



NIELIT's International Conference on  
**Communication, Electronics and Digital Technologies**

**NICE-DT 2023**

10-11 February 2023, New Delhi

**ABSTRACT BOOK**

Conference Organizer :

**National Institute of Electronics and Information Technology (NIELIT)**  
Ministry of Electronics and Information Technology (MeitY), Govt. of India

Venue:

Dr. Ambedkar International Centre  
15, Janpath, New Delhi-01

<http://conf.nielit.edu.in/>



**1st International Conference of NIELIT**  
**NIELITs' International Conference on Communication  
Electronics and Digital Technology**

**(NICE-DT 2023)**  
**10-11 February 2023, New Delhi**  
**ABSTRACT BOOK**

**Venue:**

**Dr. Ambedkar International Centre  
15, Janpath, New Delhi-01**

**<http://conf.nielit.edu.in/>**

**Organised by the National Institute of Electronics and Information Technology (NIELIT)**

## Message from Director General, NIELIT



It gives me immense pleasure to welcome you all on this 2 days NIELIT's International Conference on Communication, Electronics and Digital Technologies (NICE-DT'23). NIELIT is an Autonomous Scientific Society under the administrative control of Ministry of Electronics & Information Technology, Government of India. The first day of the conference focuses on sharing knowledge by researchers while, second day focuses on Digital Skilling that makes it more relevant in the present scenario when the industry demand is on skilled and focused manpower and India holds presidency of G20.

NICE-DT'23 provides ideal platform to researchers, academic institutes, industries and research organizations to report the findings in the emerging areas of Electronics, Communication and Digital Technologies. Thus this conference fulfils the purpose of reducing the gap between research and industrial development

The authors of published papers have shared their findings and knowledge gained during their research work by the way of contribution in 8 tracks of the conference, NICE-DT'23. I thank and congratulate to all authors for their contribution. I feel proud that NIELIT team selected the tracks on latest and emerging technologies like AI, Machine Learning, Cyber Security, Advanced computing, VLSI, Blockchain and Assistive Technology for Divyangjan. Congratulations to entire team of NICE-DT'23.

I appreciate and thank Springer who accepted the selected papers of NICE-DT'23 for its book series "Lecture Notes in Networks and Systems".

In the end, I thank all participants who attended the conference.

Hope to have more contributions and feedback from learned persons for next version.

Thank you

Prof (Dr.) M. M. Tripathi

Director General, NIELIT

## Message from Conference Chairs

With immense pleasure we extend our warm welcome to the NIELIT'S International conference on Communication, Electronics & Digital Technologies ( NICE-DT'23). This first conference organized by NIELIT as a whole has created a great opportunity for researchers across the universities in general & stakeholders NIELIT in particular. Day two has been dedicated exclusively on **Digital skilling** which is in line with the Government of India initiatives as well a lead event for the G20 presidency year . Providing opportunity to researchers across various IECT domains, 08 tracks were identified and invited to present their research findings.

Our call for papers elicited a strong response & resulted in 152 full-length papers from academia, industry and research facilities from around the world. All submissions were extensively reviewed by the Program Committee (PC), External Program Committee (EPC), External Review Committee (ERC), and additional expert reviewers. The reviewing process included an author response period during which authors could clarify any questions the reviewers as well as a resubmission opportunity.

Finally , from the total of 152 initial submission 50 has been selected for publishing in lecture notes of Springer and 18 in our journal IJDT. 68 papers will be presented in the conference . In addition 10 invited talks through renowned experts from academia & industry across the globe.

We hope you find the program stimulating and thought provoking, and that the co-located events will provide you with opportunities to share ideas with researchers and practitioners from around the world.

Finally, we offer our thanks to the NIELIT/ MeitY authorities for their sponsorship; to our corporate supporters whose contributions are essential to the sustainability of the conference and to student participation, and to steering committee for their support and guidance.

Once again , we extend a very warm welcome to you all .



**Dr M Perumal Pillai**  
Executive Director  
NIELIT Calicut



**Dr Yumnam Jayanth Singh**  
Executive Director  
NIELIT Guwahati

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Prof. Valentina E. B., University Aurel Vlaicu of Arad, Romania

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Dr Karel Sterckx, Bangkok University, Thailand

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Prof. Biju Issac, Teesside University Middlesbrough, England

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Dr. Yumnam Jayanta Singh, Executive Director, NIELIT Guwahati

**Conveners**

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Shri Ram Prakash Pandey, Registrar NIELIT

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Shri Partha P. Adhikari, Joint Director, NIELIT

## About National Institute of Electronics and Information Technology (NIELIT)

National Institute of Electronics & Information Technology (NIELIT), (erstwhile DOEACC Society), an Autonomous Scientific Society under the administrative control of Ministry of Electronics & Information Technology (MoE&IT), Government of India, was set up to carry out Human Resource Development and related activities in the area of Information, Electronics & Communications Technology (IECT). NIELIT is engaged both in Formal & Non-Formal Education in the area of IECT besides development of industry oriented quality education and training programmes in the state-of-the-art areas. NIELIT has endeavoured to establish standards to be the country's premier institution for Examination and Certification in the field of IECT. It is also one of the National Examination Body, which accredits institutes/organizations for conducting courses in IT in the non-formal sector.

As on date, NIELIT has forty seven (47) centers located at Agartala, Aizawl, Ajmer, Alawalpur (Saksharta Kendra), Aurangabad, Bhubaneswar, Calicut, Chandigarh, Chennai, Chuchuyimlang, Churachandpur, Daman, Delhi, Dibrugarh, Dimapur, Gangtok, Gorakhpur, Guwahati, Haridwar, Imphal, Itanagar, Jammu, Jorhat, Kargil, Kohima, Kolkata, Kokrajhar, Kurukshetra, Lakhanpur (Saksharta Kendra), Leh, Lucknow, Lunglei, Majuli, Mandi, Pasighat, Patna, Pali, Ranchi, Ropar, Senapati, Shillong, Shimla, Silchar, Srinagar, Tezpur, Tura and Tezu with its Headquarters at New Delhi. It is also well networked throughout India with the presence of about 700 + institutes.

Over the last two decades, NIELIT has acquired very good expertise in IT training, through its wide repertoire of courses, ranging from 'O' Level (Foundation), 'A' Level (Advance Diploma), 'B' Level (MCA equivalent), 'C' Level (M-Tech level), IT literacy courses such as CCC (Course on Computer Concept), BCC (Basic Computer Course) and other such long term and short term course in the non formal sector like courses on Information Security, ITes-BPO(Customer Care/Banking), Computer Hardware Maintenance (CHM-O/A level), Bio-Informatics(BI-O/A/B level), ESDM etc, besides, high end courses offered by NIELIT Centres at Post-Graduate level (M.Tech) in Electronics Design & Technology, Embedded Systems etc. which are not normally offered by Universities/Institutions in the formal sector, in association with the respective state Universities.

The basket of activities of NIELIT is further augmented by the wide range of projects that it undertakes. NIELIT has demonstrated its capability and capacity to undertake R&D projects, consultancy services, turnkey projects in office automation, software development, website development etc. NIELIT is also the nodal implementing agency on behalf of MeitY for Data Digitization of the population of 15 assigned States and 2 Union Territories for the creation of National Population Register (NPR) project of Registrar General of India (RGI).

NIELIT is also successfully executing the Agriculture Census and Input Survey project under which tabulation of about 10 crore data records have to be done. NIELIT has planned a roadmap for adopting appropriate pedagogy for metamorphosing NIELIT into an Institute of National Importance.

## **About NIELIT's International Conference on Communication, Electronics and Digital Technologies (NICE-DT'23):**

NICE-DT-2023 is the first International Conference on Communication, Electronics and Digital Technologies organised by the National Institute of Electronics and Information Technology (NIELIT). In this conference there presentations under the following 08 tracks.

### **The tracks of the conferences are:**

Track 1: Artificial Intelligence, Machine Learning, Big Data, Data Analytics

Track 2: Cyber Security & Forensic, Network and Mobile Security

Track 3: Advance Computing- Cloud Computing & Quantum Computing

Track 4: VLSI & Semiconductors, Electronics System, IoT, Robotics and automations

Track 5: Blockchain and Software Technology

Track 6: Digital technologies for future

Track 7: Assistive Technology for Divyangjan (People with disabilities)

Track 8: Strategy for Digital Skilling for building a global Future Ready workforce

The conference will focus on sharing the outcomes of research and development in IECT and related areas. It will be an ideal platform for Industry Professionals, Researchers and Academicians from all over the globe to share their views and present their findings in 08(eight) selected tracks.

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## Brief Profile:

**Chief Guest: Prof.K.K. Aggarwal, Chairman, National Board of Accreditation**



Prof K.K. Aggarwal, the current Chairman of NBA, is a man of great repute with glorious career to his name. He has been associated with NBA in various capacities since its inception and was Chairman, EEAC (Tier-II) before taking over as Chairman, NBA on 14th January, 2019. He has had a distinguished service era of 27 years at NIT, Kurukshetra. He was previously the Pro Vice-Chancellor, GJU, Hisar for a period of three years, the Founder Vice Chancellor of GGS Indraprastha University, Delhi, the President of the Institution of Electronics and Telecommunication Engineers (IETE), the President, Computer Society of India, and the President of South East Asia Regional Computer Confederation (SEARCC).

He obtained his Bachelor of Engineering Degree from Punjab University, Master's Degree from NIT, Kurukshetra and Ph.D from NIT, Kurukshetra. He has published approximately 400 papers in reputed journals, both national and international. He has been widely consulted by the industry, most-notable being his contribution towards the Reliability Analysis for PSLV (Polar Satellite Launch Vehicle). He was conferred the Honorary Fellowship by Broadcast Society of India. He has been conferred the Life Time Achievement Award by IETE and Computer Society of India.

**Guest of Honour, Prof. S.N. Singh, Director, ABV-IIITM, Gwalior**

Prof S. N. Singh obtained his M. Tech. and Ph. D. in Electrical Engineering from Indian Institute of Technology Kanpur, in 1989 and 1995. Presently, Prof Singh is Director, Atal Bihari Bajpayee- Indian Institute of Information Technology and Management Gwalior (MP), India (on leave from Professor (HAG), Department of Electrical Engineering, Indian Institute of Technology Kanpur, India). Before joining IIT Kanpur as Associate Professor, Dr Singh worked with UP State Electricity Board as Assistant Engineer from 1988 to 1996, with Roorkee University (now IIT Roorkee) as Assistant Professor from 1996 to 2000 and with Asian Institute of Technology, Bangkok, Thailand as Assistant Professor from 2001 to 2002. He was ViceChancellor of Madan Mohan Malviya University of Technology Gorakhpur during April 2017 to July 2020. Dr Singh received several awards including Young Engineer Award 2000 of Indian National Academy of Engineering (INAE), Khosla Research Award of IIT Roorkee, and Young Engineer Award of CBIP New Delhi (India), 1996. Prof Singh is receipt of Humboldt Fellowship of Germany (2005, 2007) and Ottomonsted Fellowship of Denmark (2009-10). Prof Singh became first Asian to receive 2013 IEEE Educational Activity Board Meritorious Achievement Award in Continuing Education. He is also recipients of INAE Outstanding Teacher Award 2016 and IEEE R10 region (Asia-Pacific) Outstanding Volunteer Award 2016. Dr Singh is appointed as IEEE Distinguish Lecturer of Power & Energy Society from 2019 and Industry application Society for 2019-2021. He is also recipient of NPSC 2020 Academic Excellence Award and 2021 IEEE Industry Application Society (IAS) Outstanding Educator/ Mentor Award. His research interests include power system restructuring, FACTS, power system optimization & control, security analysis, wind power, etc. Prof Singh has published more than 500 papers (h-index=57, Citation=12k+) in International/ national journals/conferences and supervised 40 PhD (8 PhD under progress). He has also written 30 book chapters, 8 Edited books and 2 text-books one on Electric Power Generation, Transmission and Distribution and second is Basic Electrical Engineering, published by PHI, India. Prof Singh has completed three dozen of technical projects in India and abroad. His two NPTEL (YouTube) video lectures on HVDC Transmission and Power System Operation & Control are very popular. Prof Singh was Chairman, IEEE UP Section for 2013 & 2014, IEEE R10 (Asia-Pacific) Conference & Technical Seminar Coordinator 2015-18 and R10 Vice-Chair, Technical Activities (2019-2020). Presently Prof Singh is Immediate Past Chairman of IEEE, India Council. Dr Singh is Fellows of IEEE (USA), IET (UK), INAE, IE(I), IETE, AvH.

