diminished. Face Recognition is normally used for security purposes. Here it is used as an identification & recognition method. The scope of the system is that, the time and effort for taking attendance in conventional mode can be saved using this method. A criterion can be set for attendance marking, for e.g., the person who attended the session more than 50 minutes will get attendance, so by this way, the mentality of class bunking can be reduced.

II. RELATED WORKS

The Face Recognition Techniques are divided into 4 categories

- > Knowledge Based Methods
- > Feature Invariant Methods
- > Template Matching Methods
- > Appearance Based Methods

All the above described technologies has both efficiency & deficiency. The techniques are easier to implement and on the same time they are much more susceptible to error. Detection of face with various facial expressions are also difficult by using the above mentioned methodologies [4][9].

Longitudinal Study & Analysis of Permanence Property provides stability to the system during overall analysis phase. The projected output using the above mentioned methodology is less error susceptible. The major drawback is that this methodology is much more complex to implement and the magnitude of the performance of the face recognition system is based on the amount of longitudinal analysis gets performed [5].

Superposed Linear Representation Classifier (SLRC) is another technology used for face detection. This method successfully overlays the advantages of the robustness of the collaborative representation which makes the system much more user friendly and easier to amend. Processing of uncontrolled and underdamped datasets, CR Based methodologies will result in the chance of occurring more error [7] [10].

While using Convolutional Neural Networks as training data, the face recognition system acts in a different dimension. It is common to occur image blur in the captured video or image. Here by using CNN, the image blur is treated by applying artificial blurriness to make up for the shortage of real world video training data using CNN training data. The above mentioned process can only be implemented as a single CNN Model. To implement in large scale multiple number of single CNN must be needed to concatenate together which results in the increase in cost and time of calculation. It also increases the complexity of the overall system [1].

Another methodology to implement face recognition is by using Helmert Contrast. Here signers are much less capable of identifying the human face and recognizing it by compared with non-signers. Response time varies with the age, gender and facial expression of the collected dataset [3].

Heterogeneous Joint Bayesian (HJB) is the much more advanced technology in the field of face recognition while by compared to all the former defined methodologies. Here Separation of the Equivalent/Diverse Face Matches Precise is done more rapidly. The visible drawback of the system is that the procedure of implementation is very high and small mistakes leads to overall damage of the output [2].

The metric calculations are normally expressed as vectors in Proximity Based Clustering. Time taken to complete the process is high because the vector input data is to be converted to scalar data to get processed and again needed to be converted to vector form [6].

III. PROPOSED METHODOLOGY

Face Recognition can be performed in so many ways that each way gives each result accuracy. The proposed method uses a methodology called as Fisher Linear Discriminant Analysis along with Principal Component Analysis. The system is classified into 5 Modules.

A. MODULES

i. Video Capturing Module

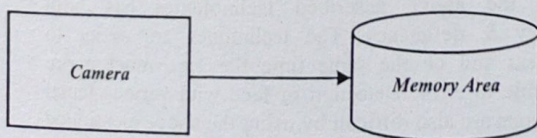


Fig. 1. Video Capturing Module

Video Capturing Module consists of only 2 items. Camera used to capture the data or video & Memory Device to store the captured data. Whenever the camera turns on, the memory device also gets turned on and the simultaneous storage will gets takes place. The video

stored inside the memory area will be used for frame by frame reading and image pre-processing.

ii. Image Pre-processing Module

Image Pre-processing improves the data stored in the image. Improvement doesn't means increase in data, but it reduces the data distortion of the image. In the proposed system, image pre-processing consists of the 2 steps: Image Crop and Resize & Gabor Wavelet Calculation.

iii. Training Module

All Images are pre-processed so that the obtained data can be used for creating tensor. The tensor is a 3D representation which describes the relationship between various sets to a vector space. The created tensor is then given to perform Principal Component Analysis (PCA). The result of PCA is then used to create various projections of face. The projection is created by using various Color lines for each expression in order easily distinguish between them. A Class Mean Matrix and Global Mean is created so that the further step of creating a Scatter Matrix will gets boosted.

Scatter Matrix is mainly created when the covarian matrix calculation is much harder or too costly to calculate. Scatter Matrix plays a huge role in the process of dimensionality reduction. Corresponding Fisher Face is gets calculated as the next step by which the scatter matrix as input. Fisher Face has superiority over Eigen faces because of the effort in maximise the separation between various domains or classes in the training pairs. Recognizer function has been derived from the calculated Fisher Face and this function is used for comparing the unique id with the actual inputs.

iv. Registration Module

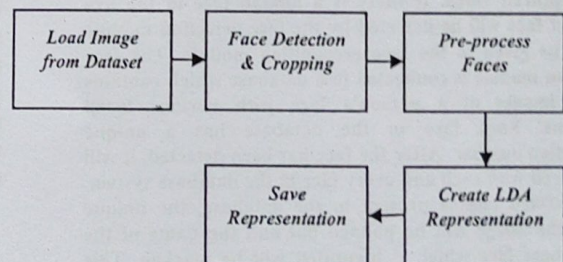


Fig. 2. Registration Module

The primary aim of registration module is to make the system able to train the datasets or the training sets. Initially, the images resides in the databases is gets retrieved using SQL queries. The retrieved images are the cropped and given for haar cascade implementation. This is for detecting a human face [8]. After detecting human face, the image is gets pre-processed as described in the pre-processing module. Pre-processed image is then transformed to some mathematical expressions based on the data obtained from the image. These mathematical data is given to LDA for Fisher Face creation. After creating the fisher face, corresponding unique ID is created so that this unique id is then compared with other unique id which is the final step for obtaining the person's identity.

v. Attendance Marking Module

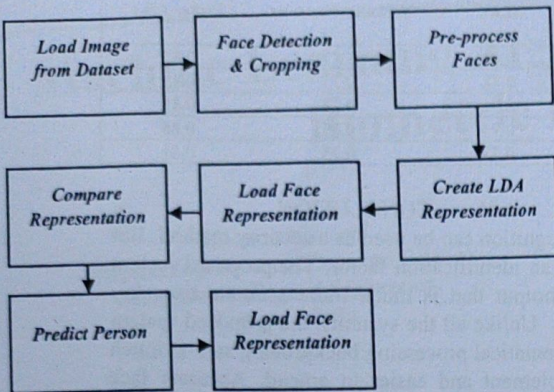


Fig.3. Attendance Marking Module

In the case of attendance module, live video is gets captured and frame by frame image is gets read out from the video. This frame by frame video is then cropped and pre-processed and corresponding fisher faces are calculated. As the next phase, the calculated fisher representations are loaded and compare with the already stored fisher face values. Based on this comparison results, predictions are happened. That is, when 2 values are gets compared and shown that they are same, details of the corresponding person is retrieved from the database and this details are used to mark the attendance.

B. SYSTEM ARCHITECTURE

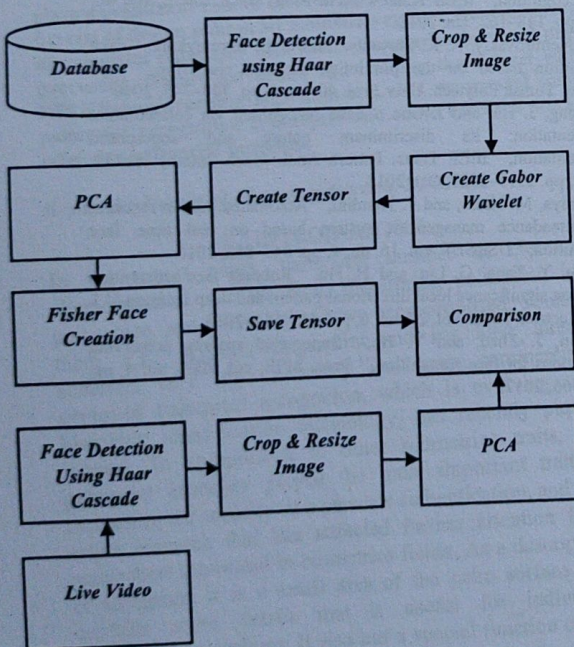


Fig. 4. System Architecture

The Above Diagram shows us the actual architectural explanation of the proposed system. The combination of 2 architecture forms a single structure to identify and mark the person's attendance. Following are the steps performed inside the system.

- Dataset (Database) – Stores data that are extracted using feature extraction technology. These Data is used to characterise the face.
- Face Detection using Haar cascade Implementation – Both Positive & Negative Images are trained so that the face detection process will be much more efficient and error free.
- Crop & Resize Face– This phase reduces the size of the image and make the face recognition process much more concentrated to the needed areas.
- Create Gabor Wavelet – Using Gabor Feature Extraction, features are directly extracted from the Gray-scale image.
- Create Tensor – Create a Rank 1 Tensor (Vector Tensor)
- PCA the Tensor – Principal Component Analysis is the process of reducing the dimension. That is the dimensionality reduction is performed so that as much as the information is retained on the image or dataset. The Tensor gets PC Analysed
- Fisher Face Creator – Face Detection is performed using the fisher algorithm so that the efficiency will be high and easier to make separation between classes during training.
- Create & Save Tensor – The New values are inserted into a tensor and this tensor is saved for future usage.

i. Haar-Cascade Implementation for Face Detection

Haar Cascade implementation is a ML method used to learn and train systems. In Haar Cascade implementation, both the positive and negative image are used to train the system. The Positive image consists of the images that we want to detect. That is in the case of human face detection, positive images consists of human faces along with some random images. In the case of negative images, it doesn't contains the type of images we want to detect. Haar Cascade Implementation makes the system much more accurate in predicting the output. This is because, the system gets much more calibre to distinguish between the training set which is necessary and not necessary. In other words, the capability of detecting wanted images from unwanted images gets increased using haar cascade implementation.

ii. Gabor Wavelet Creation

Face detection is quite possibly the main utilizations of Gabor wavelets. The face image is convolved with a bunch of Gabor wavelets and the subsequent pictures are additionally handled for acknowledgment reason. The Gabor wavelets are typically called Gabor channels or Gabor Filters in the extent of utilizations. The major reason for using Gabor wavelet is because it reduces the amount of standard deviation with respect to its time and frequency values. The 1-D equation used to calculate the Gabor wavelet is

$$f(x) = e^{-(x-x_0)^2/2\sigma^2} / e^{-ik_0(x-x_0)} \quad (1)$$

iii. Fisher Face Calculation

Fisher Face is a mathematical modelling of images. After the tensor is gets PC analysed, the next step is to

create a fisher face based on the obtained data. Fisher Face has much advantage over Eigen Face because, Fisher face is less susceptible to error & also because of the effort to maximize the separation between various classes in the dataset over the time of training.

iv. *Principal Component Analysis*

Principal Component Analysis is a dimensionality reduction process with which the larger size sets have been reduced to lower size sets with retaining the maximum amount of data it can hold. Sometimes the dimensionality reduction may results in the accuracy of the output. By compared to larger sets, smaller sets are always comfortable to scan, traverse and project the data values. So the process of the dimensionality reduction results in making the system less time consuming. It is also proved that for machine learning based calculations, it is always better to use smaller sets, which is dimensionally reduced sets. There are 5 steps for explaining the concept of PCA. They are,

- Standardization
- Covariance Matrix Computation
- Eigen Value & Eigen Vector to calculate the principal component
- Feature Vector
- Recast The Data Along The Principal Components Axes

IV. RESULT & PERFORMANCE ANALYSIS

As taking the whole output response as reference, the proposed system produce much more accurate output than any other existing face recognition system. Fisher Linear Discriminant Analysis combined with Principal Component Analysis makes the system less susceptible to error and more user friendly. Compared with the existing systems, proposed system possess much more stability while performing the operations, that is the system is stable and there is only less chance of having error. Amount of junk value generation is reduced to a certain level, so the output will not be affected with junk. Occluded Face Recognition can be performed by using the proposed system with 80% more accuracy than any other system. Computational Time has been reduced drastically so that all the operations are done rapidly.

TABLE I. DATA TABLE

Test Set Count	Accuracy		
	SLRC	Helmert Contrast	Fisher LDA
10 ~ 20	0.79	0.79	0.87
20 ~ 30	0.78	0.73	0.85
30 ~ 40	0.76	0.73	0.85
40 ~ 50	0.73	0.73	0.84
50 ~ 60	0.73	0.73	0.81

V. CONCLUSION

Face recognition can be used as a security method. But here it act as an identification factor. The proposed system provides an output that is much more accurate than any other system. Unlike all the systems, the proposed system has less mathematical processing background, so it is much easier to implement and easier to amend. Accurate face recognition is done so that no unwanted or misleading prediction will happen and the system will always remain error free.

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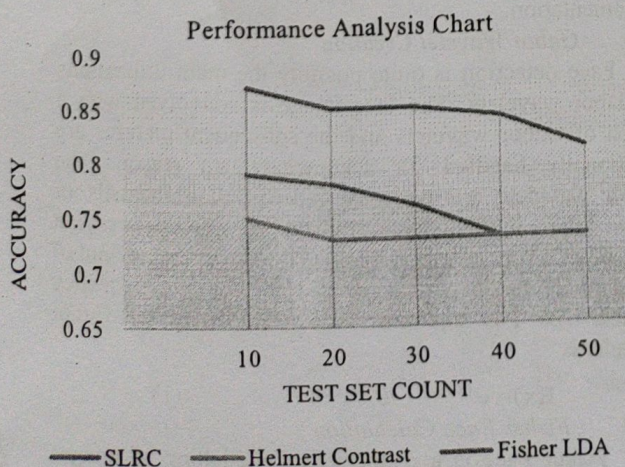


Fig. 5. Performance Analysis Based on Accuracy

Machine Learning Algorithms based Palmprint Biometric Identification

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Abstract-Biometrics have gained popularity over the last decade and palmprint have rich and unique features which makes it a reliable biometric identification methodology. There are many different low resolution palmprint recognition algorithms have been developed. Deep learning plays a prominent role in biometrics. This paper focus on the process of design palmprint biometrics system, fromsummary of palmprint databases with their characterizations and pre-processing, feature extraction and training the dataset with RFCNN deep learning algorithm and also, we present some palmprint recognition techniques and some research works related to palmprint purposes.

Keywords: Palmprint, Feature extraction, RFCNN

1. INTRODUCTION

In the recent years, there are number of biometric characteristics such as face, fingerprint, palmprint, iris, gait, voice, and handwriting have been proposed. Some of them, e.g., people's fingerprint and iris have already achieved very high accuracy and been commercially deployed. Palmprint recognition, which is evolving as a biometric identification technology, has recently piqued interest. In comparison to other biometrics traits, the palmprint modality played the most important trait in increasing the security of a person's authentication, and it is active research that has attracted further attention from researchers interested in biometrics fields. As a description of palmprint, it is a small area of the palm surface that contains more details that is useful for individual authentication systems. It also has a special function called permanence, which means it will not alter over time. For this reason, palmprint are reliable and confident modality between the same categories of palmprint like fingerprint and face etc [1].

Palmprint characteristics such as flexion creases, wrinkles, ridges, and minutiae are found on the palmar side of the

hand and are permanent and exclusive to a person [2]. Palmprint recognition has the potential to achieve high accuracy and reliable performance for personal verification and identification [3], as these significant features of the palmprint are considered to be permanent and unique to a subject [4]. As a result, palmprint recognition has the potential to achieve high accuracy and reliable performance for personal verification and identification. Palmprint recognition is often considered a non-invasive biometric technology because of its high user-friendliness and ease of self-positioning. As a result, palmprint-based biometrics have a wide variety of civilian and forensic applications [5]. The standard palmprint recognition pipeline consists of modules for pre-processing, segmentation, palm region of interest (ROI) extraction, feature extraction, and matching. At each stage, the modules are designed to extract desired features and pass that information on to the next module. In most current methods, the features are carefully hand-crafted using human knowledge of the hand, palm, and image acquisition settings to successfully process the details.

This paper focus on the process of design palmprint biometrics system step-by-step, started from giving summary of palmprint databases with their characterizations and pre-processing, feature extraction and training the dataset with RFCNN (Region fully based convolutional neural network) deep learning algorithm and also, we present some palmprint recognition techniques and some research works related to palmprint purposes. First the system we will use OpenCV for identifying the palm from an image, then the palm landmarks are extracted from image. Using these landmarks, align the image. Using a Custom RFCNN deep learning model to train the system and these models will be able to predict person based on palm image.

II. RELATED WORKS

There are many palmprint identification methods available but deep learning-based methodologies are commonly used. CNN have been successfully used in biometric identification and computer vision-based problems. Deep learning is successful in image classification, shape analysis and biometrics. Deep learning paradigm referred as d prime CNN allows learning optimal features for genuine/imposter separation task. The parameters of the neural network are learned to minimize a loss function. Here the computed scores are directly calculated and approximate the genuine/impostor score distributions as normal distributions and maximize their separation, trying to achieve the largest difference between the means and smallest standard deviations. Thus, the system learns more general representation of palmprints and performs better on new unseen data.[1]

Palmprint acquisition methods can be divided into two categories contact-based and contactless-based. Traditional contact based palmprint acquisition device is similar to optical fingerprint. During the acquisition the palm is pressed against the contact surface and light is totally internally reflected and in the ridge region and absorbed in valley region. However, when the palm is pressed on the surface, the centre region is lost in acquiring the image. Another methodology in contact-based palmprint acquisition is Diffuse Reflection (DI) image which captures diffuse reflection of light, and the camera is perpendicular to the contact surface. Thus, the central region of the palm can be imaged in the acquired image, even without touching the contact surface. Both DI and TIR is combined so that they can be used simultaneously and the centre region of the image can be captured [2]

We compare three contactless based palmprint acquisition. First palmprint images are pre-processed using fuzzy enhancement algorithm. Second approach is based on CNN for feature extraction, which is widely used in face recognition and biometric identification systems. Third methodology compares three set of databases PolyU II, CASIA and IITD.[3]

Palmprint identification method based on block mean grey value. Firstly, based on the coordinate position of finger-root in palm outline and by locating the contour feature points of palm, we obtain the palmprint region of interest, and then the block mean grey values are calculated as the palmprint features. Finally, we use feature matrix distance for the palmprint matching. These algorithms come under the category of non-contact-based recognition system, and is an online stimulation system using GUI of MATLAB.[4] The main advantage of ultrasound is that it is possible to collect 3D images. 3D images allow high defined extraction of all the features which improves accuracy. Ultrasound image uses a coupling medium, an ultrasound probe and images are collected by submerging the palm in the probe. But such a system is not acceptable by the users. To solve this problem a commercial gel is used as a coupling system.[5]

The surface feature of 3D palmprint by weighted shape index feature. The feature vector of sub-region histogram is obtained by shape index feature. Our feature can overcome

the effect of illumination change of training palmprint data. At the same time, local sparse coding can quickly find n samples similar to test samples. Most of the training palmprint data can be excluded and some samples similar to the test palmprint are retained by comparing the correlation between the test palmprint and the training data. So, the classification problem can be clear and simple. And the classified information of the test samples in the database will be finally determined.[6]

Initially DL method is to perform biometric recognition by fusing palmprint and IFT extracted from single hand acquisition. method has the following advantages: i) it uses a DL model that consists of a CNN trained using an unsupervised procedure, which does not require class labels; ii) it uses the same CNN model for all biometric traits, adapted separately to the palmprint and to the IFT extracted from the different fingers; iii) it adopts a feature-level fusion of palmprint and IFT to increase the recognition accuracy, without requiring additional biometric acquisitions.[7]

Existing palmprint approaches are broadly classified into three categories: holistic, structural and hybrid based. Holistic approach uses the whole palmprint image as a feature with some statistical technique such as Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA), Independent Component Analysis (ICA) and Kernel Fisher Discriminant Analysis (KFDA). in order to enhance the discriminative capability, the Fourier Transform, Discrete Cosine Transform (DCT), Wavelet Transform, and Gabor Transform were performed along with statistical techniques on the palmprint images to extract palm features. The structural or local feature approaches use stable palmprint features such as palm lines and texture. These approaches can be further divided into three main categories: (1) line based, (2) coding based and (3) texture based. Line based extracts the palm lines via several line detection algorithms. Second category encodes the palmprint features into bitwise codes by using the responses of a bank of phase or directional filters. The hybrid-based approach utilizes both holistic and structural features to represent palmprint images.[8]

III. PROPOSED METHODOLOGY

A deep learning-based method for identifying a person from palmprint image using OpenCV. Palmprint features which are prominent for a person are identified and these features are extracted and the region of interest (ROI) identified. These extracted features are aligned in vertical alignment. A custom RFCN deep learning model to train the system and the model predicts the person based on palm image. Thus, the saved model can easily identify a person based on the input.

The proposed system has two stages training stage and prediction stage. In training stage, the dataset containing the palm images are loaded into the memory for pre-processing and the palm features are extracted using OpenCV and these extracted features are trained using RFCN architecture model and saved for prediction stage. In prediction stage the saved model is loaded and process the input image to identify the person and return a result.

A Modules

Palmprint based biometric identification system has the following modules:

- Palm detection
- ROI extraction
- Alignment of images
- CNN creation
- Training
- Prediction

In the palm detection module palm coordinates are detected by using OpenCV. After marking the palm coordinates the ROI is extracted from the extracted features and are aligned. The next module is the CNN creation, here the convolution layers, Dense layers, Dropout layers and SoftMax activation layers are initialized and fixed for training the model and create the RFCN architecture. In training stage, the dataset containing the palm images are loaded into the memory for pre-processing and the palm features are extracted using OpenCV and these extracted features are trained using RFCN architecture model and saved for prediction stage. In prediction stage the saved model is loaded and process the input image to identify the person and return a result.

B System Architecture

System architecture have two component training stage and prediction stage. In training stage, the dataset containing the palm images are loaded into the memory for pre-processing and the palm features are extracted using OpenCV these features include principal line, wrinkles, ridges etc., which is unique to an individual. ROI is extracted from the features and align them. These extracted features are trained using RFCN architecture model and saved for prediction stage. In prediction stage the saved model the input is pre-processed and features are extracted which are then aligned after ROI extraction. The saved model is loaded and process the input image to identify the person and return a result. It compares the input and the saved model and find the right person; the expected output is person id which is a unique number for identifying a particular person in our database.

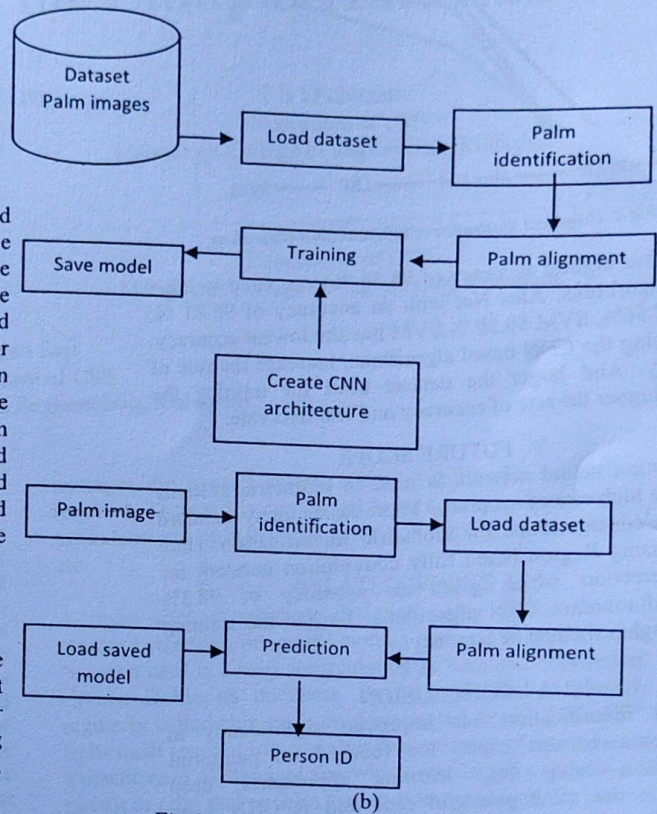


Fig 1. System Architecture (a) Training stage (b) Prediction stage

IV. Result Analysis

In this section a result analysis of the proposed algorithm is given. And compare some of the palmprint identification algorithms in terms of accuracy. Comparing three CNN based algorithms. Alex net, LBP, SVM, RFCN in terms of accuracy. Table 1 shows the accuracy rate of the four CNN algorithms and compares the test data and recognition rates.

TABLE 1. Accuracy table

Methods	Accuracy rate in %	
	Test data	Recognition rates
RFCN	94	98.36
Alex Net	92	98.21
LBP	88	92.56
SVM	79	89.50

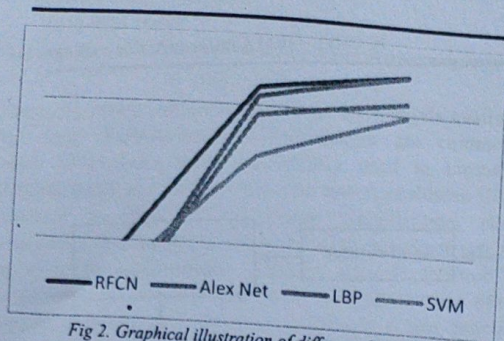


Fig 2. Graphical illustration of different CNN algorithms

RFCN has highest accuracy of 98.36 % compared to other CNN algorithms. Alex Net with an accuracy of 98.21 %, LBP 92.56%, SVM 89.50 %. SVM has the lowest accuracy. Combining the CNN based algorithms, increase the rate of accuracy. And larger the dataset used for training the model, higher the rate of accuracy and test data rate.

