



ಬಿ.ಎಂ.ಎಸ್. ತಾಂತ್ರಿಕ ಮತ್ತು ನಿರ್ವಹಣಾ ಮಹಾವಿದ್ಯಾಲಯ
(ವಿ.ಟಿ.ಯು. ಅಡಿಯಲ್ಲಿನ ಸ್ವಾಯತ್ತ ಸಂಸ್ಥೆ)

BMS INSTITUTE OF TECHNOLOGY & MANAGEMENT
(Autonomous Under VTU)

RESEARCH COMPENDIUM 2021



**DEPARTMENT OF INFORMATION
SCIENCE & ENGINEERING**

Department of Information science and Engineering (2021)

VISION

Emerge as centre of learning in the field of information science & engineering with technical competency to serve the society.

MISSION

To provide excellent learning environment through balanced curriculum, best teaching methods, mentoring and industry institute interaction.

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THE EDITORIAL BOARD

Honorary Editor:
Dr. S K Pushpa

Editors:
Dr. Shoba M
P. Ashok Kumar

About Institution

In view of the growing demand for technical education and with the goal of establishing a premier technical education on par with international standards, a technical institution by name 'BMS Institute of Technology and Management' was established in 2002. Currently, BMSIT&M offers eight UG, three PG programs and Ten programs have been recognized as research centers under VTU. All our eligible programmes are NBA accredited and NAAC accredited with 'A' grade. BMSIT&M considers research to be of equal importance as academics for the betterment of an institution. Research culture has been embraced well by the faculty members and research scholars at BMSIT&M. In this report, we present an overview of the research articles of Information Science and Engineering, BMSIT&M.

Vision

"To emerge as one of the nation's finest technical institutions of higher learning to develop engineering professionals who are technically competent, ethical and environment friendly for betterment of the society."

Mission

"Accomplish stimulating learning environment through high quality academic instruction, innovation and industry - institute interface."

Department of Information Science and Engineering

Department is established in the year 2010 with an sanctioned intake of 60 and enhanced to 120 from 2018-19 and enhanced to 180 from 2019-20 which is affiliated to VTU, recognized by AICTE. The department strives to be a center for excellence in the field of information Science with dedicated faculty, highly motivated students, state-of-the-art facilities and an innovative teaching-learning environment. The department runs UG - BE in information Science and Engineering and M.Sc. (Engg) and Ph.D Program. The UG - BE Program (ISE) was accredited by the National Board of Accreditation (NBA),New Delhi . The Department has adopted learner centric approach to groom the students in right direction. The Department has more than 200+ research articles published in various national/international conferences and Journals. Our Students has consistently demonstrated the excellent placement track record of above 90 percent. Our Students have demonstrated a high level of success at pursuing post graduate studies at top universities of the world as per QS World University Rankings. Few of our Students have turned into successful entrepreneurs and running their successful business in the areas of Software Services and Allied areas and department runs Jnan IT consulting services under CIPRAC.

From HOD's Desk

It is my pleasure to present the forth edition of Research Compendium of the Department of Information Science & Engineering. The main objective of the research compendium is to collate all the research contributions by our faculty members and students. It is evident that the Department is in-line with the on-going activities by the faculty members to cater the needs of industry to fill the gap between Industry and Institute. I hope this compendium continues its service to help the student community & faculty fraternity and attract more readers and provide an illuminating platform for the research community. I appreciate the efforts endorsed by all the faculty members and students of the department for their contribution towards the fourth edition of

Department Research Compendium. I wish all the research community members for their active participation and keep continuing.

Dr. S K Pushpa

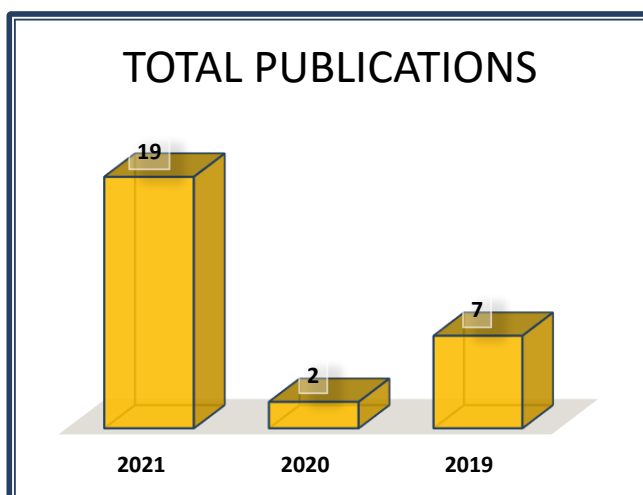
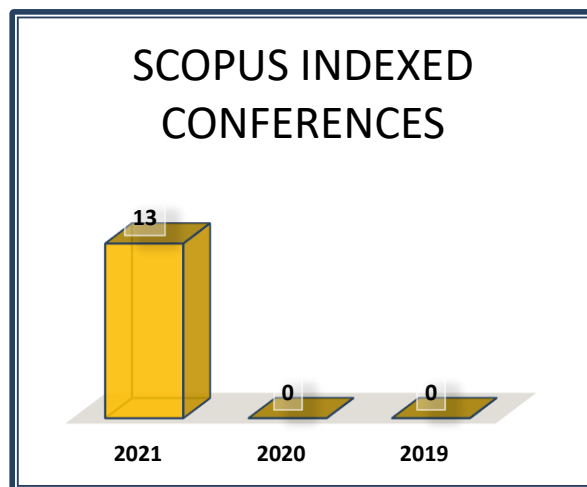
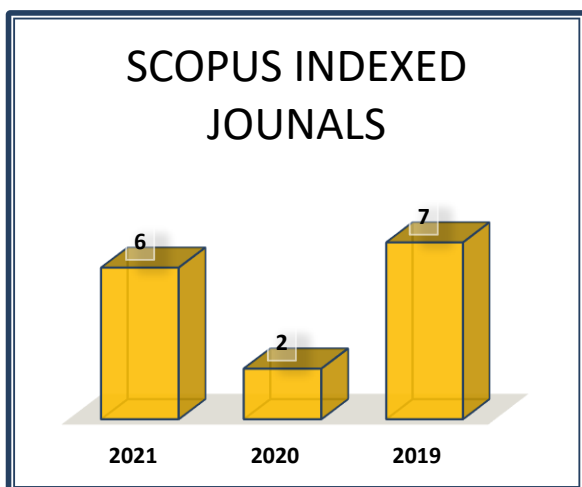
Editorial Statement

It's my pleasure to be part of Editorial team for this Research Compendium 2021, published by the Department of Information Science & Engineering. The main objective of this research compendium is to motivate all the stakeholders and the research community to get themselves actively involved in research. It comprises of publication summary for past four years, citation details of faculty, and publications in Scientific Journals/Conferences for the academic year 2021. I whole heartedly thank all the faculty members for their contribution towards research compendium 2021.

Dr.Shoba M
Research Coordinator

1. Research Publications Summary

Sl. No.	Name of the Faculty Member	2021			2020			TOTAL
		JOURNAL	CONFERENCE	BOOK CHAPTER	JOURNAL	CONFERENCE	BOOK CHAPTER	
1	Dr Manjunath T N	1	1				2	
2	Dr. Pushpa S K		1				1	
3	Dr. Sudhamani M V							
4	Dr. Usha B A							
5	Dr. Anjan Krishnamurthy							
6	Dr. Sheela Kathavate							
7	Dr. Surekha K B							
8	Dr. Geeta Amol Patil		1				1	
9	Dr. Rakesh N							
10	Dr. Veena N		1		1		2	
11	Dr. Shoba M							
12	Dr. Prakash GL							
13	Prof. Chetana. C							
14	Dr. Drakshaveni G							
15	Prof. Mahalakshmi S	2					2	
16	Dr. Shanthi D L	1	3				4	
17	Dr. Chandrashekar K T							
18	Dr. P Sudarsanam							
19	Dr. GireeshBabu C N	1	1				2	
20	Prof. Ambika R S							
21	Dr. Swetha M S	1	2		1		4	
22	Dr. Vinutha K		2				2	
23	Dr. Ravikumar B N							
24	Dr. Narasimhamurthy M S							
25	Dr. Mohan BA							
26	Dr. Anil Kumar							
27	Dr. Savitha S							
28	Dr. Basavaraj GN							
29	Dr. Karthik SA							
30	Dr. Kshama SB							
	TOTAL	6	12	0	2	0	0	



2. Citation Details of faculty

SL. No	Name of the Faculty	Citations 2021
1	Dr Manjunatha T N	29
2	Dr Pushpa S. K	5
3	Dr Sudhamani M V	10
4	Dr Usha B A	7
5	Dr Anjan Krishnamurthy	8
6	Dr Sheela Kathavate	1
7	Dr Surekha K B	1
8	Dr Geeta Amol Patil	6
9	Dr Rakesh N	5
10	Dr Veena N	1
11	Dr Shoba M	3
12	Dr Prakash G L	4
13	Dr Drakshaveni G	1
14	Prof. Chethana C	2
15	Prof. Mahalakshmi S	1
16	Dr. Shanthi D L	3
17	Dr Chandrashekhara K T	2
18	Dr P. Sudarsanam	2
19	Dr Gireesh Babu C N	2
20	Prof. Ambika Rani Subhash	1
21	Dr Swetha M S	18
22	Prof. Vinutha K	1
23	Prof. Ravi Kumar B N	1
24	Dr. Narasimha Murthy M S	1
25	Dr. Mohan B.A	2
26	Dr. Anil Kumar	1
27	Dr. Savitha S	4
28	Dr. Basavaraj G N	1
29	Dr. Karthik S A	3
30	Dr. Kshama S B	1
	TOTAL	127