## Invited Guest: Dr Yehya Al-Marzooqi, Executive Director, Advisory Unit, Tawazun Council, UAE



Dr Yehya Al-Marzooqi, Executive Director, Advisory Unit, Tawazun Economic Council, UAE, is also the Chairman of the Engineering Innovation Solution Center, Board member, UAE University, college of Business and Economy, and Chairman of Hamdan bin Mohamed Smart University, School of Business and Economy.

He pursued Program for Executive Development (PED), Organizational Leadership, International Management Development (IMD), Bachelor of Applied Science (BASc), Computer Science, Eastern Washington University, and PhD in Leadership/Emiratization, University of Bradford.

At Tawazun, he has led various people development initiatives such as Leadership Development Program, Establishment of MBA in Manufacturing Excellence with UAE University, Integration of Female Emirati National in manufacturing, Supporting SMEs and Facilitating projects from lab to market, among many others.

He also serves various other positions such as Board member of Executive Committee of Khalifa Innovation Center (KIC), Chairman of the Innovation Engineering Solution Center (IESC), Member of the Board at Wall Street Exchange and several notable others.

He has co-authored articles that were published in the National HRD Journal and American Society for Training and Development (ASTD) publication and participated as a keynote speaker in local and international conferences.

## Plenary Speaker: Prof. Rajkumar Buyya, University of Melbourne

Director, Cloud Computing and Distributed Systems (CLOUDS) Lab, The University of Melbourne, Australia, and CEO, Manjrasoft Pvt Ltd, Melbourne, Australia



Dr. Rajkumar Buyya is a Redmond Barry Distinguished Professor and Director of the Cloud Computing and Distributed Systems (CLOUDS) Laboratory at the University of Melbourne, Australia. He is also serving as the founding CEO of Manjrasoft, a spin-off company of the University, commercializing its innovations in Cloud Computing. He has authored over 850 publications and seven textbooks. He is one of the highly cited authors in computer science and software engineering worldwide (h-index=158, g-index=342, and 132,100+ citations). He is recognised as Web of Science “Highly Cited Researcher” for six consecutive years since 2016, IEEE Fellow, and Scopus Researcher of the Year 2017 with Excellence in Innovative Research Award by Elsevier. He has been recognised as the "Best of the World" twice for research fields (in Computing Systems in 2019 and Software Systems in 2021) as well as "Lifetime Achiever" and "Superstar of Research" in "Engineering and Computer Science" discipline twice (2019 and 2021) by the Australian Research Review. He received 2021 "Research Innovation Award" from IEEE Technical Committee on Services Computing, 2021 "Research Impact Award" from IEEE Technical Committee on Cloud Computing, and “Cloud Architect of the Year Award” from Oracle in 2022.

Software technologies for Grid, Cloud, and Fog computing developed under Dr. Buyya's leadership have gained rapid acceptance and are in use at several academic institutions and commercial enterprises in 50+ countries around the world. Manjrasoft's Aneka Cloud technology developed under his leadership has received "Frost New Product Innovation Award". Dr. Buyya received "Mahatma Gandhi Award" along with Gold Medals for his outstanding and extraordinary achievements in Information Technology field and services rendered to promote greater friendship and India-International cooperation. He is currently serving as Editor-in-Chief of Software: Practice and Experience, a long-standing journal in the field established 50+ years ago. For further information on Dr. Buyya, please visit his cyberhome: [www.buyya.com](http://www.buyya.com)

## Dr Saibal K. Pal - Research Scientist – DRDO



Saibal K. Pal is a Senior Scientist at Scientific Analysis Group, Defence Research & Development Organization (DRDO), Delhi. He has served as former Director of Information Technology and Cyber Security in the Ministry last year. He received his PhD in Computer Science from University of Delhi and is an Invited Faculty & Research Guide at a number of national institutions. He has more than 2 decades of experience of working in public sector and has closely worked on the policy formulation and implementation for various types of communities in India. His areas of interest are E-Governance, Information & Network Security, Computational Intelligence and Information Systems. He has more than 200 publications in books, journals & international conference proceedings.



**Speaker: Col Inderjeet Singh, CCO, Vara Technology Pvt Ltd**



Col Inderjeet Singh is the Chief Cyber Security Officer, Vara Technology Pvt. Ltd. He is an experienced Info Systems professional with experience of more than 27+ year across different areas like Info Security, Risk Management, Cyber Security, Cyber Forensics, Cyber Warfare, Expertise in SOC and CERT, Cloud Computing, Big Data, Internet of Things (IoT) including IoT Security, Blockchain, Machine Learning and Artificial Intelligence.

He is the visionary for Start-Up Incubation, Entrepreneurship Development, Strategic Consulting, New Technology Evaluation for commercial viability. His other roles include that of a Security Evangelist, Security Analyst and Freelance Writer, having efficient Solution Architect and Program/ Project Management Skills.

**Speaker: Prof. Rajiv Misra, Professor, IIT Patna**



Prof. Rajiv Misra is currently serving IIT Patna as a Professor. He was previously an Associate Professor at IIT Patna. He was the Ph.D. degree from IIT, Kharagpur.

His research areas include Distributed Systems, Cloud Computing, Big Data Computing, Consensus in Blockchain, Cloud IoT Edge Computing and Adhoc Networks and Sensor Networks. Prof. Misra is a fellow of IETE. He is also a member of the professional body, IEEE Senior. Under his guidance, 5 scholars have obtained their doctoral degrees.

Currently he has 5 sponsored projects, funded by MeitY, Gol, Microsoft, Redmond, USA, Department of Science and Technology, Govt of India, Department of Information Technology, Govt of India and DST-DAAD-2019. He has to his credit numerous research publications, including conference publications and book chapters. He expertises in Computer Science, Information Systems, Mobile Computing, Adhoc Networks and Sensor Networks.

**Speaker: Prof. Nilanjan Dey, Associate Professor, Techno International**



Nilanjan Dey , PhD., SMIEEE, is an Associate Professor, Department of Computer Science and Engineering, at Techno International, Kolkata. He also holds a position of Adjunct Professor at Ton Duc Thang University, Ho Chi Minh City, Vietnam.

Previously, he held an honorary position of Visiting Scientist at Global Biomedical Technologies Inc., CA, USA (2012–2015) and Associate Professor at JIS University. Additionally, he is a Visiting Fellow, WC Laboratory, Department of Biomedical Engineering, University of Reading, UK and Ambassador - IFIP InterYIT, India.

He was awarded his PhD from Jadavpur University in 2015. He has over 110 books and over 300 publications in the area of medical imaging, machine learning, computer aided diagnosis, data mining, etc. (over 16500 Citations, 63 h-index). He is also the Indian Ambassador of the International Federation for Information Processing—Young ICT Group and Senior member of IEEE.

His other roles include Editor-in-Chief: Int. J. of Ambient Computing and Intelligence (Scopus, DBLP, ACM dl, WoS), Springer Series Editor: Springer Tracts in Nature-Inspired Computing (STNIC), Series Co-Editor of Advances in Ubiquitous Sensing Applications for Healthcare, Elsevier, Series Editor of Intelligent Signal Processing and Data Analysis, CRC Press (Focus Series) and De Gruyter Series on the Internet of Things, De Gruyter.

**Speaker: Prof. Siddhartha Bhattacharyya, Christ University**



Prof. Siddhartha Bhattacharyya is a Fellow at The RSA UK(The royal society for arts, manufactures and commerce), FIET (UK), Full Foreign Member, RUSSIAN ACADEMY OF NATURAL SCIENCES US SECTION INC. His other roles include Principal, Rajnagar Mahavidyala, West Bengal, and Editor In Chief, International Journal of Hybrid Intelligence, United Kingdom.

He pursued BS, Physics. S. A. Jaipuria College, Kolkata, Bachelor of Technology (B.Tech.), Optics and Optoelectronics. University of Calcutta, Master of Technology (M.Tech.), Optics and Optoelectronics. University of Calcutta and Doctor of Philosophy (Ph.D.), Computer Engineering. Jadavpur University.

His previous roles include Professor, Christ University, Bangalore, Principal and Professor, RCC Institute of Information Technology, India, various roles in RCCIIT, Kolkata, Senior Research Scientist, Technical University of Ostrava, Assistant Professor, University Institute of Technology, BU, and Lecturer, Kalyani Govt. Engg. College.

**Speaker: Dr. M.P.Pillai, Executive Director, NIELIT Calicut**



Obtained M.Sc (App. Physics) in 1985, M. Tech ( Laser & E O Engg) during 1988 from College of Engineering, Anna University, Chennai. Worked as a 'Research Associate ' at IIT Madras for a period of 04 Years. Worked in Swiss Federal Institute of Technology, Switzerland under "Indo-Swiss co-operation fellowship program " for 08 months. During 1993, Joined "Centre For Electronics Design and Technology of India" CEDTI, then Department of Electronics (DoE), Government of India, as a Senior Design Engineer. Conceived and implemented a project on "Training of Teachers in E-learning "during 2006 & trained over 300 teachers.

After merger of CEDT with DOEACC Society, An Autonomous body of Ministry of communications and IT, worked as Additional Director & Chief co-ordinator, DOEACC Scheme on Hardware Courses ( National level) till June 2010. Established a new NIELIT Centre at Chennai and acted as founder Director till end of 2013. Presently, he is the Executive Director, National Institute of Electronics & Information Technology, (NIELIT) Calicut, engaged in specialized training, R & D, Consultancy in the field Electronics & IT.

Has more than 34 years of experience in Capacity building, R & D , Product development & implementation of various Central Government schemes. Successfully implemented many socially relevant ' IT literacy programs ' and Capacity building projects in Kerala & Tamil Nadu. Visited various universities, research labs and industries in Switzerland ,Germany, France, Taiwan & China.

Life member of IEEE, IETE & ISTE , member academic council of Anna university Chennai and acted as member board of studies in Electronics & IT in various universities.

**Speaker: Dr. Mani Madhukar, Program Manager, IBM**



Dr. Mani Madhukar is a Program Manager, Global University Programs, IBM. A PhD in CSE, Dr. Madhukar is a Tech Evangelist on Cloud, AI/ML Blockchain IoT.

He is a practitioner and leader with 15+ years of experience in Edtech, proven record of driving innovation and disruption in Education sector through technology. He holds deep expertise in designing, implementing, and scaling national level skills building, educational and training programs for future workforce. His niche includes Academic Program Management, Cloud Pre-sales, Cloud Application Development, Electronic Content Management, Competency Development, Mentoring Startups, Curriculum Design, Project Management.