V. FUTURE SCOPE

Convolution neural network is used in biometric systems and have high rate of accuracy. There exists many standard CNN based algorithms for biometric identification. Here we are using Region based fully convolution network for palm detection which gives an accuracy of 98.3% compared to other CNN algorithms. Larger the training dataset higher the rate of accuracy.

VI. CONCLUSION

Palmprint identification has improved significantly in recent years. In this paper, we focused on palmprint identification using deep learning approaches, deep learning is the most powerful tool and RFCNN have successful applications in biometric and computer vision-based problems. Palmprint recognition system based on RFCNN is high in terms of accuracy when compared to other identification system and is expected to be a new phase in biometric identification methodologies. Future research should suggest using segmentation algorithms, as well as other classifiers and distance measures, to extract the hand even in pictures with unconstrained backgrounds

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RFID based Smart Card for Campus Automation

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Abstract—It is developed to ease the work of students, it involves a card containing a chip which is nothing but a unique identity that is given to each student. Smart card have the advantage to individuals with right of security and provide client trust. It will be utilized as a means of recognizable proof, provide safety and helps in transactions. Smart cards have potential benefit to people with the right of privacy and give the users confidence in trustworthiness of organization. So through this project we aim to design a student card system using smart card technology. The card can be used as a means of identification, automation, and payment. The smart card has a chip and id that is unique for every student. It is scanned with the help of RFID reader therefore it makes easy for students to carry a single card rather than cash. We have also tried to identify the ways in which the users are facilitated in accessing the controls and services in the campus. The smart card does not save data directly in the smart card but in the server for account based system. This design world increase the transaction speed and also keeps the process more secure.

Keywords—Smart card, Internet of Things (IoT), Smart class, RFID, RFID Reader.

I. INTRODUCTION

A smart card is a device that includes an embedded integrated circuit (ICC) that can be either a secure micro controller or equivalent intelligence with internal memory or a memory chip alone. The card connects to a reader with direct or with a remote contact-less radio frequency interface. In current scenario student cards are either made of magnetic strip or of ordinary plastic cards. These card have only limited space for data storage or in other words we say these cards do not store information rather they are just used as the means of identification. The wider advantage of a smart card over these ordinary id lies in its space, security, reliability and functionality. Smart cards have the benefit of storing comprehensive records with the advantage of accuracy and reliability in other words we define this smart card as a mobile database. Through this paper we aim to implement a student card using smart card technology for educational institutions. This will enhance the current student id's that are seen in many institutes and also abolish the the use of multiple cards and id. The authority of smart card is given to the admin who

manages the overall system and also refills the card when required. The card is considered to be a unique id and useful to students not only in classroom but in library, canteen, office etc.

II. RELATED WORKS

A smart card is structure designed using plastic card of standard size with integrated circuits inserted in it. In a word, "a smart card is a card consolidating at least one coordinated circuits inside its thickness. Smart cards are additionally regularly called chip cards or incorporated circuit (IC) cards". In its most straight forward structure meaning of smart card is a plastic card of standard size which consists of a coordinated circuit or chip that enables card to store or potentially process information. As indicated in the paper "A Review on IoT based Smart Card System for Students," the architecture has automated attendance records using a smart card with bar code. Here only attendance is marked and when compared to a chip bar code has only limited storage facility. No database is required only detection takes place here. Here the bar code is the unique identify of each student.

When it comes to [2] "Prototyping of Class-Attendance System Using Mifare 1K Smart Card". The design of this system is revolving around Raspberry Pi minicomputer and it act as the main controller of the system. Here Mifare 1K Contact less smart card act as the student id here and it is tapped on the NFC card reader during which a connection is established and information is exchanged between the host computer and the card reader. In this process the information like name and student id are fetched from the card. MIFARE is one of the NXP Semiconductor products that popularly used in contact less smart card[2]. The disadvantage of this system is that Raspberry Pi 3 does not have a built-in monitor or screen to display the output. Therefore, an additional screen is needed in order to display and also there is a small possibility of data loss.

As seen in [3] in general the implementation of smart cards will improve security, efficiency of cashless society, data consistency and functionality of the student card. Education is just one sector where smart cards can be adopted other sectors can also take on the adoption to improve their functionality and usability. But the drawback of this paper is

that it store only limited amount of information and less secure, other hand smart cards stores 100 times more data than magnetic tape cards.

The contribution of the paper[4] is a secure smart card reader system which serves as a middle system security. It improves the security of smart card transactions both contact and contact less. In this system the process of verification and initial validation of the card is done. The main drawback of the proposed method is that the system does not have a module to control SAM, and the protection is still vulnerable to hacking activities.

In IoT based Smart Monitoring System using RFID [5] the advantage is that the system uses RFID tags and is easy to handle and very convenient for any organization. It is time saving and user-friendly. But here only identification is performed the data is stored for few days and will be lost soon. It do not poses any multipurpose utility.

As mentioned in paper "Smart cards in Health Information System (HIS)" [6], the paper depicts same concept but the area of usage is different instead of educational institution here smart cards are used in Health care sectors to store the patient details. The plus point is that the Health data is consistent, its availability and management. But the cost of replacing the existing infrastructure is a bit risky factor and also data security plays a crucial role in health related documents. In paper [7] Students can purchase products through vending machines in their colleges by using RFID in their id card. These cards are useful only for purchasing items from college stores and there is no any kind of official utility.

III. PROPOSED SYSTEM

The Internet of things (IoT) describes the network of physical objects—"things" or Objects that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the Internet.

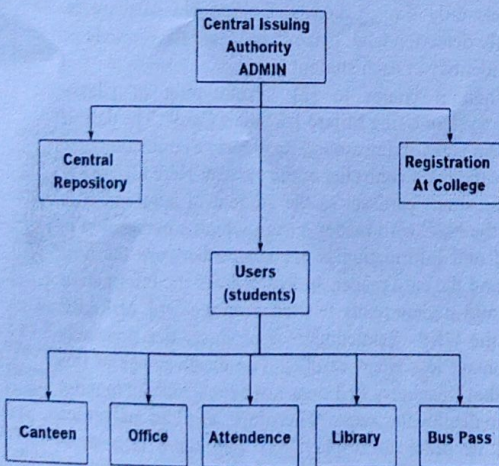


Fig 1. Overview of proposed system

In current situation the college management is a tedious task and it is also paper based . It requires extra effort an time to make records externally into the system and also causes errors.

All managerial activities require a 3rd authority to authenticate legally. But by using this proposed system automatically data is fetched, manipulated and recorded. This increases the ease of functions. The proposed model has a hierarchical structure which is shown as a figure above. The root node is the admin who manages every details of the students as well as all other nodes. The leaf nodes represent the end points where the services are offered to the students.

IV. MODULES

There are five modules for the system they are:

1. Admin
2. Office
3. Student
4. Library
5. Canteen

V. SYSTEM ARCHITECTURE

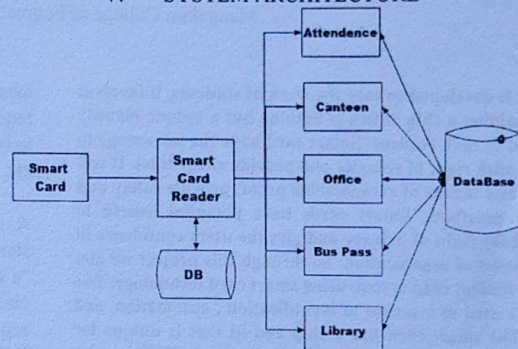


Fig 2. Architecture of proposed system

The figure above shows the architecture of smart card system. The central role of smart card is unique identification which is done using the unique id which is scanned using RFID reader hence according to the unique id the details are restored from the database. The database contain all the details related to all the modules and are interconnected. The database stores values in four tables. They are attendance, office payments, bus pass and canteen, library. For web page creation we use HTML and for the database creation and manipulations we use SQL queries and to link both these we use python.

VI. DFD DIAGRAMS

LEVEL 0

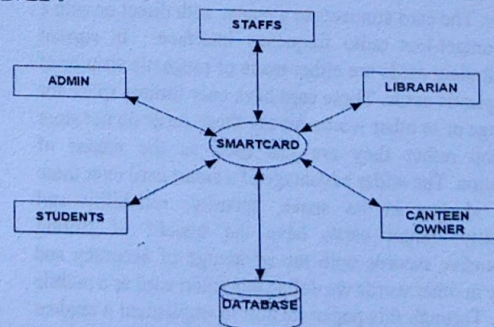


Fig 3. Level 0 DFD

LEVEL 1 ADMIN

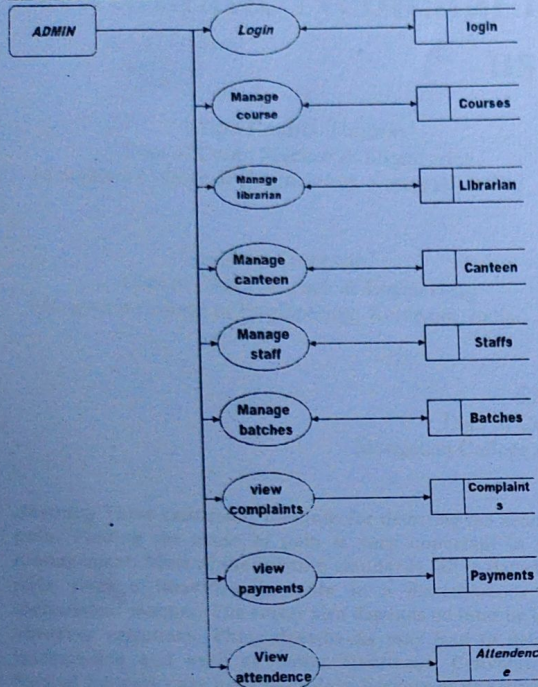


Fig 4. Level 1 Admin DFD

Canteen	Cash payment	Cashless payment
Bus pass	Paper pass	Smart card scanning

VIII. CONCLUSION

The smart card is a booming technology. The implementation of smart cards will improve security in general, efficiency caused by a cashless environment, data consistency and functionality of student card. Through the applications of the versatile smart card, many improvements in the existing environment can be made. Education is just one sector for the implementation of the smart card, smart cards can be adopted in various sectors and on taking upon the usage of smart cards it will improve their functionality, efficiency, and usability.

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VII. PERFORMANCE ANALYSIS

The RFID is a new technology that is widely used and deployed for object tracking and monitoring, contact less payment etc. In the below table we perform the comparison between conventional and the proposed smart card system using RFID.

Table 1

Parameters	Conventional system	Proposed system
Attendance	Registers are to be maintained. Faculty is needed to enter the record Time recording is not possible.	The database is created Attendance can be entered simply by scanning smart card. Exact time is recorded
Payment	Multiple cards are required for payment making	Single smart card be used
Library	Ordinary id is used for authentication	Smarted can be used and all details of book taken and returned are recorded automatically

Automatic Neonatal Pain Detection for Pediatrics using CNN

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Abstract: There exist many methods for detecting the neonatal pain. Finding the cause of pain is very important in pain management. Most of the existing standards fail to detect the pain since it identifies the pain in a discontinuous and inconsistent manner. The result also depends on inter or intra observer variations. These drawbacks may lead to delayed intervention and over or under treatment. Convolutional Neural Networks are used nowadays because of its successful application in medical image analysis, image recognition etc. Here we are using a lightweight Convolutional Neural Network which is specifically designed for neonates for the effective detection of neonatal pain. The N-CNN used here is applied on a real world dataset which contains images of the neonates at the time of pain while being hospitalized in Intensive Care Unit. It is clear from the experiments that N-CNN used here is very efficient in classifying the pain when compared to the existing standards.

Keywords – Convolutional Neural Network, Neonatal pain, Pain Detection

I. INTRODUCTION

For many years Paediatricians believe that neonates do not have the ability to sense the pain. But later it is discovered that they do have a sense of pain. There exist many methods for detecting the neonatal pain. The main drawback of these methods are they are discontinuous and not consistent in determining the pain of neonates. Since neonates can't able to communicate correctly it is very important to determine the cause of pain for the proper pain management. The current standards are discontinuous and inconsistent as it depends highly on intra and inter observer variations it will gradually leads to under or over treatment. Over use of medications like Morphine causes serious Side effects like hypotension, intolerance etc. Convolutional Neural Network were used because of its wide successful application in medical image analysis, object recognition, image recognition etc. Convolutional Neural Networks provides pain relevant features as they have the ability to learn and extract features at multiple levels of abstraction. The existing CNNs are not very efficient in determining the pain of

neonates as these networks are trained using a number of images [9]. Here we are using a novel light weight neonatal convolutional network which is designed specifically for determining the pain of neonates using facial expressions. These CNNs are trained using globally available dataset. Many existing standards fail to detect the facial expression of neonates due to the unique craniofacial structure of neonates and large variations in pose and expressions [10]. From the experiments it is clear that the proposed CNN is very efficient and viable in determining the facial expression of neonates than other existing standards.

II. RELATED WORKS

Local Binary Pattern is a vector based used for detecting the pain in neonates. Images are adopted from COPE dataset. Feature Vector is classified into pain or no pain using the Gaussian and nearest mean classifier. Gaussian classifier is best in distinguishing pain and no pain symptom. The time consumption of the classifier showed very fast and a consistent result. As the neighbourhood is small it cannot capture dominant features with a large-scale structure [1].

Image-based technique is used for the classification of pain states. Comparing several texture descriptors based on Local Binary Patterns (LBP). The two novel solutions obtained based on the combination of new text descriptors are the Elongated Ternary Pattern (ELTP) and the Elongated Binary Pattern (ELBP). ELTP is considered as the best performing descriptor. ELBP combines both the characteristics of the Local Ternary Pattern (LTP) and ELTP. This method involves unusual amount of noise in the face of neonates and the variations in the expression between the classes affect the sub images rather than the whole image [2].

Neonatal Facing coding system (NFCS) is used to study the full term pain behaviour of the neonates. The aim is to evaluate the reliability and feasibility. NFCS can be used at the bed side thereby ensuring a good reliability. Inter observer reliability was found to be high for the NFCS pain

facial actions. It discovered pain in premature babies. Through this method a good reliability can be demonstrated consistently. Rather than hand held computer recording paper and pen recording was used. For the face actions at the bed side a high inter observer reliability was observed [3].

Pretrained Deep learning Convolutional Neural Network (DCNN) with transfer learning is used for the neonatal pain expression recognition. The transfer learning method used here helps to avoid the occurrence of overfitting and accelerate the training procedure. In order to enhance the generalization ability of DCNN it is fine-tuned using the neonatal pain expression image dataset. Fine tuning helps DCNN to achieve a good performance. DCNN along with transfer learning gives a promising application for clinical diagnosis [4].

The basic concepts of three face classification techniques are PCA, LDA and SVM. The main idea in PCA is that finding the covariance matrix of image data set with which each image is considered as a one or single point in high dimensional space. In LDA images are projected into the space. SVM separates the input vector patterns into two classes considering the optimal separating hyperplane. Using this method, a high recognition rate was achieved. Reactions corresponding to acute pain is only included in the dataset. This study takes photograph which do not take into account the dynamic nature of the facial expressions [5].

A combination of hand-crafted and deep-learning based features are used for the pain assessment of neonates. Uses a pipeline for pain assessment in new-borns using the face images. Face detection is facilitated by face detector and aligned by using affine transformation. Local Binary Pattern (LBP) and Histogram of Oriented Gradients (HOG) are considered as hand crafted features. VGG and MBPCNN have been used for deep feature extraction. Attains an average accuracy of 82.47 [6].

A neonatal convolutional neural network is proposed for the detection of the neonatal pain. The proposed N-CNN is evaluated in an unconstrained dataset which was collected from 31 neonates. When compared to the current existing standard the proposed CNN achieves attains a high accuracy. It is also considered as the most viable and efficient when compared to other standards [7].

Existing standards which were developed for recognizing the face in adults do not work well for infants due to the unique structure of the face of neonates. A special engine is trained to recognize the face of the neonates which also discriminate the faces of neonates from adults. This software system developed to annotate the image database is also developed. Experimental result shows that trained baby face recognizer achieves a great improvement in differentiating baby faces from adults and works well in dataset which contains both baby faces and adult faces [8].

III. PROPOSED METHODOLOGY

We use a novel Convolutional Neural network for assessing the type of neonatal pain by facial expression. The machine learns from examples like the human brain and

forms a logic in CNN to classify, which category it belongs to. We use pre-processed neonatal images collected from NICU (Neonatal Intensive Care Unit) and CNN to develop the trained model and the model won pain classification tasks. The Architecture layers of CNN are created using Keras Library in Python. The trained model categorizes the images into four different stimuli-Pain stimuli, Rest/Cry stimulus, Air stimulus to Nose, Friction stimulus.

A. The Pre-processing Stage

The neonatal image dataset must be loaded as python data structures for pre-processing to suppress the undesired distortions, enhance some relevant features, and for further analysis of the trained model. Since the model gets trained faster on small images, resizing is done. Later, Histogram Equalization and Normalization techniques are applied to neonatal images to clean image data for model input.

B. The Feature-Extraction Stage

Feature Extraction increases the accuracy of the model by extracting the features of pre-processed neonatal images and converting them into a lower dimension without losing image characteristics. Based on this stage, classification of the pain states can be done.

C. The Classification Stage

An image classification model is trained to recognize various pain states of neonatal images and classification is done by the dense layer associated with the CNN. It will tell the probability that a neonatal image representing one or more classes that the model was trained on.

D. Training Stage

The system is based on the idea that it learns from pre-processed neonatal images and forms a logic in CNN to classify, based on to which pain category it belongs to. This trained model is saved and is later used in the prediction section. In CNN, the stages of feature extraction and feature classification are merged and thus it improves classification efficiency and accuracy.

E. Prediction Stage

In this stage, the saved model automatically detects the pain state of the neonatal image given by the user. The saved model and the pre-processed images are loaded for predicting the type of pain state. CNN offers high accuracy over image classification and produces perfect results.

IV. MODULES

The proposed system contains the following modules:

- Pre-processing images
- Training
- Prediction
- GUI Creation

A. Pre-processing Images

Here the images are loaded from the dataset. After the loading of images resizing is applied to images. Later, weighted mean Histogram Equalization is performed for brightness preserving image enhancement and to reduce noise. After that Normalization is performed to normalize the images from 0-255 range to 0-1 range.

B. Training

In training, load the pre-processed images and the architecture, that was created. After loading, training is performed. When training gets completed, a logic is formed in the CNN on how to classify the images and this model is saved.

C. Prediction

In prediction we load a neonatal image which has to be classified. Resizing and pre-processing is done to the loaded image. Thereafter, load the saved model. Pass the pre-processed images through the trained model for predicting the type.

D. GUI Creation

GUI will be created using tkinter package in Python. This contains a button for choosing the images. The predicted type will be displayed in the same window.

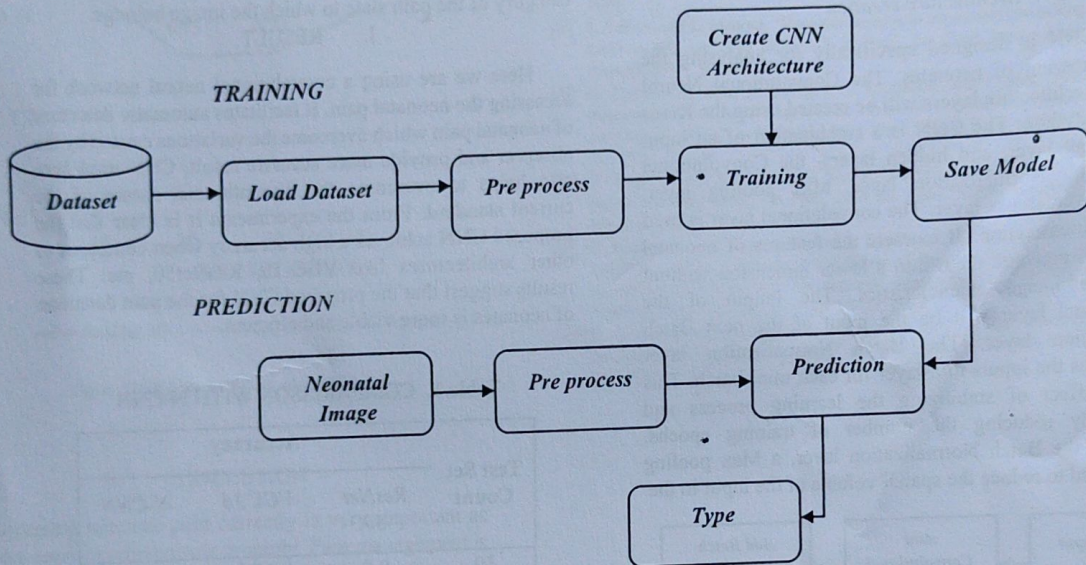


Fig.1. System Architecture

The proposed model uses a novel Convolutional Neural Network (CNN) for assessing neonatal pain by facial expression. This CNN was designed and trained end to end using a real-world dataset of neonates to form the model. Here, the system learns from the dataset like the human brain

A. Dataset (Database)

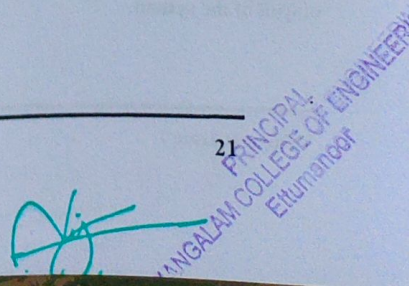
The datasets are collected from the neonates while being hospitalized in the Neonatal Intensive Care Unit (NICU). The dataset of neonates is classified into four classes depending on the four pain states - 1. Pain stimulus, 2. Rest/Cry stimulus, 3. Air stimulus to Nose, 4. Friction stimulus and is stored in four separate folders. Each folder contains up to 50 neonatal images for training. This dataset is loaded using Python data structures.

Pre-processing

The loaded dataset is undergone pre-processing to reduce the data distortion of the image. The pre-processing

and forms logic in CNN to categorize the neonatal image into four different stimuli--1. Pain stimulus, 2. Rest/Cry stimulus, 3. Air stimulus to Nose, 4. Friction stimulus. The following steps are performed inside the system:

involves Resizing, Histogram Equalization, and Normalization techniques. Images captured by a camera and those fed into the CNN may vary in size and so it is necessary to establish a base size for all the images. Then, it is undergone weighted mean Histogram Equalization for contrast-enhancement in images. Later, the Normalization technique is also applied that changes the intensity values. After this stage, the neonatal image set is capable of training the model.



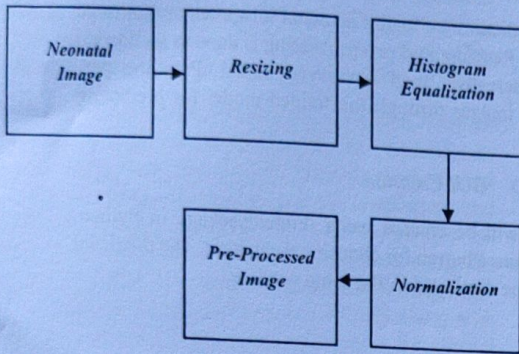


Fig.2.Pre processing

B. CNN Architecture creation

CNN is designed specifically for analysing the facial expression of neonates. The Convolutional Neural Network Architecture layers will be created using the Keras library in Python. The CNN is a combination of an input layer, output layer, and hidden layers- the Convolutional layer, Batch Normalization layer, Max pooling layer, Dropout layer, Dense layer. The convolutional layer is used for Feature extraction. It extracts the features of neonatal images and converts them into a lower dimension without losing the image characteristics. The output of the convolutional layer will be the input of the next Batch Normalization layer. The Batch Normalization layer standardizes the inputs to a layer for each mini-batch. This has the effect of stabilizing the learning process and dramatically reducing the number of training epochs. Following the Batch Normalization layer, a Max pooling layer is used to reduce the spatial volume of the input in the

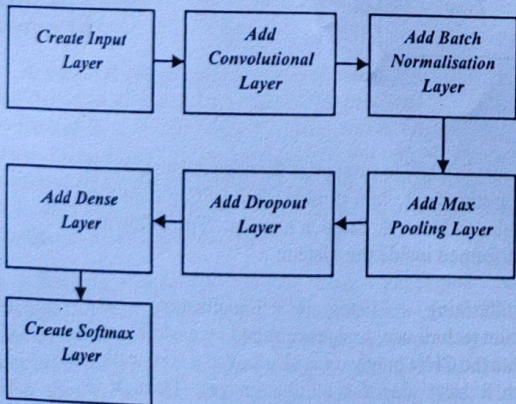


Fig.3. CNN Architecture Creation

neonatal image. The dropout layer prevents Overfitting. Each neuron in the Dense layer will receive an input from the Dropout layer. Since the Dense layer is fully connected, it can be used for classification. The final layer associated with the CNN is the Softmax layer which is used for the output of the system.

C. Training

The pre-processed neonatal images are directed to the CNN for training. Based on the dataset provided, a logic is formed in the CNN to categorize the image to the pain state. This trained model is then saved. Thus, the saved model is capable of classifying the images based on four stimuli--1. Pain stimulus, 2. Rest/Cry stimulus, 3. Air stimulus to Nose, 4. Friction stimulus. The pain assessment for each period is done using the Neonatal Infant Pain Scale (NIPS).

D. Prediction

In this Stage, a neonatal image is given by the user for Prediction. It is undergone pre-processing. This pre-processed neonatal image and the saved model are then loaded. Based on the logic created, the system predicts the category of the pain state to which the image belongs.