Department of Information science and Engineering

RESEARCH PUBLICATIONS FOR THE YEAR 2021

INTERNATIONAL JOURNALS with Scopus Indexed	
3.1.1	<p>Prof. Swetha M S (Assistant Professor), Dr. Pushpa S K & Dr. Manjunath T N, Scopus ID: 57198883483</p> <p style="text-align: center;"><i>Turkish Journal of Computer and Mathematics Education</i> <i>Vol.12 No.3(2021), 4349-4356</i></p> <hr style="border: 1px solid black;"/> <p style="text-align: right;">Research Article</p> <p style="text-align: center;">Strong Secure Anonymous Location Based Routing (S2ALBR) method for MANET</p> <p style="text-align: center;">Mrs. Swetha M S^a, Dr. Pushpa S K^b, Dr.Thungamani M^c, Dr. Manjunath T N^d, Dr. Deepak S Sakkari ^e</p> <p>^aResearch Scholar, Dept. of ISE, BMS Institute of Technology and Management, Bengaluru, India ^bAssistant Professor, Dept. of CSE, GKVK, UOH, Bengaluru, India ^c4 Professor, Dept. of ISE, BMS Institute of Technology and Management, Bengaluru, India ^dAssistant Professor, Dept. of CSE, Presidency University Bengaluru, India</p> <p>^aswethams_ise2014@bmsit.in, ^bpushpask@bmsit.in, ^cthungamani_k@rediffmail.com, ^dmanju.tn@bmsit.in, ^edeepakssakkari@presidencyuniversity.in</p> <p>Article History: Received: 10 November 2020; Revised 12 January 2021 Accepted: 27 January 2021; Published online: 5 April 2021</p> <hr/> <p>Abstract: Mobile Ad Hoc Networks (MANETs) utilize confounding planning shows that spread community point characters similarly as courses from outside onlookers so as to give obscurity security. MANET contains different little gadgets either produce imperative expense or can't give full namelessness security to information sources, targets, and courses. The imperative expense raises the trademark asset limitation issue in MANETs particularly in natural media remote applications. To offer high absence of definition assurance expecting for all intents and purposes no effort, we strong secure anonymous location based routing (S2ALBR) protocol for MANET utilizing optimal partitioning and trust inference model. In S2ALBR appear, first segments a system into zones utilizing optimal tug of war partition (OTW) algorithm. By at that point, figure the trustiness of each reduced focus point utilizing the imprisonments got signal quality, versatility, way debacle and joint exertion rate. The arrangement of trust calculation is advanced by the optimal decided trust inference (ODTI) model, which gives the trustiness of each adaptable. By then picks the most basic trust ensured focus point in each zone as generally engaging trade habitats for information transmission, which structure a non-unquestionable bewildering course. The introduction of proposed S2ALBR show is examined by various testing conditions with Network Simulator (NS2) instrument.</p> <p>Keywords: Strong secure anonymous location based routing (S2ALBR) Optimal tug of war partition (OTW), optimal decided trust inference (ODTI).</p> <hr/> <p>1. Introduction</p> <p>MANET includes focuses that can converse with one another through remote mediums. [can use - focuses/mode/technique]These focuses fill in as an end structure, yet in like manner as a change to impel packs to other people, without the guide of any present foundation or united affiliation [1]. It is hard to give trusted and guarantee about correspondences in inadequately organized conditions, for example, front lines. Organizing controlling shows for such a not all around masterminded conditions is an affecting errand in MANET[networks]due to getting away from hand of focuses [2].The essential for flaw tolerant and guarantee about planning shows was seen to address planning in gravely orchestrated conditions, unequivocally inside observing harmed focuses, by investigating system redundancies [3,4].</p> <p>Secrecy in MANETs joins character and area riddle of information sources (i.e., senders) and goals (i.e., beneficiaries), comparably as course dimness. "Character and domain puzzle of sources and targets" hints it is hard if achievable for different focus focuses to pick up the genuine characters and mindful areas of the sources and goals. Moreover, so as to confine the relationship among source and target (i.e., relationship nuance [11]), it is fundamental to shape a dark course between the two endpoints and affirmation that middle focuses in movement don't have the foggiest idea where the endpoints are, particularly in MANETs where area gadgets might be prepared. Existing absence of definition planning appears in MANETs can be fundamentally depicted into two classes: jump by-ricochet encryption [12], [13], [14], [15], [16] and excess traffic [17], [18], [19], [20]. A gigantic portion of the present strategies are limited by concentrating on keeping up riddle at a stunning expense to significant assets since open key-based encryption and high traffic produce fundamentally critical expense. Likewise, different ways of thinking can't give the total of the as of late referenced namelessness affirmations.</p>

3.1.2	<p>Dr. Manjunath T.N, Professor Scopus ID: 57205117286</p>		
	<p>International Journal of Power Electronics and Drive Systems (IJPEDS) Vol. 12, No. 4, December 2021, pp. 2501-2510 ISSN: 2088-8694, DOI: 10.11591/ijpeds.v12.i4.pp2501-2510 □ 2501</p> <hr/> <p style="text-align: center;">An efficient hybrid reconfigurable wind gas turbine power management system using MPPT algorithm</p> <p style="text-align: center;">Manjunath T. N.¹, Mallikarjunaswamy S.², Komala M.³, Sharmila N.⁴, Manu K. S.⁵ ¹Department of Information Science Engineering, BMS Institute of Technology and Management, Bengaluru India ²Department of Electronics and Communication Engineering, JSS Academy of Technical Education, Bengaluru India ³Department of Electronics and Communication Engineering, SJB institute of Technology, Bengaluru India ⁴Department of Electrical and Electronics Engineering, RNS Institute of Technology, Bengaluru India ⁵Department of Computer Science and Engineering, SJB institute of Technology, Bengaluru India</p> <hr/> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 35%; vertical-align: top; padding: 5px;"> <p>Article Info</p> <p><i>Article history:</i> Received Jul 25, 2021 Revised Oct 6, 2021 Accepted Oct 14, 2021</p> <hr/> <p><i>Keywords:</i> Hybrid power system Maximum power point tracker Permanent magnet synchronous generator Wind energy conversion system Power management system</p> </td> <td style="width: 65%; vertical-align: top; padding: 5px;"> <p>ABSTRACT</p> <p>To improve power management scheme in standalone mode using hybrid wind-gas turbine system. To reduce electrical fluctuations due to permanent magnet synchronous generator (PMSG) in wind turbine system. For power generation, the wind turbine system is a main source. When there is reduction in wind turbine power generation, then gas turbine gets activated immediately and produces the required electricity in effective manner. This reconfigurable power generation system is controlled by perturb and observe maximum power point tracking (P&O_MPPT) algorithm. The proposed wind-gas power management system algorithm and device performance was analysed and simulated using MATLAB R2021a for various wind turbine experiment parameters. The simulation result shows that the proposed model and algorithm effectively meets the load demand when the wind turbine speed falls below the minimum required value.</p> <p style="text-align: right;"><i>This is an open access article under the CC BY-SA license.</i></p> <div style="text-align: right;">  </div> </td> </tr> </table> <hr/> <p>Corresponding Author: Mallikarjunaswamy S Department of Electronics and Communication Engineering JSS Academy of Technical Education JSSATE-B Campus, Dr. Vishnuvardhan Road, Uttarahalli - Kengeri Main Road Srinivaspura-Post Bengaluru - 560 060 Karnataka, India Email: mallikarjunaswamys@jssateb.ac.in</p> <hr/> <p>1. INTRODUCTION</p> <p>Constant attempts and efforts are made to meet the increase in power demand over the years. Conventional sources of power have issues of reserves and pollution. Solar and wind energy are enormously available and can be efficiently utilized. Hybrid power generation units have become an integral part of the conventional grid in recent times [1], [2]. The foremost goals of HPSs' is such that to decrease zero power intermissions, lessen the price & deliver a consistent feed. The power system of wind utilized in our work comprises a diode which is a bridge rectifier and also a permanent magnet synchronous generator (PMSG), a wind turbine, a power-managed voltage source inverter a DC to DC boost converter. Resultant power which is generated from the PMSG is initially transformed to dc & after that, it is supplied to the grid. The transformations are accomplished at the factor of unity power & the voltage of dc-link is retained as fixed. Nevertheless, when speed of the wind drops lower than the minimum needed a minor gas turbine model is presented as a hold up or a backup source to sustain electricity of a nonstop stream mode [3]-[5]. The power of wind which is maximum is extracted from the wind power system controller and it supplies to the given grid with a worthy quality [6], [7]. A flow controller of power is utilized to maintain the supplied electricity</p> <hr/> <p><i>Journal homepage: http://ijpeds.iaescore.com</i></p>	<p>Article Info</p> <p><i>Article history:</i> Received Jul 25, 2021 Revised Oct 6, 2021 Accepted Oct 14, 2021</p> <hr/> <p><i>Keywords:</i> Hybrid power system Maximum power point tracker Permanent magnet synchronous generator Wind energy conversion system Power management system</p>	<p>ABSTRACT</p> <p>To improve power management scheme in standalone mode using hybrid wind-gas turbine system. To reduce electrical fluctuations due to permanent magnet synchronous generator (PMSG) in wind turbine system. For power generation, the wind turbine system is a main source. When there is reduction in wind turbine power generation, then gas turbine gets activated immediately and produces the required electricity in effective manner. This reconfigurable power generation system is controlled by perturb and observe maximum power point tracking (P&O_MPPT) algorithm. The proposed wind-gas power management system algorithm and device performance was analysed and simulated using MATLAB R2021a for various wind turbine experiment parameters. The simulation result shows that the proposed model and algorithm effectively meets the load demand when the wind turbine speed falls below the minimum required value.</p> <p style="text-align: right;"><i>This is an open access article under the CC BY-SA license.</i></p> <div style="text-align: right;">  </div>
<p>Article Info</p> <p><i>Article history:</i> Received Jul 25, 2021 Revised Oct 6, 2021 Accepted Oct 14, 2021</p> <hr/> <p><i>Keywords:</i> Hybrid power system Maximum power point tracker Permanent magnet synchronous generator Wind energy conversion system Power management system</p>	<p>ABSTRACT</p> <p>To improve power management scheme in standalone mode using hybrid wind-gas turbine system. To reduce electrical fluctuations due to permanent magnet synchronous generator (PMSG) in wind turbine system. For power generation, the wind turbine system is a main source. When there is reduction in wind turbine power generation, then gas turbine gets activated immediately and produces the required electricity in effective manner. This reconfigurable power generation system is controlled by perturb and observe maximum power point tracking (P&O_MPPT) algorithm. The proposed wind-gas power management system algorithm and device performance was analysed and simulated using MATLAB R2021a for various wind turbine experiment parameters. The simulation result shows that the proposed model and algorithm effectively meets the load demand when the wind turbine speed falls below the minimum required value.</p> <p style="text-align: right;"><i>This is an open access article under the CC BY-SA license.</i></p> <div style="text-align: right;">  </div>		
3.1.3	<p>Prof. S. Mahalakshmi, Assistant Professor Scopus ID: 57201896763</p>		