Dr. Madhukar has worked across many technologies including Cloud, Blockchain, Internet of Things, Data Science, DevOps, IBM Watson, and contributed to Ecosystem development with stake holders from ISVs, Startups and Academia.

His other current and former roles include Adjunct Professor, Indira Gandhi Delhi Technical University for Women, Adjunct Professor, Gurukul Kangri Vishwavidyalaya, Haridwar, IBM Ecosystem development team, IBM India Pvt. Ltd., and several others.

He pursued Bachelor's Degree, Computer Engineering, Hemwati Nandan Bahuguna Garhwal University, Master's Degree, Computer Engineering, Graphic Era University, Doctor of Philosophy (PhD), Computer Science, Banasthali Vidyapith, and Executive program in Management, Business Administration and Management, General Executive program in Management, Business Administration and Management, McIntire School of Commerce, University of VirginiaMcIntire School of Commerce, University of Virginia.

**Speaker: Prof Alak Kumar Buragohai, Chancellor-Girijananda Chowdhury University**



Prof Alak Kumar Buragohain is the Chancellor-Girijananda Chowdhury University, Assam. Previously he was the Chairperson Academic, Royal Global University. He was also the founder Head of the Department of Molecular Biology and Biotechnology at Tezpur University-a Central University in Assam and the founder of the ONGC Sponsored Centre of Petroleum Biotechnology in the same University.

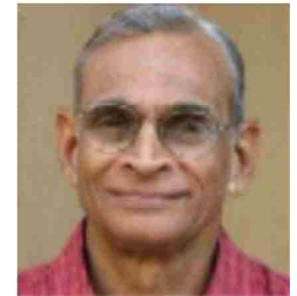
Extending academic governance, he was the Registrar of Tezpur University and the Vice Chancellor of Dibrugarh University, Assam. Professor Buragohain has made remarkable contribution in forging Industry-Academia Interfacing and in bringing in international academic research collaboration at Dibrugarh University under the UKIERI, Indo-US and Indo-Tunisian research schemes. He was awarded for his remarkable contribution towards Exemplary Industry-Academia Partnership by World Wide Industry Academia Network.

He has spent over four glorious decades in research and teaching. Also previously associated with Brahmaputra Valley Fertilizer Corporation Limited as Independent Director.

Professor Buragohain received his early education from North Eastern Hill University, Shillong. He obtained his Post Graduation from Gauhati University in Botany, Ph.D in Plant Molecular Biology from the University of London and DIC in Plant Virology from Imperial College of Science Technology and Medicine.

**Speaker: Prof. G. S. Mani, Former Dean & Director, DIAT, DRDO, Pune**

Prof. Dr. G. S. Mani is a Former chair at IEEE, Pune section and Former Dean and Director at DIAT, DRDO, Pune. Born in 1941, Prof GS Mani had his academic career at University of Mysore, Madras Institute of technology, Chennai, and at Indian Institute of technology, Delhi. He served Indian Defence R&D Organization for nearly 40 years and retired as Director and Dean of Institute of Armament Technology in 2002. Under his leadership, the Institute was awarded Deemed University status in 2001. He was later Adviser to a leading academic institution, Principal of an engineering college and an Emeritus Professor.



He has many achievements to his credit.

- one of the first persons to be awarded by Government of India for indigenous design and development of Microwave components in 1971.
- one of the first persons to be awarded an Indian Patent in DRDO in 1972.
- was associated with building largest Anechoic chamber of the country for antenna testing, and for developing broadband Indigenous radomes.
- was instrumental in formulating and conducting Induction training programs for Defence scientists at All India level.
- was also associated with teaching and conducting Master's Degree Courses on many special subjects related to Defence technology.
- has guided 2 students for PhD and many students for Master's degree on applying AI and data processing in Defence related disciplines.

Some of his awards include

- Recipient of Import Substitution Award from President of India (1971),
- "Excellence in Education/R&D" Trophy presented by Governor of Maharashtra (1999),
- Prof. K. Sreenivasan Award from IETE (2000)
- Appreciation Award from DEMA (2000),
- Appreciation certificate for the Mayor of Pune for social service (2014).
- Appreciation Certificate from IEEE for notable services and contributions towards advancement of IEEE and engineering (2017).
- Life Time Achievement award from Society for Data Science for advancing science and technology for the betterment of society (2023).
- Prof Mani is a Senior Life Member of IEEE, Life member of IETE, and a Life member of Society of EMC Engineers (India).



**Speaker: Akanksha Saini, Spoken Tutorial, IITB**



Akanksha Saini is the National Coordinator Training & College Division head, DHE, DTE & DET - All India head and runs a project of the National Mission on Education through ICT funded by the Ministry of Education (MoE), Govt. of India

She is a Project Management professional with continued career progression & documented history of bridging managerial acumen in turning around of information technology, ICT, Free and Open-Source Software (FOSS) coupled with an insightful exposure to IT management and roll-out, planning, and vision for future projects, and technology management.

Throughout the years she has held various roles in Indian Institute of Technology, Bombay, including being a National Coordinator, and also worked as a Software Developer AHEC, Indian Institute of Technology, Roorkee.

She is a multi-talented Senior Executive with impressive experience within all facets of Operations Management, Customer Relationship, Stakeholder Management with proven dexterity in Process Improvement.

She obtained her Master of Computer Applications (M.C.A.), Computer Programming, Specific Applications, Administration and Management, from Graphic Era Deemed to be University.

**Abstracts - NICE-DT'23****Paper ID: 7: An FPGA Implementation of Gigabit Ethernet data transfer scheme for Ultrasound Imaging**

Jayaraj U Kidav, Sreejeesh S G and Navin Kumar W

**Abstract:**

Ultrasound (US) imaging demands real-time data transfer from the data capturing-processing boards to the computers at a very high speed for real-time streaming. Almost all modern-day ultrasound systems employ high-speed serial interfaces like peripheral component interconnect express (PCIe), universal serial bus (USB), gigabit ethernet (GbitEth), etc., for handling the data transfer requirements throughout the system. This work demonstrates a user datagram protocol (UDP) based ethernet data transfer scheme to transfer the processed US front-end data to a PC for further backend processing and display. The method employs a ping-pong first in first out (FIFO) based data path and a custom UDP packetizer implementation on a field-programmable gate array(FPGA) to full fill the real-time requirements of US imaging systems. The implemented scheme showed a frame rate of up to 65fps for a field of view (FOV) of a 60° video graphic adapter (VGA) frame.

**Keywords:** *Gigabit Ethernet, TEMAC, FPGA, ASIC, Linux, UDP***Paper ID: 9: FPGA Accelerated QRD based Matrix Inversion Core for Signal Processing**

ShibinFabi M and Jayaraj U Kidav

**Abstract:**

Most of the signal processing, communication, and parameter optimization algorithms make extensive use of matrix operations. These methods frequently have to solve linear system equations or matrix inversion problems. It is a necessary component of many sophisticated signal processing algorithms and a performance bottleneck for those systems. Matrix inversion is difficult to implement in hardware, therefore choosing an appropriate algorithm is crucial. The two major technical requirements for a matrix inversion algorithm are real time and numerical stability. This paper combines the Back substitution algorithm with the Column wise Givens Rotation based QR Decomposition algorithm to create a highly parallelized algorithm. The improvised algorithm is implemented in C as a multithreaded program by exploiting parallelism wherever possible. This work focuses on developing a co-processor core on FPGA, and thereby lift the burden of computationally complex task from the core processor. The proposed matrix inversion core will exponentially improve the throughput of the main system. High level Synthesis (HLS) tool is employed here to convert high level language written in C to verilog. Since RTL development in Hardware description language (HDL) is slow, difficult to debug and update , HLS is an exciting option with almost equal performance as in HDL.

**Keywords:** *QR decomposition, high level synthesis, co-processor, throughput*

**Paper ID: 34: A Redesigning of NER for actor, event for summarization of given text.**

SanahNashir Sayyed, Maheshkumar B. Landge, C. Namrata Mahender

**Abstract:**

Stories are important part of our lives. When you share a story with someone, you initiate a connection with them. Story has been an integral part of human communication ever since the first cave paintings were discovered. Stories have been told by humans ever since they first had the ability to read and write. Everyday occurrences were turned into stories that were recounted to youngsters, stories about religious issues were told by scribes and priests, and leaders told heroic stories about their exploits. These tales have been passed down from generation to generation; some of them may be found in history books, some play an important role in culture, and yet others are ingrained in the morals of families. In this study, we have considered story domain and employed a ruled-based method to extract the relation, actor, event, and location. The relation extraction is going to be the primary focus of our efforts because it allows us to better understand the connections between the various entities. The retrieved words are brought to use in the process of collecting sentences, which is followed by the ranking of the sentences and the generation of a summary.

**Keywords:** *Named Entity Recognition, POS Tagging, Tokenization, Relation Extraction, Location, Actor, Event.*

**Paper ID: 37: Real Time Face Mask Detector with Multi-class Classification using Deep Neural Networks**

Smiti Singh, PratyushaDebadarshini, Sanjit Kumar Dash, Prashant Gupta

**Abstract:**

For the last three years, the coronavirus pandemic has created havoc in peoples' lives and has taken many lives. Due to the airborne transmission of the coronavirus, as a non-pharmaceutical intervention, face-mask wearing has been mandatory in public places, as it is a non-surgical and low-cost method to reduce mortality and morbidity from respiratory infections. Despite the mandatory rule, some people disregard this, oblivious to the hazard of probable virus transmission. To enforce the rule, models have been developed to detect if face mask is worn by a person or not. But the drawback of these models is that they do not consider the case of an incorrectly worn face mask, which equally contributes to the onward transmission of the virus. The proposed model detects and classifies the different ways a person wears the face mask. As the initial step, the model compared different architectures of the Convolutional Neural Networks (CNN), namely, Inception v3, ResNet 50 and VGG-16. It was found that the Inception v3 model outperformed the other architectures with an accuracy of 90.58%. A model like this would identify individuals, in a confined area, who are not complying with the government rule of face masks and are posing a threat in spreading the Coronavirus and other airborne diseases.

**Keywords:** *Face mask detector, CNN, Multi-class classification, Image Resizing, Deep Learning*

## Paper ID: 38: **A New Algorithm for Interoperability Problems in Joined Heterogeneous Cloud Computing Environments**

Zayyanu Umar, Musa Abubakar Alkali Tanko, Musa Ibrahim Kamba and Abdullahi Abubakar

### **Abstract:**

Cloud computing services are now being embraced by several businesses, academia, and entrepreneurs. Because cloud-service-providers (CSP) are restricted to a limited number of resources and cannot provide all of the resources that their clients require, interconnections between homogeneous or heterogeneous computing clouds are required in order for them to communicate with one another and share resources. Different functions and techniques can be used for cloud interconnection. In this study, we employed exploratory and design science research approaches to model interconnections and interoperability between several cloud service providers using Cloud-Analyst. Due to potential high costs and unsecure CSP authorizations, the study cannot be carried out in actual cloud computing environments. In this research, we developed a system and algorithm that can manage inter-cloud resources while taking into account the complexity and diversity of the various clouds. The experiments findings indicate that The performances of the three (3) tested algorithms: Round-Robin, Dynamic Load Balancer and Joined\_Clouds using CloudAnalyst Simulator were, obtained in milliseconds (ms) of average data-center processing speed were 4.42, .082 and 0.80, respectively, performance in ms of average user-base-response were 145.89, 142.29 and 142.28, respectively, while performances in ms of data-center request service time were 3.82ms, 0.92ms and 0.90ms, respectively.