I. RESULT

Here we are using a convolutional neural network for accessing the neonatal pain. It facilitates automatic detection of neonatal pain which overcome the variations caused by the observer and provide more accurate result. CNN used here also helps to overcome the discontinuous nature of the current standard. From the experiments it is clear that the proposed CNN achieves a high accuracy when compared to other architectures like VGG-16, ResNet50, etc. These results suggest that the proposed CNN for the pain detection of neonates is more viable and efficient.

Table.1. COMPARISSON WITH N-CNN

Test Set Count	Accuracy		
	ResNet 50	VGC 16	N-CNN
10	0.8	0.76	0.85
20	0.76	0.76	0.86
30	0.75	0.76	0.85
40	0.81	0.75	0.87
50	0.8	0.76	0.87

III. REFERENCES

Performance Analysis Chart

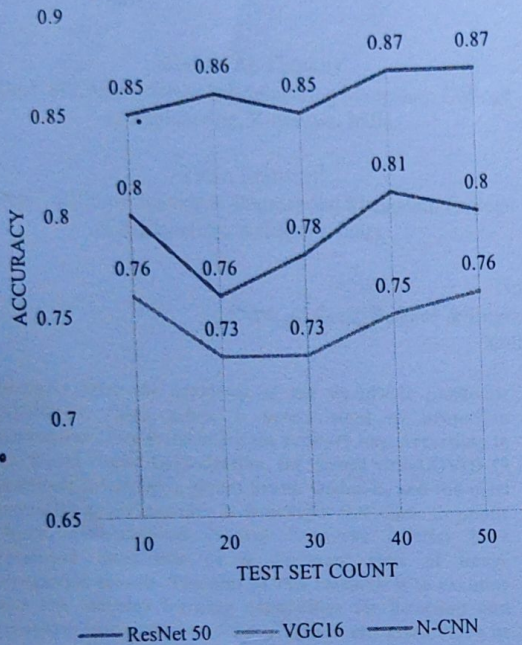


Fig.4. Graphical illustration of N-CNN

II. CONCLUSION

Accessing neonatal pain correctly is very important as neonates cannot communicate properly. Pain management is a very important step in pain detection. There exist many standards for accessing the neonatal pain which is discontinuous and not consistent in nature. These methods require large number of well-trained nurses for observing the neonates. The presented CNN is evaluated on a real-world dataset and achieves an overall accuracy of 85%. The results are encouraging and suggest that the automatic recognition of neonatal pain is more viable and efficient and can be used as a better alternative to the current standards.

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Real Time Face Mask Detection and Recognition using Python

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Abstract- After the breakout of the worldwide pandemic COVID-19, there arises a severe need of protection mechanisms, face mask being the primary one. According to the World Health Organization, the corona virus COVID-19 pandemic is causing a global health epidemic, and the most successful safety measure is wearing a face mask in public places. Convolutional Neural Networks (CNNs) have developed themselves as a dominant class of image recognition models. The aim of this research is to examine and test machine learning capabilities for detecting and recognize face masks worn by people in any given video or picture or in real time. This project develops a real-time, GUI-based automatic Face detection and recognition system. It can be used as an entry management device by registering an organization's employees or students with their faces, and then recognizing individuals when they approach or leave the premises by recording their photographs with faces. The proposed methodology makes uses of Principal Component Analysis (PCA) and HAAR Cascade Algorithm. Based on the performance and accuracy of our model, the result of the binary classifier will be indicated showing a green rectangle superimposed around the section of the face indicating that the person at the camera is wearing a mask, or a red rectangle indicating that the person on camera is not wearing a mask along with face identification of the person.

Keywords – Face Recognition and Detection, Convolutional Neural Network, GUI, Principal Component Analysis, HAAR Cascade Algorithm

I. INTRODUCTION

Face Recognition is a technique that matches stored models of each human face in a group of people to identify a person based on certain features of that person's face. Face recognition is a natural method of recognizing and authenticating people. Face recognition is an integral part of people's everyday contact and lives. The security and authentication of an individual is critical in every industry or institution. As a result, there is a great deal of interest in automated face recognition using computers or devices for identity verification around the clock and even remotely in today's world. Face recognition has emerged as one of the most difficult

and intriguing problems in pattern recognition and image processing. With the aid of such a technology, one can easily detect a person's face by using a dataset of identical matching appearance. The most effective approach for detecting a person's face is to use Python and a Convolutional Neural Network in deep learning. This method is useful in a variety of fields, including the military, defense, schools, colleges, and universities, airlines, banks, online web apps, gaming, and so on. Face masks are now widely used as part of standard virus-prevention measures, especially during the Covid-19 virus outbreak. Many individuals or organizations must be able to distinguish whether or not people are wearing face masks in a given location or time. This data's requirements should be very real-time and automated. The challenging issue which can be mentioned in face detection is inherent diversity in faces such as shape, texture, color, got a beard/moustache and/or glasses and even masks. From the experiments it is clear that the proposed CNN and Python algorithm is very efficient and accurate in determining the facial recognition and detection of individuals.

I. RELATEDWORKS

Local Binary Pattern (LBP) method is used to filter the candidate region. LBP reflects the details of the face characteristics, focusing on the description of texture features. Therefore, after using global feature to identify the face, the local feature recognition LBP method is used to filter the candidate region. LBP reflects the details of the face characteristics, focusing on the description of texture features. This paper combines skin colour detection with LBP. If the number of pixels of the skin colour points exceeds the set threshold, the face image is initially determined. Otherwise it is a non-face image. Then the LBP algorithm is used to detect the candidate window. If the match is successful, it is a face image. Otherwise it is non-human face. Otherwise it is non-human face. LBP is not capable of detecting faces with masks or glasses in faces. [1]

A robust approach to face & facial features detection must be able to handle the variation issues such as changes in imaging conditions, face appearances and image contents. Here we present a method in which utilizes colour, local symmetry and geometry information of human face based on various models. The algorithm first detects most likely face regions or ROIs (Region-Of-Interest) from the image using face colour model and face outline model, produces a face colour similarity map. Then it performs local symmetry detection within these ROIs to obtain a local symmetry similarity map. These two maps are fused to obtain potential facial feature points. Finally, similarity matching is performed to identify faces between the fusion map and face geometry model under affine transformation. The output results are the detected faces with confidence values [2].

Face detection and eyes extraction has an important role in many applications such as face recognition, facial expression analysis, security login etc. Detection of human face and facial structures like eyes, nose are the complex procedure for the computer. This paper proposes an algorithm for face detection and eyes extraction from frontal face images using Sobel edge detection and morphological operations. The proposed approach is divided into three phases; pre-processing, identification of face region, and extraction of eyes. Resizing of images and gray scale image conversion is achieved in pre-processing. Face region identification is accomplished by Sobel edge detection and morphological operations. In the last phase, eyes are extracted from the face region with the help of morphological operations. [3].

YOLO has a fast detection speed and is suitable for target detection in real-time environment. Compared with other similar target detection systems, it has better detection accuracy and faster detection time. This paper is based on YOLO network and applied to face detection. In this paper, YOLO target detection system is applied to face detection. Experimental results show that the face detection method based on YOLO has stronger robustness and faster detection speed. Still in a complex environment can guarantee the high detection accuracy. At the same time, the detection speed can meet real-time detection requirements [4].

Partially Occluded Face Detection (POFD) problem is addressed by using a combination of feature-based and part based face detection methods with the help of face part dictionary. In this approach, the devised algorithm aims to automatically detect face components individually and it starts from mostly un-occluded face component called Nose. Nose is very hard to cover up without drawing suspicion. Keeping nose component as a reference, algorithm search the surrounding area for other main facial features, if any. Once face parts qualify facial geometry, they are normalized (scale and rotational) and tag with annotation about each facial

features so that partial face recognition algorithm can be adapted accordingly with the test image. [5]. We are focused on the face detection process and the role of interest regions of the human face. In order to locate exactly the facial area, we propose the use of horizontal and vertical IPC (Integral Projection Curves). The role of important patches of face: nose and eyes is investigated in this work. An efficient method based on PCA (Principal component analysis) followed by EFM (Enhanced Fisher Model) is used to build the characteristic features, these latter are sent to the classification step using two methods, Distance Measurements and SVM (Support Vector Machine). Finally, the effect of fusion of two modalities (2D and 3D) is studied and examined. [6].

Existing standards which were developed for recognizing the face with masks on it do not work well due to the unique structure of the human faces. Face recognition is one of the latest technologies being studied area in biometric as it has wide area of applications. But Face detection is one of the challenging problems in Image processing. The basic aim of face detection is determining if there is any face in an image & then locates position of a face in an image. Evidently face detection is the first step towards creating an automated system which may involve other face processing. The neural network is created & trained with training set of faces & non-faces. All results are implemented in MATLAB 2013 environment. [7].

II. PROPOSED METHODOLOGY

We use Convolutional Neural Network and Deep Learning for Real Time Detection and Recognition of Human Faces, which is simple face detection and recognition system is proposed in this paper which has the capability to recognize human faces in single as well as multiple face images in a database in real time with masks on or off the face. Pre-processing of the proposed frame work includes noise removal and hole filling in colour images. After pre-processing, face detection is performed by using CNNs architecture. Architecture layers of CNN are created using Keras Library in Python. Detected faces are augmented to make computation fast. By using Principal Analysis Component (PCA) features are extracted from the augmented image. For feature selection, we use Sobel Edge Detector.

A. The Input Image

Real-time input images are used in this proposed system. Face of person in input images must be fully or partially covered as they have masks on it. The system requires a reasonable number of pixels and an acceptable amount of brightness for processing. Based on experimental evidence, it is supposed to perform well indoors as well as outdoors i.e. passport offices, hospitals, hotels, police stations and schools etc.

B. The Pre-processing Stage

Input image dataset must be loaded as Python data structures for pre-processing to overturn the noise disturbances, enhance some relevant features, and for further analysis of the trained model. Input image needs to be pre-processed before face detection and matching techniques are applied. Thus pre-processing comprises noise removal, eye and mask detection, and hole filling techniques. Noise removal and hole filling help eliminate false detection of face/ faces. After the pre-processing, the face image is cropped and re-localised. Histogram Normalisation is done to improve the quality of the pre-processed image.

C. The Face Detection Stage

We perform face detection using HAAR Cascade algorithm. This system consists of the value of all black pixels in greyscale images was accumulated. They then deducted from the total number of white boxes. Finally, the outcome is compared to the given threshold, and if the criterion is met, the function considers it a hit. In general, for each computation in Haar-feature, each single pixel in the feature areas can need to be obtained, and this step can be avoided by using integral images in which the value of each pixel is equal to the number of grey values above and left in the image.

$$\text{Feature} = \sum_{i \in \{1..N\}} w_i \cdot \text{RecSum}(x, y, w, h),$$

where $\text{RecSum}(x, y, w, h)$ is the summation of intensity in any given upright or rotated rectangle enclosed in a detection window and x, y, w, h is for coordinates, dimensions, and rotation of that rectangle, respectively. Haar Wavelets represented as box classifier which is used to extract face features by using integral image

D. The Feature-Extraction Stage

Feature Extraction improves model accuracy by extracting features from pre-processed face images and translating them to a lower dimension without sacrificing image characteristics. This stage allows for the classification of human faces.

E. The Classification Stage

Principal Component Analysis (PCA) is used to classify faces after an image recognition model has been trained to identify face images. Identifying variations in human faces is not always apparent, but PCA comes into the picture and proves to be the ideal procedure for dealing with the problem of face recognition. PCA does not operate classifying face images based on geometrical attributes, but rather checks which all factors would influence the faces in an image. PCA was widely used in the field of pattern recognition for classification problems. PCA demonstrates its strength in terms of data reduction and perception.

F. Training Stage

The method is based on the notion that it learns from pre-processed face images and utilizes CNN model to construct a framework to classify images based on which group it belongs to. This qualified model is saved and used in the prediction section later. In CNN model, the stages of feature extraction are done by PCA and feature selection done by Sobel Edge Detector and thus it improves classification efficiency and accuracy of the training model.

G. Prediction Stage

In this stage, the saved model automatically detects the face mask image captured by the webcam or camera. The saved model and the pre-processed images are loaded for predicting the person behind the mask. CNN offers high accuracy over face detection, classification and recognition produces precise and exact results. CNN model follows a sequential model along with Keras Library in Python for prediction of human faces.

IV. MODULES

The proposed system contains the following modules:

- A. Pre-processing Images
- B. Capture image ()
- C. Upload image ()
- D. Classifier(image)
- E. Prediction(image)

A. Pre-processing Images

The input image is captured from a webcam or camera in real-time world. The frames (images) from the dataset are loaded. Face images are cropped and resized after they have been loaded. Later, noise distortions in the images are suppressed. Normalization is then done to normalize the images from 0-255 to 0-1 range.

B. Capture image ()

In this Module we are able to capture real time images. We do this by the help of Flutter and applying in to the Classifier Model.

Input: Nothing

C. Upload image ()

Here we can browse the image and upload for finding the Plant disease. We need to fetch the image. And this image passes to Classifier Module.

Input: Nothing

Output: Image

D. Classifier(image)

Following data Preprocessing of the images, will apply to the Classifier. Here it will find out the feature of the images. Mainly in this module feature extraction occurs. Image similarity features will be stored in to the model which gets created.

Input: Image
Output: Model

E. Prediction(image)

In this Module prediction of person take place. Here the browsed image will be placed in to the model and output will be shown as based on which label its get matched the most.

Input: Image
Output: Predicted Label

V. SYSTEM ARCHITECTURE

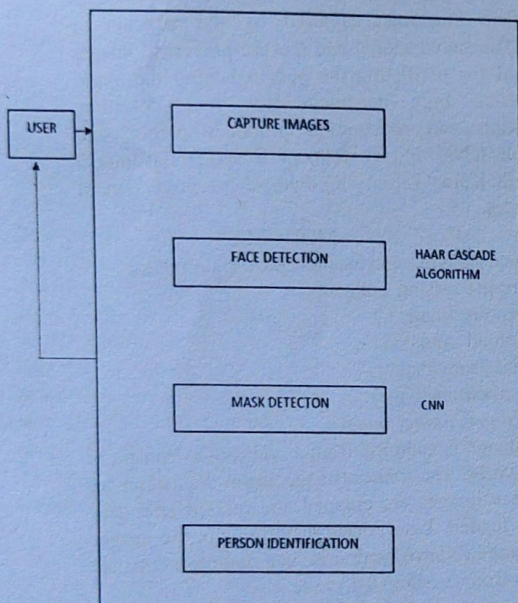


Fig1. System Architecture

A. User

User refers to person standing in front of a webcam or camera in a real world scenario.

B. Capture Images

The webcam or camera captures images which are then used as dataset to train the model. If the dataset captures human faces in different masks and in different backgrounds along with large number of human face images, then the accuracy of the training model increases.

C. Face Detection

For face detection, we use HAAR Cascade algorithm. In this method all black pixels in greyscale images was accumulated. They then deducted from the total number of white boxes. Finally, the outcome is compared to the given threshold, and if the criterion is met, the function considers it a hit.

D. Mask Detection

For Mask Detection, we use a sequential CNN model along with inbuilt Keras Library in Python. The sequential CNN model is trained from dataset of human faces with or without masks on the faces. It forms a logic from the pre-processed images like a human brain, then the model detects the face along with mask using feature extraction and feature selection. After identification of the mask along with face of the person, it forwards to the prediction or identification stage.

E. Person Identification

In this stage, the trained model predicts the face of the person behind the mask according to the trained model. The prediction is based on the number of images trained by the model and its accuracy. Finally, the system displays that the person name along with the indication of he or she wearing a mask or not.

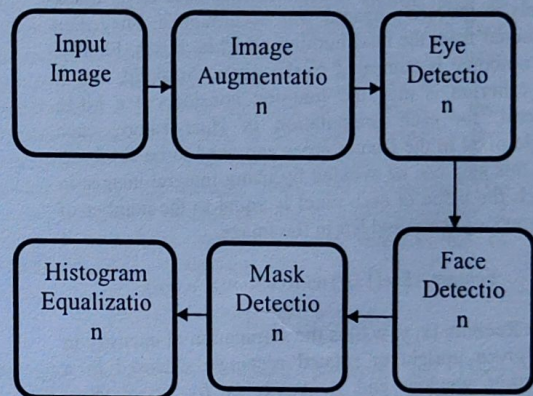


Fig2. Pre-processing

F. Dataset

The proposed model has datasets captured from individual's person. The dataset of faces is classified into with masks and without masks and is stored in different databases. Each folder consists 40 to 60 images of an individual person respectively. The individual's person face images should have images captured from different masks and different backgrounds so the accuracy of training model increases. The dataset is integrated with Keras Library in Python. Larger the dataset more accurate the training model. So dataset images are directly congruent to accuracy of the training model.

G. Data Pre-Processing

This module is used for read image. After reading we resize the image if needed we rotate the image and also remove the noises in the image. Gaussian blur (also known as Gaussian smoothing) is the result of blurring an image by a Gaussian function. It is a widely used effect in graphics software, typically to reduce image noise. Later normalization is done to clean the images and to change the intensity values to pixel format. The output of this stage is given to training model.

Input: image

Output: pixel format

H. Segmentation

Segment the image, separating the background from foreground objects and we are going to further improve our segmentation with more noise removal. We separate different objects in the image with markers.

Input: pixel format

Output: image

I. Edge detection

Sobel edge detector is using. It is based on convolving the image with a small, separable, and integer valued filter in horizontal and vertical direction and is therefore relatively inexpensive in terms of computations. 2-D spatial gradient measurement on the image is performed by Sobel operator. Each pixel of the image is operated by Sobel operator and measured the gradient of the image for each pixel. Pair of 3×3 convolution masks is used by Sobel operator, one is for x direction and other is for y Direction. The Sobel edge enhancement filter has the advantage of providing differentiating (which gives the edge response) and smoothing (which reduces noise) concurrently.

Input: image

Output: image

J. Localization

Find where the object is and draw a bounding box around it.

Input: image

Output: localized image

K. Feature Selection

The biggest advantage of Deep Learning is that we do not need to manually extract features from the image. The network learns to extract features while training. You just feed the image to the network (pixel values).

What you need is to define the Convolutional Neural Network architecture and a labelled dataset. Principal Component Analysis (PCA) is a useful tool for doing this. PCA checks all the factors influencing the faces rather just checking its geometrical factors. Thus using PCA gives accurate and precise detection and recognition result of faces.

Input: image pixel format

Output: labels

L. CNN Architecture creation

A sequential CNN model is designed specifically for analyzing the human faces with mask on it or not. The Convolutional Neural Network Architecture layers will be created using the Keras library in Python. The convolutional layer is used for mask detection. It extracts the features of face images using Principal Component Analysis (PCA) and converts them into a lower dimension without losing the image characteristics. The output of the convolutional layer will be the input of the next Batch Normalization layer. The Batch Normalization layer standardizes the inputs to a layer for each mini-batch. This has the effect of

stabilizing the learning process and dramatically reducing the number of training epochs. After this, the face images undergo classification. If the images are tested, then model accuracy calculations and predications takes place. If non-test images come, then first the images are trained along with its validation testing is also done. If it is validating, then the model is trained and saved for further calculations. Otherwise, if it is non-validate, then it undergoes network training and calculations are done for losing weights and are adjusted accordingly. Finally, the CNN model gives accuracy and prediction of the human face behind the mask.

M. Training

The pre-processed face images are directed to the CNN model for training. Based on the dataset given, a logic is formed in the CNN to categorize the faces according to their features. This trained model is saved. The trained model is capable of categorizing human faces based on with or without masks on it. Training model is done with the help of a sequential CNN model and HAAR Cascade Algorithm.

N. Predication

In this phase, when a person comes in front on a webcam, the image is captured and predicted by the CNN model according to the logic learned by the sequential model. The image undergoes pre-processing. This pre-processed images and the saved CNN model are then loaded. Based on the algorithm interpreted by the system predicts and detects the human faces according to trained model.

VI. RESULT

This proposed work uses a sequential Convolutional Neural Network for detecting and recognizing human faces of individuals with mask or without it. CNN model and Haar Cascade Algorithm facilitates automatic detection and recognition of human face which overcome the noise variations and background variations caused by the surrounding and provide more accurate and precise result. It also helps to overcome the uneven nature of the current trend of face recognition and detection. From the experiments it is clear that the proposed CNN achieves a high accuracy when compared to other architectures. The proposed algorithm works effectively for different types of images. These results suggest that the proposed CNN model reduces complexity and make method computationally effective. The proposed system works well effectively for grayscale as well as for the colour image with masks on it or without masks on it.

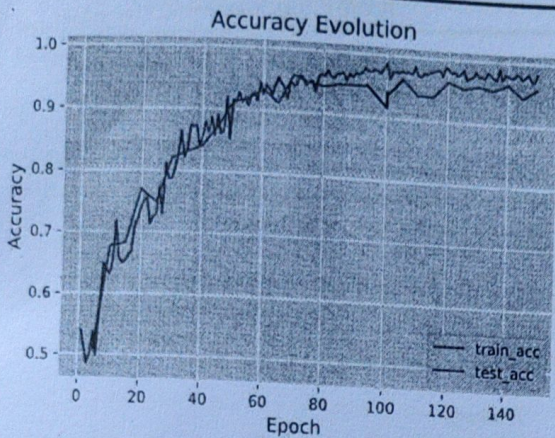


Fig3. Accuracy analysis

	Precision	Recall	F1-Score	Support
With mask	0.99	0.99	0.99	138
Without Mask	0.99	0.99	0.99	138
Accuracy			0.99	276
Macro Avg	0.99	0.99	0.99	276
Weighted Avg	0.99	0.99	0.99	276

Table1. Performance Analysis

VII. CONCLUSION

Our proposed system can detect and recognize human face(s) in real-time world. Compared to the traditional face detection and recognition system, the face detection and recognition based on CNN model along with the use of Python libraries has shorter detection and recognition time and stronger robustness, which can reduce the miss rate and error rate. It can still guarantee a high test rate in a sophisticated atmosphere, and the speed of detection can meet the real time requirement, and achieve good effect. The proposed CNN model shows greater accuracy and prediction for detecting and recognising human faces. The results show us that the current technology for face detection and recognition is compromised and can be replaced with this proposed work. Therefore, the proposed method works very well in the applications of biometrics and surveillance.

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Secure Peer-To-Peer Messenger and File Sharing Over IPV6

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Abstract-There is a need for a Privacy-Oriented messenger in a world where data security is becoming more important. In this paper we introduce a Fully End-to-Encrypted Peer-to-Peer Messenger and File sharing Application over IPV6. IPV6 is a main where people have yet to do many projects. Our model will ensure more security and privacy when compared to other client-server models or even other Peer-to-Peer models since we use IPV6's inbuilt security features. The application itself is portable since it was developed as a Progressive-Web-App (pwa). Thus making it portable and can be installed in any Operating System. This project is aimed to bring privacy at its best to all users since there is no server to control or monitor. We have introduced a so-called "Tracker" which keeps track of IPV6 addresses of all users and passes it to someone when requested. Tracker act as the back-bone of the entire architecture.

KeyTerms:- Security,IPV6,Messenger,Peer-to-peer architecture, Tracker, File sharing

I. INTRODUCTION

Messaging apps are those apps or platforms that make possible immediate messaging. Copious of such apps have developed into broad platforms which facilitate status updates, chatbots, payments and conversational commerce. They are normally centralised networks run by the servers of the platform's operators, unlike peer-to-peer protocols Bit-torrent. Some examples of popular messaging apps include WhatsApp, Facebook Messenger, Telegram etc. The feature which makes

our messenger secure is the fact that there is no-one to control/monitor the communication. With IPV6, we take IPsec and other security features for granted which makes our model more secure to use.

II. LITERATURE SURVEY

IPV4 has certain disadvantages compared to IPV6. The scarcity of network address was especially extrusive for IPV4. Therefore IPV6 is generated. It is highly essential to research applications in IPv4/IPv6 coexistent network. Applications related to peer to peer network plays a major role in internet communication. Peer to peer related traffic is much more compared to other models. This model uses FSP2P as a P2P file sharing system in IPv4/IPv6 coexisting networks. It can be applied on IPV4/IPV6 coexist networks as well as pure IPV4 and IPV6 networks. Here P2P file sharing protocol is

applied to IPV4/IPV6 coexist networks. When considering such a model, the model is very easy to install. Since there is no central dependency the model is more reliable. To build and maintain it needs only less cost is another advantage of this model. The model has some disadvantages too. Since it is decentralized it is very difficult to administer. Each computer keeps its own backup system. Therefore data recovery and backup of data is little bit difficult. There is no guarantee for security of the model is an important drawback of the models which should be avoided completely. When compared to IPV6, IPV4 has only less addresses to deliver. Even with IPV4, especially in mobile networks, NAT implementations such as CGNAT, NAT444 are used. This makes hosting a public web server impossible unless we port forward local port to a public server using SSH, VPN or other methods. Still, some ISPs have not yet implemented IPV6. For them, we could use IPV6 tunnel brokers which gives us an IPV6 address^[1].

Efficient location of the node which keeps a desired data item is a problem of peer-to-peer protocol. The paper^[3], introducing a model which gives solution for the particular problem. A distributed lookup protocol (chord) is used here to solve the problem. The distributed protocol gives support only for one operation. Here we have a key which maps the key onto a node. On top of the lookup protocol, location of data can be implemented, by combining a key with every data item, and by storing the key at the node to which the key maps. The chord is efficient to join nodes and leave the system, and can answer questions even if the system is changing simultaneously. The Chord is scalable: cost of communication and the state maintained by all nodes scale logarithmically with the number of nodes of Chord. Since IPV4 model is limited in IP-Addresses^[3].