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ISSN: 2008-8019
Vol 12, Issue 02, 2021



The Internet Of Things On Neural Networks Provides Intelligent Healthcare Management For Diabetic Patients

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Vaishali Chandrakant Shelar⁵, Purshottam J. Assudani⁶

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⁴Associate Professor, Department of Computer Science and Engineering, Lovely Professional University, Jalandhar-Delhi, G.T. Road, Phagwara, Punjab (India) -144411.

⁵Assistant Professor or Mentor of Change in Atal Innovation Mission and PG Student Masters of Computer Engineering, Department of Computer Engineering, Thakur College of Engineering and Technology, Thakur Village, Kandivali East, Mumbai, Maharashtra 400101.

⁶Assistant Professor, Department of Information Technology, Shri Ramdeobaba College of Engineering and Management, Gittikhadan, Katol Road, Nagpur, Maharashtra, India-440014.

Abstract: A newly developed health system for a diabetic is described in this study, which tracks their health based on blood sugar levels, heart rate, food consumption, sleep duration, and activity. To explain, this technology is continually receiving variables via sensors and processes them using a neural network to analyze the data, yielding four things like health threats: minimal, moderate, extreme, and severe. The spectrum of genetic risk varies depending on the customer's kind and past health histories. Furthermore, if a patient's health state is at high or extreme danger, an instantaneous phone call/SMS notice is made to the patient's family, including the patient's position. In addition, it alerts patients to the nearest hospital if they are in danger. This technique has been successfully tested on 25 people with diabetes, with reliability of 84.41 percent in determining the appropriate level of risk, which is a highly adequate standard of determining risk factor status.

Keywords: Diabetic Treatment, ehealth, Neural Networks, Internet of Things

1. INTRODUCTION

Extended waiting times and health monitoring equipment is now possible due to the Internet of Things (IoT). Diabetics must queue for years in hospitals and care centers for a fasting blood glucose test and blood pressure. The development of a smart health care system for diabetics, which can be utilized for everyday routine diabetic monitoring, became a need. Until now, an enormous number of solutions for diabetes monitoring of patients have been created. With the aid of the IoT, these technologies may simply and effectively address this

2085




3.1.4 Prof. Shanthi D L, Assistant Professor
Scopus ID: 57205733111



Optimized artificial neural network assisted trade-off between transmission and delay in LTE networks

D.L. Shanthi^a, K. Arumugam^b, V.M.M. Swamy^c, A. Farithkhan^d, R. Manikandan^e, D. Saravanan^f

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Abstract

The quality of data transmitted via LTE channels is often affected with the trade-off between the delay and network throughput. It often affects the performance of video transmitted with data rate distortion. In this paper, Lagrange dual multiplier with Artificial Neural Network (ANN) is used to solve the NP-hard problem and incorporates the Lagrange approach to achieve an optimum solution for higher network rating by reducing resource allocation. The way to find the optimal radio resource block (RRB) assignment strategy is iterated many times. Lagrange Dual Multiplier will also be used and implemented in this solution and this will help to achieve a closed form solution for any RRB assignment and further simulations to assess the efficiency of the process proposed. The experimental verification shows the efficacy of the model over existing state-of-art mechanism in terms of transmission errors and delay.

3-1-5	Prof. S. Mahalakshmi, Assistant Professor Scopus ID: 57201896763
<div style="text-align: right; margin-bottom: 10px;">  </div> <div style="margin-bottom: 10px;"> International Journal of Aquatic Science ISSN: 2008-8019 Vol 12, Issue 02, 2021 </div> <div style="text-align: center; margin-bottom: 10px;"> <h2>Analyzing the Performance of Marketing Life Cycle Process Using Software Architecture Model</h2> </div> <div style="text-align: center; margin-bottom: 10px;"> ¹Dr.Shaik.Shakeer Basha, ²S.Mahalakshmi, ³Amin Tuni Gure, ⁴Durga Prasad Sharma, ⁵Dr.Syed Khasim , ⁶P N Jeipratha </div> <div style="margin-bottom: 10px;"> ¹Asst.Professor, Computer Science & Engineering, Avanathi Institute of Engineering and Technology, Gunthapally, Abdullahpurmet Mandal, Telangana, PIN-501512. ²Assistant Professor, Department of Information Science and Engineering, BMS Institute of Technology and Management, Avallahalli, Bangalore, Karnataka 560064. ³AMIT Arba Minch University, Ethiopia. ⁴AMUIT MOEFDRE under UNDP and MAISM- RTU, India. ⁵Professor, Department of Computer Science & Engineering, Dr.Samuel George Institute of Engineering & Technology, Markapur, Prakasam Dt, Andhra Pradesh, 523316 ⁶Assistant Professor, Department of Computer Science and Engineering, St.Joseph's College of Engineering, OMR Chennai 600119 </div> <p>Abstract: <i>The findings of our research of software framework metrics are presented in this paper. This analysis includes a short selection of the finest and most widely utilized application development metrics regarding Software Architecture programs and measurements. In a nutshell, the measures performed to strengthen the matrix-based assessment & design of the software platform differ from machine to machine. We developed a technique utilizing commercially available and normal sizes to prove our point. For 3 computer systems of varied sizes, we generated matrix values utilizing the same standardized matrices. Products parameters, Marketing predictive analytics, inheriting, mobility services, diversity, recycling, and complication evaluations were all studied with the help of Software Design matrices toolkits. With a really essential observation and control, it determines the classification of groups. The findings will aid quality engineers in determining the appropriate metrics for their enterprise applications and estimating the dimension that have evolved through time utilizing the Commercial Life Cycle approach.</i></p> <p>Key terms: <i>Software Architecture Procedure, Marketing life cycle, Metrics, Reusability, Performance Estimation.</i></p> <h3>1. INTRODUCTION</h3> <p>A metric is indeed a measurement of such a system's effectiveness and capabilities in application development. A metric is a parameter used to estimate the very next location that originates a packet in routing protocol. The metric is being used immediately by algorithms at points and also as an element at other times. The scale in computing is made up of elements. The metrics has an impact on anything that uses the meter as a spatially measuring unit. Metrics are therefore insufficient for determining information about a developing application. To obtain information regarding software performance improvement, multiple factors must</p>	

3.1.6	Prof. Gireesh Babu C N, Assistant Professor Scopus ID: 57208672997
	<div data-bbox="670 344 1121 533" data-label="Image"> </div> <div data-bbox="469 745 1323 837" data-label="Section-Header"> <h3 style="text-align: center;">A semantic-enabled and context-aware monitoring system for the internet of medical things</h3> </div> <div data-bbox="427 842 1367 925" data-label="Text"> <p style="text-align: center;">Ahlem Rhayem, Mohamed Ben Ahmed Mhiri, Khalil Drira, Said Tazi, Faiez Gargouri</p> </div> <div data-bbox="414 1025 726 1061" data-label="Section-Header"> <p>► To cite this version:</p> </div> <div data-bbox="427 1079 1393 1167" data-label="Text"> <p>Ahlem Rhayem, Mohamed Ben Ahmed Mhiri, Khalil Drira, Said Tazi, Faiez Gargouri. A semantic-enabled and context-aware monitoring system for the internet of medical things. <i>Expert Systems</i>, 2021, 38 (2), pp.e12629. 10.1111/exsy.12629. hal-02944704</p> </div> <div data-bbox="700 1370 1023 1408" data-label="Text"> <p style="text-align: center;">HAL Id: hal-02944704</p> </div> <div data-bbox="598 1417 1128 1456" data-label="Text"> <p style="text-align: center;">https://laas.hal.science/hal-02944704</p> </div> <div data-bbox="730 1469 992 1500" data-label="Text"> <p style="text-align: center;">Submitted on 19 Nov 2021</p> </div> <div data-bbox="383 1601 861 1776" data-label="Text"> <p>HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.</p> </div> <div data-bbox="865 1601 1348 1776" data-label="Text"> <p>L'archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.</p> </div>
INTERNATIONAL CONFERENCE with Scopus Indexed	

3.2.1 Prof. M. S Swetha, S K Pushpa, & T N Manjunath
Scopus ID: 57198883483

Blockchain enabled secure healthcare Systems

Mrs. Swetha M. S
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Abstract— Blockchain technology is known for its application in fields such as finance, banking and cryptocurrency and these are the fields that have very sensitive data that has to be stored and transferred securely. An important advantage of blockchain based system is that it is decentralized. The data stored is managed by a P2P network which eliminates several disadvantages that occur in centralized systems. Blockchain uses ad-hoc message passing. One such risk in a blockchain is that it avoids the central point of failure. Due to this advantage blockchain can be used in Healthcare systems. There is also step increase in the number of IoT devices which in turn is a threat to the patient's medical data. This paper is aimed at giving an overview of the use of blockchain in healthcare systems. Blockchain can be used not only to secure patient information in their EHR's but also allows them to give permission to entities as and when deemed necessary. We can use Hyperledger here in order to provide data access control. In order to take advantage of its decentralized nature, the EHR can be distributed among the various entities of the network such as doctor, medical practitioner, labs and so on.