**Keywords:** *Clouds Heterogeneity, Cloud Service Providers, Algorithm, Cloud Resources.*

## Paper ID: 46: **Employment and retention of Differently abled people in the workplace through Assistive technologies**

Neha Kumari, Usha Lenka

### **Abstract:**

Aim of this study is to find assistive technologies that make differently-abled people accessible in the workplace. To find how assistive technologies can increase the recruitment and retention of differently-abled people in the workplace. This study follows the PRISMA framework for paper selection, and forty- five documents are obtained between 1984 and 2022. Assistive technologies are found according to the disability type authors have divided disability into broadly four, namely visual, hearing, physical, and cognitive disability. Study further explains how assistive technologies can help differently-abled people to gain and retain employment. In this study, the organizations that provide assistive technology

to the differently abled are not subjected to any expert or exploratory analytical techniques. People who are differently abled often lack both hard and soft skills, and their lack of formal training makes it challenging for them to effectively use assistive devices. This research will assist organizations and policy-making authorities in developing programmes for the education and training of differently-abled people so that they can effectively use the technologies available in the market to meet their needs.

**Keywords:** *Assistive Technologies, Differently-abled people, Employment, Accessibility*

### **Paper ID: 52: Design of UAV based RF Transceiver for Detecting Land Fertility**

Shankho Boron Ghosh, Harsh Pallav Govind Rao, Harsh Agrahari, Ravindranath Prasad Yadav, Rana Pratap Yadav

#### **Abstract:**

Agriculture continues to be a significant source of livelihood and food for a substantial population worldwide. Precision farming is an established farming management technique that includes collecting detailed information about the spatial characteristics of farming operations. One of the easiest ways to define soil properties is to measure the soil's electrical conductivity and moisture content, which provides much more measurements in a shorter time than traditional soil sampling. This paper proposes a novel system that can measure soil electrical conductivity and moisture content using the RF-based Time of Flight (ToF) approach. This UAV-mounted system consists of Raspberry Pi and Software Defined Radio and uses Sloped Vivaldi Corrugated Antenna and Wilkinson Power Divider to acquire raw data. Agronomists can analyze this raw data to map fertility parameters and infer suitable plans to increase crop yield accordingly.

**Keywords:** *Precision Farming, Unmanned Aerial Vehicle, Software Defined Radio, Raspberry Pi, Vivaldi Antenna*

### **Paper ID: 53: Design and Development of a FPGA Based Real Time Reconfigurable Computing Platform**

Jayaraj U Kidav and Varun Mohan

#### **Abstract:**

The computational requirements in modern workloads like artificial intelligence (AI), machine learning (ML), etc. demands the necessity of hardware acceleration and partial reconfiguration (PR) on a platform like a field programmable gate array (FPGA). In this work, the extendibility and modularity of reduced instruction set computer (RISC)-V® instruction set architecture (ISA) are combined with the dynamic partial reconfigurable features of contemporary FPGAs, to develop new hardware accelerated computing architecture. The architecture executes the extended instruction as a co-processor implementation, and the necessary co-processor logic will be loaded into the PR region in real-time. The work also explores the idea of having multiple PR regions and caching frequently used co-processor logic and evaluates its impact on system performance.

**Keywords:** *FPGA, RISC-V®, Partial Reconfiguration, Hardware Acceleration, Coprocessors*

**Paper ID: 54: Hardware Vulnerability: Meltdown**

Keyur R Aghao and Vinit Tribhuvan

**Abstract:**

Since the dawn of the digital era, the security of the network system and its components has been solely dependent on the security of the software. The hardware was trusted blindly. Initially, the software vulnerabilities were discovered. These vulnerabilities were easy to detect and could be mitigated by modifying the code. The emerging hardware attacks have shattered this trust. Fundamentally, the security of the computer is dependent on memory isolation. This means that the kernel address ranges are not accessible to the user. Hardware attack is not just a code that runs but the hardware itself is modified to perform a specific task. This modification can be carried out at any stage of the hardware manufacturers, such as during design or fabrication.

This paper contains a prediction of Meltdown. Meltdown reads arbitrary kernel memory regions, including private information such as cryptographic keys and passwords, by taking advantage of the consequences of out-of-order execution on contemporary processors. A revolutionary performance feature found in a wide variety of contemporary CPUs is out-of-order execution. By processing the instruction set simultaneously, out-of-Order execution speeds up calculation. This paper introduces and describes the working countermeasures to be implemented for Meltdown.

**Keywords:** *Meltdown, Out-of-Order execution, Address Spaces, Branch Prediction, Return-oriented programming, Speculative Execution.*

**Paper ID: 56: God's Eye: An Assistive Device for Blind**

Apoorva Mishra, Nishant Prajapati, Yash Srivastav, Pankaj Shukla

**Abstract:**

Through the advancement of multidisciplinary subjects such as the Internet of Things, computer science and electronics, and hardware engineering, a God's Eye for the blind allows visually impaired individuals to explore at speed and confidence by recognizing objects and people nearby deterrents using ultrasonic waves and informing them with audio assistance and beeping sounds. According to the World Health Organization, an estimated 39 million people are blind worldwide. Our goal is to design a cheap and more efficient product that will greatly benefit visually impaired individuals and people who depend heavily on others. The Arduino Pro Mini/Nano board has an ultrasonic sensor, composed of a module, tied like a band. Through the use of this sensor module, the person can see objects around them and can travel efficiently. Whenever this sensor detects an object, it will emit a beep sound or vibration to notify the person. They just need to wear this device as a band or cloth.

**Keywords:** *Arduino Pro Mini/Nano, Ultrasonic Sensors, Vibration, Visually impaired.*

## Paper ID: 57: **A Framework to Maintain Child Immunization Records in Secure Ethereum Blockchain-Enabled Platform**

Rashmi Mandal (Vijayvergiya), Soumya Sen

### **Abstract:**

As the number and type of diseases are growing throughout the world it is important to provide the vaccination to the child to immune them against the different types of disease, Specially, after the corona pandemic the importance of healthcare has increased and it is well understood that some secured and robust framework is required to store the vaccination information. In many countries around the world different vaccination are provided to the newborn baby but often these are maintained on paper or in a system that lacks in providing ease of audit transparency, immutability, , traceability and trust features. Due to the centralized nature of data maintenance, they are vulnerable to the single point of failure problem and also 24x7 availability of child immunization records cannot be guaranteed due to policies. These limitations tend to hinder the transparent, safe, trustworthy, secure and reliable maintenance of child immunization records. In this paper, we propose an Ethereum blockchain-based solution for managing data related to the child vaccination programme. We propose smart contracts to automate the traceability of records of child immunization programmes and vaccination along with ensuring data provenance, transparency, security, and accountability.

**Keywords:** *Blockchain, Ethereum, Solidity, tamper-proof record, child immunization*

## Paper ID: 58: **IRIS Segmentation Techniques For Iris Diagnosis: A Survey**

Poovayar Priya M, Ezhilarasan M

### **Abstract:**

The iris of the eye is the most complex tissue of the body. The iris is connected to the dura mater of the brain via 28,000 nerve endings that form part of the optic nerve (part of central nervous system). It is an extension of the brain, being incredibly endowed with hundreds of thousands of nerve endings, microscopic blood vessels, muscle and other tissues. The iris is connected to every organ and tissue of the body by way of the brain and nervous system. Nature has provided us with a miniature television screen showing the most remote portion of the body. In the recent years, due to the success of the deep learning models in the computer vision fields, there has been a large amount of works aimed at developing image segmentation approaches using deep learning model. In this survey, we provide a review on iris segmentation models covering the traditional models as well as recent deep learning methods. We examine the strengths and weaknesses of the various models and discuss promising future direction in this research area.

**Keywords:** *Image processing, Image segmentation, deep learning, neural networks, Traditional methods, edge detection, iris diagnosis.*

**Paper ID: 59: Data Correlation Analysis to Curb Road Accidents**

Neha Sharma, Dimple Pal, SmitaTaitwale, Jurgen Seitz

**Abstract:**

In this paper, the road traffic accident datasets for Germany and India are compared as a sample for developed and developing countries. Data wrangling and data analysis are performed on the adjusted OECD datasets to compare the number of road accidents, motor vehicles per road length and death rates in both the countries and the factors influencing it. As per the analysis, the death instances in India are high due to road accidents inspite of less registered vehicle per road length. Besides, the research reviews the road accidents in developed countries, for which the dataset maintained by German Government are fetched to study the population that generally use the local public transport to commute to office, and also the sociodemographic data are collected to gather the preference to use the local transport, in developed country. The objective of the research is to evaluate and understand the various data distributions in the dataset and to analyze the different factors and attributes responsible for the accident. External independent variables like the weather, lighting conditions, etc. are excluded as do not show major impacts on the road accidents. By performing the correlation analysis of the dependent variables like category, type and kind of the road traffic accidents, it is evident that majority of accidents occur during the rush hours.

The paper reviews the road accident data of Germany in 2019 and analysis showcase that the group involved in road accidents is of the normal commuters working from 9 to 5 time period.

**Keywords:** *Transportation, Road Accidents, Vehicle, Statistics, Decision Tree, Logistic Regression*

**Paper ID: 63: Speech Recognition via Machine Learning in Call Center**

Mampi Devi, Manoj Kr. Sarma, Jyotismita Talukdar

**Abstract:**

The exact speech recognition from voice signals has up till now been the most needed component of CAS (computer-aided services) and emotion from speech recognition is very difficult but important component. Several techniques, including various classification and speech analysis methods, have been employed in SER (speech emotion recognition) to extract emotions from the signals. We introduce a novel method for automatically identifying emotional emotions from continuous speech in this research. The famous "The Assamese language," which is combined with other cultures from Northeast India, is employed in the construction of the speech corpus that is used in experiments. In the speech corpus, there are six different emotional states that are represented: anger, happiness, sadness, surprise, disgust, and neutral. Using Multivariate Regression HMM (Hidden Markov Model) and forward feature selection, the categorization of emotions has been done.

Controlling "Noise" combined with speakers' voices is a crucial issue in contact centers, and we have brought forward one GM approach in this research. The earliest estimates of the speech and noise power spectra were obtained by forming sets of the system of equations from the GMM



mean vectors. The noise cause category is resolved, and the input SNR is assessed in this first stage, followed from the first estimation of the noise power spectrum, the chosen noise model is finally constructed. The Wiener filter was then applied to the improved estimate to dampen background noise and improve noisy speech. Using the assumption that the uncertainty parameters were known, we then assessed the classification of synthetic data and enhanced speech data. Finally, clustering is done on Gaussian data to identify three clusters for the high, medium and low tone voice for proper identification of three common emotional states of humans.