MMP2P which is an extended P2P protocol. MMP2P is based on IPv6. Several application for Windows using this are instant messenger, file sharing function and high-quality multimedia conference systems, are implemented. This model mainly focused on scalability to maintain peer to peer network and efficiency. This model has less response time compared to other models such as CAN and CHORD. Peer-to-peer algorithms ensure efficient management of resources. Resources and resource locators are scattered all

over the network. Therefore this protocol would help file sharing among friends. Information among peers used to reduce routing path. The model ensures better communication among users. Less response time provides support for more efficient communication. MMP2P provides better routing. The model is easy to implement^[2].

Gnutella, is a virtual network which possesses its own routing mechanisms. The topology of the routing of Gnutella as well as network ensures performance, reliability, and scalability. Extracting the topology of the application level network of Gnutella by using a "crawler". Analyzing the graph of topology and evaluating generated network traffic. Gnutella has the merits as well as demerits of a power-law structure. Therefore some changes are required for Gnutella which will help to enhance performance as well as scalability. Connectivity of Gnutella nodes always keeps a multi-model distribution. This is made possible by combining a power law as well as a quasi-constant distribution. Therefore the network is reliable like a pure power-law network when considering random node failures. This makes it not very easy to attack by a malicious adversary. The protocol takes some actions or precautions to prevent potential attacks. Consider an example, information of network topology that is obtained is very easy to obtain and that ensures efficient service attack prevention. Security mechanisms are capable of preventing an intruder from collecting information of topology that appears required for the long-term survival of the network. The application-level topology determines the volume of traffic generating, rate of successful searches, and reliability of application. An agent monitors the network constantly. The agent intervenes by asking servants to drop or add links as it is essential to keep the optimal network topology. Agents could embed some data of underlying physical network and builds the topology of virtual application. Only small modifications are required to implement these ideas is advantage of the model. Flooding can be replaced with a smarter as well as group communication mechanisms. Smarter mechanism is less expensive compared to other^[9].

The paper^[5], focuses on feasibility of personal inter network (PIN) and study how to attain the real coordination of multiple personal devices. It improves the usability of the hybrid as well as the pure P2P architecture in the personal scope. The particular paper proposing an IPv6 based Node Discover Stack. It makes the usability of the personal P2P application possible. Nowadays the trend of adoption of the personal devices as well as official online devices that make small scale network users need. Using less costly broadcast internet connection many families can access high speed internet and which is make the peer-to-peer connection more important. Here to reduce the difficulty of configuration in application as well as IP layer. The IP layer configuration methods for the end users is required for the population of intelligent appliances. In the peer-to-peer network each of the nodes or workstations has equal responsibilities and capabilities. Sharing of the computer services and resources by the direct exchange between the system. The p2p node should work outside the DNS system and which have importance from central servers. Here the communication protocol that

gives identification as well as location system for computers and routes traffic. The pure P2P is the fully distributed P2P architecture. But there are no popular pure P2P models currently due to resource allocation problems^[5].

III. PROPOSED MODEL

The proposed model contains following modules:

- > Socket-IO framework
- > User id creation
- > User id searching in DHT
- > Key exchange
- > Channel creation
- > Data exchange

A. The Application

Application can be made using any framework/language since the idea is the same. Socket.IO provides the ability to implement real-time analytics, binary streaming, instant messaging, and document collaboration.

B. User id creation

Technically, User-Id is a way to map to a user's IPV6 address. Since we use DHT, there is a key (user-id) to map corresponding IPV6 addresses.

C. User id lookup

When Alice searches for Bob, Alice uses Bob's user-id as a key to find the address of Bob. This in terms makes a query to the tracker using the user-id.

D. Key exchange

Before the communication with Bob, Alice has to request a security-key exchange process. After both parties complete the process.

E. Channel creation

The 'channel' is an abstraction for the Alice-Bob peer-to-peer communication. For each new connection, there will be a new channel created with new key parameters.

F. Data exchange

After a secure channel is created, users can now start sharing files and messages. It is also possible to have real time video chats. At this time, the data exchange is expected to work.

IV. SYSTEM ARCHITECTURE

This project Aimed to Bring Privacy at it's best to all users. There is no server concept in this model. We have a so-called "Tracker" which keeps track of IPV6 addresses of all users And passes it to someone when requested. All communication between "Tracker" and client is encrypted. Once the client gets the Address, then we no longer need a tracker.

Alice \iff Tracker
Alice \iff Bob

Host-A and B checks for IPV6 GUA, Host-A gets User id of Host-B, Host-A asks for User-Id address of Host-B. If such

an address exists, the Distributed Hash Table will forward the address. More technically, we can simply think of a python dictionary having a key as user-id and value as address if someone is not comfortable with the idea of a DHT. At his point, Host-A and Host-B are initiating key exchange. A secure channel is created. Now both start P2P communication. Host-A or B can revoke when they exit. DHT key, values are cleared and the CHANNEL is revoked.

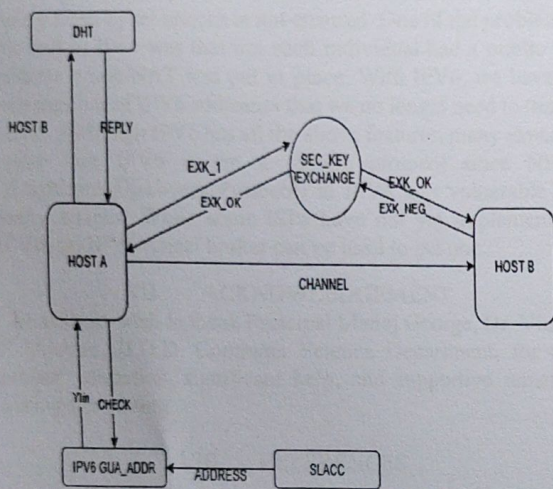


Fig1. Architecture of the model

D. Peer-to-Peer (P2P)

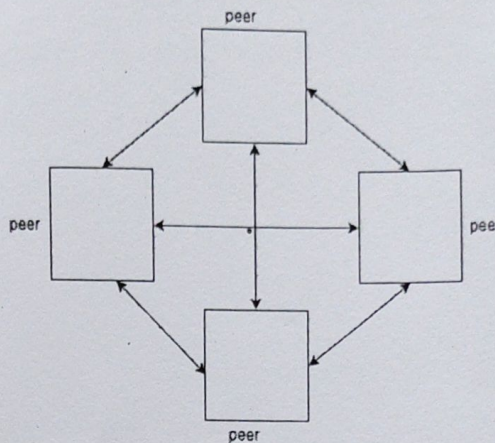


Fig 2. Peer-to-Peer architecture

Peer-to-peer(P2P) computing is a distributed architecture, in which tasks or works are assigned between each workstation(peer). All peers have equal privilege and the peers are equipotent participants in the application. In a peer to peer model, each individual node can perform as client as well as server. The username, addresses, chat history and everything is stored in a local database (client's own system).

Advantages of using peer to peer architecture

Peer to peer architecture is easy to build and maintain. It is very easy to install. Since the model is decentralized it is more reliable. For peer to peer architecture there is no need of a full time administrator. The user can control their resources, makes it expedient. So it is not necessary to have an administrator.

A. Concept of Tracker

The Tracker uses Distributed Hash Table (DHT) for User-to-IP lookup. Technically, Tracker is built using Socket-IO and it is said to handle more requests than a synchronous model server. The communication from and to the tracker is encrypted and privacy is guaranteed.

B. Global Unicast Address

Global unicast addresses (GUAs), are addresses which are globally routable and accessible in the Internet version 6. GUAs start with 2000::/3 (hex 2 or 3) having 2 parts which are, the subnet ID and the interface ID.

C. IPV6

Internet Protocol version 6 (IPv6) is the most recent form of Internet Protocol (IP), which provides an identification and location system for computers on networks as well as routes traffic across the Internet. One of the greatest features is the usage of Internet Protocol Security (IPsec) which was developed for IPv6, but found widespread deployment first in IPv4, for which it was re-engineered. Internet protocol security(IPsec) is a mandatory part of all Internet protocol version 6 protocol implementations.

E. SLAAC

SLACC stands for Stateless Address Auto Configuration. It is a way to automatically assign an IPv6 address to the interface. It works by combining addresses from the gateway of the interface learned through router advertisements as well as the second layer of the interface. But, that is just an abstract idea.

V. RESULT

With a not-yet-complex model, we were able to develop a privacy oriented messenger. This can be made portable to work with any operating system. We ensured that ip-sec is really a protection suite in ipv6. The overall performance seems very impressive when a single socket-io connection. Since there is a need for multiple socket-io connections, WebRTC-like protocols would have been easier to deal with P2P connections. But, that would be an entirely different idea and something that is already implemented. The result of some experiments showed that firewalls are blocking and dropping socket-io connections. But, that is only happening in 3 out of

10 connections. Most of the time, there is no reason that a firewall would block inbound, outbound IPV6 packets without explicitly blocking it. Therefore our model should work fine. We have also noticed that there is a considerable decrease in bandwidth usage with this model since it is P2P.

VI. CONCLUSION

Common messengers like facebook, whatsapp, wechat etc are a real question to privacy and data security. Yet a complete safety from cyber attacks is not ensured. One of the problems we had in IPV4 was that not each individual had a public ip address when NAT was put in place. With IPV6, we have a rich number of IPV6 addresses that we no longer need to think about. Although IPV6 has all the above features, many experts argue that IPV6 is not a mature protocol since NDP (Neighbour Discovery Protocol) in IPV6 was vulnerable to many attacks. While some ISPs have not yet implemented IPV6, an IPV6 tunnel broker can be used to get one.

VII. ACKNOWLEDGEMENT

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Web based Graphical Password Authentication System

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Abstract—Authentication dependent on passwords is utilized generally in applications for security and protection. Still, human actions, as an example, choosing bad passwords and contributing passwords in square measures are viewed as "the most fragile connection" in the Authentication chain. Maybe than discretionary alphanumeric strings, clients may pick passwords either short or significant for simple memorization. With web applications and versatile applications accumulation, individuals can get to these applications whenever and anyplace with various gadgets. This advancement brings extraordinary accommodation yet, in addition, builds the likelihood of presenting passwords to bear riding attacks. Attackers can notice straightforwardly or utilize outside recording gadgets to gather client's qualifications. To avoid this sort of issue, we need another method of confirmation. Here, we can choose a graphical authentication method. The image password offers the best approach to sign on that is simpler than recollecting and composing along with simple passwords. You can sign in by tapping the right points or creating the right gestures over an image that you just select in advance.

Key Terms – Authentication, Graphical Passwords, Image Slicing, Encryption

I. INTRODUCTION

User Authentication is an interaction that permits a gadget to approve the character of an individual who associates with network assets. Commonly textual passwords are the most used form of authentication for all websites and applications. Textual passwords consist of a string of characters which may also include special characters and numbers. In most cases, users may use only one username and password for multiple accounts. But they are not fully secured. So, we should maintain strong passwords, comprising numbers, uppercase, and lowercase letters. Then these textual passwords are considered strong enough to resist brute force attacks. However, a strong textual password is hard to remember and recall. Along these lines clients will in general pick passwords that are

either short or from the word reference, instead of irregular alphanumeric strings. Human actions such as selecting bad passwords for new accounts and inputting wrong passwords in an insecure way for later logins are regarded as the weakest link in the chain of authentication. Shoulder surfing occurs when someone watches over your shoulder to collect valuable or personal information such as your password, ATM PIN, or credit card number, as you key it into an electronic device. A strong textual password is hard to memorize and recollects. To avoiding such problems, we are presenting a secure graphical web-based authentication system that protects users from becoming victims of shoulder surfing attacks.

II. LITERATURE REVIEW

Wantong Zheng and Chunfu Jia proposed a method "Combined PWD". This scheme proposes an online secret phrase verification component, combined PWD, through embedding separators (e.g., spaces) into the passwords to reinforce the current secret word validation framework. This plan uses the custom of the client's input. In this examination, site clients can embed spaces in their secret word where they need to stop when they register a record and the site back-end records the number of spaces in each hole [1].

In the paper [2], a novel time-based unique password was contributed to avoiding challenges of using a third party such as one-time password email, test and token device, the client will set an underlying secret word to characterize how the secret key will be changing throughout a characterized time, we tracked down that the framework. Then found that the system retains the strength of the dynamic password and improves the usability of the system in terms of availability [2].

A strong password authentication scheme was proposed by Yang Jingbooo. The one-time password authentication schemes can be divided into two types namely weak password authentication schemes and strong password

authentication schemes. In this paper, we survey the as of W.C Ku's scheme and italso shows an attack against his protocol. And also found that strong passwords have higher strength and easily guessing is not possible. Later, we present a strong password authentication scheme. This paper expands W. C. Ku's plan so that the alteration convention can oppose Stolen-verifier assault. The changed convention is built without loss of effectiveness [3].

Hua Wang, Yao Guo proposes another reuse- situated secret phase authentication system, called Desktop Password Authentication Center (DPAC), to reuse counter-measures among applications, along these lines lessening the expense of protecting passwords against dangers. This arrangement can take out a ton of tedious work and reduces the expense essentially, we demonstrate the feasibility ofDPAC by implementing a prototype, in which we migrate the widely used OpenSSH to DPAC and implement two example countermeasures [4].

Password authentication code (PAC) is a very important issue in many applications such as web- sites and database systems etc. Salah Refish proposes a PAC-RMPN scheme. In this paper, PAC between two clients to affirm verification between them has been introduced. This research presents a novel solution to the era-long problem of password authentication at the incoming level. They should discover a strategy to secure this a secret word from anticipated attackers. A legitimate user types his password only and presses enter topropagate it to another user which he wants to be authenticated [5].

A secure password authentication scheme is proposed which gives more security. This method uses a combination of pattern, key, and dummy digits. For this, the client needs to perceive and enlist design asarea numbers from the network, register key qualities that guide esteem to secret password, and attach fakerqualities to misguide the attacker. From that point forward to log in, the client needs to review the example and guides the secret key from design with enrolled key qualities, making a secret word by including sham digits. It minimizes shoulder surfing, brute-force attacks, cross site scripting etc. due to the high complexity of guessing passwords in multi-levels: first from the pattern, then from key, and then fromdummy values [6].

The secret key is the fundamental key to get approval however programmers are a lot of fruitful in secret phrase breaking because of the frail secret key choseby the client. To reinforce the secret key stockpiling, the proposed framework utilizes the Honeyword procedure alongside Honey encryption. Honeywords are false passwords which are put away with unique secret word to draw the aggressor. The basic idea behind Honeyword is the insertion of false passwords. These areto lure the attack. To generate the Honeyword of original password different techniques like Chaffing- with-tweaking, Chaffing-with-password model, etc. are available, but in the existing approach [7].

III. PROPOSED SYSTEM

Here we develop a web-based application that uses graphical authentication. It uses two layers of security.

Here, we use a picture password for the second authentication. So, no need for complex textual passwords. Users can use any basic textual password. The system is classified into threemodules.

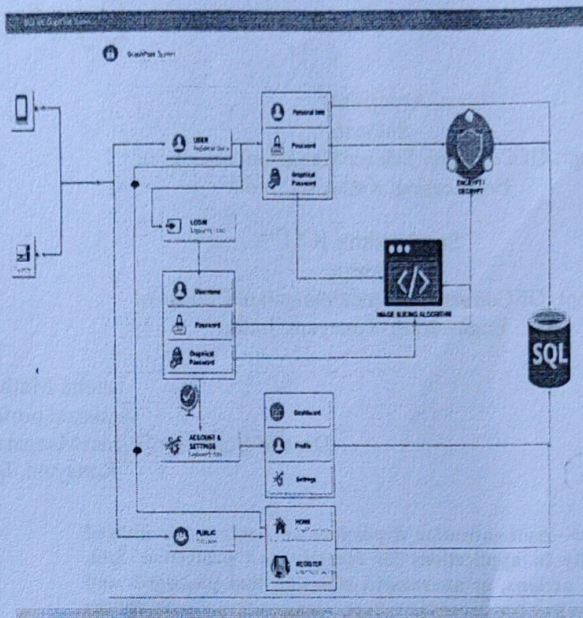


Fig. 1. Modules of Graphical Password System

A. Public Module

It is the overall viewing end of an individual website. Anyone with the URL can access this module. It is public however they can't change or alter the information.

B. User Module

The registered users are the part of user module. The user module consists of 2 functionalities - Registration and Login. During Registration, the system collects the basic details of the user like name, mobile and email, textual password, and graphical password. These all are encrypted and stored in the database. During the login phase, the user will give the username, textual password, and image password for accessing the resource. It compares the given values with data already given by the user at the registration phase. If it matched, then he/she will be logged into the page.

C. Account and Settings

This is the third module that contains the client's records and different settings of the computerized web stage. There is a link between the user module and the account module, If the user completes the registration, then the account will be created on the database. Also, the users can change their passwords at any time. Sign-in data, privacy and security choices, and so on are a benefit of it. Furthermore, clients can get warnings and request support from this part.

IV. SYSTEM ARCHITECTURE

The architecture chooses how the framework should work. Request response time, page loading time, Ability to deal with the various requests, and so on are characterized

by the design of the web application. In this manner, for better execution, it is indeed to utilize the best design. Here it utilizes the MVC architecture (Model-View-Control Architecture).

MVC Architecture implies Model-View-Controller architecture, which is an example architecture plan for programming projects.

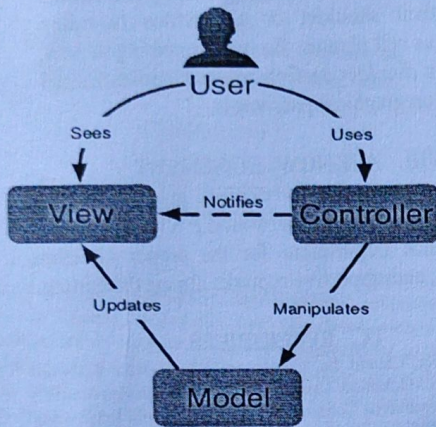


Fig. 2. MVC architecture

Password. Graph Pass was divided into 4 slices. Encryption takes place in each slice. The user-friendly graphical user interfaces make the task easier. Accordingly, the client doesn't have to think about the programming language and ideas.

The framework strictly follows the rules of Model view controller design (MVC architecture). MVC Architecture implies Model-View-Controller architecture, which is an example architecture plan for programming projects. As well as it needs a more grounded database that can hold a colossal measure of information, Here we utilize the SQL worker for storing all the client information. This is a web-based application that maintains a client-server architecture. Different devices will be connected on the client-side that communicates to the server with the help of the internet/cloud. When the clientsends a request to the server, the server returns the corresponding data as the response.

Client-Server Architecture is a processing model in which the worker has, conveys, and oversees the greater part of the assets and administrations to be devoured by the customer. This type of architecture has at least one customer PCs associated with a server over an organization or web association. Thisframework shares figuring assets. Client/serverdesign is otherwise called a systems administration processing model or customer/worker network since every one of the solicitations and administrations is conveyed over an organization.

B. Framework Architecture

On the side of client, we use a PHP framework called CodeIgniter. It is of the MVC architecture – Model View Control architecture. Database operations are managed in the model session.

Like database comparisons and validations takes place in the model session. The overall functions are performed in the control session.

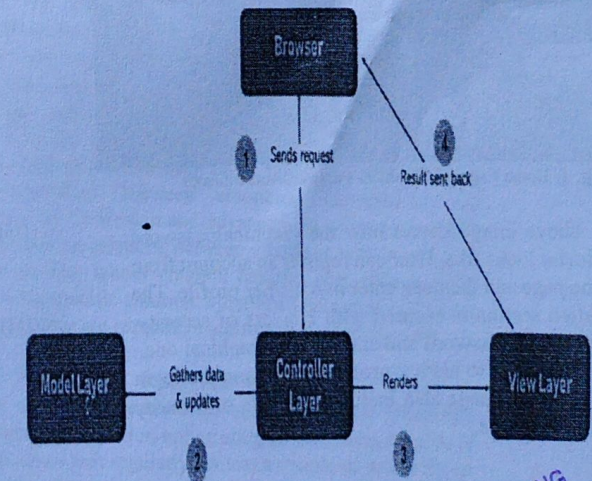


Fig. 4. Framework Architecture

The design has 3 parts, they are Model, View, and Controller (Fig 3). These segments make the framework more adjustable.

The primary layer is the Model layer which deals with information and data set associations. The View layer is the viewing layer or result showing Layer in the MVC design. The Controller plays a mediator role among model and view parts, and the data flow is chosen by this segment. Along these lines, it takes information from the client and cycles it with Model segments, and gives it to the View segment.

A. System Architecture

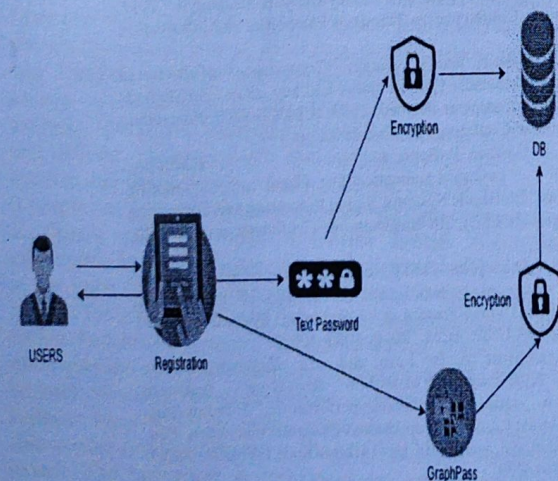


Fig. 3. System Architecture

On the border of the client, the user requests the registration. The Registration process includes two encryptions. One for text password, other for Graphical

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V. IMPLEMENTATION

Tools used for the implementation are:

A. Software tools

The text editor used for this development is sublime text. Sublime Text is a shareware cross-platform source code editor with a Python application programming interface (API). It natively supports many programming languages and markup languages, and functions can be attached by users with plugins, typically community-built and maintained under free-software licenses.

The server setup is done using XAMPP. XAMPP is a free and open-source cross-platform web server solution stack package developed by Apache Friends, consisting mainly of the Apache HTTP Server, MariaDB database, and interpreters for scripts written in the PHP and Perl languages. Since most actual web server deployments use the same components as XAMPP, it makes transitioning from a local test server to a live server possible.

SQL represents Structured Query Language, which is utilized to collaborate with databases. It may be utilized for storing, manipulating, and retrieving information in databases.

B. Hardware tools

Hardware requirements for this development are an i3+ processor, 4GB+ Ram, and 2GB+ SSD space.

VI. RESULT

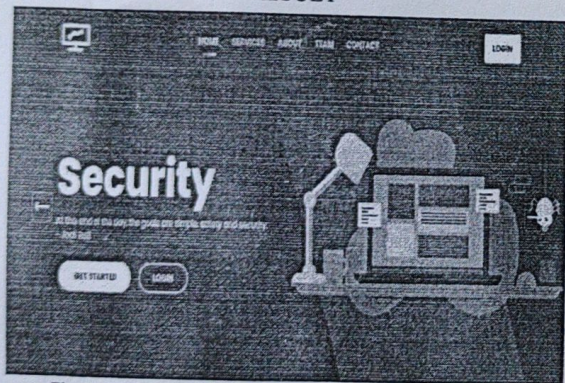


Fig. 5. Home Page of Graphical Password Authenticator

The above image shows how the graphical password authenticator looks like. User can register an account from this home page and then can enter into his/her profile. The registration section is secured with 2 layers of security. One is a textual password and another is a graphical one.

User can login to his/her profile by clicking the login button. The login page also includes 2 layers of security as mentioned above.

VII. CONCLUSION

To protect user's digital property, authentication is required every time they try to access their account and data. Conducting the authentication process in public might result in potential shoulder surfing attacks. Using traditional textual passwords or PIN method, users need to type their passwords to authenticate themselves and thus these passwords can be revealed easily if someone peeks over their shoulder or uses video recording devices such as cell phones. To overcome this problem, we proposed a shoulder surfing-resistant authentication system based on graphical passwords.

VIII. ACKNOWLEDGEMENT

The authors wish to express gratitude toward Principal Dr. Manoj George, Dr. Vinod P Vijayan, H.O.D, Computer Science Department for the proper direction, significant help, and supportive remarks during the editing.

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Emotion Recognition Systems and Emotion Correlation Mining

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Abstract—Emotion is complex, individualized, subjective, and sensitive to context. Emotions are correlated rather than independent, which contributes to the complexity of individual and public emotions. Most previous works focus on recognizing emotion, here we check for the reason for emotions getting wrongly recognized. We attempt to fill the void between emotion recognition and emotion correlation mining. To mine emotion correlation from emotion recognition through text two deep neural-network models are used. First the neural networks are trained on the dataset. Then DNNs are used to extract features from data. These features are used to mine correlation between emotions. Correlations are found out by Confusion and evolution of emotions. The result will be relations between emotions which will give insights like which emotion has the greatest possibility to be confused with particular emotion. Emotion correlation findings could provide insights for applications regarding affective interaction, such as network public sentiment, social media communication, and human-computer interaction.

Keywords—Convolutional neural networks, deep neural networks, emotion correlation mining, emotion recognition.