Keywords— Electronic Health Record (EHR), Electronic Medical Record (EMR), Blockchain, Hyperledger, Ethereum, Smart Contracts

1. INTRODUCTION

Blockchain was invented by Satoshi Nakamoto which is either a person or a group of people. Blockchain for bitcoin became popular and it was the first ever digital currency that was able to solve the problem of double-spending without needing any higher central or some trusted third party [3]. After this blockchain began to have a wide application in various other fields such as Supply chain, IoT, Healthcare, etc.

Blockchain in healthcare system is playing a vital role and is becoming popular as it helps the both the patient and doctor in giving the data in real quick time wherein both can be in any part of the world, by creating the block which is secured and

easy to access. Chain-link is created of patient's data on EHR and we can use sensor to sense patient condition, store and transfer the data easily [6]. Thus reducing the time and money involved.


Blockchain is quintessence of importance and efficiency in hashing. A blockchain as the name suggests is an extending list or collection of records, which are known as blocks. Each of these blocks is interlinked to one and another using cryptography. Each of these blocks not only contains cryptographic hash of itself but also of the preceding block. It also contains a timestamp or the transaction. In addition to this it also contains other data related to the transaction[9]. The transaction in general is represented as a Merkle Tree.

A blockchain is extremely secure as it is immune to manipulation or modification of the data. One of its most important properties is that it is an open and distributed ledger. It records the transaction that occurs between any two of the several parties very efficiently and in a conformable and an almost completely in permanent way[2]. Blockchain abides to a protocol for inter-node communication and for the validation of new blocks and it is managed by a P2P network. If any block has to be modified, then a consensus of majority of the network is required. Blockchains therefore have a high Byzantine tolerance as the data is not alterable and thus blockchains are considered to be secure.

A block in a blockchain is a record and it holds a series of valid transaction that are hashed and stored in the form of a Merkle Tree. As we have already seen a block contains a hash of itself and the preceding block and it's further made secure using time stamping [8]. Therefore, if any data in the block is modified or tampered in any way, then even the hash related to it changes and it doesn't match the value in the next block and so we will know that it is modified. Another important term is

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<p>3.2.2</p>	<p>Dr. S K Pushpa, Professor and HoD, Scopus ID: 57200869940</p>
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Soft Computing Technique for Block Chain Enabled Secure Healthcare System

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Abstract: Recent study shows that the integration of AI and Blockchain in the field of healthcare we can decrease many loopholes by integrating AI & Blockchain techniques. AI algorithms works better based on data input, which should be strong, deduce, and make final judgments. The machine learning algorithms work better when information is gathered from a data vault that is solid, secure, trusted, and tenable. On other hand Blockchain which is a scattered information system on which information are kept and transferred in a way that's cryptographically authenticated, certified, and acceptable by all mining nodes. The sensitive personal data of the patients are often securely stored within the Blockchain system which is stored with high reliable and tough, and can't be tampered with. When Smart Agreement are used for machine learning algorithms to form decisions and perform analytics, the result of those decisions are often trusted and undisputed. These blockchain secured dataset are used for the AI and ML algorithms. We use support vector machine algorithm as a Soft Computing Technique to demonstrate here. The main feature e of support vector machine algorithm is to find a hyper plane in an N-dimensional space (N — the number of features) that separates and categories the data points. Our objective is to find decision boundaries that classify maximum distance between data points of both the objects. We get better reinforcement by finding margins having more distance which also helps future data points that can be segregated with more confidence. The integration of AI and blockchain helps in creating strong and secure decentralized system for the real world application like healthcare system wherein AI-driven systems must collect, store, and utilize.

Index Terms: Machine Learning (ML), Artificial intelligence (AI).

1. INTRODUCTION

Data or observations are a fault-finding characteristic in machine learning. The indication also can be utilized in pre-processing techniques for improving research environments. The information will be gathered from various sources from people across the world through various means such as surveys, voluntary data collection, trails etc. The quality just as amount of information increases the machine learning's performance, classification and prediction quality. Blockchain accompanies decentralized database without settling on information dependability. In decentralized database this information is conveniently accessible to users. Blockchain technology may be a network of interconnected nodes and is distributed.

1.1 Soft Computing

Soft computing is a rising method to manage and figuring, that gives the astonishing limit of the human mind to battle and learn in case of helplessness and uncertainty. Soft computing depends on some natural actuated techniques like hereditary qualities, advancement and conduct, the overall data nodes, the human framework, and so forth. Presently soft computing is that the main arrangement after we don't have any numerical displaying of critical thinking (i.e., calculation), continuously, there is a need to handle an erratic issue, modify with the changed circumstance and be executed with equal processing. Its gigantic applications in numerous application zones like diagnosing, PC vision, machine knowledge, anticipating, arrange advancement, LSI configuration, design acknowledgment, written by hand character improvement and so forth.

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<p>3.2.4</p>	<p>Dr. Manjunath T.N, Professor Scopus ID: 57205117286</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">2021 International Conference on Forensics, Analytics, Big Data, Security (FAABS) 978-1-6654-2005-1/21/\$31.00 ©2021 IEEE DOI: 10.1109/FAABS52071.2021.9702557</p>	<p style="text-align: center;">2021 International Conference on Forensics, Analytics, Big Data and Security</p> <h2 style="text-align: center;">A Study on Edge Computing through Machine Learning for IoT Devices</h2> <p style="text-align: center;">Manjunath T N¹, Pushpa S.K², Ravindra S Hegadi³, Deepa Yogish⁴</p> <p style="text-align: center;">¹Department of ISE, BMS Institute of Technology and Management, Bengaluru, Karnataka, India ²Department of ISE, BMS Institute of Technology and Management, Bengaluru, Karnataka, India ³Department of CS, Central University of Karnataka, Kalaburagi, Karnataka, India ⁴Department of CSE, Don Bosco Institute of Technology, Bengaluru, Karnataka, India manju.tn@gmail.com, pushpask@bmsit.in, rshegadi@gmail.com, deepayogish@gmail.com</p> <p>ABSTRACT In the current computing trend, next few years from now, it is anticipated, there will be billions of devices in the world that are connected to each other in our homes, cities, vehicles and industries. Devices with resource constraints interact with users and their surroundings. Sensors and actuators have been a common part of our lives in recent years. IoT devices have restricted resources. The large amounts of data collected by such IoT devices are an attractive target for AI systems. But such resource-constrained devices do not provide the necessary resources needed to deploy machine learning models. One approach is to offload the data to external computing systems (such as cloud servers) for further data processing, which increases latency, increases communication costs, and adds to privacy problems. Additional computer devices are placed at the edge of the network, that is, near the devices in which data is generated. The problem of offload is solved effectively by allowing computations to be made close to the sources of data. This paper provides a detailed overview of the overall architecture of how machine learning models are deployed at the edge. It also discusses some light weight machine learning algorithms that have been developed that can be used on such resource constrained IoT devices.</p> <p>Keywords: Edge Computing, Machine Learning, Internet of Things, Artificial Learning, Cloud Environment</p> <p>1. INTRODUCTION</p> <p>In last decade, the Internet of Things (IoT) paradigm has garnered a lot of attention. It is used to refer to the software and technology infrastructure that forms a connection between the Internet and physical aspects world. There has been an explosion of IoT devices in the past couple of years as a result of the tremendous surge of interest in this paradigm. About 75 billion devices are expected to be connected by 2025, according to estimates. According to projections of the McKinsey Global Institute, IoT could generate \$11 trillion per annum of economic value by 2025[1]. IoT devices generate vast amounts of data, and often have limited computing power and tiny memory. In our homes, cities, automobiles and industries, low-powered and networked systems, particularly sensors, will be used. Cloud computing can be appropriate for IoT expansion, however in addition to the possible bandwidth saturation, the time required to send data is not acceptable for certain jobs (e.g. health monitoring). As a result, the sole cloud processing would become impossible owing to increased numbers of linked devices and would lead to increasing latencies, less bandwidth and concerns in privacy and dependability. Therefore, calculations have to be carried out locally, with intelligence incorporated on end devices in order to decrease cloud traffic. A realistic answer to these problems is to take account of how data is processed closer to the place it is being generated and to send just the data required for further processing to faraway cloud servers. Edge computing means that calculations are carried out as closely as feasible to data sources and not remote sites.</p> <p>1.1 Edge Computing Architecture The As shown in Figure 1, The following is a brief explanation of each layer in the Architecture: a. Layer I(IoT and Sensors): This layer consists of IoT devices (sensors, smart plugs, smart meters, etc.) as well as the end users. Intake of data and the</p> <p style="text-align: center;">Authorized licensed use limited to: BMS Institute of Technology. Downloaded on December 12, 2023 at 04:10:54 UTC from IEEE Xplore. Restrictions apply. 978-1-6654-2005-1/21/\$31.00 ©2021 IEEE</p>