**Keywords:** *Speech, Assamese, GMM, Pitch, MFCC, Gaussian Data, Clustering*

## Paper ID: 65: **Short Term Load Forecasting using Machine Learning Algorithms**

Suchi Prabhu Tandel, Padvariya Aniket, Prince Bari, Vimala Mathew, Kishor S. Chaudhari and Swapnali Naik

### **Abstract:**

In meeting the ever-increasing demand for power, electric power distributors must be well-equipped with a prediction mechanism that can accurately forecast the load. Furthermore, a system for forecasting the short-term load is also necessary to exploit to improve accuracy. This paper illustrates the utilization of Machine Learning algorithms like Linear Regression, Gradient Boosting Regression, Light GBM (Gradient Boosting Machine), Random Forest, and K-Nearest Neighbor with their MAPE (Mean Absolute Percentage Error) and RMSE (Root Mean Square Error) for predicting the load demand at the consumer end. Various atmospheric parameters like temperature, relative humidity, liquid precipitation, wind speed, etc. that affect the transmission power as well as the holidays are taken into consideration. Of all the algorithms deployed, Random Forest Algorithm proved to be giving the best results. In this paper, we have not only compared the existing Machine Learning models but also successfully achieved the least value of MAPE and RMSE with our data set which makes the proposed model the most accurate and more reliable.

**Keywords:** *Machine Learning algorithms, MAPE, RMSE, Short Term Load Forecast*

## Paper ID: 66: Insights from Molecular Dynamics Studies on the effects of molecular crowding on the Human Argonaute protein

Dheeraj Chitara and Prashant Kumar

### Abstract:

The human Argonaute2 family plays a crucial role in RNA interference, and the crucial step in miRNA-mediated gene silencing is short RNA identification by the Ago-2 domain. To study the dynamics of Ago2-miRNA complex interactions in a more physiological context, we have chosen human Ago2 protein along with miRNA and the target mRNA. In the presence of various crowders, current research focuses on the structural and functional characteristics of Ago2 and their interaction with miRNA and the target mRNA. At the time of the 500 ns simulation, the Ago-2 domains follow structural changes like "open" and "close." PAZ, an Ago-2 domain that houses the 3' -end of the miRNA-guided strand, has been analysed as a highly mobile area. Our results indicate that crowding alters dynamics, improves the stability of the complex, and aids binding free energy, which increases catalytic activity and helps to load and unload tiny regulatory RNAs in the RISC complex. More crucially, amino acid residues are identified with crowding resilient interactions with RNA.

**Keywords:** *Argonaute Protein, Molecular Crowding, Molecular Dynamics, Binding Free Energy, Essential Dynamics*

## Paper ID: 67: A Group Authentication Scheme for IoT 5G Network Enabled e-healthcare System

Hemangi Goswami and Hiten Choudhury

### Abstract:

Internet of Things (IoT) refers to a network, which consists of real life physical objects that can communicate with the virtual world and can make intelligent decisions. The rapid development of IoT has led to new opportunities in several real time use case scenarios like, smart home, healthcare system, transportation system, energy management, education system, agriculture system, etc. With the growth in different technologies used for e-healthcare system, the numbers of security challenges are increasing day by day. It is due to the fact that it introduces several methods/techniques for medical data collection and data analysis. Different medical information are collected from the patient's body using medical sensors that are attached in the patient's body. Since the collected data and information are very sensitive, therefore, transmission of those information securely over the internet has become a challenging task. However, Fifth Generation (5G) cellular network, because of its flexibility and high speed, has become a preferred alternative for transmission of those data compared to other cellular networks. In this paper, a group authentication scheme for e-healthcare system in 5G cellular network is proposed. In the proposed scheme, registration of the medical

sensors are done remotely. Authentication process is performed as an extension of the existing 5G Authentication and Key Agreement (5G-AKA) protocol. Lightweight cryptographic techniques like XOR function, one-way hash function and Elliptic Curve Cryptography (ECC) are used, which are suitable for resource-constrained IoT environment. The results obtained from the security and performance analysis of the proposed scheme show that the scheme is secure and efficient.

**Keywords:** *e-healthcare system, Group Authentication, 5G-AKA, Elliptic Curve Cryptography, Lightweight Cryptography*

## Paper ID: 68: **Using Blockchain for Fast Re-authentication in 5G Cellular Network**

Bidisha Goswami and Hiten Choudhury

### **Abstract:**

In order to serve more users and to provide higher band-width, 5G cellular network supports deployment of small cells like femtocells, picocells and microcells. However, a user equipment in 5G cellular network may experience frequent handover, as the subscriber moves from the coverage area of one cell to another. Therefore, for a seamless user experience, it is necessary that the re-authentication procedure during handover is made faster. In this paper, we propose a blockchain-based fast re-authentication scheme for handover in 5G cellular network. We have considered security requirements like forward secrecy, backward secrecy, anonymity, etc. Formal and informal security analysis of the scheme shows it is robust against various kinds of security attacks. Performance analysis of the scheme shows that the protocol achieves its goals with minimum communication and computation overhead.

**Keywords:** *Blockchain, 5G Cellular Network, Re-authentication, Handover Authentication, Security*

**Paper ID: 69: Clustering-based Filter Pruning approach for efficient ConvNets**

DevdattaKhoche and Swapnali Naik

**Abstract:**

Convolutional Neural Networks (CNN) or ConvNets have been popularly used in the real-world applications related to Computer Vision, Natural Language Processing and various other similar domains, accompanied by an increased computational cost. Deploying CNN models on resource-constrained devices has become a challenging task. In order to solve this, one can produce a compact structure by compressing the model. This work proposes a novel cluster-based filter-pruning approach to compress the model and accelerate the inference performance of ConvNets. We propose a structured filter pruning method, which removes the redundant filters from each convolution layer of the CNN model and thus reduces the size and the computation cost needed for the inference. First, we determine the optimal number of clusters to be formed using Silhouette score and perform clustering of filters based on K-Means++ algorithm in each layer. Next, we apply a filter selection strategy which selects only suitable high-impact filters as representatives of each cluster to achieve the pruning effect. With this strategy, we obtain a Binary Filter Mask (BFM), which is further used to decide which filters need to be retained and which need to be discarded. Finally, we apply this BFM to our CNN model to perform the pruning. We have demonstrated this method on the VGG network model and the experimental results show that by using this method, on CIFAR-10 dataset, we are able to prune at an average of more than 83% of parameters resulting in 54% of FLOP reduction and 94% size reduction. We also compare the pruning effect of the proposed approach with the original unpruned and the L1-Norm pruned model and it is found that the proposed pruning method outperforms other two methods.

**Keywords:** *Pruning, Compression, Deep-Learning, CNN, Clustering***Paper ID: 71: Visual Surveillance for the detection of abandoned objects: review**

Ali Mansour Almadani, Vivek Mahale, and DrAshok.T.Gaikwad

**Abstract:**

Image processing and computer vision's "intelligent visual surveillance" are critical and troublesome. Monitoring public places and infrastructure and spotting an unsecured device amid a crowd in a common area might help reduce the environmental and economic harm caused by bomb explosions. An abandoned item has been left in a public place for an extended time without being visited by its owner. To prevent terrorist strikes,

automated video surveillance systems can discover abandoned items immediately. Papers on intelligent visual Surveillance for detecting abandoned or removed things have appeared during the last decade. Research on identifying human activity is scattered across the literature, but no research specifically addresses how to identify abandoned or discarded things.” Progress in identifying missing or abandoned objects from surveillance video has been reported over the last decade. It shows how far the field has come in the previous decade. We provide a brief outline of the issues and problems that arise while locating abandoned items.

**Keywords:** *Abandoned objects, left languages, deep learning, object detection, background subtraction*

## Paper ID: 73: **SMS and Email Spam Classification using Natural Language Processing and Machine Learning**

Prince Bari, Vimala Mathew, Suchi Prabhu Tandel, Padvariya Aniket, Kishor S. Chaudhari and Swapnali Naik

### **Abstract:**

Billions of messages are sent daily over the internet, out of which a majority part of them is spam. These spam messages have become a primary cause of distraction and security threat for users as their number keeps on increasing day by day. Many researchers have addressed this problem and there are different approaches to it. In this present study, Machine Learning algorithms such as Naïve Bayes, Logistic Regression, K-Nearest Neighbors, Support Vector Machine, Random Forest, Gradient Boosting, and Extra Trees Classifier have been utilized to predict whether an incoming message or e-mail is spam. The model performance has been evaluated based on accuracy, precision, F1 Score, and Confusion Matrix. Three different datasets including two SMS datasets and one email dataset has been used and a maximum F1 Score of 96.06% and accuracy of 99.12 % with the Extra Trees Classifier is achieved, which is 0.02% higher than the highest value of accuracy ever achieved for the SMS Spam Collection Dataset.

**Keywords:** *Classification, e-mail, Machine Learning, Natural Language Processing, SMS, Spam Detection*

## Paper ID: 74: **Exploration of Rhinacanthone, a natural naphthoquinone, as a potential Human Papilloma Virus E7 oncoprotein inhibitor (HPV-E7i) through AI-based protein modeling, molecular docking, and simulation studies.**

Kanak Chakraborty, ParthaSaha, Arabinda Ghosh and Samir K Sil

**Abstract:**

For more than three decades, the Human Papillomavirus has been identified as a cause of cervical cancer, yet there is currently no effective therapy for Human Papillomavirus infection. E7-pRb interaction is essential for anti-proliferative signal transformation and suppression in cervical cancer. In this study, in order to fulfill the rising need for nonpeptidic inhibitors with high specificity for Human Papillomavirus E7, computational analyses of the viral protein were done in an effort to identify a natural chemical that may be employed as effective inhibitor. AI-based modeling was used to create the structure of HPV16 E7 using AlfaFold 2, followed by model refinement using YASARA. Energy Minimization Server and validation with PDBsum Generate. Using the Preparation window of the SeamDock online services, the modified model was processed to eliminate water, assign borders, and include hydrogen atoms. In SeamDock's docking parameter window, Autodock software was used for molecular docking with Rhinacantone against E7 (with spacing 0.375Å and exhaustiveness 8). Additionally, ADMET (absorption, distribution, metabolism, excretion, and toxicity) study was carried out on Rhinacanthone. Validation of the phytochemical and its interaction with HPV16 E7 by molecular dynamics simulation with Desmond version 2020–1. Molecular Docking and molecular dynamics simulation validation revealed that Rhinacanthone was a potential inhibitor for E7 oncoprotein. Therefore, it may be a suitable inhibitor of E7-pRb interaction deserving future study as a Human Papillomavirus E7 oncoprotein inhibitor.

**Keywords:** *AI-based protein modeling, HPV-E7 inhibitor, HPV-E7 oncoprotein, Human Papillomavirus, Molecular Docking, Molecular dynamics simulation, Rhinacanthone*

**Paper ID: 75: Hypervisors for embedded multicore architectures targeting IoT applications**

Rajesh.M, P.Rangababu, Jayaraj U. Kidavu, Nivya .N, Ardhra.C.Sunny

**Abstract:**

Initially, embedded system development was single-core based. Later with the hike in industrial growth, the functionality of single-core systems became insufficient for developing precise embedded applications, which boosted the multi-core system development. Resource contention is a major problem faced by embedded systems. Especially while dealing with modern IoT gateways, which use multiple protocols and are connected with a variety of different end nodes. In such applications, the effective utilization of multi processor resources and resource contention management will be challenging. There are many mechanisms to solve this issue, such as using locks, semaphores, and mutexes, and using techniques such as page coloring, intelligent scheduling, isolation, etc. The paper gives you the comparative study survey details of various hypervisors available in the market to solve the resource contention issues in modern Embedded systems applications such as IoT.