I. INTRODUCTION

Emotion analysis has been pulling in researchers' attention. Most past works in the artificial intelligence field center around perceiving emotion instead of mining the motivation behind why emotions are not or wrongly perceived. The relationship among emotions adds to the disappointment of emotion analysis. Emotion is unpredictable, individualized, abstract, and delicate. Emotion guides choice, prepares the body for activity, and shapes the progressing behavior. Singular emotion is perplexing in any event the accompanying three viewpoints. A. Steady individual value is formed through long-term experience. Emotion response among individuals differs even in the same context. b. Misconception happens when people impart. The comprehension of the setting changes as individual earlier foundations contrast. The assessment of an individual turns out to be more significant while getting more information on track occasions. The misconception of introductory emotion happens when there is an earlier information hole between the data sender and the collector. c. Singular emotion turbulence exists. The turbulence is influenced by outside moment negative or positive mood. Emotion changes alongside instant conditions for a similar occasion. For most people, it is a typical phenomenon in day-by-day life that outside conditions impact

inner emotions. For instance, a melodic tweet can likewise be upsetting when one's work execution is judged contrarily.

From one viewpoint, the emotion of people is complex because of individualized long haul social encounters, relational misconceptions, and outer moment mind-set impact. Emotions are associated instead of autonomous, which adds to the intricacy of individual and public emotions. Emotion relationship mining can help examine the individual and public emotions in any event in the accompanying applications such as like, Human Computer Interactions, Social Media Communication, Public Sentiment Analysis. The correlation among emotions adds to the disappointment of emotion recognition. Emotion correlation is depicted as emotion confusion and evolution. The confusion of emotion alludes to "distance" among emotions. The evolution of emotion alludes to the emotion changes during the interaction of occasion propagation. Misjudgment of emotions is one of the significant variables in the evolution of emotion. Analysis of correlation among emotions brought about by the intricacy of emotion is not many engaged and few covered in the literature in computer science.

Here, we attempt to fill the void between emotion acknowledgment and emotion relationship mining through characteristic language text. Two deep neural-network models are utilized for mining emotion correlation from emotion recognition using text. First the neural organizations are prepared on the dataset. At that point DNNs are utilized to extricate highlights from data. These highlights are utilized to mine correlation between emotions. Correlations are discovered by Confusion and advancement of emotions. The outcome will be relations between emotions which will give experiences like which emotion has the best chance to be mistaken for specific emotion. Mentioned dataset is in Chinese language, rather we can utilize elective dataset in English.

II. RELATED WORK

With the improvement of social network platforms, discussions, and question noting sites, an enormous number of short messages that regularly contain a couple of words for an individual archive are posted by online clients. In these short messages, emotions are every now and again installed for imparting feelings, communicating fellowship, and advancing

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impact. It is very significant to distinguish emotions from short messages, yet the relating task experiences the sparsity of feature space inserted in records. [1] This article put forward two models, WLTM and XETM, in order to address the matter of feature sparsity in perceiving emotions over short messages. In this article, they assessed the impact of the quantity of words in a term gathering and contrast the exhibition and cutting-edge baselines. To diminish the time cost of assessing boundaries, they proposed the accelerated strategies, fWLTM and fXETM to produce points and recognize emotions productively. The exploratory outcomes demonstrated that the accelerated models were very less tedious without decreasing a lot of value, particularly for the proposed fWLTM.

Social media are utilized as primary conversation channels by a large number of people each day. The content people produce in every day social media-based miniature interchanges, and the movements in that communicated, may affect the emotional conditions of others. Here, [2] they studied the dynamics of emotional contagion using a random sample of Twitter users, whose actions was observed during a week of September 2014. Rather than manipulating content, they devised a null model that discounts some confounding factors. We measure the emotional valence of content the users are presented to prior to posting their own tweets. They identified two different classes of individuals: highly and scarcely susceptible to emotional contagion.

[3] Manages sentence-level sentiment arrangement. The objective of this research was to create simple sequence models yet in addition endeavors to completely utilizing linguistic assets to benefit sentiment characterization.

Multi-Task Multi-Label (MTML) [4], which performs classification of both sentiments and topics of tweets simultaneously, and in-corporates each other's results from prior steps to promote and reinforce current results iteratively. The learned class labels of one task are incorporated as part of predicting features of the other task. For each assignment, the model is prepared with the greatest entropy by utilizing different names to learn more data and handle class uncertainty. Furthermore, the MTML model produces probabilistic outcomes, rather than parallel outcomes, so that multi-label expectation is permitted and labels can be positioned as needs be.

Paper [5] involves a methodology for extracting small investor sentiment from stock message boards. Five distinct classifier algorithms coupled by a voting scheme are found to perform well against human and statistical benchmarks. Time series and cross-sectional aggregation of message information improves the quality of the resultant sentiment index. Empirical applications evidence a relationship with stock returns – visually, using phase-lag analysis, pattern recognition and statistical methods.

[6] Proposed a novel way to deal with multimodal sentiment analysis utilizing deep neural networks consolidating visual analysis and natural language processing. Our objective is not quite the same as the standard sentiment analysis objective of

anticipating whether a sentence communicates good or negative sentiment; all things being equal, we mean to gather the inactive emotional condition of the user. It includes a novel multimodal sentiment examination strategy utilizing deep learning strategies. This methodology gave new apparatuses to the joint investigation of pictures and text via social media.

Text emotion dispersion learning (EDL) [7] create models that can foresee the power estimations of a sentence across a bunch of emotion classes. Existing techniques dependent on supervised learning require a lot of all well labelled training data, which is hard to acquire because of conflicting impression of fine-grained emotion intensity. In this paper, in view of meta-learning, they proposed an effective way to deal with take in text emotion dispersion from a little example. To capitalize on a small labelled dataset, proposes to utilize the K-closest semantically similar neighbors (KNNs) of each training sample to cluster the training data, and train a meta-learner that can adjust to new testing data with only a few samples on the clusters. Then be able to fit the meta-learner on KNNs of each testing test.

III. METHODOLOGY

A. Proposed System

The proposed model uses two deep neural-network models to mine emotion correlation from emotion recognition through text. Initially the neural networks are trained on the dataset. Then DNNs are used to extract features from data. The extracted features are used to mine correlation between emotions. Correlations are found out by Confusion and evolution of emotions. The result will be relations between emotions. The result will give insights like which emotion has the greatest possibility to be confused with particular emotion.

B. Modules

The proposed system contains following modules:

1. Data preprocessing
2. Architecture creation
3. Training
4. Emotion correlation calculation
5. Prediction

1. Data preprocessing

Data processing involves the Loading of text and labeling. It involves preprocessing of data

2. Architecture creation

Here, two neural network models CNN-LSTM(M1) and CNN-LSTM- STACK(M2), are used for emotion recognition. M1 is constructed with part I and part II. M2 is constructed by adding an additional part III to M1. Part I deals with Feature Processing includes Embedding Layer, Convolution Layer. Part II deals with Emotion calculation includes LSTM, Dense layer. Part III deals with Attention mechanism includes LSTM-stack

3. Training

In training, load the preprocessed data and the architecture that was created. After loading, training is performed. After

training gets completed, a logic is formed in the models. Thus, the two models are trained and saved

4. Emotion correlation calculation

It involves Data preprocessing. Here each model is tested with same amount of data. Both results are saved. Now Creation of correlation matrix using result is done.

5. Prediction

In prediction the text is loaded, then it is preprocessed and tokenized. Now the required model is chosen. The chosen model is loaded and the prediction using the loaded model takes place.

C. System Architecture

1. Data preprocessing

Text preprocessing is traditionally an important step for natural language processing (NLP) tasks. It transforms text into a more digestible form so that machine learning can be better performed. Data processing involves the Loading of text and labeling. It involves preprocessing of data. Here Removal of unwanted characters and the Create vocabulary takes place.

2. Architecture creation

Two deep neural-network models (CNN-LSTM (M1) and CNN-LSTM-STACK (M2)) forms architectures are created. The calculation process can be divided into 3 parts. M1 is

constructed with part I and part II. M2 is constructed by adding an additional part III to M1.

• Part I – Feature Processing

Part I deals with Feature Processing includes Embedding Layer, Convolution Layer. It transforms the original features into dense vector information. Embedding involves language modeling and feature learning techniques where words from vocabulary are mapped to vectors of real numbers. Convolution layer apply convolution operation to the input, passing the result to the next layer. The final output of the convolution layer is a vector.

• Part II – Emotion calculation

Part II deals with Emotion calculation after the feature processing in the Part -I. It includes LSTM, Dense layer. LSTM stands for Long short-term memory. It can not only process single data points, but also entire sequences of data. A dense layer feeds all outputs from the previous layer to all its neurons each neuron providing one output to the next layer.

• Part III – Attention mechanism includes LSTM-stack

Part III deals with Attention mechanism includes LSTM-stack. As the neural network goes further deep backward fine-tuning process in CNN-LSTM becomes weak and the vanishing gradient problem occurs. This is solved by associating CNN-LSTM with Part III. Thus, more attention to original information can be attained.

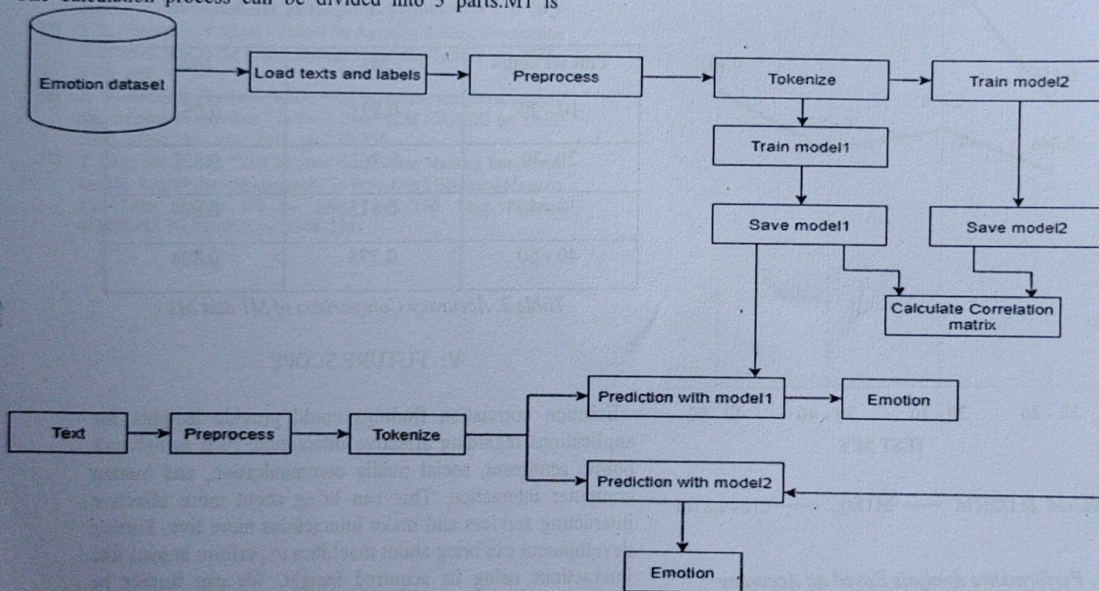


Fig.1. System Architecture

4. Emotion correlation calculation

It involves Data preprocessing. Here each model is tested with same amount of data. Both results are saved. Now Creation of correlation matrix using result is done.

3. Training

The training involves loading the preprocessed data and the architecture that was created. After loading, training is performed. After training gets completed, a logic is formed in the models. Thus, the two models are trained and saved.

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5. Prediction

In prediction the text is loaded, then it is preprocessed and tokenized. Now the required model is chosen. The chosen model is loaded and the prediction using the loaded model takes place.

IV. RESULT & PERFORMANCE ANALYSIS

Here, we are using two models CNN-LSTM(M1) and CNN-LSTM- STACK(M2), for emotion recognition and determining emotion correlation. The output of the models is emotion like love, joy, anger, etc. and the relation among emotions. From the experiments it is clear that the proposed CNN- LSTM model achieves a comparatively high accuracy than the emotion recognizing models like fWLTM & fXETM, MTML etc. Results shows that the proposed system achieves a better performance than other existing systems.

Performance Analysis Chart

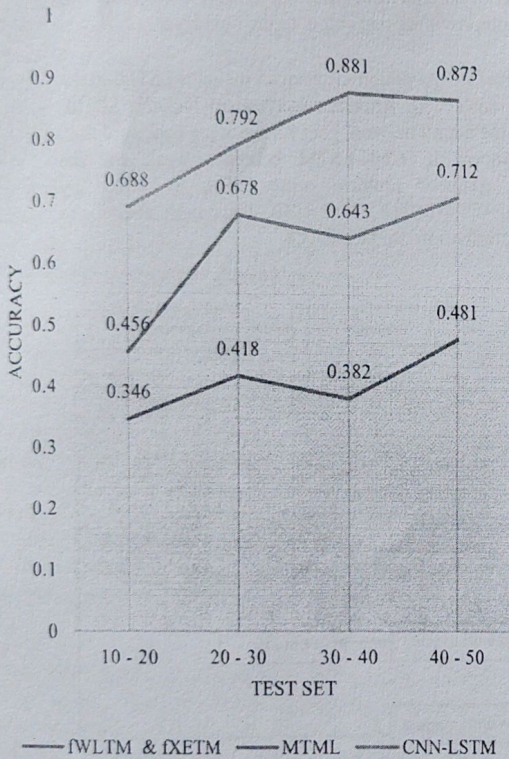


Fig. 2. Performance Analysis Based on Accuracy

Test set count	fWLTM & fXETM	MTML	CNN-LSTM
10 - 20	0.346	0.456	0.688
20 - 30	0.418	0.678	0.792
30 - 40	0.382	0.643	0.881
40 - 50	0.481	0.712	0.873

Table 1. Accuracy of different emotion recognizing models

The performance of two proposed model is compared based on accuracy. The results show that the among the models M1 and M2, M2 achieves a better performance compared to M1.

Performance Analysis of M1 & M2

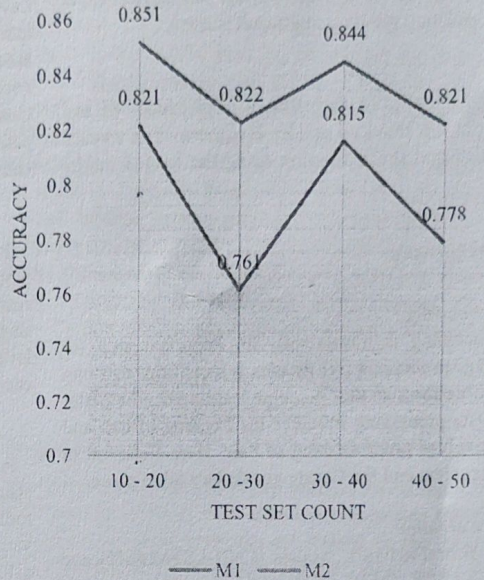


Fig. 3. Performance Analysis of M1 and M2

Test set count	M1	M2
10 - 20	0.821	0.851
20 - 30	0.761	0.822
30 - 40	0.815	0.844
40 - 50	0.778	0.821

Table 2. Accuracy Comparison of M1 and M2

V. FUTURE SCOPE

Emotion correlation findings could provide insights for applications regarding affective interaction, such as network public sentiment, social media communication, and human computer interaction. This can bring about more affective interacting services and make interactions more live. Further development can bring about machines to perform human like interactions using its acquired insight. We can further be studied possibility of considering prediction of a next interaction in a series of interaction considered which can add about high amount of efficiency and accuracy as more likely to hit the right emotion within less time considering and comparing the predictions while reaching the final recognition result.

VI. CONCLUSION

Most past works in the field center around perceiving emotion as opposed to mining the motivation behind why

emotions are not or wrongly perceived. The correlation among emotions adds to the disappointment of emotion recognition. Here we fill the hole between emotion recognition and emotion correlation mining with this framework. Emotion correlation discoveries could give experiences to applications, for example, network public notion, social media correspondence, and human-computer interaction. conclusion section is not required. Although a conclusion may review the main points of the paper, do not replicate the abstract as the conclusion. A conclusion might elaborate on the importance of the work or suggest applications and extensions.

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Innovative Teaching and Learning Process during COVID 19

2nd Edition


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Trending Teaching and Learning Mechanisms in 21st Century

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Learning is a process by which a person acquires knowledge and skill through study, been taught or by experience. Learning has wide flexibility to adapt to any situations such that one who craves for knowledge could acquire it through many means. Now our world is facing with such a pandemic disaster, so many have to be self-isolated and nothing other than imprisonment inside four walls. But this situation is a chance to enhance our skillset within our isolation so that a wide set of online skill improvement programmes have been initiated, so many could utilize it in a fruitful way. Dedicating some of our quarantine time to improve self-education makes good sense. Now we can see many people are in an urge to enroll many online learning platforms which focuses on wide areas like technology, arts, humanities, personal development. So we would like to open some of good platforms you could use for e-learning purpose.

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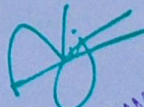
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1

Knowledge Transfer through Transfer Learning—A Machine Learning Approach for Image Classification

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ABSTRACT

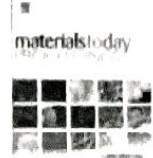
Machine learning and deep learning are widely used today in computer science field and are more popular nowadays. In the field of Artificial Intelligence, more researches are ongoing and are mainly focused on the sub areas like Machine Learning and Deep Learning. Transfer learning a technique, which can provide a successful outcome in the field of Deep Learning. This chapter aim to provide an outline about transfer learning and its mass benefits in image classification. It also reviews some architectures, which support Transfer Learning and the story of successful implementations.

Keywords: Machine Learning, Deep Learning, Transfer Learning, Computer Vision, VGG16.

Introduction

The concept of machine learning is emerged from a question like can we program a computer to learn from the available input. The answer is yes, using machine learning technique. It is an automated learning with no human intervention or little. The main purpose of machine learning is to develop algorithms, which can learn from previous data and enable them to predict something using new data. The input is called training data sets and using testing data set we can test the accuracy of our model continuously.

Sometimes machine learning is not useful when we are using large number of input or high dimensional data. It also fails to recognize images and Artificial Intelligence problems like Natural Language Processing (NLP). Here comes Deep



Modified solar generating panel for high-efficiency solar power station – Using temperature study

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ABSTRACT

The design of a hybrid solar generation module based on high-efficiency silicon solar cells with a solar radiation mirror concentrator and a solar cell cooling system for the construction of a high-performance solar power station is described in this article. The need for this research is focused on the experimentally proven effect of working temperature and solar radiation power on performance. The need of this work supported through an experiment established influence of the operating temperature and radiation power on the potency of business production semiconducting material solar cells. In planned style, concentrator of radiation provides in 1.5-time increase of power generating by module, and at constant time water-cooling system will doubly scale back potency losses from solar cells heating by reducing the equilibrium temperature of the module up to ten degrees. In apply the conclusion of planned hybrid solar generating module can scale back the quantity of modules required to create solar power station varied temperature studies square measure conducted.

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1. Introduction

Since solar power being the foremost plentiful renewable energy, the huge power generation through it absolutely was a breakthrough in electrical and physical science engineering. By the tip of 2018, international additive put in PV capability reached regarding 512 GW (GW). But the key drawback is just eleven to fifteen of the solar power is reborn to electricity. The common single junction semiconducting material electric cell will turn out a most open-circuit voltage of roughly 0.5 to 0.6 V. Solar cells are delineated as being electrical phenomenon, regardless of whether or not the supply is daylight or a synthetic lightweight. additionally to manufacturing energy, they will be used as a photodetector (for example infrared detectors), detection lightweight or alternative electromagnetic wave close to the visible vary, or measure intensity level. To design the idea of a changed solar generating module equipped with a mirror concentrator of radiation and solar

cells cooling system for victimisation in high performance solar power station.

2. Conventional solar cells

A Solar cell is created of semiconductor materials that absorb the photons emitted by the sun and generate a flow of electrons. Photons are elementary particles that carry radiation at a speed of three hundred kilometers per second within the Nineteen Twenties, Albert Einstein said them as "grains of light". Once the photons strike a semiconductor material like element, they unleash the electrons from its atoms, leaving a vacant house. The stray electrons move around arbitrarily trying to find another "hole" to fill.

To produce an electrical current, however, the electrons have to be compelled to flow within the same direction. This can be achieved victimisation 2 sorts of element. The element layer that's exposed to the sun is doped with atoms of phosphorus, that has an additional lepton than element, whereas the opposite aspect is doped with atoms of B, that has one less lepton. The ensuing sandwich works very like a battery: the layer that has surplus electrons becomes the negative terminal (n) and also the aspect that incorporates a deficit of electrons becomes the positive terminal

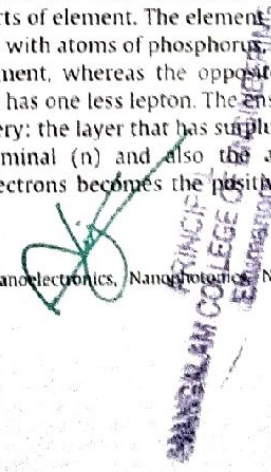
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A study of novel technique - solar powered bicycle

T. Suresh ^a, T.D. Subha ^b, C Surendra Kumar ^c, T.D. Subash ^d[Show more](#) [Outline](#) | [Share](#) [Cite](#)<https://doi.org/10.1016/j.matpr.2020.09.827>[Get rights and content](#)

Abstract

There are scores of bicycles in the world including the mundane one which has to be paddled in order to move, motorized bicycle that utilizes fuel as its crude power and electric bicycle that can only be passable for an hour. Owing to certain discrepancies in the existing system, the motive of a solar bicycle sprung up. The idea is to make the cycle eternally efficient by recharging it whenever it is not in use, with the help of renewable solar energy. The notion of solar energy is that a high torque motor will be put on the bicycle as a result of solar energy. The solar energy will be consumed by the portable solar panel to generate power. The power that has been absorbed can be used directly by the motor if the power conforms to the power requirement. If not, the motor will wield the power from a battery. Whenever the bicycle remains unused during the day, the solar panel will charge its battery. The system would thus make the bicycle operate more efficiently. The controller in electric bicycle controls the flow of power from the battery to the electric motor. The E-bike rider can rely on the motor completely, pedal and use the motor concurrently or pedal only.

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Materials Today: Proceedings

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Ethernet interaction at wave propagation of millimetres

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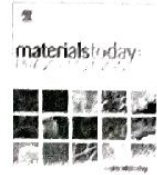
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Abstract

For the establishment of 5G cellular system, increased amount of data rate is required. The frequency requirement of 5G system is 6GHz. In order to transmit signal with large bandwidths, such high frequency is required. The propagation loss can be reduced by using beamforming antennas with increased amount of gain. The use of high frequency beamforming antennas require several changes in the cellular system such as cell search, random access, beam measurement for fast beam adaptation, and various physical data and control channels. In this paper, a new radio frame structure is proposed for the upcoming mobile cellular communication system at millimeter wave frequency which overcomes the fore mentioned challenges. A test bed in Samsung Electronics, Korea, was built which was based on the proposed structure of frame at 28 GHz with bandwidth was 800MHz It delivers a stream of 64 QAM data with a data rate of 7.5Gbps and code rate of $\frac{3}{4}$ to the transmitter as well as receiver mobile stations (MSs) which are closely located with their corresponding base stations. They also deliver a stream of 16 QAM data with the data rate of 1.2 Gbps and the code rate of $\frac{3}{4}$ to an MS moving at a speed of 110km/h within a cell of coverage area up to 800 m in a Line Of Sight scenario. Finally, Handover is achieved at an interruption time of 21 ms in 3-

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Analysis of acute myocardial infarction diagnosis

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ABSTRACT

The modern Era has not only developed science and technology but also improved the quality of human life. Since, the need of extended life is increased in recent years; the effective health care system is constructed to provide a better medical service. Particularly, when it comes to emergency diseases, the quality of medical system imposes a unique care on the patients. In order to diagnose these emergency diseases, the medical images are used to check the lesion information. In medical fields, PACS (Picture Archiving and Communication System) technology is used to acquire, transmit, or manage the medical images. However, since the existing system manage those diseases based on their superficial metadata, but the semantic information cannot be analyzed inherent in the medical images. Therefore, in this paper, an innovative method of providing medical image information by using their semantic information which is related to AMI (Acute Myocardial Infarction) is proposed. Here an essential image modality is selected and used for diagnosis as well as treatment of AMI, extract its semantic features, and analyze their semantic relations. The proposed method can provide several important information which is provided in medical images on a template, so that the insightful and efficient medical information can be provided for urgent diseases.

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1. Introduction

In recent years, the technology development has improved the quality of human life by upgrading the intelligent medical system. Especially, in providing rapid medical reports based on the diagnosis and providing suitable treatment to save the patients' life in case of urgent diseases [2]. There are several emergency diseases. Acute Myocardial Infarction (AMI) is one among them. It is commonly called as a heart block which is caused by necrosis of myocardial tissue due to ischemia or blockage of a coronary artery by thrombus [1]. By providing necessary treatment, the blood flow in the heart can be made normal by opening the blocked artery as a result AMI can be cured. In order to cure AMI a speed diagnosis and methodologies are required to avoid heart risks such as heart failure. However, the existing medical systems have several limitations. Therefore, in this paper we design an advanced medical system targeting AMI Fig. 1 Fig. 2 Fig. 3.

In case of AMI, CAG (Coronary Angiography) is broadly used to identify the location and condition of coronary arteries. The medi-

cal institutions have introduced PACS (Picture Archiving and Communication System) to acquire and transmit medical images like CAG. PACS is a technology which stores digital images and maintains them for future usage [17]. PACS is an electronic platform where, interworking among the medical systems such as HIS (Hospital Information System), EMR (Electronic Medical Record), and RIS (Radiology Information System) can be achieved [17]. Especially, in case of cerebrovascular diseases those medical images are more important for their diagnosis [1].