<p>3.2.5</p>	<p>Prof. Vinutha K, Assistant Professor Scopus Id: 57224559287</p>
	<div style="text-align: center;"> <h2 style="margin: 0;">Prediction of Employability of Engineering Graduates using Machine Learning Techniques</h2> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> <p>Vinutha K BMS Institute of Technology and Management Research Scholar, VTU Belgaum, Bengalur,India vinuthak_ise2014@bmsit.in</p> </div> <div style="text-align: center;"> <p>Yogisha H K MSRIT, Bengalur,India yogishahk@gmail.com</p> </div> </div> <p style="margin-top: 20px;"><i>Abstract</i>— The number of graduates that are produced from the higher education organizations are exponentially increasing which in turn creates the need for early prediction of employability of the students. As the world is moving towards digital adoption, acquisition of skills and enhancement of knowledge plays a vital role, but it is still practised and acquired in a traditional way. The intent is to address this issue by predicting the status of student’s employability by considering various factors such as academic score and skill set the student needs to possess as defined by the companies in general using machine learning algorithms. The proposed work used various machine learning algorithms like Support vector machine, Naïve Bayes , Random forest ,Bayesian classifier ,Artificial neural network ,Logistic regression, Gradient boosting and Xgboost for the first phase where the employability of the student was predicted along with the areas in which the student has to improve in order to be eligible for employability. For the final phase, random forest algorithm was used as it predicted the highest accuracy when compared to other algorithms and it predicted the List of companies that a student is eligible for, List of eligible students under a particular role, List of students eligible for a particular company, Generation of report about student’s eligibility, Generation of report about percentage of eligibility under each role. This research would be helpful for all kinds of organizations such as government, private and corporations as well as educational organizations.</p> <p><i>Keywords</i>— Academic score and company specific parameters in general, employability prediction, machine learning algorithm, student’s eligibility.</p> <h3 style="text-align: center; margin-top: 10px;">I. INTRODUCTION</h3> <p>The employability of a student can be defined as the ability of the student to get a job in his/her field of study. The prediction of student employability is in a budding state meaning the term Employability has no precise definition. Employability can be described as the ability to secure a job within a specified period of time, ability to map the skills or requirements required to get the job by enhancing one’s own knowledge by having a strong and good basic technical knowledge and by improving the knowledge through certain courses. These courses provide immense knowledge about the subject and also provide the students the chance to explore and understand the concepts to a greater extent. Apart from having technical knowledge, students are expected to have a strong foundation in basic mathematics, Analytical and problem solving skills, English comprehension, good vocabulary and communication skills which leads to increase in the chances of students being employed in larger number. As educational organizations are focused mainly on their students being able to secure a job in campus, it is a requirement to these organizations to know the strengths and weaknesses of their students and take the appropriate measures in improvising their knowledge and skill sets based on the areas in which they lack knowledge. As employability plays a major factor in country’s economy and as it is important to sustain one’s own life to make his living, it has become a very important factor to take into consideration.</p> <h3 style="text-align: center; margin-top: 10px;">II. RELATED WORK</h3> <p>In [1] they use Decision Trees as classification technique of data mining and also finds an algorithm which suits best for this problem statement. So the data needed to analyze is collected from training and placement cells and also from students who are given forms to fill. The data includes not only academic scores but also includes skills acquired and personality of each student. Data mining task is carried out to extract a previously unknown interesting pattern which uses techniques involved in database, for example spatial indices.</p> <p>The study in [2] shows that the expectations of industry for employability of students includes: “economy related skills, ability to instantly work after graduation, working pleasantly with partners, ability to take on complex tasks, business sensitivity/work experiences, and flexible also it not only includes hard skills and computer skills but also includes soft skills”. All these produced remarkable differences, which overall helps in determining the gap between the academia and the industry and their views on the outlined three items helps university graduates upon graduation to focus and improve.</p> <p>The study in [3] helps us to explore employers’ viewpoint on skills acquired by undergraduate students in three fields: “Personal Qualities; Core Skills; and Subject Knowledge”. The inputs for this research were 40 employers from four industrial sectors: “Information Technology sector, Business sector, engineering sector and Service sector”. Open-ended questionnaire and rating-scale were the two instruments used in this paper. The statistical values were the standard deviation, frequency, content analysis, percentage and mean. A questionnaire was prepared based on what are the skills required by a graduate to become employable in employer’s viewpoint.</p> <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <p>978-93-80544-43-4/21/\$31.00 ©2021 IEEE</p> <p>742</p> </div> <p style="font-size: small; margin-top: 10px;">Authorized licensed use limited to: BMS Institute of Technology. Downloaded on December 12,2023 at 04:21:08 UTC from IEEE Xplore. Restrictions apply.</p>

<p>3.2.6</p>	<p>Prof. Vinutha K, Assistant Professor Scopus Id: 57224559287</p>			
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">2021 International Conference on Forensics, Analytics, Big Data, Security (FAIBS) 978-1-6654-2005-1/21/\$31.00 ©2021 IEEE DOI: 10.1109/FAIBS52071.2021.9702586</p>	<div style="text-align: center;"> <p>2021 International Conference on Forensics, Analytics, Big Data and Security</p> <h2>Job Role Prediction System</h2> </div> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%; border: none;"> <p>Adarsh Hiremath BMS Institute of Technology and Management Student, VTU Belgaum Bengaluru, India adarsh.c.hiremath@gmail.com</p> </td> <td style="width: 33%; border: none;"> <p>Vinutha K BMS Institute of Technology and Management Research Scholar, VTU Belgaum Bengaluru, India vinuthak_ise2014@bmsit.in</p> </td> <td style="width: 33%; border: none;"> <p>Dr. Yogisha H K Professor & Head MSRIT Bengaluru, India yogishahk@gmail.com</p> </td> </tr> </table> <p>Abstract— The job outlook growth in recent years has been growing constantly as per the market requirements. Specifically in the areas of those where there is a higher necessity of specialized, trained and skilled professionals. Often not all the seekers get their desired jobs based on their skills. This is a cause of concern as it might lead to a lot of indifference between the seekers. So, a Web Application could be developed so that an employment-availability or employee-availability search engine can be used in this process. This Web Application can be used by employers and employees. The Application makes use of Machine Learning(ML) and Neural Networks in order to predict whether a candidate is eligible for a given job based on a set of hyper parameters. These parameters can be their major, Grade Point Average(GPA), Co-Curricular activities and Internships. The Parameters mentioned here are relevant to a University student. In the testing process we different models are worked with of which are Decision Trees, Support Vector Machine, Sequential neural network and XgBoost. With the XGBoost giving the highest accuracy of 93.02%. This study is primarily concentrating on freshly graduated computer science engineers, but it can be extrapolated to professionals of other domains.</p> <p>Keywords— <i>Job role, Academic score and company specific parameters in general, employability prediction, machine learning algorithm, student's eligibility.</i></p> <h3 style="text-align: center;">I. INTRODUCTION</h3> <p>According to a study in the year 2018, India produces almost 15 lakh engineers every year. Of which not everyone lands their dream job. This can be due to numerous reasons, of which the most important reason would be lack of the right skills for a particular job. The IT Industry has a lot of Software Engineers but not all of them have the relevant skills. This often leads to them not securing their desired jobs. In order to secure such a job there is a requirement for improving the Job Seeker's skill sets. In recent years the growth of Machine Learning's predictive power is phenomenal. This technology is also used for detecting banking fraud, recommending online advertisements, powering driverless cars, and forecasting medical diagnoses.</p> <h3 style="text-align: center;">II. RELATED WORK</h3> <p>As the scope of job roles keeps on augmenting in the market in an ever increasing manner, the process of categorizing them becomes difficult. In [1], the job role is elicited out of a job description that might be present on the candidates application, based on this content the job role is being predicted. The proposed system makes use of different deep neural network models including TextCNN. The system showcased the highest results of the F1-score of 72.71%. In [2] they try to reason out the possibility that unsuccessful job statuses could be anticipated from known job characteristics. In the process of exploring it they develop a method for the execution of jobs on scientific clusters. The results from the research conducted show that the method was able to predict the unsuccessful job statuses for job executions in 99.8% the cases with 83.6% recall and 94.8% precision. In [3] they try to identify the dropouts among the students who would need special and extra attention, as a result of which they would allow teachers to provide appropriate placement training. They go onto describing how the different Decision tree algorithms used to predict student performance in placement. Decision tree algorithms such as ID3, CHAID, and C4.5 were used in the implementation by using the Rapid Miner tool. In [4] the study collects data regarding the students that have different information about their previous and current academics. This study presents a proposed model based on classification approach to find an enhanced evaluation method for predicting the placement for students. This model can determine the relations between academic achievement of students and their placement in campus selection. In [5] the proposed algorithm is a comprehensive solution for tertiary institutions. The study undertakes information from the beginning of admissions to graduations. In the scope of tertiary education institutions, the data-driven approach towards a more professional culture. In [6] the authors try to ascertain the factors influencing degree performance and outcomes of it. In [7] homogeneous of the previous reference attempts to draw out the parameters incite the prediction and the outcome of characteristics predictions. In [10] to resolve difficulties that students face during placements by the concept of data mining using ECLAT algorithm. In [11] they try to estimate the expected knowledge</p> <p style="text-align: center;">978-1-6654-2005-1/21/\$31.00 ©2021 IEEE</p> <p style="text-align: center; font-size: small;">Authorized licensed use limited to: BMS Institute of Technology. Downloaded on December 12, 2023 at 04:24:55 UTC from IEEE Xplore. Restrictions apply.</p>	<p>Adarsh Hiremath BMS Institute of Technology and Management Student, VTU Belgaum Bengaluru, India adarsh.c.hiremath@gmail.com</p>	<p>Vinutha K BMS Institute of Technology and Management Research Scholar, VTU Belgaum Bengaluru, India vinuthak_ise2014@bmsit.in</p>	<p>Dr. Yogisha H K Professor & Head MSRIT Bengaluru, India yogishahk@gmail.com</p>
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3.2.7