**Keywords:** *Hypervisors, IoT*

## Paper ID: 76: Benchmarking On RISC-V Core and Performance Analysis of Two Open-Source Real Time Operating Systems

Seetha R, Nandakumar R

### **Abstract:**

Through open standard collaboration, “RISC-V” is an open and free “instruction set architecture” that enables development of new age processors. Developed at the “University of California, Berkeley”, “RISC-V ISA” is increasingly being used in IoT, embedded systems etc, particularly in microcontroller unit segments. Performance analysis and benchmarking are essential because they provide insight into numerous areas of critically scheduled real time operating systems. It assists application programmers in selecting the optimal real-time operating system for their application. The work is aimed at evaluating the performance of two “open-source real time operating systems”, FreeRTOS and Zephyr RTOS. Comparison among them will be done based on the performance metrics. Various performance metrics include “preemption time”, “semaphore shuffling time”, task switching time, “inter-task messaging latency”, mutex acquisition time, mutex release time, maximum semaphore acquisition time, maximum semaphore release time. All the tests were carried on RED-V REDBOARD by Sparkfun based on SiFive FE310 microcontroller unit. Evaluation of available software libraries and software development tools will be done. Benchmarking for capturing CPU processing power will be done using CoreMark application.

**Keywords:** *Real Time Operating Systems, Embedded System, FreeRTOS, Zephyr RTOS, Benchmarking, Performance Metrics, RISC-V ISA*

## Paper ID: 80: Detecting Malware in Windows Environment Using Machine Learning

Poulomi Deb, Nirmalya Kar, Niladri Das, Viki Datta

### **Abstract:**

Based on recent studies, malicious software, i.e., malware, is one of the significant deterrents among the users of digital platforms, as it is increasing at a high rate and affects many systems. Early detection of malware is necessary to protect the internet and computer system. However, detecting malware is challenging as it can hide in the system using several techniques. Many large-scale businesses and personal

users toil a lot to get adequate protection from malware in the cyber domain. Malware and phishing attacks have been increasing significantly since the inception of the COVID-19 pandemic because of the massive rise in the prevalence of digital mediums for many daily tasks like school/college education, office work/meetings, casual get together, and so on. To detect known malware, heuristic-based and signature-based detection technique are fast and efficient, but it becomes inefficient in the case of unknown malware. Whereas model checking- based, behavior-based, and cloud-based technique works better for unknown malware detection. Machine learning-based, IoT-based, and mobile device-based techniques are also used to detect malware. This paper proposes a Machine Learning (ML) based binary classification solution to label a PE Windows Binary (executable) as legitimate or malicious with high accuracy and F-1 Measure and low computation overhead. This methodology uses Python scikit-learn library's ExtraTreeClassifier() function module to select relevant features for binary classification.

**Keywords:** *Machine Learning, PE Files/Windows Binaries, ExtraTreeClassifier(), Entropy, Gini Index, Random Forest*

**Paper ID: 81:** *In silico study for selection of potential Glutamine synthetase inhibitor in Mycobacterium tuberculosis from active compounds of Adhatodavasica*

DebashreeKakati, Tufan Naiya, Saurov Mahanta

**Abstract:**

Tuberculosis (TB) is one of the most lethal respiratory infections caused by the microorganism *Mycobacterium tuberculosis*. Despite the availability of several drugs to treat TB, numerous reports have demonstrated the cause and emergence of multidrug resistance of *M. tuberculosis*. Hence, the need of developing effective anti-TB therapeutics against multidrug-resistant strains has always been cardinal attention for the past two decades. In this study, to identify potent anti-tuberculosis drugs, two enzymes namely, 3-dehydroquinate synthase and 3-dehydroquinate dehydratase of mycobacterial Shikimate pathway were selected as drug targets for inhibiting their regulatory mechanisms. The medicinal plant *Achyranthes aspera* has been traditionally used in pulmonary infection. Therefore, the phytochemicals from this plant were selected for carrying out the computational evaluation of their binding affinities and drug-like properties against the selected enzymes. Molecular docking was done for 11 phytochemicals against these two enzymes (receptors) using AUTODOCK vina software. The compounds which exhibited the highest binding affinities with targets were selected for pharmacokinetic analysis, bioactivity prediction and toxicity calculation. From the docking study, it was concluded that the compound-9 (Ecdysterone 2,3-acetonide 22-O-benzoate) and compound-2 (2,3,14,20,25-Pentahydroxy-6-oxocholest-



7-en-22-yl benzoate) showed the highest binding affinities with the enzymes 3-dehydroquinase synthase and 3-dehydroquinase dehydratase, respectively. Eventually, both the compound exhibited similar druglikeness by obeying Lipinski's rule of 5.

**Keywords:** *Achyranthes aspera, Molecular docking, Shikimate pathway, Pharmacokinetics*

## Paper ID: 84: Fake News Detection using LSTM based deep learning approach and Word embedding feature extraction

Shashikant MahaduBankar and Sanjeev Kumar Gupta

### **Abstract:**

We live in the digital age, and whenever we read something or follow the television news, we take glance for a trusted source. There is a lot of fake news on the internet and social media. Fake news is misleading information or modified news which is disseminated on social networking sites with the intention of causing harm to a person, agency, or organization. Misinformation propagation in crucial circumstances can lead to disaster. Because of the spread of fake news, methodologies to detect it are required. To avoid the damage that technology can cause, we have applied Machine Learning algorithms and approaches such as NLTK and LSTM. Our contribution is dual in nature. To begin, we must implement datasets containing both fake and real news and run various experiments to organize a fake news detector. In comparison to the existing systems, we achieved better results.

**Keywords:** *NLP, Word Embedding, LSTM, NLTK, Fake news, TF-IDF, Bag of Words.*

## Paper ID: 85:Concentration Dependent Assessment of GaAs JunctionlessFinFET (JLFinFET) with High-k Spacer

Praween Kumar Srivastava, Ajay Kumar, and Atul Kumar

### **Abstract:**

This work presents the doping concentration assessment of Gallium Arsenide (GaAs) based junctionlessFinFET (JLFinFET) with Silicon nitride (Si<sub>3</sub>N<sub>4</sub>) as a high-k spacer to optimize the doping concentration of the channel. Si<sub>3</sub>N<sub>4</sub> is used as a high-spacer between source-gate and drain-

gate regions to improve the performance of the device. The doping concentration assessment is observed in terms of the energy band profile (conduction band and valence band), surface potential profile, transfer characteristics, electric field, transconductance, and device efficiency. Results show that for higher doping concentrations ( $1 \times 10^{20} \text{ cm}^{-3}$ ) on-current (ION) improves significantly by 60% and the electric field reaches 1.03 MV/cm as compared to lower doping concentration ( $1 \times 10^{19} \text{ cm}^{-3}$ ). The improvement in ION results in higher device efficiency (98 V<sup>-1</sup>) for higher doping concentrations ( $1 \times 10^{20} \text{ cm}^{-3}$ ). Thus, the higher doping concentration paves the way for JLFinFET for high-performance applications.

**Keywords:** *GaAs, High-k, JLFinFET, Si<sub>3</sub>N<sub>4</sub>.*

## Paper ID: 87: Edge Computing: Attributes, Applications and Future Trends

Pankaj U. Joshi, Deepak Khushalani, TaslimChhaware, Yug Jain, Shreya Bharati

### **Abstract:**

Edge computing is a collection of connected systems and devices that uses artificial intelligence for gathering and processing data, caching, and computing at the proximity as to where it was captured. It strives to improve data processing and analysis while ensuring that the users' privacy and data are preserved. This research topic has seen tremendous growth over the last five years despite its recent emergence from 2011 to today. This paper covers the complete knowledge, a survey demands in the area of edge computing. This review commences with a discussion of the attributes and traits of edge computing that make it so viable when compared to other options. This is followed by a systematic overview of edge applications in the current scenario. In addition to the preceding, the review elaborates, compares and analyses each application while keeping in mind the approaches that one needs to adopt, the objectives the application aims to cover, performance of the applications under the test window, benefits that are in bound, and limitations that are to be ignored. An overview of the evolution of developing study disciplines and break through for this research is also covered in the paper. The paper culminates with a discussion of the most pressing challenges and potential solutions from a theoretical and a technical standpoint.

**Keywords:** *Edge Computing, healthcare, 5G, IoT, Smart City*

## Paper ID: 88:Safe Distance Monitoring for COVID-19 Using YOLOv3 Object Recognition Paradigm

Ajay Kumar, Marvin Choudhary, Aditya Jain, Neha Gupta

### **Abstract:**

The ongoing outbreak of the COVID-19 virus has caused a global catastrophe with its deadly spread. The risks of the virus can be reduced by following social distancing. Therefore, this work aims to come up with a deep-learning platform for community-level tracking. YOLOv3 object recognition paradigm is used to identify people in video sequences. The detection tool is designed to test whether people keep a safe distance with a video feed test. A pre-recorded video was used as an input and a pre-trained opensource object detection model based on the YOLOv3 paradigm was used to identify people. The acquisition model identifies people using the information binding box obtained. By using the distance formula (Euclidean), the centroid's pairwise distances of people in the detected bounding box are calculated. To evaluate social distance violations between individuals, we have used physical distance to pixels and set a threshold value. The infringement limit is established to assess whether the range of the breach violates the minimum public distance.

**Keywords:** Covid-19, Deep Learning, Machine Learning, Object Detection, YOLOv3

## Paper ID: 89:MRI Lung Tumor Segmentation and Classification using Neural Networks

MonitaWahengbam, Dr. M. Sriram

### **Abstract:**

More deaths occur each year due to a general health problem is cancer. It is one of the major issues distributed over a huge area. Within various cancers, lung cancer is the biggest issue having a high demise rate. Due to this a lot of research is going on to recognize lung cancer from CT (Computed Tomography) and MRI scanned image. The stages involved in it are proposed work using methods of image preprocessing where a Gaussian filter is used followed by segmentation where algebraic morphological operations are applied. Geometrical attributes are calculated for the tumor identified part. Finally EBFNN model is used to categorize whether it is Malignant or Benign. This research uses the algorithms like Random Forest (RF), Convolution Neural Network (CNN), and Enhanced Back propagation Feed forward Neural Network (EBFNN) its accuracy is been calculated, and proved that EBFNN performs well than other algorithms. The recommended model executes based on four main steps like pre-processing phase, segmentation stage, feature removal, and classification. For implementation stage, a standard dataset from LIDC

(Lung Image Database Consortium) is used and the outcomes are examined under various aspects. From the results it proved that proposed EBFNN produces Accuracy of about 93% which is higher than RF Accuracy which is 89% and CNN Accuracy which is 91% respectively.

**Keywords:** *Accuracy, Classification, Lung Cancer, Neural Network, Tumour Segmentation*

## Paper ID: 90:What beyond implementing 'eOffice' the Digital Workplace in Government

Sandeep Kumar Ahlawat

### **Abstract:**

India has already traversed all levels of digital transformation. Workflows are already automated, across department data are seamlessly exchanged or shared in real time. These public service delivery workflows are comprising repeating work function and are generating structured and organised data. The eOffice, a single collaborative workspace for the Government with paperless electronic workflows environment in government offices has also been implemented in large number of offices. Now tactical and strategic decisions within Government are being taken in file or eFile of eOffice. The contents of eFile is majorly in text format (word format, pdf format).

Decision situations having similar context are repeating frequently in eFile and precedence of similar decisions can be leverage in current situation towards enhancing the effectiveness of decision making. Use of Natural Language Parsing (NLP) and AI inferencing [1] are game changer.

For eFile NLP applications, dependency relations will be of prime importance. Stanford System that automatically extracts typed dependency parses from phrase structure can be utilised for eFile NLP case. Many 'English' parser including some with open source exhibited to achieves 94% accuracy that is very close to human accuracy considered in between 96-97% range.