Some studies are shown which focus on quick exchange of large amount of medical data [6–7] or suitable techniques for automatically processing medical images [8–9]. However, they are majorly focused on transmitting or processing images, so they do not consider semantic information of the medical images. Generally, Meta data is used to represent the image information. Metadata is the structured data about attributes and characteristics of specific data. In PACS, DICOM (Digital Imaging and Communication in Medicine) Meta data is used to obtain the medical image information [10]. There exists an issue in legacy system while internetworking

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A DTM Research based on the strategic process

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ABSTRACT

This paper analyzes the reasons for the formation of security problems in mobile agent systems, and analyzes and compares the security mechanisms and security technologies of existing mobile agent systems from the perspective of blocking attacks. The host guiding mobile agent shielding technology is sorted out, a technique to intensify the reliability shield of mobile representative (named as IEOP procedure) is proposed. The method first encrypts the mobile agent code using the encryption function, and then encapsulates the encrypted mobile agent with the improved EOP protocol IEOP, and then traces the suspicious execution result. Experiments show that using this method can block most malicious attacks on mobile agents, and can protect the integrity and confidentiality of mobile agents, but the increment of mobile agent tour time is not large.

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1. Introduction

As a new Internet application business model, "Cloud computing" shields users from issues, such as data center management, big data processing, and application deployment. Through the network, users can quickly apply for or release resources according to their business needs, and pay for the resources used in an on-demand payment manner. Just as it is now convenient and quick to use hydropower, users do not have to purchase a hardware infrastructure to liberate themselves from the heavy pressure of IT infrastructure management and maintenance, and focus more on their core business development. With its economic advantages of convenient services to attract the attention of many enterprises in the IT industry, "cloud computing" is generally considered to have a huge market growth prospects. From a technical perspective, "cloud computing" has two key points. One is the research on the distribution method of large-scale dynamic resources in resource pools; the other is the computational methods and programming methods on distributed collaborative application development platforms. For the latter, the mobile agent computing scope provides a universal reference model for the

design and development of application systems in the "cloud computing" environment. The mobile agent model can realize the core idea and computing principle of mobile internet cloud computing in terms of technology, and realize the business service form of cloud computing in terms of service. However, due to the virtuality, dynamics, openness and commonality of the cloud environment, it brings great security challenges to the application of the mobile agent paradigm

2. Related work

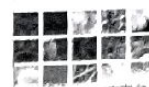
[1]. Mobile Agent technology is an emerging technology that is multi-disciplinary and at the forefront of international research. It is also a product of the combination of Agent and Internet in the field of artificial intelligence [2]. In the cloud computing environment, the problem of resource allocation of trust security domain in mobile agent system is studied [3,4]. It can track international cutting-edge mechanics, enhance the conceptual methodology of mobile agent model and cloud computing, and improve the security implementation of agent utilization system. It can also promote the further development of China's distributed application technology and information security technology, and promote the application of mobile agent technology in various fields in the cloud computing environment. Therefore, it is of great theoretical and practical significance to study the security trust problem in

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Radical low-slung influence 12-Bit SAR ADC

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ABSTRACT

This paper presents a 12-bit SA-ADC for portable low power wireless sensor systems. The proposed SA-ADC operates for rail-to-rail input range and achieves low power consumption. Split capacitor array-based DAC and a novel charge-integration based dynamic comparator are used for low power consumption of the ADC. Measured DNL and INL are $-0.59/0.67$ LSB and $-1.2/1.33$ LSB respectively. At sampling rate of 100-kS/s with 1.8-V supply, the ADC consumes only 2-mW power and achieves a SNDR of 64.42-dB, SFDR of 71.2-dB resulting in an FoM of 14-fJ/Conversion-step. The ADC core occupies an area of 0.238-mm² and is fabricated in AMS 0.35- μ m CMOS technology.

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1. Introduction

Typically the small sensor system require an analog to digital converter (ADC) of 10–12 bits resolution and the bandwidth up to 100kHz. Also the wireless sensor systems can be operated with the battery or surrounding sources like solar, RF, vibration etc., the demand occur extremely in low power circuits and these important sub-block use ADC for the purpose of signal conversion [1]. Typically, power consumption is expressed in is one of the important sub-blocks for signal conversion in these circuits. The energy per conversion step is momerit (FoM) given by

$$P = F_s$$

Where, F_s is the sampling frequency, P is the power consumed and ENOB is the effective number of bits [2]. The medium resolution and sampling rates can be obtain at few kHz. Due to the low power consumption of successive approximation based ADC it should been an appropriate architecture [3]. The Comparator, capacitive reference digital to analog (DAC) and digital logic circuit is used for primary source of power consumption in SA-ADCs. The advance technology scales with the power consumption of digital logic circuits [4]. To reduce the power consumption it is necessary to supply voltage reduction and the efficiency of digital circuits can be improved by the supply voltage reduction. Compared to typical 3.3v for AMS 0.35 μ m technology, the SA-DAC can be operated at

1.8v. It is hard to make the design of analog circuit part more challenging due to its low supply voltage [5]. The changes to be done in the design of the analog circuits, to meet the challenge while reducing the supply voltage. Normally the analog circuits are operated at high supply voltage and the digital circuits are operated at low supply voltage in this case dual supply is another method of reducing power consumption [6]. Instead of reducing the supply voltage, various methods have been introduced to reduce the power consumption in ADCs. This method involves scaling of sampling rate, reducing the number of boosted switches, charged-based scheme and time domain scheme. By using fully differential, pseudo differential and single ended architectures the SA-ADC can be implemented [7]. The common mode noise and the signal distortion can be reduced by using the fully differential implementation of ADC. The wireless sensor network is shown in Fig. 1.

Neglecting the use of the additional reference to ADC will reduce the overall power consumption. This can be done by rail to rail operation [8]. This paper proposes to design a fully differential rail to rail 12-bit SA-ADC by using novel charged-integration based dynamic comparator [9]. The proposed ADC has FOM of fJ/ conversion step for 1.8v supply and the area of 0.238-mm² get occupied. There are four sub-circuits inside the successive approximation analog -to-digital converter circuit:

The input voltage (V_{in}) is acquire by the sample and hold circuit,

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Nonlinear adaptive smart antenna resource management for 5 G through to surveillance systems

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ABSTRACT

5G evolution in the mobile telecommunication is an emerging technology which achieves the data rate of about 10 Gbps. In order to achieve such a super speed data increased bandwidth with high frequency waveform is required. Massive Multiple Input Multiple Output Beam forming (BF) is a technique which is used to develop the 5G system and Millimeter (mm) wave is used to provide higher frequency. Conventional BF can provide the Channel State Information (CSI) to end terminals but adaptive BF cannot provide CSI. But adaptive BF is highly efficient for changing their behavior according to the requirement of the channel. In such a hybrid BF technology can be used to implement 5G technology which uses both analog and digital BF technology to transmit and receive the signal without distortion. The major challenge in the implementation of 5G technology is to find out the best beamforming technique. This paper deals with the performance of various beamforming techniques for implementing 5G technology.

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1. Introduction

Massive Multiple Input Multiple Output (MMIMO) is an antenna technology which is used in wireless communication. MIMO system is widely used in cellular base station because it has very large number of antennas which improves spectral efficiency and energy magnitude using linear processing [1]. In MIMO system, multiple antennas are used at both the transmitter and receiver end. MIMO system is a technique, in which more than one data signal is sent simultaneously through the same radio channel from the transmitter to the receiver through multipath propagation [12,13]. The channel capacity or Shannon capacity of MIMO system increases with increase in array antennas [2]. The 5G technology can be implemented using MIMO system because it has less installation cost. The cell is separated into small cell which are known as phantom cell. A very high frequency, wider bandwidth and even the high Bit Rate is possible in small cell [3]. Fixed BF, which uses the fixed BF weights selected from the BF weight candidates, can be introduced to the signal transmission [4]. For the digital fixed BF, equal number of digital baseband signals and baseband chain which increase the cost of the massive

MIMO transceiver remarkably. The model representation of Massive Multiple Input Multiple output network system is shown in Fig. 1 and the closed-loop and open-loop representation of CSI acquisition and utilization is shown in Figs. 2 and 3. On the contrary, for the analog fixed BF, the number of the BF chains can be limited for the analog radio frequency (RF) signals compare to the digital precoded outputs, which results in the cost reduction [15]. The analog fixed BF and the digital precoding, which is referred to as hybrid BF, can be effective to reduce the cost of the Massive MIMO transceiver. In the jointly operated to maximize the channel capacity and reduce the cost [11]. The Channel State Information (CSI) which is available in hybrid BF is useful for transmitting data of extremely high bit rate using multiple streams.

2. Related study

a. 5th Generation Communication (5G)

The term 5G represents 5th generation mobile networks or 5th generation wireless systems has been used. Right now, in any written document the term 5G hasn't been formally used rather different telecommunication firms or standardization bodies like 3GPP

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The importance for nanostructures in N-I-P ambiguously defined Si periodic concentrated solar devices

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ABSTRACT

Arrays of periodic one-dimensional nano materials provide light-matter interaction in terms of tunable optical properties which are attractive for planning efficient optoelectronic devices. This paper is based on n-i-p thin-film amorphous silicon utilizes scaffolds of vertically aligned carbon nanotube (CNT) array for a fabrication of bottom-up grown Nano pillar (NP) array solar cells. The varying effect of the CNT extent over a wide range from 800 to 2000 nm on electrical properties of the solar cells and optical were examined. The NP solar cell with CNT extent over a range of 800 nm show 'moth-eye' broadband antireflection effect and the value 10% lower than an average reflectance. The enhanced optical absorption relocates to significant enhancements in quantum efficiency and photocurrent contrast to a conventional planar solar cell under low light circumstances. The open-circuit voltage (V_{oc}) of the NP solar cell was established uniformly correlated with the illumination condition and CNT spacing. The main importance is to develop high efficiency one-dimensional nanostructured solar cells results were presented here. © 2020 Elsevier Ltd. All rights reserved.

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1. Introduction

Interaction of light with spatially ordered nanostructures shows some matchless characteristics, especially when the characteristic size is in the sequence of the incident wavelength. Across, the last few years has been a research paper on exploiting these properties to enhance the absorption of solar cells [1]. One class of such Nano pillar (NP)/one dimensional nanowire (NW) structure are nanostructures which provide superior optical absorption enhancement via jurisdiction of its length, resulting array density, diameter and pattern. NP/NW structures are good looking not only for solar cells but also for other implementation like image sensors and large area photo detectors e.g., for medical imaging [2]. In addition, the charge collection by allowing high optical absorption via the use of long NWs while reducing photo generated carrier losses over the application of thin absorber layers and the radial junction geometry disconnect the light absorption direction. The carbon nanotubes were shown in Fig. 1. These NP/NW structure supply very good broadband optical absorption improvement for light

with broad incidence. The one dimensional nanomaterials for bottom up growth procedure like silicon NWs, carbon nanotubes (CNTs) and zinc oxide NWs has adopted before to make transistors, nanostructured interconnects and photovoltaic (PV) devices.

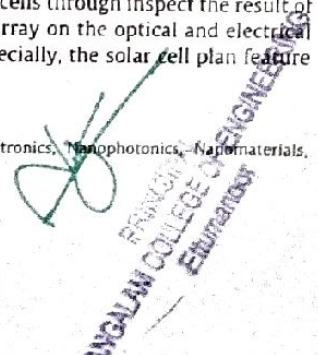
Established devices may range from shell/core Si NW array solar cells, ZnO Si/shell (core) radial hetero junction NW photodiode to amorphous Si coaxial cable/CNT such as NW solar cells. These devices show enhanced short circuit current and higher photo responsivity contrast to their planar counterparts [3]. The use of periodic structures like NW arrays and sub-wavelength gratings depend on devices with having photon capturing state have been enhanced further. Instead of bottom up technique and solar cell efficiencies with describe values of still fall behind the top down engrave Si Nano pillar solar cells is 18.2%. Therefore, further the fundamental problems probe the bottom-up grown NW solar cells like periodicity, including array density and examining the effect of geometrical parameters on the device performance [4]. This paper makes an effort to systematically probe the fundamental problems of the bottom-up grown NP solar cells through inspect the result of geometrical features of the NW array on the optical and electrical characteristics of PV devices. Especially, the solar cell plan feature

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Review on some kind of new process of restructuring the automotive process

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Abstract

Based on Information Synthesis Approach (ISA), Concurrent Engineering (CE) and Net Brainstorm (NBS) the development method of the Automobile can be improved and it also helps in accelerating development of Automobile. There are four modules in development preparation which includes automobile design, automobile manufacturing and automobile sell which make a magic ball according to rules of ISA. The little magic balls can be subdivided based on four modules. With the help of Concurrent Engineering the balls of same hierarchy can be carried out. The feedback information should reciprocally combine with principle of ISA to find more and better development concepts. In every place of automobile development, the main innovation mode is NBS.

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COVID 19 an infectious disease influenced in modern era - recent survey in India

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SAR-Cov (Severe Acute Respiratory System Coronavirus)

WHO (World Health Organization)

MERS (Middle East Respiratory Syndrome)

TGEV (Transmissible Gastroenteritis Virus)

ABSTRACT

The virus which is called as corona spoiling many of human lives as well as countries growth. Coronavirus is an infectious disease, so spreading from one person to other easily. Till now there is no medicine for corona. World Health Organization (WHO) taking lot of steps to control it. In India many of them get affected by coronavirus called COVID-19. A household survey is conducted nationally through online. This survey is a method for checking knowledge about the infectious virus. In this online survey some questionnaires were asked. People take their own interest and submit their reply through mobile phone and laptop/desktop devices. After analysing the survey, it is clearly proved that people didn't have enough knowledge about COVID-19.

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1. Introduction

The word Corona described from the Latin word Crown. Coronavirus is a virus which affects animals during 19th century. M.C. Hawn and Arthur Schalk from North Dakota described about Coronaviruses [1] affected chickens in 1930's. The virus spreaded chicken is called as IBV (Infections Bronchitis Virus). In 1940's the coronaviruses which spreaded for animals are called MHV (Mouse Hepatitis Virus) and TGEV (Transmissible Gastroenteritis Virus) [4]. British Medical Research Council give a description about coronavirus in the year 1960 [2]. In 1960's coronavirus first discovered was a large family of viruses [3]. Due to this illness for people and animals are affected a lot. These viruses severely affect the respiratory system. So, it is called as Severe Acute Respiratory System Coronavirus (SAR-Cov). Many of them affected mildly were recovered without any kind of special treatment. But severely affected persons were unable to recover. In 2019, it introduced in Wuhan (China) followed that it spreads throughout the world [13]. If it is infected by a person, its unable to predict for the first 14 days. Due to this reason, it's difficult to avoid spreading. The

symptoms include fever, difficulty in breathing and flu like symptoms. The precaution measures are maintaining social distance of 2 m, staying home, wearing mask and washing hands for every 20 min.

The origin of human virus is shown in Fig. 1. Two kinds of coronaviruses are detected, 1) SARS (Severe Acute Respiratory System) and 2) Middle East Respiratory Syndrome (MERS). In 2002 to 2003 SARS occurs around the world, nearly 800 death and around 8,000 people infected [5]. In 2012 MERS sporadically occurs, due to these 900 deaths and around 2,500 people infected [6]. The common human coronaviruses are a) Alphacoronaviruses (HCoV-229E, HCoV-NL63) and b) Betacoronaviruses (HCoV-OC43, HCoV-HKU1). Dorothy Hamre and John Procknow the medical students of the University of Chicago discovered a new cold virus called 229E which affects kidney well in 1965 [7]. In 1967, June Almeida a Scottish Virologist gave a study about two novel strains B814 and 229E at St. Thomas Hospital in London [8]. A virus called IBV (Infectious Bronchitis Virus) is a mouse hepatitis and a novel cold virus is known as coronaviruses introduced in Wuhan in 2019 [12]. In Wuhan, there is a wet market, in that large number of fishes, birds and animals were sold. Due to this the viruses easily jumped from animals to humans. Thus Covid-19 has been identified. Within a

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Extended gate with source splitted tunnel field effect transistor for improved device performance

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ABSTRACT

A novel tunneling field effect transistor having extended gate with source(s) splitted (EG-SS-TFET) is proposed in this paper. The device physics of our proposed structure is compared with conventional L-shaped TFET for better device performance. The vertical band-to-band (B2B) tunneling in L-shaped structure is our motivation, which has been finetuned by gate extension (varied 2 nm to 6 nm) and splitted source (varied 2 nm to 10 nm). The gate extension results better tunneling at source-channel interface. The device models are simulated using two-dimensional numerical device simulator (Silvaco). The turn-on voltage of our proposed EG-SS-TFET is about 0.35 V lower than other established L-shaped TFET structures. The average Subthreshold Swing (SS) is recorded about 10 mV/decade lower than conventional L-shaped TFETs, resulting steep slope for fast switching applications.

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1. Introduction

In nanodevice modelling and fabrication, tunnel field effect transistors (TFET) become most promising candidate now a days. Continuous degraded device scaling issues have limited the metal oxide field effect transistor (MOSFET) models for better device performance. Since conventional MOSFET offers limited subthreshold swing of 60 mV/decade, has now been outplayed by band-to-band (B2B) quantum tunneling performed by TFETs [1–5]. Due to B2B tunneling the subthreshold swing (ss) is now getting reduced below 60 mV/decade theoretically. But the poor ON-state current has been an issue of TFETs for fast switching and low-power applications. With the advent of modified TFET structures, several solutions to boost ON-state current have been studied. To maximise the source-channel interface region, various L-shaped TFET structures are analysed from recent literature surveys [6–8].

The conventional L-shaped device structure actually provides larger source-channel interface, by means of which the B2B tunneling can be performed perpendicular to intrinsic channel. In 2016, Z. Yang introduced a typical L-shaped TFET structure, where the n⁺ source-pocket region overlapped with gate utilizes both vertical

and lateral B2B tunneling [9]. The minimum subthreshold swing obtained as 38.5 mV/decade at 0.2 V_{GS}. In 2019, S. Yun et al. modified L-shaped tunnel FET with specific strategic device parameters, named as F-shaped TFET shows 4.8 times higher I_{ON} and 7 mV/decade smaller average subthreshold swing compared to conventional L-shaped TFET [10]. In 2019, S.K. Sarkar et al. put light into a vital issue of ambipolarity in L-shaped TFET, by designing double gate double metal dielectric L-shaped TFET targeting reduced ambipolarity [11]. In this work, they performed material engineering in the modified L-shaped TFET structure to boost drive current. Whereas in 2017, P.K. Dubey and B.K. Kaushik introduced T-shaped TFET which results 4.3 times improvement in drive current, 4 times rise in transconductance and 2.3 times improvement in cut-off frequency compared to traditional L-shaped TFET [12]. Considering the recent literature survey (simulation as well as experimental reports), in section II the conventional L-shaped TFET is modelled and then modified with our proposed device structure targeting better device performance. All device models are simulated by Silvaco TCAD device simulator.

2. Device structure and simulation methodology

The three-dimensional simulated structure of a L-shaped conventional tunnel FET (LTFET) is shown in Fig. 1. The device physics

* Corresponding author.

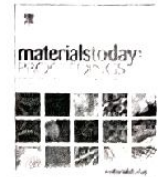
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Autonomous public transportation system

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ABSTRACT

Disaster management has become a research area in its own right, with few reported cases of successful installation of robots in real disaster areas. Most of these disasters are using air, ground, or underwater platforms. However, studies involving private boats or Unmanned Surface Vehicles (USV's) for Disaster Management (DM) are presently being distributed in many publications, of varying depths, and focuses mainly on single-seat vehicles - usually under the banned Ocean umbrella. Therefore, the current value of USVs in the DM process at its different stages is unclear. This paper presents the first comprehensive study on the use of USV DMs, as far as we know. This work shows that with few current issues in disaster situations, most research in the area focuses on USV Hardware and software platforms, such as Guidance Navigation and Control, do not focus on their actual DM value. Finally, to guide future researches, this paper also summarizes our contributions towards it, the lessons learned by everyone, the guidelines made by us, and the research gaps.

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1. Introduction

Technological advancements produce continuity between customary, absolutely autonomous vehicles and AVs, that are partially or self-driving and would possibly eventually need no driver in the least [1,3]. At this moment there are technologies that permit the automotive to help and assist the selections of the human driver. Such technologies embrace crash warning systems, adaptational controller (ACC), routing systems, and parking technology [10,12].

AVs have nice potential to permit for longer spent on the vehicle and cut back friction, overhead prices, energy consumption and pollution [6,8]. They'll amendment automotive possession models and land use patterns, and that they will produce new markets and economic opportunities. However policymakers are commencing to face major changes created by AVs. They alter variety of policy queries, the answers of which can contribute to shaping the adoption and impact of AVs. This includes everything from once and the

way this technology ought to be allowed on the roads to the proper credit bureaus [11,13]. The report seeks to help policy manufacturers by summarizing an oversized body of relevant data on these policy problems, and proposing acceptable policy goals.

Autonomous driving is presently being talked by a lot of people - once it involves the automotive sector. So far, this advancement has been primarily associated to personal traffic. Driverless transport has a small role in present analysis and progress compared to absolutely autonomous buses, completely autonomous cars, and trains which are already on public roads. Sitten autonomous buses are operative within the Swiss town since 2016 [1,6].

As another example, a completely machine-driven line one in Paris (France) will carry 725,000 passengers per day. Paris Metro's ordinal line is that the world's 1st wide-gauge machine-driven subway, serving up to five hundred thousand commuters on a daily basis. The amount of passengers enlarged from 3.5 million in 1998 to eighty million in 2009 (UITP, 2012). This information indicate that the approval of rail-bound, completely machine-driven trains is extremely high. Since autonomous buses are now solely in the time of testing, there are only a few user reviews during this space

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Application of electric springs in fuel cells

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ABSTRACT

As an energy source, fuel cells are a good option for distributed generation and implementations for hybrid vehicles. One of the key problems of this technology are its slow internal electrochemical and thermodynamic response, which lead to slow reaction time to transient electrical loads. This article proposes a new configuration and a novel control strategy to solve fuel cell weak transient response by using type 1 AC electric spring (ES-1). Furthermore, it will be shown that the same configuration helps in decreasing the required space for battery storage.

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1. Introduction

Electric spring is a new emerging technology mainly intended for demand side management applications by controlling the current and voltage of the non-critical loads to follow generated power profile, especially by renewable energy resources. Since then it has been used in various applications such as power quality enhancement and optimization of micro-grid operation. Different types of electric spring have been proposed for both AC and DC grids. In order to form a smart-load electric spring should be connected in series with a noncritical load such as a water heater. This paper proposes a new application for the AC electric spring type 1 connected in series with the noncritical load as a smart load to mitigate the load transients which can affect the lifespan and the hydrogen consumption of the Fuel Cell. It will be shown that this solution helps not only to improve the efficiency of the Fuel Cell operation and provide an AC voltage regulation but also eliminate the use of the battery storage system compared to the conventional topology where the battery is in parallel with the Fuel Cell. The idea of electric spring is derived from the mechanical spring system. A mechanical spring can store energy when stretched and can release the stored energy when required. Similarly, electric spring works to improve the power quality. When the voltage dips down below certain pre-fixed reference level then it adds up to the voltage of the system to make it equal to the pre-set reference value. In the same way if voltage is increased then it

can create a negative voltage to make voltage profile equal to reference value.

2. System modelling

In this section, a brief explanation of the modelling of the fuel cell is given (Figs. 1-9). The proposed system is composed of a PEM-FC connected to a DC/DC boost converter and a DC/AC single-phase inverter is also used with an LC filter to supply AC voltage to the loads. Besides, the electric spring is connected in series with the non-critical load to form a smart load (SL).

2.1. Modeling of PEM-FC

One of the most developed fuel cells is Proton Exchange Membrane fuel cell (PEMFC). PEMFC has been proven as a reliable energy source in transportation as well as power generation [6]. The model used in this study is based on the dynamics of PEMFC developed and validated in [6]. The model is based on the equivalent electrical circuit to represent the electrochemical and thermodynamic behaviour of the PEMFC.

The cell voltage is described as follows;

$$V_{cell} = E_{cell} - V_{act} - V_{ohm} - V_{conc}$$

E_{cell} is the cell open circuit voltage

V_{act} is the activation voltage

V_{ohm} is the ohmic voltage drop



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Enhancement of remote monitoring implantable system for diagnosing using IoMT

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ABSTRACT

The main aim of this paper is implantation in human body. Observation of a patient employing remote systems in practice is going to convenient. Implantation of medical equipment to the heart for monitoring the wellness of heart patients is made a practice, utilizing the biomedical and electronic devices. The implantable part is introduced to the internal body of the patient. An artificial implantable device replaces the current biological structure of the heart. Implantable patient's iEEG signals were processed and recorded utilizing the Internet of Medical Things technology. Making use of the desired remote systems, high dynamic range amplifier, and Internet of Medical Things technology, biomedical implantable monitoring system can be done in an enhanced manner.

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1. Introduction

Nowadays implantation plays an important role using Internet of Medical Things (IoMT) technology. In 1999, Federal Communication Commission (FCC) permits Medical Implant Communication Service (MICS) to use mobile radio devices for implantation [1]. Implantation process play a major role in medical field. The diagnostic/therapeutic functions were used for transmitting data's by using the implanted medical devices [2]. In 2016, the implantation process is done with 400 MHz frequency band and 2360–2400 MHz band for Medical Body Area Network (MBAN) devices. This frequency specifications used in medical field is called Medical Implant Communication Service (MICS). In united states, the patient's health was monitored by wireless service WMTS (Wireless Medical Telemetry Service) is called biotelemetry. In 2000, the bands used for digital televisions were 1427–1432 MHz, 1395–1400 MHz and 608–614 MHz, but these frequency bands were not agreed internationally. Many manufacturing companies are using ISM bands (902–928 MHz). IEEE 802.11 or Bluetooth are the best examples of ISM bands using devices.