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MOESI_L: A Cache Coherency Protocol for Locked Mixed Criticality L1 Data Cache

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Abstract—The tremendous needs of computing power and predictive timing behaviours of modern systems bring revolutionary changes in memory subsystem architecture. One such improvement is the usage of locked caches to have predictive execution time. The existing cache coherence protocols such as MESI, MOSI, MOESI, and MESIF lack a comprehensive approach for handling coherency in locked caches. This work proposes MOESI_L, an enhanced version of MOESI to increase the data consistency of locked caches. Experimental evaluations using splash-2 benchmark programs on CACTI 5.3 and CACOSIM simulator substantiate the suitability of MOESI_L protocol for locked caches in multi-core mixed criticality systems to honour the deadline of high criticality jobs. It is observed that MOESI_L protocol reduces the miss rate by 2.89% with a comparable energy consumption over MOESI protocol.

Index Terms—Cache Coherence Protocol, Cache Locking, Predictable Memory Access, MOESI, Mixed Criticality Systems, Multi-core Systems

I. INTRODUCTION

The widespread usage of multi-core controllers in safety critical and mixed critical systems has dwindled due to the unpredictability in computations. Pellizzoni et. al. [1] and Garcioli et. al. [2] reported the increase in execution time by 2.96 to 3.84 times in a multi-core system due to shared memory access. Ward et. al. [3] observed that predictive computation is one of the key challenges with respect to safety critical certification needs. In addition, there is a tremendous pressure to have high computing power with co-existing mission and safety tasks in cyber-physical systems like automotive, avionics, aerospace, bio-instrumentation and robotics domains. The introduction of domain controllers and usage of multi-core controllers in automotive systems are attempts to compete with this computing requirement. The increased deployment of certifiable systems with stupendous changes in system behavior and computing needs in turn require predictive memory subsystems. The usage of cache locking is one of the desired techniques implemented to have predictive computation of high criticality (HC) tasks. Puaut et al. [4] proposed a static cache locking technique that reserves cache lines for HC jobs of mixed criticality systems (MCS), which need to be available when the job comes back for execution. These cache lines should not be replaced by other jobs within the same core or different cores, which is very necessary to satisfy the timing constraints of HC. Locked cache lines in real-time / MCS

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bring out interesting coherency related research problems in multi-core systems. In multi-core systems, coherency misses because of cache line invalidation by another core is one of the major reasons for HC job deadline misses. The most widely used cache coherence protocols like MESI, MOSI, MOESI and MESIF invalidate the cache entries of a core if the cache line data is modified by other cores, which abates the purpose of locked caches.

In this work, we propose a novel cache coherence protocol - MOESI_L to guarantee the availability of valid data, even if an update from other cores arrives. MOESI_L ensures that a cache line which is locked will always contain valid data. This ensures guaranteed performance for HC jobs. The remaining sections of this paper are organized as follows: Section 2 provides the related work in deterministic memory access and reservation techniques existing in the multi-core domain. Section 3 presents the system and memory model considered for this work. Section 4 details MOESI_L cache coherence protocol for locked cache access. Section 5 presents experimental evaluation of MOESI_L and Section 6 concludes the work with future directions.

II. RELATED WORK

Access to shared resources need arbitration that leads to varying execution times at multiple runs of the same code. Real-time / Mixed Criticality jobs expect predictive memory access and predictive worst case execution time (WCET) for HC jobs. Awan et. al. [5] proposed a memory reservation technique to avoid shared memory contention. Bletsas et.al. [6] presented a partial lockdown and cache reclaiming techniques to have predictive accesses of HC jobs.

Cache locking mechanism is one of the most widely used solutions for predictive computation. But with the growth of multi-core systems, locked cache requires enhanced cache coherence mechanism to avoid computing penalty. Kaur et. al. [7] evaluated performance of cache coherence protocols and observed MOESI as a better protocol compared to MESI/MSI in a shared memory dual processor system. Patil et.al [8] evaluated MI, MESI, MOESI and MESIF cache coherence protocols and proposed MOESIF to improve the off chip and on chip bandwidth usage. Sritharan et. al. [9] proposed a predictable time based cache coherence protocol for bounded execution. Kaushik et. al. [10] proposed a criticality aware hardware cache coherence protocol, that enables data transfer among low criticality (LC) and HC tasks without safety interference. The

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<p>3.2.8</p>	<p>Prof. M. S Swetha, Assistant Professor Scopus ID: 57198883483</p>
	<p style="text-align: center;"> First International Conference on Advances in Physical Sciences and Materials IOP Publishing Journal of Physics: Conference Series 1706 (2020) 012069 doi:10.1088/1742-6596/1706/1/012069 </p> <p style="text-align: center;">Smart helmet system with accident safety gears and bike tracking mechanism using non IOT methods</p> <p style="text-align: center;">Shreyanka Subbarayappa^{1,2,3}, Ramesh Kempasatti^{1,4}, Samarth S Kulkarni^{1,5} and Shubhang Johari^{1,6}</p> <p> ¹Department of Electronics and Communication Engineering, M. S. Ramaiah University of Applied Science, #470-P, 4th Phase, Peenya Industrial Area, Bengaluru, KA 560054, India. ²Electrical Engineering Department, University of Texas at Arlington, Arlington, TX 76019, U.S.A. </p> <p> E-mail:³shreyanka.ec.et@msruas.ac.in, ⁴kempasattir@gmail.com, ⁵samarthkulkarni34@gmail.com, ⁶shubhangjohari@gmail.com </p> <p>Abstract. The road accidents across the world have been increasing every year. Due to this, safety of a rider has become a major concern. It is observed that bike accidents in south Asian countries are in majority as compared to other class of vehicles. Most of these bike accidents are due to rider's negligence. The intension is to circumvent the negligence of the rider and fatal injuries. In this regard, the Arduino microcontroller system is developed which does not allow the rider to start the bike until the main rider and pillion rider wears the helmet. It is also necessary that the main rider is not drunk and is sober to start the bike which is detected in the helmet. In case of an occurrence of the bike accident, the concerned members of the rider and emergency services are notified with text message and real time location to avoid last minute casualties. If the rider exceeds the speed limit, audio warning alert will be given to the main rider through the speakers in the helmet. The provision for alternate method to start the bike is given to the rider in limited access to avoid misuse of the system in case the helmet is lost. The bike is made trackable in case of lost or not found.</p> <p>1. Introduction</p> <p>India is a vast country and road transportation is serving as the backbone of the country, from cargo to connecting cities, towns and villages. On the other hand, road safety has also become a major concern as the road accidents have led to causality and serious injuries. These accidents are mostly caused due to over speeding, hit and run, drunk and drive and many more reasons. As per the government reports of India in the year of 2017, number of accidents caused are 4,64,910 which has further led to 1,34,796 fatal accidents out of which 1,47,913 were killed and 4,70,975 were injured including the pedestrians and other victims of the accident[1].The accidents caused in the year 2014 to 2017 in India as projected by the government can be seen in Table 1.</p>

3.2.9	Prof. Shanthi D L, Assistant Professor Scopus ID: 57205733111
	<p style="text-align: center;"> <u>First International Conference on Advances in Physical Sciences and Materials</u> IOP Publishing <u>Journal of Physics: Conference Series</u> 1706 (2020) 012069 doi:10.1088/1742-6596/1706/1/012069 </p> <p style="text-align: center;">Smart helmet system with accident safety gears and bike tracking mechanism using non IOT methods</p> <p style="text-align: center;">Shreyanka Subbarayappa^{1,2,3}, Ramesh Kempasatti^{1,4}, Samarth S Kulkarni^{1,5} and Shubhang Johari^{1,6}</p> <p style="text-align: center;"> ¹Department of Electronics and Communication Engineering, M. S. Ramaiah University of Applied Science, #470-P, 4th Phase, Peenya Industrial Area, Bengaluru, KA 560054, India. ²Electrical Engineering Department, University of Texas at Arlington, Arlington, TX 76019, U.S.A. </p> <p style="text-align: center;"> E-mail:³shreyanka.ec.et@msruas.ac.in, ⁴kempasattir@gmail.com, ⁵samarthkulkarni34@gmail.com, ⁶shubhangjohari@gmail.com </p> <p>Abstract. The road accidents across the world have been increasing every year. Due to this, safety of a rider has become a major concern. It is observed that bike accidents in south Asian countries are in majority as compared to other class of vehicles. Most of these bike accidents are due to rider's negligence. The intension is to circumvent the negligence of the rider and fatal injuries. In this regard, the Arduino microcontroller system is developed which does not allow the rider to start the bike until the main rider and pillion rider wears the helmet. It is also necessary that the main rider is not drunk and is sober to start the bike which is detected in the helmet. In case of an occurrence of the bike accident, the concerned members of the rider and emergency services are notified with text message and real time location to avoid last minute casualties. If the rider exceeds the speed limit, audio warning alert will be given to the main rider through the speakers in the helmet. The provision for alternate method to start the bike is given to the rider in limited access to avoid misuse of the system in case the helmet is lost. The bike is made trackable in case of lost or not found.</p> <p>1. Introduction</p> <p>India is a vast country and road transportation is serving as the backbone of the country, from cargo to connecting cities, towns and villages. On the other hand, road safety has also become a major concern as the road accidents have led to causality and serious injuries. These accidents are mostly caused due to over speeding, hit and run, drunk and drive and many more reasons. As per the government reports of India in the year of 2017, number of accidents caused are 4,64,910 which has further led to 1,34,796 fatal accidents out of which 1,47,913 were killed and 4,70,975 were injured including the pedestrians and other victims of the accident[1].The accidents caused in the year 2014 to 2017 in India as projected by the government can be seen in Table 1.</p>