In the current regime of open data, deluge of data from social sites has already enabled environment for evolving automated decision making (ADM). Algorithms to make decisions automatically with varying degree of human intervention are exhibiting success in vivid contexts.

Knowledge required to take a decision already exists in eFile and can be leveraged to enhance the effectiveness of decision once intelligence is incorporated in place within eOffice. Availability of NLP technology enables to develop intelligent model inferencing context matching decisions along with values of associated decision parameters from eFiles. Modules empowered with Natural Language Parsing (NLP) and AI inferencing search, explore and set similar Decision Match Cases. The decision being taken is compared with qualified match cases for assessing the

consistency and accordingly Maturity Index is assigned to the decision option(s). Intelligent Inferencing Model is outlined which would pave way for developing precedence supported decision system that would have competence to self-enhance its intelligence along with its usage.

**Keywords:** *eOffice, Decision Making, Digital Workspace, Workflow, e-Governance, Digital Government, AI Inferencing, Natural Language Parsing*

**Paper ID:** 93:*In-silico identification of phytocompounds as inhibitors of key enzymes in Shikimate pathway of *Mycobacterium tuberculosis* for discovery of new lead molecules*

Narayan Sarkar, Nabajyoti Goswami, Suresh Bharali, Saurov Mahanta, Bhaben Tanti

**Abstract:**

Tuberculosis (TB) is one of the most lethal respiratory infections caused by the microorganism *Mycobacterium tuberculosis*. Despite the availability of several drugs to treat TB, numerous reports have demonstrated the cause and emergence of multidrug resistance of *M. tuberculosis*. Hence, the need of developing effective anti-TB therapeutics against multidrug-resistant strains has always been cardinal attention for the past two decades. In this study, to identify potent anti-tuberculosis drugs, two enzymes namely, 3-dehydroquinate synthase and 3-dehydroquinate dehydratase of mycobacterial Shikimate pathway were selected as drug targets for inhibiting their regulatory mechanisms. The medicinal plant *Achyranthes aspera* has been traditionally used in pulmonary infection. Therefore, the phytocompounds from this plant were selected for carrying out the computational evaluation of their binding affinities and drug-like properties against the selected enzymes. Molecular docking was done for 11 phytocompounds against these two enzymes(receptors) using AUTODOCK vina software. The compounds which exhibited the highest binding affinities with targets were selected for pharmacokinetic analysis, bioactivity prediction and toxicity calculation. From the docking study, it was concluded that the compound-9(Ecdysterone 2,3-acetonide 22-O-benzoate) and compound-2(2,3,14,20,25-Pentahydroxy-6-oxocholest-7-en-22-yl benzoate) showed the highest binding affinities with the enzymes 3-dehydroquinate synthase and 3-dehydroquinate dehydratase, respectively. Eventually, both the compound exhibited similar druglikeness by obeying Lipinski's rule of 5.

**Keywords:** *Achyranthes aspera, Molecular docking, Shikimate pathway, Pharmacokinetics.*

## Paper ID: 94:Accurate Cervical Tumor Cell Segmentation And Classification From Overlapping Clumps In Pap Smear Images

TonjamGunendra Singh, B. Karthik

### **Abstract:**

Cervical tumours impact women of all ages from the world's enormous female population in a variety of ways. Therefore, the majority of researchers, pathologists, and many collegiate students have provided greater resolutions to identify this malignancy from the test photographs of pap smear viewing tests. However, their results only partially indicate whether a person has cancer or not, and they do not specifically highlight the exact characteristics and brutality of cancer. It is suggested in this study that pictures from Pap smear-type tests can be used to accurately identify cancer and classify its stages. Segmentation, improvement, feature removal, and categorization processes are the foundation of the suggested work. Results show the mean value and area values based on the classification of the normal and affected cells and also recognize the stage of cervical cancer. The outcomes would be more useful for healthcare pathologists to decrease their workload and decrease human error while enhancing the accuracy rate of diagnosis. In this research we will be using the following algorithms namely Support Vector Machine (SVM), Random Forest (RF), and Enhanced Convolution Neural Network (ECNN) in terms of accuracy. From the outcomes its proved that proposed ECNN produces Accuracy of about 92% which is higher than RF Accuracy which is 87% and SVM Accuracy which is 90% respectively.

**Keywords:** *Tumor, Segmentation, Classification, Accuracy, SVM, RF*

## Paper ID: 95: Salivary Cortisol determination through sensors attached with dental augmentation

Karuna Wangkhem, Monita Wahengbam

### **Abstract:**

This paper gives a review on different types of sensors to detect cortisol from saliva and different ways to collaborate the same with various dental augmentation styles. Stress monitoring is not a new term and the importance of it does not bind to a single purpose nowadays. During the whole Covid-19 period, stress detection through cortisol has found a good momentum due to its demand. However, stress detection through

cortisol, a hormone generally known as 'stress hormone', is not a one way path. Cortisol and its presence and variations along with their corresponding strengths and limitations are mentioned and discussed. Different types of generic sensors, biosensors, Nano sensors along with relevance and feasibility are reviewed. An elaborate cross examination has been made on the existing dental enhancers and the materials from the perspective of digital augmentation. Then a novel way of attaching the existing salivary cortisol detection system to various types of dental augmentation tools is also proposed in the coming section. Specific pros and cons of each have also been mentioned. The reason why this technology concerns with human augmentation is advocated. The level of advancement in this field and its overall impact on other digital technologies are also illustrated using multiple examples.

**Keywords:** *biosensors, future digital technology, healthcare, human augmentation, orthodontic braces, salivary cortisol.*

## Paper ID: 98: Assembled LSTM Technique used for Phonetic-Based Algorithm for Demographical Data

Nagesh Raykar and Prashant Kumbharkar, Dand Hiren Jayntilal

### **Abstract:**

Demographic Information is qualitatively gathered data that depicts various aspects of the population. Numerous phonetic-based retrieval methods are employed, but they are ineffective when attempting to appeal Indian name records. This paper is based on data records obtained from demographic databases in order to identify Indian names with similar accents but different spellings. The phonetic-based pronunciation algorithm, LSTM (Long Short Term Memory), and K-Mean algorithm cross-breed LSTM technique are all included in this research proposal to recognize Indian names from the databases. For the purpose of evaluating prediction accuracy for Indian names, the proposed cross-breed LSTM technique is put up against a recurring unit (GRU)-based algorithm. The K-Mean technique and the LSTM technique are combined to produce the cross-breed LSTM model. When retrieving Indian Names records from databases, the assembled LSTM method gives greater accuracy. If, as is the case at hand, the demographic data gathered from Indian Names in demographic databases contains inconsistent data due to managed to misspell names, the suggested approach can be used to reduce data redundancies and obtain precise data.

**Keywords:** *Demographic Information, K-Mean, LSTM, GRU, Phonetic Pronunciation Technique*

## Paper ID: 100: Low contrast medical image enhancement technique using fuzzy based two class pixels partial contrast stretching

L. Shyam Sundar Singh, Y. Subhaschandra Singh, A. Buboo Singh, T. Romen Singh

### **Abstract:**

This paper presents a new fuzzy based low contrast medical image enhancement technique. This technique is very simple and effective regarding the object domain. It is a global partial contrast stretching technique for enhancement. It involves two stages like pixel classification and pixel range stretching. Pixel classification is based on fuzzy system. The pixels are classified based on the fuzzy membership degree of the pixels using threshold value into two classes. Each class is applied different stretching function. Since the application is point operation, the result causes global contrast and brightness to the output image and it is also very fast compared to other related techniques. As compare with the other contrast stretching technique it outperforms with respect to result as well as speed.

**Keywords:***fuzzy logic, pixel classification, partial contrast stretching, image enhancement, threshold, member function, medical image*

## Paper ID: 101: Understanding the Motion Adaption of Machine Using Long Short – Term Memory Networks for voiceless Virtual assistant.

Subhrajit Roy, Binoy Das

### **Abstract:**

In recent years, the study of computer vision and pattern recognition has seen a significant increase in the popularity of video-based human action recognition as a research topic. Many different fields, including surveillance, robotics, healthcare, video searching, and human-computer interaction, are among its many potential uses. Human action identification in videos faces several difficulties, including crowded backdrops, occlusions, viewpoint fluctuation, execution rate, and camera motion. Over the years, numerous strategies have been put up to deal with the difficulties. For research, three different dataset types—single perspective, multiple viewpoints, and RGB-depth videos—are used. This paper provides an overview of several cutting-edge deep learning-based methods for the recognition of human actions on three different kinds of



datasets. Given the increasing.[6]. Here we are using Long short-term Memory networks, as it is a part of Neural Networks. It is more efficient and accurate to create the structures so that the model can understand the method easily.

**Keywords:** *Holistic, OpenCV, LSTM, RNN, Numpy, mediapipe, os.*

## Paper ID: 102: Performance analysis of 24-tupled RoF system based on parallel MZMs and SOA

Sonam Singh, Ankita Rani, Deepak Kedia

### **Abstract:**

This paper presents a radio-over-fiber (RoF) system based on 24-tupled millimeter-wave generation using parallel mach-zehnder modulators (MZMs) and a semiconductor optical amplifier (SOA). By precisely configuring the parameters of two parallel MZMs, a frequency octupled signal is generated, which is further converted into 24-tupled mm-wave using optical four-wave-mixing (FWM) in SOA. A 5 GHz signal carrying 2.5 Gbps data is up-converted to 120 GHz signal and BER of  $4.9e-35$  is obtained at transmission length of 15 Km. Further, the performance of the presented scheme is analysed by employing practical filters like Gaussian and Bessel filter and varying different parameters such as fiber length, SOA's current etc. The results show that among the practical filters, the Gaussian filter provides better performance in terms of BER and required SOA's current.

**Keywords:** *Four-wave-mixing, Mach-zehnder modulator, Radio-over-fiber, Semiconductor optical amplifier*

## Paper ID: 104: IoT Based Electric Vehicle Battery Monitoring System At Charging Stations

Mohammed Hamza, Ishant Kumar Bajpai, ShoukathCherukat

**Abstract:**

Electric Vehicles (EVs) are although solution for green transportation but have also shown vulnerabilities in terms of battery fire accidents. This paper proposes a solution to this issue, where we try to design and develop an IoT-based system to remotely monitor the health of batteries in electric vehicles. The prototype of the proposed system has been developed in two different phases. In the first phase, a single-node IoT system has been designed and the latter phase is the multi-node IoT system design. In the single-node IoT system, the data is captured by the embedded module in the client terminal and this data is directly uploaded to the cloud. The processed data is made available to the user through a mobile application. In the multi-node IoT system, the data is read from 3 different embedded modules from the client terminals. This data is pushed to the gateway from the various multiple nodes using RF communication. The data received at the gateway is then uploaded to the cloud. This data access is provided to the owner of the vehicle through a mobile app.

**Keywords:** *IoT, electric vehicle, single-node IoT system design, multi-node IoT system design, wireless sensor networks, microcontroller.*

## Paper ID: 105: Machine Learning Based Depth of Anesthesia Estimation Using Spectral and Statistical Features of EEG

Merin Loukrakpam, MaibamDebina Devi, KhundrakpamVeeshel Singh, GegerinKonsam, Hodam Monica, R.K Bigensana Singh

**Abstract:**

Improper estimation of depth of anesthesia (DoA) during surgical procedure may lead to intraoperative awareness and is associated with postoperative complications such as hypotension and hypoperfusion of heart and brain. Therefore, monitoring DoA is critical in these surgical operations. In this paper, a machine learning based DoA estimation is proposed using six electroencephalogram (EEG) features including five spectral and one statistical feature. A decision tree classifier is trained with EEG and Bispectral Index (BIS) data from 100 patients using the extracted features. The developed model showed an accuracy of 56.65%. The accuracy improved to 59% after deploying grid search and gradient boost methods.