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In 1906, Lee De Forest invented triode vacuum tube for amplification. Upto 1960 s, vacuum tubes were used and from 1970 s transistors were used. In 1876, lot of problems like crosstalk's, long distance transmission, etc., occurred in telephone communication. These problems were overcome in telegraphy using intermediate devices such as relay. The Scientist C. F. Varley introduced relay repeaters for telegraphic transmission, in which bidirectional communication takes place. Until 1904, this problem was not solved in the telephone communication. The scientist H. E. Shreeve from American Telephone and Telegraph company constructs a telephone repeater to overcome this problem. Mercury lamps were amplified using Shreeves repeater. In 1906, an American inventor Lee de Forest invented Audion triode as a first amplifier [4]. The term amplification and amplifier were derived from the Latin and it means to expand or to enlarge. During 1920–1940 s the theory of amplifiers were introduced at Bell Laboratories. Upto 1934, the amplifiers used were highly distorted and then Harold Black invented negative feedback to reduce distortion. Hendrik Wade Bode and Harry Nyquist developed the detailed study of amplification [5].

In 1947, John Bardeen and Walter Brattain invented point-contact transistors at Bell Laboratories. In 1948, William Shockley invented Bipolar Junction Transistors (BJT) at Bell Laboratories.

For the invention of transistors John Bardeen, Walter Brattain and William Shockley won Nobel prizes. In 1959, Mohamed M. Atalla and Dawon Kahng invented metal-oxide semiconductor field-effect transistor (MOSFET) at Bell Laboratories. Nowadays, MOSFET is one of the widely used amplifier in the world. Due to the invention of transistors, integration process takes places. The integration process includes SSI (Small Scale Integration), MSI (Medium Scale Integration), LSI (Large Scale Integration), VLSI (Very Large-Scale Integration), ULSI (Ultra Large-Scale Integration) and GSI (Giant Scale Integration). Integration is nothing but large number of transistors were integrated in a single chip to perform a specific function. Nowadays, the amplifiers used in commercial purposes were based on the integration process only. In 1982, at Carnegie Mellon University, the first smart device named Coca-cola vending machine work was started by scientist mark Weiser's [11].

2. Related study

2.1. High dynamic-range amplifier

A dynamic range amplifier is defined as the rate in the middle of the smallest values and largest values. It is used as a logarithmic value and often used as a signals in light and sound [16]. For light sight and sound hearing the dynamic range needed will be high for human senses [17]. The best example for high dynamic range is loudspeaker and is expressed as,

$$DR_{ADC} = 20 \times \log_{10} \left(\frac{2}{1} \right)^Q = (6.02.Q)dB \tag{1}$$

In the above expression DR_{ADC} represents the dynamic range in analog to digital conversion and its unit is decibel. The output response of a high dynamic range amplifier is sinusoidal in nature. The high dynamic-range amplifier is shown in Fig. 1. In the figure it is clearly shows that V_{dd} act as power supply or external supplied voltage.

The power of a signal represents the time varying current or time varying voltage. The power of a signal is increased in an electronic device is called as an amp or electronic amplifier or an amplifier. The amplification of an amplifier is measured by using gain [3]. In an amplifier, the power gain should be greater than one. Nowadays amplifiers are used in many of the electronic devices. Amplifiers are of many kinds such as RF amplifiers, audio amplifiers, instrumentation amplifiers and servo amplifiers. The graphical representation of input and out voltage representation is shown Fig. 2. The input voltage V_i signal is represented in green colour and the output voltage V_o signal is shown in yellow colour.

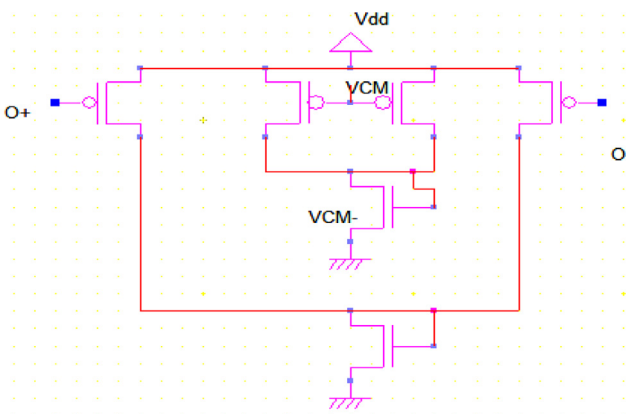


Fig. 1. High dynamic-range amplifier.

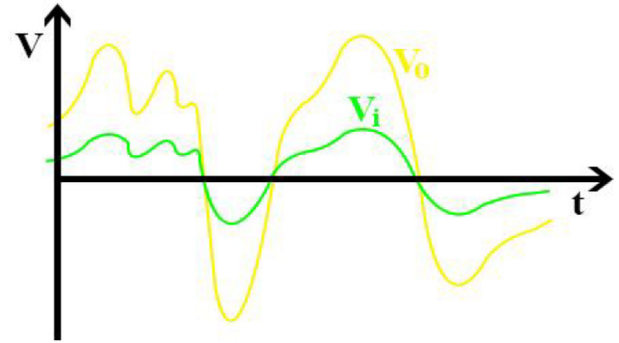


Fig. 2. Graphical representation of input and output voltage.

In the above figure, the green color represents the input voltage and the yellow color represents the output voltage. The amplitude of the voltage/current increases is called amplification. The voltage gain of an amplifier is expressed as,

$$\text{Voltagegain, } V_o = 3V_i \tag{2}$$

The ratio of output power to the input power or amplitude is called amplifier gain and is measured in decibels. The gain of the amplifier is expressed as,

$$G(dB) = 10\log(P_{out}/P_{in}) \tag{3}$$

The performance of an amplifier depends on the frequency range and is known as bandwidth. The efficiency depends on the amplifier input power. The dynamic range of an amplifier is expressed as

$$DR = (S + N)/N \tag{4}$$

Where, S is defined as the maximum signal power, N as the noise power and DR defined as the dynamic range [6]. The impedance matching of the input signal is eliminated by using the instrumentation amplifier and it is also called as In-Amp.

2.2. Implantable device

An implant defines a device which is used in medical field. The implantable device is used to replace the damaged or missing part of a human. The medical device or the implantable device is manufactured in the corresponding biological structure. The medical devices are man-made materials such as silicone, apatite or titanium based upon the function of a body it is used [7]. The coronary stent for implantation is shown in Fig. 3. The coronary stent consists of stent delivery catheter, location markers and inflated balloon with drug coated stent.

For example, consider a coronary stent, which is a tube-shaped medical device and is placed in the coronary arteries and for supplying blood towards heart. This is mainly for coronary heart diseases and while performing treatment, it makes the arteries to be open. Nowadays coronary stents are majorly using throughout the world. By using this technique, the chest pain gets reduced and also the acute myocardial infarction gets decreased [8]. The disorders in brain by means of diseases like Parkinson's disease, epilepsy, etc., were implanted by using Cataract, Keratoconus and neurostimulator. Artificial heart, valve, coronary stent, cardiac pacemaker was used as implantable devices for cardiovascular. By using Magnetic Resonance Imaging (MRI) device a patient muscular skeletal study did and if implantation needed, pins, screws, plates and rods were used in orthopedic implantation [9]. For implantation most commonly stainless steel is used. In some cases, alloys such as titanium and cobalt-chromium is used. There are lot of complications while performing implantation surgery and also

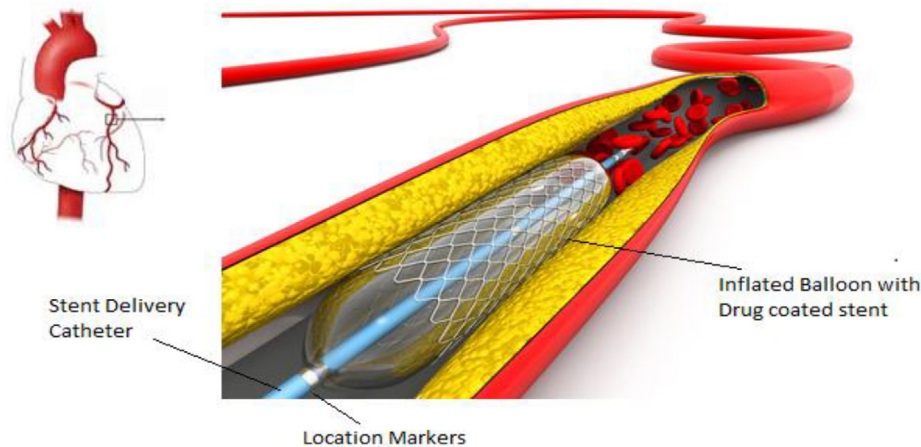


Fig. 3. Coronary stent used for implantation.

after the completion of surgery. This complication includes pain, allergic infection and inflammation. The infections were reduced by means of the material used for implantation. Due to blood-borne bacteria complication occur. Using antibiotics, it is difficult to reduce the risk [10].

2.3. Internet of medical things

Due to advancements, Internet of things play a vital role throughout the world. In manufacturing, commercial applications, smart factories and in medical field IoT plays an important and useful role. By using internet of things costs of the device and application get reduced and in medical field saved many lives too. AutoBed an IoT-driven software used in hospitals for monitoring the patient's health. By using telehealth system, a doctor can monitor the patient's health from his house itself. By using IoT one of the major disadvantages is power shut down. Due to power off, the entire system get failed and there is a chance of patients death too. By using radio frequencies internet of things is used in many applications from 2009 [12]. In 1959, the internet of things and semiconductor materials were used together to create smart phones, computers, etc., at Bell Laboratories [13]. Nowadays Internet of Things play a major role in medical field. So, it is called as Internet of medical things (IoMT). In simple it is called as Smart Health.

2.4. Implantable device electronics system

For monitoring wellness of the heart of patient there introduces an implantable part through which bio potential signal from the heart is obtained and monitored. The process of monitoring a bio potential signal from heart involves several process. High dynamic range amplification gives a stable output from a wide range of input signals. So different signals are reached the high range dynamic amplifier as inputs then there is an output produced which is in dB tends to give the output of smallest and largest output levels. Signal which is generated from the high dynamic range amplifier made sub ranged within three period of cycles. ADC converts the signal from analog to digital proportional to the analog input. Off-chip controller controls the data that is flowing through the device. Here the digital signal flow is control monitored by off-chip controller. For getting raw data from the obtained signal enabled by feature extractor. Most appropriate digital signal created from the desired signal. Stimulator which is attached by using the electrodes to the internal body makes the monitoring in an

enhanced way. The implantable part block diagram is shown in Fig. 4. The block diagram consists of high dynamic range amplifier, sub-ranging system, analog to digital converter, off-chip controller, stimulator, feature extractor and to the electrode blocks.

Monitoring patient's health by using remote is an easiest technique for all the doctors. This technique is called remote patient monitoring (RPM). The overall cost of this system is less and also less complications [14]. Normally, it is difficult to monitor the patients' health continuation by a doctor sitting in hospital. But by using IoMT doctors can monitor the patient's health from wherever they are. With the help of IoMT, patients' blood pressure, diabetes, heart related issues, whole health functioning is monitored by the doctor. Congestive heart failure is called as heart failure [15]. Two types of heart failures are there. One as reduced ejection fraction and another one as preserved ejection fraction. It is repaired by using coronary stent.

3. Simulation results

An amplifier is an electronic device used for amplification purpose [18]. For some functions low-range amplifiers are used. But in this paper high range dynamic amplifiers were used. The simulation results of the high dynamic range amplifier gain and its frequency response is obtained by using the circuit diagram [20]. The quantitative measure of a device is called frequency response. The output obtained perfectly without any distortion and is shown in the figure. The gain always depends on the frequency of an electronic device input signal [23]. In an electronic device some kind of unwanted signals were induced and affect the transmission is called noise [24]. The simulation results prove the success of a technique. In this Internet of Medical Things the high dynamic range amplifier frequency response for gain versus frequency is shown in Fig. 5 and noise versus frequency in Fig. 6. The electrical stimulus output representation is shown in Fig. 7.

Electrical stimulator is defined as the stimulation done by using electricity [19]. The electrical energy used for amplifiers should be limited only [21], so by using amplifiers there is no distortion in the output received by the doctor. A circuit which consists of resistors then the circuit is called resistive circuit. But for an electronic circuit it consists of all the active electronic components. In an electrical circuit the output response is obtained between the gain and the frequency [22].

The electricity stimulus is measured for two parameters such as current and voltage. The voltage response for electrical stimulator is shown in Fig. 8 and current response is clearly shown in Fig. 7.

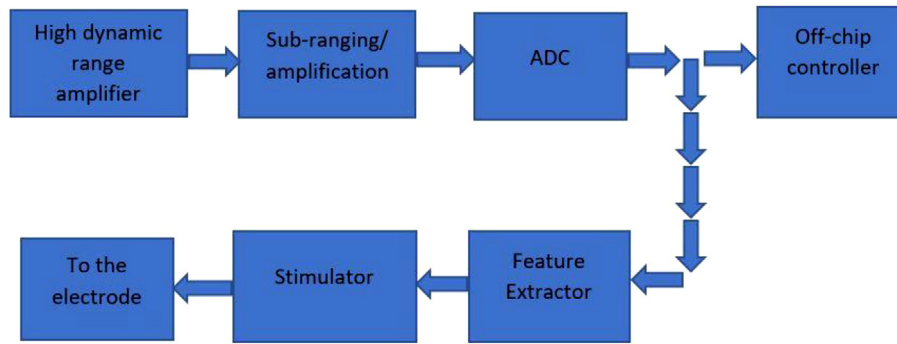


Fig. 4. Implantable part block diagram.

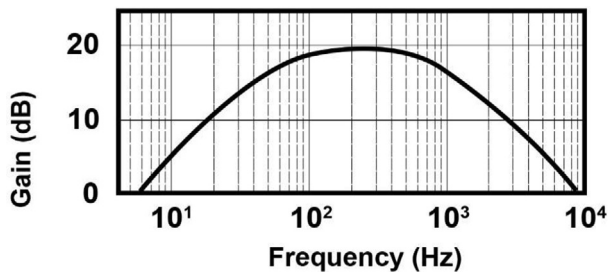


Fig. 5. High dynamic range amplifier frequency response: Gain Vs Frequency.

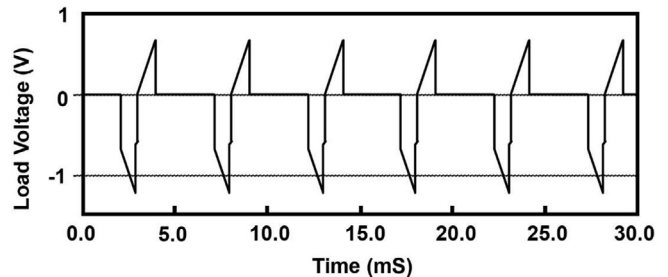


Fig. 8. Electrical stimulator measured voltage response.

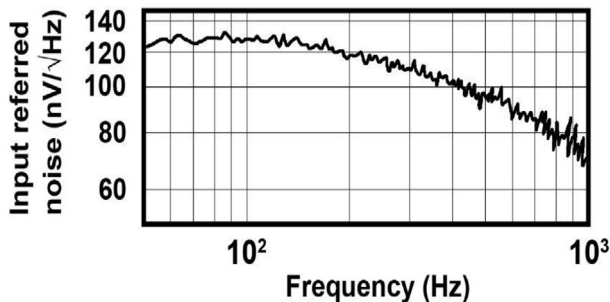


Fig. 6. High dynamic range amplifier frequency response: Noise Vs Frequency.

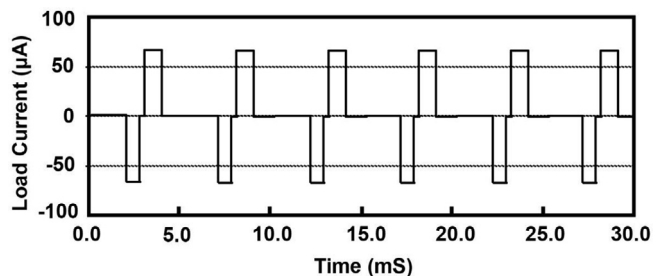


Fig. 7. Electrical stimulator measured current response.

The output wave is obtained between Load current and time for current response and load voltage and time for voltage response.

4. Conclusion

Thus, by using the implantation technique with the help of IoMT a doctor save many lives. Perception of a patient utilizing remote systems in practice is progressed using the Internet of

Medical Things technology. Implantation of restorative device to the heart for observing the wellness of heart patients is practiced, utilizing the biomedical and electronic gadgets. The implantable portion is presented to the internal body of the patient for the A counterfeit implantable gadget replaces the current biological structure of the heart for improving the monitoring system. Implantable patient's iEEG signals are prepared and recorded utilizing the Internet of Medical Things technology. Utilizing the required farther frameworks, high dynamic range amplifier, and Internet of Medical Things technology, biomedical implantable observing framework can be worn out in an improved way.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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The role of nano-communication in bio medical application and research

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ABSTRACT

Nano-communication devices play the vital role in the medical field in order to improve the quality of human life. They can be widely used because it can access small and delicate body sites non-invasively, where traditional medical devices are inefficient. In this paper, a brief study about the current models, various communication paradigms, antenna design, radio channel models and nano network models of the nano technology is presented. Also, the open research areas are illustrated for future development in the field.

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1. Introduction

This new technology creates a great impact on various fields such as industries, bio-medicine, defense and so on. The role of nanotechnology is efficient in the field of health care and bioengineering applications as it create a substitution for the existing medical technologies such as catheters and endoscopes. The nano devices are eminent in reaching the spinal cord, gastrointestinal or inside the human eye without introducing any medical instruments into the human body [1]. With the help of these nano devices a variety of information can be obtained to solve complicated tasks. In order to gather such information, proper connectivity should be established among these nano devices, which eventually lead to nano communication via nano network, for a wide range of operation [2]. The data can be transferred among these devices by Electromagnetic waves at terahertz band [3]. The main goal in the bio medical field is to connect the nano devices to the Internet in order to fulfill the needs of e-health system [5]. The nano scale devices produce shorter wavelength. At such frequency molecular resonance is present, which detects highly micro particles in water content and biomedical tissues of the human body.

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In this paper, we are discussing about nano-communication based on their biomedical applications, research challenges, antenna design, and channel modeling aspects, simulation issues and measurement techniques and so on.

2. Various applications and the network design

Nano networks can be broadly classified into four types: They are environmental, biomedical, military and industrial [2,4]. Nano devices can monitor the human biological movement. For example, nano pressure-sensors can be used to detect the intraocular pressure for diagnosing glaucoma which is caused by the high eye pressure. Eventually necessary treatment can be provided in order to prevent vision loss [1]. Similarly, nano devices can be placed in the bones to monitor the growth of bones in diabetes patients to prevent them from osteoporosis [1]. Also, Nano devices can be used in the biological tissues to detect and eliminate the foreign malicious agents at their initial stages and making the treatment more non-invasive [13]. Nano network is used to optimize and track the organs, nervous and tissue replacements. The nano network is subdivided into three parts: in-body, on-body and off-body.

Nano-nodes: The nano nodes are composed of sensor and communication units which can perform simple task and transfer the signal over very small distance. The nano nodes are the integrated

version of nano devices which has less memory and less communication characteristics.

Nano-routers: Nano routers are far better than nano nodes because they have comparatively large computational characteristics than nano nodes. They can control nano nodes by sending simple instructions. These routers can also obtain information from nano machines. Their physical deployments are literally an infrastructure based system (Fig. 1).

Nano-micro interface: This nano micro interface is a kind of hybrid device which is widely used to connect the nano scale devices with the micro scale devices. This interface is used to collect and transmit information from nano scale devices to micro scale devices, vice versa.

Gateway: It is used to control the whole system by the user via Internet.

3. Various paradigms of nano-communication

According to Akyildiz et al. the nano communication falls under two scenarios: They are, (i) Communication between a nano scale device and a micro/macro system, and (ii) Communication between more than two nano-devices. These devices can communicate under various paradigms they are electromagnetic, acoustic, nanomechanical or molecular etc.

3.1. Molecular paradigms

In molecular communication, a small sized transmitter is used. The molecules are used to encode, transmit, receive and decode the information, while a small particle of molecule is released into the propagation medium. Molecular communication can be broadly classified into several types. They are:

- walkway-based: molecules propagate via molecular motors along a path on which they were previously blocked.
- row-based: It is one of the communications in the circulatory system. In row based molecular communication the molecules propagate in a guided fluid medium.
- diffusion-based: The diffusion based molecular communication (DMC) is the widely popular because the molecules propagate in the fluidic medium via spontaneous diffusion [4].

3.2. Acoustic paradigm

Acoustic propagation produce a mild pressure in the fluid or solid medium that satisfies the wave equation without changing

the characteristics of the nano robots such as physical properties, surrounding medium and the working frequency. The communication effectiveness, power necessities and effects on the nearby tissue in vivo ultrasonic communication. Were clearly examined by Hogg and Freitas [16].

3.3. Touch communication paradigm

Touch Com Paradigm use the nano robots as a carrier for information exchange. In TouchCom, transient micro bots (TMs) [8,10] which can be controlled and monitored by the macro unit (MAU), installed inside the body to carry the drug particles to the tiny and sophisticated areas of the human body [11,15]. The channel model of TouchCom was obtained by decreasing the propagation delay, path loss with the angular/delay spectra of the signal strength. Meanwhile, the movement of the nano-robot swarm within the blood was described by a simulation tool.

3.4. Electromagnetic paradigm

In electromagnetic paradigm, the electromagnetic waves are used as a message carrier and their amplitude, phase, delay etc. are used to encode or decode the information. The emerging new materials such as Carbon Nano-Tube (CNT) and Graphene which uses EM nano-transceivers that requires the operational frequency range of THz band [5].

4. Recent development in nano-antennas

The major challenge faced by the nano technology is the communication among nano-devices that mainly depends on the nano antennas and their corresponding transceiver. By decreasing the size of the existing antennas to nano meters, high operating frequencies can be produced, that are useful in constructing an EM based wireless communication among the nano devices. For constructing nano antennas, metal or novel materials like carbon nanotube and graphene are used.

4.1. Metallic material based nano-antennas

There are several metallic material based nano antennas, they are: Metallic plasmonic nano-antenna, optical metallic nano dipole antenna and so on. It is difficult to choose the proper metal in terms of operational frequency band for nano antenna than the conventional antennas. To perform this study Method of Moments (MoM) based electromagnetic solver was developed. Besides that, metal oxide metal (MOM) techniques were also used for nano-antenna array because they have excellent tunnelling characteristics (Fig. 2).

4.2. Nano-antennas made of novel materials

The novel materials such as carbon nanotube and graphene can be used to overcome the fore mentioned limitations such as size and communication constraints, by using graphene to fabricate the antennas since the wave propagation velocity in CNTs and graphene nano ribbons are hundred times lesser than the speed of light in vacuum which depending upon the temperature, Fermi energy and so on [8]. The graphene-based antenna with 1 m length radiate EM wave at THz band [14]. For short range of communication MIMO antenna system based on graphene nano-patch antenna can be used which enlarges the channel capacity by increasing the number of antennas and selecting the suitable channel state matrices [15]. An equilateral triangular patch antenna,

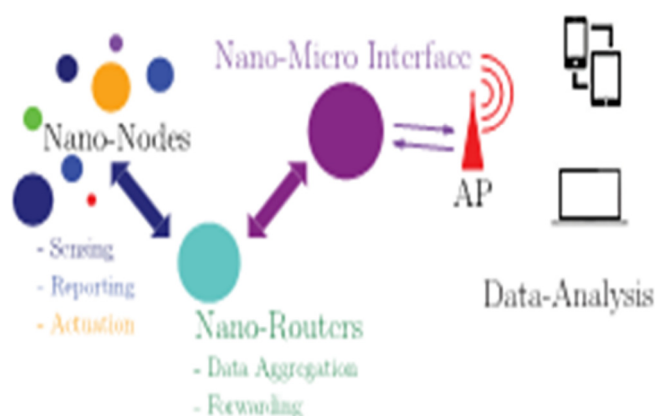


Fig. 1. Envisioned architecture for nano-healthcare.

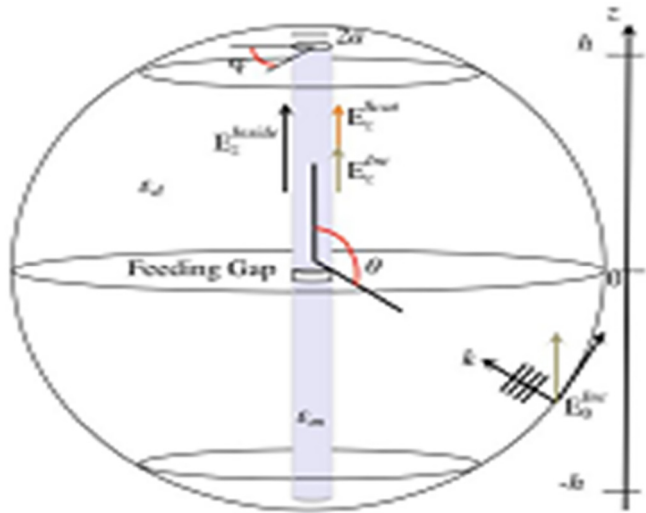


Fig. 2. Simulation results for the network. The analytical model validated by COMSOL Multi-physics simulations.

rectangular patch antenna, a log-periodic toothed nano-antenna and so on were designed using graphene.