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Autonomous Temperature scan system using IoT to detect COVID-19 symptom

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Abstract— The current situation of pandemic demands utmost care of health for every individual, rapid spread of SARS-CoV-2 needs regular temperature check-ups as one of the means of identifying the disease. The design of a low cost and efficient system to automate the human temperature sensing using IoT is presented in this paper. This system can be used in most of the places where temperature check ups are to be done and still using the manual check-up tools hence easing the way of checking the temperature. The system mainly consists of two subsystems. One subsystem that determines the temperature value (TS) and the other that triggers the temperature sensor (PS). The PS uses a proximity sensor that senses whether the person is near the temperature sensor and triggers the TS to sense the temperature of individual standing in front of it. The system can be mounted on any simple mirror that enables the individuals to align their head correctly with the temperature sensor and hence it can be used anywhere. To govern the behavior of the sensors we use a microcontroller (Node MCU). In this proposed method we are developing a cost- effective solution to detect the temperature of the individual without human resources installed in the place. The system can be used in various places such as Schools and colleges, public places, hospitals and many more.

Keywords—IoT (Internet of Things), IR Proximity sensor (PS), sensing, automate, Node MCU, COVID-19

I. INTRODUCTION

The dreaded and possibly fatal Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-Cov-2) virus has created widespread anxiety and a major pandemic, endangering the global economy and overwhelming public and private healthcare institutions throughout the world. The disease caused by SARS-Cov-2, a new coronavirus identified in Wuhan, China in 2019, has been formally recognized by the

World Health Organization (WHO). COVID-19 is a human-infecting virus [1].

II. RELATED WORK

The World Health Organization [7] had released a bulletin outlining several methods for protecting ourselves from the corona virus and preventing it from spreading further.

COVID-19 has a wide range of clinical manifestations, from asymptomatic (no symptoms) to severe respiratory failure Acute respiratory distress syndrome and multiple organ failure (ARDS) and multiple organ dysfunction syndrome (MODS). According to the findings of a recent study, The WHO, in conjunction with China, performed a research. There were 55,924 laboratory-confirmed COVID-19 cases out of the total of 55,924 cases. When they were evaluated, the majority of them showed clinical signs. Fever, dry cough, tiredness, and sputum production are some of the symptoms. At the same time, just a few patients were featured. Sore throats, headaches, myalgia, and shortness of breath were missing, whereas nausea, nasal congestion, hemoptysis, and other symptoms were present as in fig1.

Most Common Symptoms	
Fever	87.9%
Dry Cough	67.7%
Fatigue	38.1%
Sputum Production	33.4%
Less Common Symptoms	
Shortness of Breath	18.6%
Myalgia / Arthralgia	14.8%
Sore Throat	13.9%
Headache	13.6%
Chills	11.4%
Rare Symptoms	
Nausea	5.0%
Nasal Congestion	4.8%
Diarrhea	3.7%
Hemoptysis (coughing up blood)	0.9%
Conjunctival Congestion	0.8%

Source: WHO

Fig1. List of COVID-19 symptoms

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<p>3.2.11</p>	<p>Prof. Shanthi D L, Assistant Professor Scopus ID: 57205733111</p>						
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">2021 IEEE International Conference on Mobile Networks and Wireless Communications (ICMNWC) DOI: 10.1109/ICMNWC52512.2021.9688135</p>	<div style="text-align: center;"> <p>2021 IEEE International Conference on Mobile Networks and Wireless Communications (ICMNWC)</p> <h2>Traffic Prediction System using IoT in Smart City Perspective</h2> </div> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%; border: none; vertical-align: top;"> <p style="text-align: center;">Shanthi D L Department of Information Science and Engineering BMS Institute of Technology and Management Bengaluru, India gopalaiahshanthi@bmsit.in</p> </td> <td style="width: 33%; border: none; vertical-align: top;"> <p style="text-align: center;">Keshava Prasanna Department of Computer Science and Engineering Channabasaveshwara Institute of Technology Gubbi, Tumkur, India keshavaprasanna2013@gmail.com</p> </td> <td style="width: 33%; border: none; vertical-align: top;"> <p style="text-align: center;">Vishwas Desai Department of Information Science and Engineering BMS Institute of Technology and Management Bengaluru, India vishwasdesai.info@gmail.com</p> </td> </tr> <tr> <td style="width: 33%; border: none; vertical-align: top;"> <p style="text-align: center;">Sakshi Agarwal Department of Information Science and Engineering BMS Institute of Technology and Management Bengaluru, India sakshiagarwal209@gmail.com</p> </td> <td style="width: 33%; border: none; vertical-align: top;"> <p style="text-align: center;">V Manish M Shetty Department of Information Science and Engineering BMS Institute of Technology and Management Bengaluru, India shettymanish011@gmail.com</p> </td> <td style="width: 33%; border: none; vertical-align: top;"> <p style="text-align: center;">Rakesh A S Department of Information Science and Engineering BMS Institute of Technology and Management Bengaluru, India Rakesh.a.s.info@gmail.com</p> </td> </tr> </table> <p>Abstract—The development of sensors and their integration with the environment enables us to build smarter applications that suit modern city needs. A Road network is the backbone of any country's development structure. The free flow of traffic on the highways is vital for better mobility and transportation. These problems necessitate the development of smarter technologies focused on the Internet of Things, which recognize real-time data in the monitored area and analyze urban transportation flow in a smart city road. For a variety of road users, including commuters, private vehicle drivers, and the public transportation system, reliable traffic flow information is critical. This data would aid passengers in choosing the best mode of transportation, improving road flows, reducing noise, and reducing traffic congestion. The proposed system provides solutions to these problems partly. This system predicts the congestion in the road traffic and provides information ahead of time. The importance of traffic congestion prediction has grown in tandem with the rapid development of Smart Transportation Networks for convenient transportation. This paper illustrates a smart traffic management infrastructure based on Internet of Things (IoT), traffic is predicted using KNN algorithm and information is projected to smart devices through Android application. The outcome is smart predictive system with suggested alternates. The system can be further enhanced by installing display panels integrated with cloud computing at key places that shows alternate routes with time constraints. Also the performance and accuracy of application can be tested with different machine learning algorithms.</p> <p>Keywords—Congestion, predict, Internet of Things, Android, Infrared sensors, Cloud computing, smart cities.</p> <h3 style="text-align: center;">1. INTRODUCTION</h3> <p>Road networks form the backbone of any country's development structure. The free flow of road traffic is important for quicker connectivity and transport system. The number of vehicles on the road has significantly increased in recent years, but our roads and transportation networks' capacities have not kept pace, and as a result, they are unable to cope with this growth. Increase in traffic jams, accidents and mortality rate are the consequences of existing urban cities. The advance in technology enables to develop systems for analyzing traffic and transport flow in a smart city lane [1]. This knowledge would help road users make better choices in terms of travel, increase traffic quality, reduce emissions, and</p> <p>resolve traffic congestion. The aim of forecasting traffic congestion is to provide information about traffic congestion well in advance. The prediction of traffic congestion has gained popularity as Smart Transport Systems rapidly expanded and deployed. This prediction system for traffic congestion uses IR sensors, embedded systems using Arduino, a Wi-Fi module, and an Android Application Interface to predict and notify congestion along a specific path. Our Android App displays the congested route, forecasts the congestion level and severity, and notifies it to the users. It helps users who have registered for the app receives real-time notifications of any congestion that occurs in any part of town. Enhance job execution, monitor health, and make available real-time statistics. In a smart city, the road would be equipped with a traffic flow analysis infrastructure. Therefore, the free flow of road traffic is necessary for faster connectivity and transport systems. Major cities across the world are getting affected by traffic congestion most importantly problems like fuel waste, high degrees of stress, slowed consignments, and financial hazards [2]. The current situation of traffic in metropolitan areas like Mumbai, Chennai, Bengaluru etc. very difficult task to overcome road jams, the current scheme needs traffic cops to be physically present. There are no sufficient personnel to control and resolve the traffic congestion. However, little forecast and congestion control systems have been built as times and technologies have changed. The majority of these systems are ineffective in a city with a dynamic traffic grid like Bengaluru. The majority of these systems are dependent on the type of vehicle on the lane.</p> <p>In order to minimize these problems, a meticulous traffic prediction system is essential. However estimating is a dominant challenge to produce promising outcomes in metropolitan organizations for dynamic and unpredictable traffic flows. The work is come up with contemporary model of traffic jam forecasting based on previous traffic results. Classification of online traffic continues to be of long-term interest to the networking community. This acts as feedback for realistic approaches such as network control, quality of service and intrusion detection. We describe a machine-learning technique to precisely categorize traffic in this implementation. [2] Congestion is both burdensome and agonizing; India has one of the largest road networks amongst all countries. The national highways cover almost 97,991 km</p> <p style="text-align: center;">978-1-6654-3883-4/21/\$31.00 ©2021 IEEE</p> <p style="text-align: center; font-size: small;">Authorized licensed use limited to: BMS Institute of Technology. Downloaded on December 12,2023 at 05:53:22 UTC from IEEE Xplore. Restrictions apply.</p>	<p style="text-align: center;">Shanthi D L Department of Information Science and Engineering BMS Institute of Technology and Management Bengaluru, India gopalaiahshanthi@bmsit.in</p>	<p style="text-align: center;">Keshava Prasanna Department of Computer Science and Engineering Channabasaveshwara Institute of Technology Gubbi, Tumkur, India keshavaprasanna2013@gmail.com</p>	<p style="text-align: center;">Vishwas Desai Department of Information Science and Engineering BMS Institute of Technology and Management Bengaluru, India vishwasdesai.info@gmail.com</p>	<p style="text-align: center;">Sakshi Agarwal Department of Information Science and Engineering BMS Institute of Technology and Management Bengaluru, India sakshiagarwal209@gmail.com</p>	<p style="text-align: center;">V Manish M Shetty Department of Information Science and Engineering BMS Institute of Technology and Management Bengaluru, India shettymanish011@gmail.com</p>	<p style="text-align: center;">Rakesh A S Department of Information Science and Engineering BMS Institute of Technology and Management Bengaluru, India Rakesh.a.s.info@gmail.com</p>
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VEHICLE ACCIDENT PREVENTION AND ALERT SYSTEM

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Abstract: As the usage of vehicles is increasing drastically, the hazards due to vehicles is also increased. The main cause for accidents is high speed, drunk and drive, diverting minds, over stress and due to electronic gadgets. This paper deals with accident detection system that occurs due to carelessness of the person who is driving the vehicle. This introduces accident alerting system which alerts the person who is driving the vehicle. If the person is not in a position to control the vehicle, then the accident occurs. Once the accident occurs to the vehicle this system will send information to registered mobile number. Speed is one of the basic reasons for vehicle accident. Many lives could have been saved emergency services could get accident information and reach in time. This project deals with accident detection system when the accident occurs it uses various components and alerts the Rescue team for help. An efficient automatic accident detection with an automatic notification to the emergency service with the accident location is a prime need to save the precious human life. The proposed system deals with accident alerting and detection. It reads the exact latitude and longitude of the vehicle involved in the accident and sends this information to nearest emergency service provider. The goal of the project is to detect accidents and alert the rescue team in time.

Index Terms - Vehicle, GSM, GPS, Alert, Rescue.

I. INTRODUCTION

The main goal of our project is to build an IoT tool that may be used in coincidence detection and alerting the nearest clinic via an SMS. The net of factors (IoT) is the time period used to refer to the conversation among people to matters and matters to matters. In nowadays society, technology is improving at an exponential price, Broadband net is more broadly to be had and greater fee-green than ever earlier than. All of these things are creating a ripe environment for IoT.

Currently, many vehicles are geared up with an automated crash response system that can communicate with a server inside the Cloud alerting a paid company of an emergency. Once the company has been alerted, an operator communicates lower back with the motive force to get further instruction and sends emergency employees if important. This task proposes a gadget which can eliminate the want for an operator. Whilst the vehicle is in a twist of fate it communicates without delay with emergency offerings and family participants giving the severity of the accident, GPS vicinity. Ambulances are currently able to sending affected person statistics to the sanatorium.

The distinctiveness of this assignment is that sensors stumble on an accident and information is sent without delay to the ambulance, as a consequence casting off the want for an intermediary step. In created nations like India with advance transportation, innovation should assist with contacting individual in most limited time to spare lives. Facilities take care of certain sufferers and elderly individuals who, because of flexibility troubles, are at risk for falls, and can require quick reaction inside the occasion of a disaster. In this challenge we are utilizing internet of things (IOT). IOT is a rapidly creating improvement to offer statistics correspondence using simplicity and imperativeness worthwhile used in the vehicle. Net of things (IoT) groups reshaped the manner in which individuals impart and brought a exchange in attitude to open and personal administrations. This challenge passes on an awesome and reliable IoT framework answer for in a flash informing the Open properly-being association at something factor a coincidence takes place and pinpoints its geographic facilitates on the guide.

3.2.13	Dr. Veena .N., Associate Professor, Prof. Mahalakshmi S, Assistant Professor
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">2021 International Conference on Forensics, Analytics, Big Data, Security (FABS) 978-1-6654-2005-1/21/\$31.00 ©2021 IEEE DOI: 10.1109/FABS52071.2021.9702552</p>	<div style="text-align: center;"> <h2 style="margin: 0;">Heart Disease Prediction System</h2> <p style="margin: 5px 0;">Dr. Veena N¹, S. Mahalakshmi¹, Anisha Diyya G², Alekhya Allada², Malavika S Anand² 1, Faculty, Department of Information Science and Engineering 2, Student, Department of Information Science and Engineering BMS Institute of Technology and Management Bengaluru, Karnataka, India veena@bmsit.in, maha.shanmugam@bmsit.in, lby18is025@bmsit.in lby18is018@bmsit.in, lby18is064@bmsit.in</p> </div> <p>Abstract—The term “Heart disease” refers to different types of heart conditions. Even when there is slow flow of blood in the heart it can cause a heart attack. There are many such aspects that can raise the risk for heart disease called risk factors. Lots of researchers have been discovering new technologies to predict the disease early before it's too late for helping people suffering from heart disease. In our project we are helping out the users to predict their risk of heart attack by using the UCI Repository Heart Disease dataset that is used to train the model.</p> <p>I. INTRODUCTION</p> <p>Cardiovascular Diseases (CVD's) are one of the fastest growing diseases affecting 27% of the human population. It is also discovered to be the cause of death of 45% of people within the age groups of 45–60-year-old. The cause of this can be plenty but one of the main reasons is a sedentary lifestyle. This lifestyle is characterized by lack of movement and exercising.</p> <p>Another important factor is the lack of basic hospital amenities to treat CVD's, a reduction in the number of doctors specializing in Cardiology and no education among the people.</p> <p>This project aims to use Machine Learning algorithms such as Logistic Regression, Naive Bayes, Decision Tree and Random Forest to predict the presence or absence of heart disease in a patient. This Web Application (Web App) takes the user input such as Age, Pulse Rate, Blood Pressure, Resting Heart Rate, ECG Values, etc. Using the user input and the model trained using the UCI Repository Heart Disease data, the Web App is able to predict accurately if the patient has a risk of heart disease or if the patient is risk free.</p> <p>This project will help doctors who are not specialized in Cardiology to be able to diagnose his/her patients without a Cardiologist intervention. It will also help the specialists make a final call-in complicated case. This will also eliminate the human error made by doctors and help the doctor-patient create a customized treatment course of action according to the needs of the patient.</p> <p style="text-align: center;">II. EXISTING SYSTEM</p> <p>In the current world, due to the sedentary lifestyle of many people, the rate of heart disease has gone up. In the current system, the patient goes to the doctor after symptoms such as chest pain and numbness in arms and legs. The doctor then conducts a preliminary checkup of the patient and suggests advanced tests such as Electrocardiogram (ECG or EKG) and Echocardiogram (Echo). These tests are done to detect the problems in the heart valves and the blood vessels such as a block or weakness.</p> <p>The doctor then looks at the results of the test and then prescribes the next course of action. In some cases, there may be a lot of factors affecting the results of the test or there might be an error or the test results can be inconclusive. This makes it difficult for the doctor to predict the presence or absence of heart disease.</p> <p>Human error is a main concern in these cases. Sometimes, the course of action prescribed may not be the best for the patient. The patient has to visit the doctor multiple times and sometimes even a specialist is recommended. This is a costly affair and cannot be affordable to all sections of the society.</p> <p style="text-align: center;">III. PROPOSED SYSTEM</p> <p>The website developed helps the users to predict whether they have a heart disease or not. This website helps the admin to store the information of the doctor and the patient's information of who has logged on the website.</p> <p>We have namely three modules:</p> <p>A. Admin login module</p> <p>The admin needs to provide the admin credentials to access the system. The admin login module has six more sub modules:</p> <ul style="list-style-type: none"> • Add doctors: In this module the admin can add a new doctor by adding a few details. After submitting all the details, the new doctors are added into the system. • Training Data: In this module the admin can enter

Program Outcomes

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. Conduct investigations of complex problems: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling to complex engineering activities, with an understanding of the limitations.

PO6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. Communication: Communicate effectively on complex engineering activities with the engineering community and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.



ಬಿ.ಎಂ.ಎಸ್. ತಾಂತ್ರಿಕ ಮತ್ತು ನಿರ್ವಹಣಾ ಮಹಾವಿದ್ಯಾಲಯ
(ವಿ.ಟಿ.ಯು. ಅಡಿಯಲ್ಲಿನ ಸ್ವಾಯತ್ತ ಸಂಸ್ಥೆ)

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