A novel graphene-based nano-antenna can exploit Surface Plasmon Polariton (SPP) waves in Graphene Nano ribbons (GNRs); the graphene based plasmonic nano-antennas can operate at less frequency than the metallic antennas [9] (Fig. 3).

5. Current development of nano-scale devices

The micro fabrications are introduced in medical domain in order to replace the existing medical devices such as catheters and endoscopes and also to access the complicated human body areas like spinal cord, blood capillaries and so on. The IC fabrication which support full duplex communication was manufactured in CoSMIC research laboratory is represented below (Fig. 4):

Some of the developments in nano scale devices are as follow: The capsule endoscopes replace the existing endoscopy system which was applied in 2001 with the FDA's approval. A crawling mechanism [6] and on-board drug delivery mechanism [7] were some of the evolutions of capsule endoscopy. Anano-scallop was invented which can swim in biomedical fluids. A tiny bio-bot which was invented and empowered by skeletal muscle cells [9]. It is possible to deliver a single cell gene to the human embryonic kidney whose SEM image is shown in Fig. 5c [10]. A wireless radiation

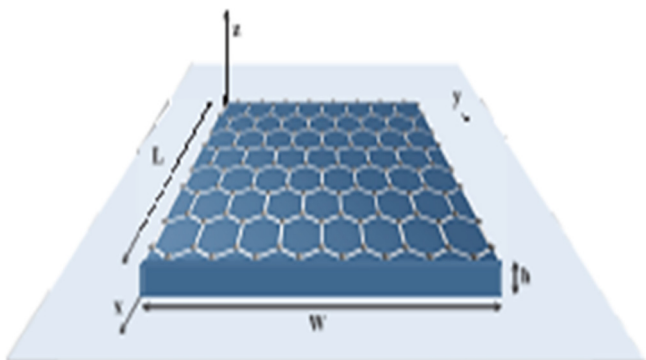


Fig. 3. A plasmonic nano-patch antenna based on graphene.

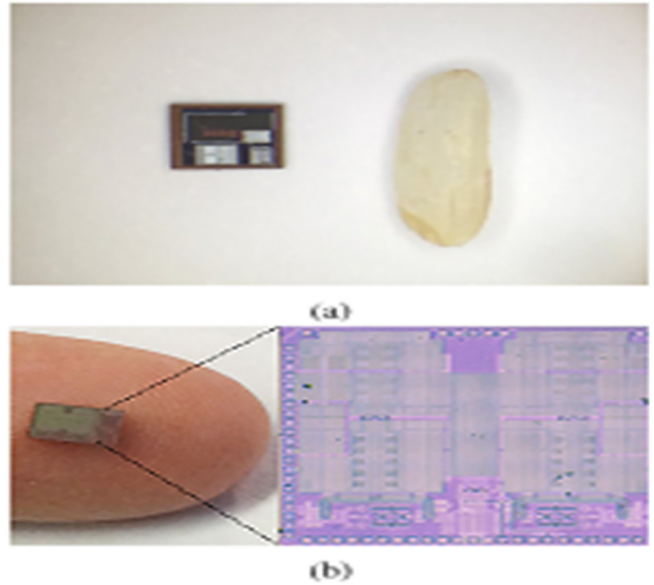


Fig. 4. The Realized IC chips. (a) Comparison of the chip with a rice (reproduced from [11]). (b) An image of the full-duplex transceiver IC which was manufactured in Cosmic Lab.

detector was invented to detect the level of therapeutic radiation the tumour cell gets [11].

6. Modeling of nano scale communication channel at terahertz frequencies

The THz Band provides a very broad bandwidth, which ranges from tens of GHz up to several THz depending on the transmission distance. The use of this frequency band is expected to address the spectrum scarcity and capacity limitations. In order to completely utilize the potential of nano scale devices, it is essential to have the knowledge about EM wave forms propagation and accurate channel models inside the body, which are important to design efficient, reliable and optimized high performance systems. It is mandatory to create a model which achieves target link budgets and high data rates. It is also important to design an efficient transceiver and antennas by using digital baseband algorithm. Initially the communication between nano devices through electromagnetic radiation was considered challenging because of limitations such as size, complexity and energy consumption [12]. However, with the advent of the carbon-based materials like graphene and CNT (carbon nanotube); attention has been moved to the EM communication slowly [4,13]. The modified Friis formula for path loss calculation [11] in water vapour at THz has two parts: the absorption path loss and the spread path loss. Later, a more described model of THz communication is proposed with multi-ray scenario [14]. The channel noise power is represented as follows [11]:

$$P_n(f, d) = \int_B^0 N(f, d)df = k_B \int_B^0 T_{noise}(f, d)df$$

$$\cong k_b \int_B^0 T_{mol}(f, d)df \tag{1}$$

where, $T_{mol} = T_0(1 - e^{-4\pi f d k/c})$ is the equivalent noise temperature due to molecular absorption; k_B - Boltzmann constant; T_0 - reference temperature. The capacity of the channel was also studied to determine the potential of the EM model. Higher transmission of bit rates up to Tera bits per second can be supported for the very short range

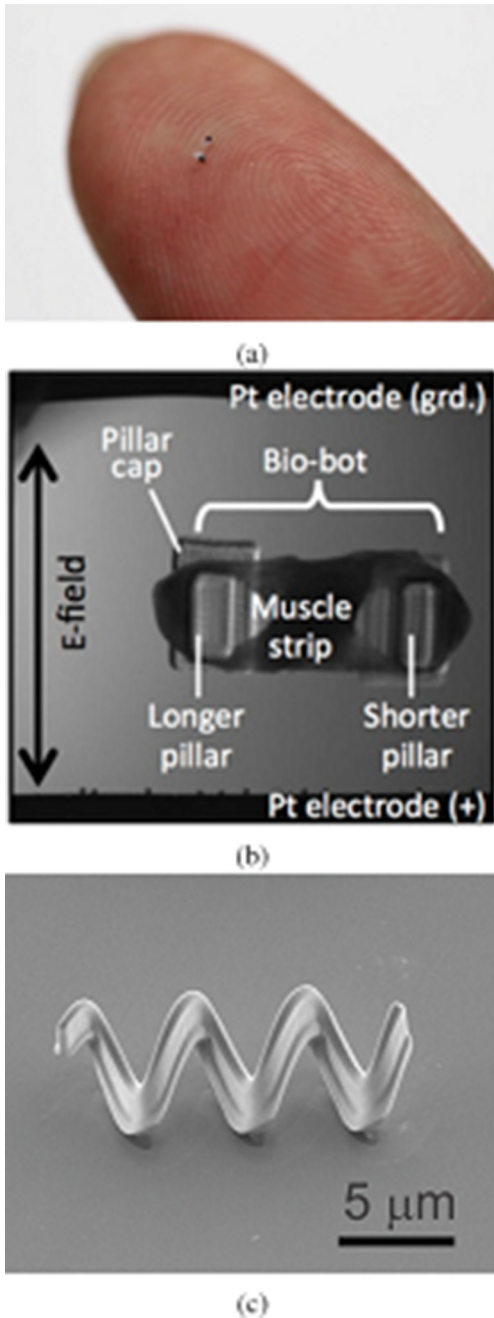


Fig. 5. Photos of the nano-bots which can be used in human body. (a) Nano-scallop which can swim in bio-fluids (reproduced from [8]) (b) Bio-bot powered by skeletal muscle cells c UIUC. (c) SEM image.

of communication indicates the promising future of the application of the EM mechanism for nano-communication.

6.1. Numerical modeling at terahertz frequencies

With the modelling of homogenous and layered model the wave propagation was investigated at THz band inside human tissues [6,7] then the results would be compared with theoretical model mentioned above.

6.1.1. Homogeneous model

In [8], using CST Microwave Studio the absorption path loss in tissues was calculated by setting up a simple model, shown in

Fig. 5, [9]. As lossy materials attenuate the plane wave, absorption path loss was calculated by studying plane wave in tissues. In order to investigate this concept a tissue cube was modelled by dielectric shown in Fig. 5 whose wavelength is ranging to THz.

The variation of E-led for a plane wave propagating in +z direction is monitored by equally spaced probes, while considering a perfect matched layer boundary condition. The comparison of analytically and numerically calculated absorption path loss (as shown in Fig. 6) verifies the numerical model accuracy, thus making a way forward for more studies.

6.1.2. Layered model

In addition to simple model mentioned above, studies were also performed numerically in CST on layered structures as well. A three layered model with the thickness of 1.5 mm (skin), 5 mm (fat) and 1.9 mm (muscle) was developed with perfectly matched layer boundary condition. Two dipoles were used in this simulation, where one of the two dipoles was in skin and the other one was in fat. Vertical and horizontal orientations of dipoles were considered. The minimum effect of the layered structure was shown by the comparison of power loss (Fig. 7).

6.2. Measurement techniques atterahertz frequencies

The electromagnetic/optical properties of human tissues are limited in the THz band [9,10]. Initially, the absorbance of DNA was measured using pulse based THz time domain spectroscopy (THz-TDS), at the band of 0.06 to 2.0 THz [19]. Later, power absorption and far-infrared signal transmission capabilities of animal tissues at THz band were measured using THz-TDS [20]. Because the

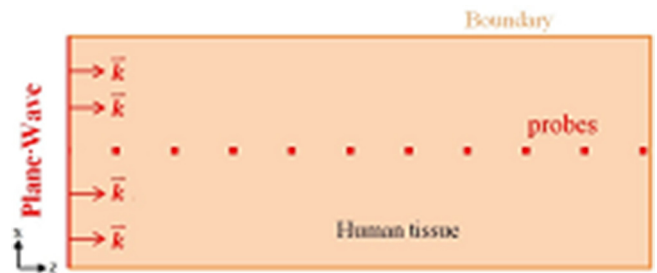


Fig. 6. a human tissue model for plane wave propagation.

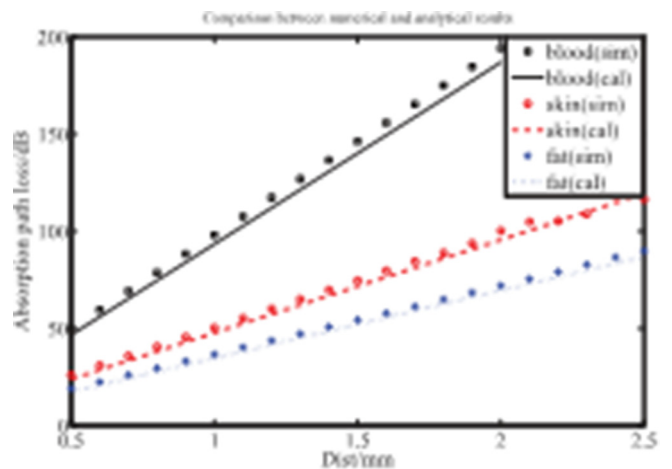


Fig. 7. Comparison of numerical and theoretical absorption pathloss at 1 THz [6].

performance of the cancer tissue is entirely different from the performance of healthy tissue at THz band, more and more studies have been conducted to describe the distinctive nature of the human tissues at these bands. Recently, with spectroscopy measurements of normal and cancer breast tissue in the range 0.1 to 4 THz were conducted by Bowman et al. [18], demonstrating the potential of THz spectroscopy to recognize the cancer cell (Fig. 8).

However, most of the researches are confined to KHz or GHz of range [14,15] because the human biological materials have minimum scattering in this range. The research of human tissue parameters at THz band is still in early stage. The authors did not consider skin type, specific skin layer and complexity of the tissue in their

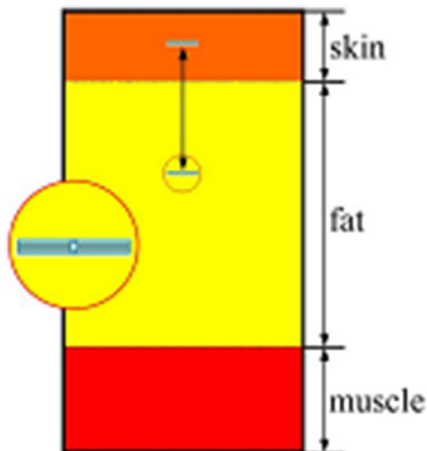


Fig. 8. A planar three layered human model at terahertz frequencies [6].

studies [9,10]. It should be considered that the fresh tissue is likely to have more water content. THz radiation cannot penetrate very far into samples with high water content due to strong water absorptions at THz frequencies. They have high absorption coefficient (Figs. 9 and 10).

The main constitute of epidermis were taken to investigate whether it is enough to use the parameters of collagen as the epidermis and the band of interest by having a study on both dielectric constants and channel parameters (Fig. 11).

7. Open research challenges

The nano-technology especially in biomedical domain provides substantial flexibility and advancements in healthcare for diagnosing and treating of more diseases will likely increase their usage in time. Some of the most important open research topics in this filed is given as follows:

Human tissue parameters extraction at tera hertz frequencies: The research on tissue parameters at THz band is still in its infancy. The complete set of data about tissue properties at such frequency is required for developing efficient and accurate nano based medical systems.

Safety constraints, heating and other problems at THz frequencies: Since the nano-devices are injected into the body, Safety to the patients is always the main consideration about nano-network. Hence, THz wave heating effects on the human tissue should be analysed to make the standard systems.

Interaction between the nano-devices and the surrounding environment: The interaction between the environment and the

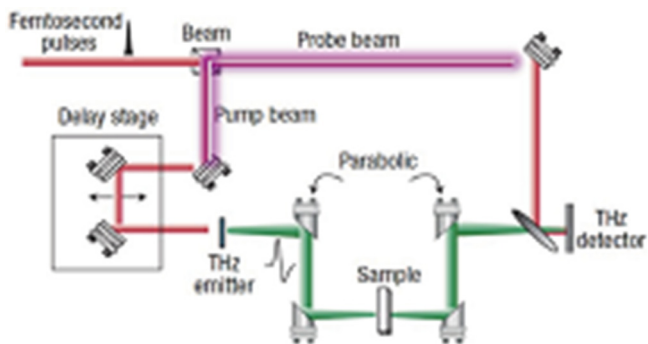


Fig. 9. Terahertz Time Domain Spectroscopy measurement setup at Queen Mary University of London [17].

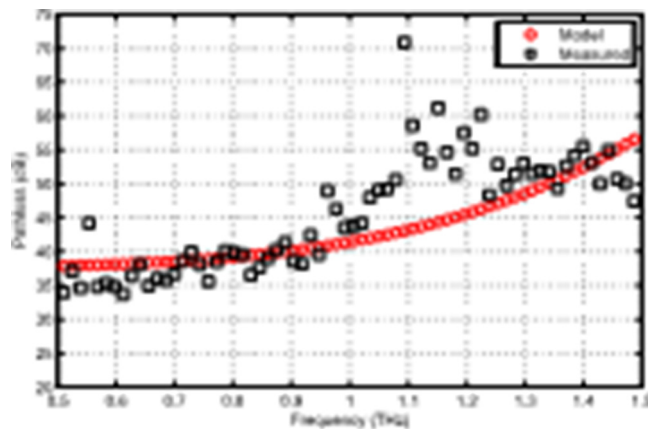


Fig. 11. Comparison of measured (THz- TDS) and modelled path loss inside the skin at THz frequencies [16].

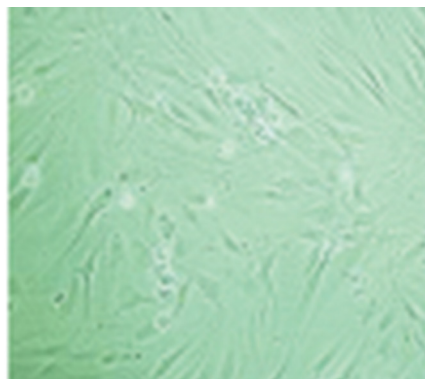
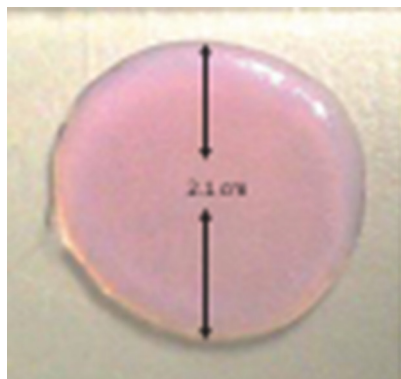


Fig. 10. Artificial Skin (collagen) cultured in the Blizzard Institute, QMUL (left) & Collagen layer growth by fibroblast cells (right) [17].

devices should be investigated to make sure the devices work in a desired manner.

Hybrid nano-communication systems: we can see lot of communication patterns for nano communication but still the study on interaction between two different communications paradigm is missing. In order to make the nano-networks more powerful and flexible, all the communications can be merged. Hence the researches on hybrid communication generally believed that by merging all the communications together the nano-network would be much more flexible and powerful. Hence studies on hybrid communication mechanism and their practicability is much needed future direction.

Architecture and protocols: Different challenges against protocols design have been faced with no currently fully developed solutions. A creative and innovative protocol stack model is introduced recently to provide various characteristics of nano network but it is still in its early stage.

Antenna design and propagation models: Antennas are designed in a way that should support high data rates and overcome high path loss. A compact large antenna array is needed with multi-band and ultra-band characteristics. Propagation hurdles like particle scattering, noise and multipath fading affect signal propagation; hence all propagation effects need to be developed to create highly efficient systems.

Massive MIMO and cooperative communication: In order to overcome the high path loss issues and other propagation hurdles like scattering and multipath fading, massive MIMO and cooperative communication based methods are used.

Security: The database of patient has to be secured. The secure transmission is ensured between nano and micro device interface and gateway.

Nano sensor integration: The integration of nano components including sensor, battery, memory etc is very challenging. These nano devices are designed and developed in strict laboratory condition.

8. Conclusion

In this paper, the comprehensive study about nano-scale electromagnetic communication particularly for biomedical applications is presented. Various studies have been made on basis of communication among nano devices, antenna design and the channel model. By considering the future growth of nanotechnologies and their use for the detection and diagnosis of various health related issues, the open research challenges for the nano networks are clearly demonstrated. By enhancing and developing the current status of the nano network may lead to the wider range of application not only in biomedical domain but also in various communication related fields.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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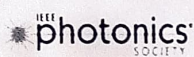
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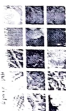
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COVID-19 an infectious disease influenced in modern era - recent survey in India

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ABSTRACT

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SAR-CoV (Severe Acute Respiratory System Coronavirus)
WHO (World Health Organization)
MERS (Middle East Respiratory Syndrome)
TCGEV (Transmissible Gastroenteritis Virus)

1. Introduction

The world Corona described from the Latin word Crown. Coronavirus is a virus which affects animals during 19th century. M.C. Hawn and Arthur Schalk from North Dakota described about Coronaviruses [1] affected chickens in 1930s. The virus spreaded chicken is called as IBV (Infectious Bronchitis Virus). In 1940s the coronaviruses which spreaded for animals are called MHV (Mouse Hepatitis Virus) and TGEV (Transmissible Gastroenteritis Virus) [4]. British Medical Research Council give a description about coronaviruses in the year 1960 [2]. In 1960s coronavirus first discovered was a large family of viruses [3]. Due to this illness for people and animals are affected a lot. These viruses severely affect the respiratory system. So, it is called as Severe Acute Respiratory System Coronavirus (SAR-CoV). Many of them affected mildly were recovered without any kind of special treatment. But severely affected persons were unable to recover. In 2019, it introduced in Wuhan (China) followed that it spreads throughout the world [13]. If it is infected by a person, its unable to predict for the first 14 days. Due to this reason, it's difficult to avoid spreading. The

The virus which is called as corona spoiling many of human lives as well as countries growth. Coronavirus is an infectious disease, so spreading from one person to other easily. Till now there is no medicine for corona. World Health Organization (WHO) taking lot of steps to control it. In India many of them get affected by coronavirus called COVID-19. A household survey is conducted nationally through online. This survey is a method for checking knowledge about the infectious virus. In this online survey, some questionnaires were asked. People take their own interest and submit their reply through mobile phone and laptop/desktop devices. After analysing the survey, it is clearly proved that people didn't have enough knowledge about COVID-19.

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symptoms include fever, difficulty in breathing and flu like symptoms. The precaution measures are maintaining social distance of 2m, staying home, wearing mask and washing hands for every 20 min.

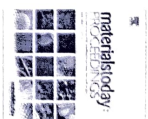
The origin of human virus is shown in Fig. 1. Two kinds of coronaviruses are detected, 1) SARS (Severe Acute Respiratory S) (S1) and 2) Middle East Respiratory Syndrome (MERS). In 2002 to 2003 SARS occurs around the world, nearly 800 death and around 8,000 people infected [5]. In 2012 MERS sporadically occurs, due to these 900 deaths and around 2,500 people infected [6]. The common human coronaviruses are a) Alphacoronaviruses (HCoV-229E, HCoV-NL63) and b) Betacoronaviruses (HCoV-OC43, HCoV-HKU1) Dorothy Hamre and John Pocknow the medical student of the University of Chicago discovered a new cold virus called 229E which affects kidney well in 1965 [7]. In 1967, June Almeida, a Scottish Virologist gave a study about two novel strains B81/4 and 229E at St. Thomas Hospital in London [8]. A virus called IBV (Infectious Bronchitis Virus) is a mouse hepatitis and a novel cold virus is known as coronaviruses introduced in Wuhan in 2019 [12]. In Wuhan, there is a wet market, in that large number of fishes, birds and animals were sold. Due to this the viruses easily jumped from animals to humans. Thus Covid-19 has been identified. Within a

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Solar powered two-level cascaded interlaced step-up Dc-Dc converter with MPPPT

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Here suggests the formation of a pair of CIBC's with raised performance for solar application by employing maximum power point tracking method. The suggested two level CIBCS contains a pair of interlaced boost converter (CIBC) coupled in concatenation to gather the utmost power from sunlight and to supply

Keywords:
 Concentrated interlaced boost converter
 Photovoltaic
 Maximum Power Point Tracking
 Interlaced Boost converter
 Solar Energy

a rise in output voltage with low ripple. The simulation of PV system and power converters has been done in MATLAB/simulink.

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1. Introduction

The much demanded growth for energy the continual dropping in standing source of fossil fuels and the growing care with respect to environmental pollution have impelled humankind to investigate latest non conventional renewable energy resource like solar, wind energy etc. for the gathering of structure electricity considering our country collecting sunlight all 12 months of a year. Accordingly utilizing it within the various zones could also be a knowledgeable concept. Solar power is that the foremost plenty cause of energy in the world. Solar energy is not a sole solution for future energy calamity even so an ecologically friendly sort of energy. The energy production using photovoltaic is a systematic approach for executing the solar power. Solar panels are widely used presently to satisfy household application. The price of solar panels has been consistently diminishing which inspires it's in different areas to control.

Photovoltaic (PV) system [4] provides main contributions specifically for the present electricity supply and in addition attractively acceptable because of the zero emission and spending expenses. Yet the magnitude of voltage acquired is small and uncontrolled, thus stepping up converters is mandatory to amplify and control the magnitude of the output voltage. Typical step-up converter has a defect of switching loss and low performance. Normally the important aim to try a step-up converter is that these sources operates solely and also transmitting energy to the power grid with a few rising voltage quantities. Even So, the primary boost converter can meet few defects, for example the rise in

voltage can be gained by extending the duty cycle. Still as a result, such as saturation, reverse recovery problem and low performance, the conversion ratio cannot be appreciably boosted. Nonetheless the power switch undergoes the voltage stress as like the output diode coupled to the load which is almost huge and needs a high cost power switch in the circuit. Another trouble in a step up converter is the demand for continued power in the input and output. Despite the output power in a basic dc-dc converter will discontinue. These drawbacks drives critical ripple at the output and set the output diode in risk of reverse recovery issue [3].

The CIBC is a remedy of this issue that brings a rise in the gain of voltage with small losses and less stress across the switches. Here suggests the formation and simulation of two level CIBCS for utmost power gathering from sunlight with high performance. So here exhibits a formation of a two level concatenated interlaced boost converter (CIBC) for solar application managed by employing maximum power point tracking method [6].

The suggested two level CIBCS contain a pair of interlaced boost converter IBC coupled in concatenation to gather utmost energy from sunlight. Significantly more investigation are in process on making new topologies and numerous ideas for the different applications of boost converter. There are many converter topologies to obtain utmost power from sunlight. The power DC -DC converter has been attending as a extremely dominant part in the form of distinct topologies in several applications. To detect the crucial drawbacks of DC/DC power converters such as high voltage and current ripples, undermost performance etc, interlacing schemes takes part a vital role.

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Ceria-based Mixed Oxide Nanoparticles for Diesel Engine Emission Control

P. K. Shihabudeen, Ajin C. Sajeevan, N. Sandhyarani & V.

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Abstract

One of the effective methods for the control of harmful emissions from diesel engines is the use of fuel-borne catalyst. Ceria is commonly used as a redox catalyst, and the catalytic activity of ceria decreases due to particle sintering, especially at high temperatures. The catalytic activity of ceria nanoparticle can be improved by doping it with transition metals such as zirconium, yttrium. A comparative study on the catalytic activity and various physicochemical properties of $Ce_yZr_{1-y}O_2$, $Ce_xY_{1-x}O_2$ and $Ce_xZr_yY_{1-x-y}O_2$ mixed oxide nanoparticles, synthesized by co-precipitation


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