**Keywords:** *BIS, Depth of anesthesia, EEG, Feature extraction, Machine learning*

## Paper ID: 106: Need for Detection of Liveness of Biometric Traits and implementation in Cloud Environment

Niladri Das, Swanirbhar Majumder

### **Abstract:**

Biometric recognition has become integral to almost all current electronic devices and applications that need authentication and verification. Different methods for biometric authentication, such as fingerprint, face detection, iris detection, etc., have been developed based on biometric characteristics and are being preferred to be used to ensure authentication as the same is considered to be more secure and convenient as compared to passwords, pins and patterns. In this paper, we surveyed and proposed that the increased use of biometric traits for authentication has also invited frequent spoofing attacks that need to be addressed. The same can be done with implementing Liveness Detection using multiple Biometric traits. Secondly, we proposed that offloading Biometric Authentication to a cloud environment using BaaS protocol is essential to minimize the deployment and maintenance costs and enhance security.

**Keywords:** *Index Terms—biometric authentication, liveness detection, multi-modal, recognition, cloud computing*

## Paper ID: 107: Deep Learning Based Plant Phenotyping Framework: Analysis of Crop Life Cycle Data for Indian Farmers to Develop a Smart Agri-field Management System.

Sayanti Basak, SarmisthaSaha, Abinash Halder, Anirban Jyoti Hati, Bhaskar Banerjee, V Krishnamurthy

### **Abstract:**

The increase in global population, climate changes, shrinking farmland, and liberalization in trade are driving traditional agriculture to adopt emerging technologies to ensure food and nutritional security for the global population. To simulate crop attributes, this research introduces non-destructive plant phenotyping techniques based on computer vision and deep learning. A smart agri-field management system also has been proposed in this research for crop life cycle traits modelling and monitoring to foster agricultural productivity with lesser work effort. Emerging technologies like Unmanned Aerial Vehicles, the Internet of Things, Computer Vision, and Deep Learning have been incorporated into the proposed architecture to find a robust and effective explanation for automation with intelligence, remote data collection, efficient analysis methodology, and quick decision-making. A suitable implementation methodology has also been formulated in this article towards fast adaptation of the agri-field management system in India. The AlexNet-based Deep Neural Network architecture has shown a notable performance for crop species detection, growth monitoring, and health identification, with F1-scores of 0.81, 0.98, and 1, respectively.

**Keywords:** *AlexNet, Agri-field Management, Computer Vision, Deep Neural Network, Plant Phenotyping, Unmanned Aerial Vehicle, Smart farming*

## Paper ID: 108: Child Predator Detection System On Social Media

Vaibhav Kasar, Schuzelle Fernandes, Ashutosh Chillarge, Vaishnavi Abuj, Dipali Patil

### **Abstract:**

It is important for psychotherapists to have understanding about dangers of online sex advertising and how the World Health Organization uses the Internet to protect teens from sexual predators. While the Internet also has some positive aspects, and most harmful aspects is that it can be used for online sexual assumptions. The web provides a medium that gives sex offenders permission to infiltrate various children in a very relatively anonymous atmosphere. And posts, and send paedophilia records to cyber cell managers Approximately 1 in 5 young people in the country each year need sex through the Internet, according to a nationwide survey. This research illustrates how the system is being changed right now. Due to this, child robbery accounts using the developed system are aware of all reports to the administrator for each action.

**Keywords:** *Support vector machine, Machine learning, training module, dataset.*

## Paper ID: 109: Comprehensive Study on Edge Detection

Shalu Gupta, Harmanpreet Singh and Y. J. Singh

### **Abstract:**

Edge detection or edge finding is the way of finding out and detecting sharp breaks in an image. The breaks are unpredicted modifications in a pixel intensity scene. Traditional or customary approach of facet finding contains convolving an image through operators which is built to be

superficial to huge inclines. Edge detectors shape a group of very essential local picture processing approach to find sharp adjustments within the depth characteristic. Edge detection is a vital method in which a number of picture processing packages together with item recognition, movement analysis, pattern reputation, medical image processing and so forth. This paper presents several aspects of edge detection strategies with advantages and disadvantages of the chosen algorithms i.e. Canny, Sobel, Robert, Laplacian of Gaussian (LoG) etc. An element discussion related to advantages and disadvantages of each algorithm also are discussed.

**Keywords:** *Edge detection, Canny algorithm, Sobel algorithm, Robert algorithm, digital image, Gaussian based, Gradient based.*

## Paper ID: 110: Improving Energy Efficiency of 5G Base Stations: an AI-based Optimization Approach

Preetjot Kaur and Roopali Garg

### **Abstract:**

The rising awareness about global environmental change has sparked a revolution in how energy is being used. Green wireless communications have lately garnered considerable attention in the wireless sector, and they're found to play a major role in reducing a network's power usage. AI has been around for decades, but its effect on our culture, economy, and military is rising quickly. There have been several optimization strategies based on it, and each of these methods has the potential to provide optimum results. In wireless cellular networks, optimising the energy efficiency (EE) of base stations (BSs) has been a major architectural challenge. The BSs are major consumers of energy among different components of a network. The paper provides a comprehensive review of past optimization techniques. Furthermore, the Grey Wolf Optimizer (GWO), a nature-inherited meta-heuristic approach, is proposed in this work to effectively diminish the energy consumed by BSs. This optimization technique is applied in conjunction with sleep mode procedures. Thus, the idea of the amalgamation of sleep mode techniques and GWO produces remarkable results.

**Keywords:** *Artificial Intelligence (AI), Particle swarm optimization (PSO), Grey Wolf Optimizer (GWO), Green Communication, Energy Efficiency (EE), Convex Optimization.*

## Paper ID: 112: Survey on Virtual Paint Board using Computer Vision

Yasvi D. Vamja, Chaitali A. Patil, Shrushti A. Matode, Nikhil N. Kundale, Pallavi M. Tekade

**Abstract:**

Virtual paint board is a method in which one can draw, write and erase on the screen by selecting different colors. By removing the background and concentrating on the human's hand movements, a virtual paint board makes it easy to identify hand gestures. The design of the virtual paint board demonstrates how it understands hand motions and chooses the appropriate mode for drawing, writing, or erasing on the screen. Numerous scholars investigated and advanced numerous virtual writing strategies. In contrast to other studies, distinct virtual writing approaches were employed. The methods that have been suggested include YOLO (You only look once), Faster R-CNN (Regions with Convolutional Neural Networks), MediaPipe, and OpenCV. These methods are deep learning techniques. Spatial and temporal feature detection is necessary for object detection in a virtual paint board. Based on how well it identifies human hand motions, the virtual writing or erasing process is deemed effective. Numerous uses exist for virtual whiteboards, including online education and hearing-impaired communication.

**Keywords:** *Virtual paint board, OpenCV, Object Detection, Hand Gesture Recognition, Human Computer Interaction*

**Paper ID: 114: Comparative Analysis of Crash Consistency Techniques in File Systems**

Archana Sondur, Sachin Sakhare, Priyanka More

**Abstract:**

Since it is necessary to manage user data, the file system is an essential part of the operating system. It must be reliable, efficient, and crash proof. For a variety of reasons, file systems are highly likely to experience a system crash or power outage, but with the help of a few crash consistency techniques, the data can still be assured to be crash consistent. To be able to create the required file system, a thorough understanding of these techniques has become highly critical. Hence, the authors have conducted a thorough survey to study crash consistency and its techniques. Using the relevant information that was within their reach, the authors conducted a comparative analysis of the three classic crash consistency techniques which are journaling, log-structuring, and shadow-paging using the factors like consistency achieved, performance, complexity, and availability and presented it in one table, and transaction method, storage, cost required, and main fault in another. With the aid of this study and the analysis, the authors have proposed an adaptive recommendation system to suggest to developers the crash consistency technique most suited for their file system.

**Keywords:** *Crash consistency, Data consistency, journaling, log-structuring, shadow-paging, copy-on-write, file system, system crashes.*

## Paper ID: 115: Yoga Trainer App using Human Pose Detection

Thoudam Johnson Singh, BorishKshetrimayum , HemanBudathoki, Chelsea Dambe R Sangma

### **Abstract:**

The dependence on mobile devices for daily tasks has risen as a result of technological innovation and changing lifestyles. A mobile yoga app is crucial since yoga may improve one's lifestyle. For this study, a flutter-built, user-friendly yoga trainer software was employed. The methodology and technology used to create the software are discussed, along with an overview and outcomes of the software. The software detects the user's postures to ensure that they are performed correctly using machine learning techniques. A report is produced based on the user's prior sessions. The major goal of this paper is to create an app that may give users the impression that they have a yoga instructor in their own homes, which will inspire everyone to practice yoga. The conclusion of this study offers a few encouraging perspectives and directions for the software.

**Keywords:** *Pose detection, Yoga, Flutter, Machine Learning, Artificial intelligence.*

## Paper ID: 117: Randomized gaze-contingent music reward therapy for major depressive disorder in Adolescents

Saurabh Gupta, Dr.Rolly Gupta

### **Abstract:**

Heightened interest allocation towards negative-valence facts and decreased interest allocation towards superb-valance facts represent possible goals for interest bias amendment in predominant depressive sickness. Accordingly, we carried out a randomized controlled trial checking out the efficacy of a novel gaze-contingent interest bias amendment manner for predominant depressive sickness. Sixty sufferers with predominant

depressive sickness have been randomly assigned to both 8 training sessions of feedback-primarily based totally gaze-contingent music praise remedy designed to divert sufferers' gaze towards superb over unhappy stimuli, or to a manage circumstance which entailed 8 sessions of gaze-non contingent music. Clinician-rated and self-pronounced measures of despair, and share of dwell- time on unhappy faces, have been assessed pre-treatment, post-treatment, and at a 3-month follow-up.

Gaze-contingent music praise remedy produced an extra discount in dwell-time on unhappy faces as compared with the manage circumstance; however it did not generalize to novel faces. Both groups manifested in addition widespread discounts in despair signs from pre- to post-treatment that have been maintained at follow-up. Exploratory analyses advise that first-episode sufferers might also additionally advantage greater from this remedy than sufferers with a records of more than one episode. Gaze-contingent music praise remedy can regulate interest biases in despair; however differential medical results did now no longer emerge. Theoretically and practically implications are also discussed.

**Keywords:** *Attention, attention allocation, attention bias, attention bias modification, depression, eye tracking, major depressive disorder*

## Paper ID: 119: **Comparative Analysis Of Anomaly-Based Intrusion Detection System On Artificial Intelligence**

Pawan Kumar Mall, Abhinav Mishra and Abhijeet Sinha

### **Abstract:**

Network Security (NS) has now become critical in securing the computing infrastructure of government and industry. A current intrusion detection system (IDS) must meet stringent criteria, including being dependable, expandable, simple to operate, and inexpensive to maintain. The effectiveness of any IDS is a challenging issue owing to its non-linearity and the qualitative or quantitative network data stream (traffic) with various aspects. The goal of this article is to compare the effectiveness of artificial intelligence approaches in IDS, in order to serve as a guide for the development of future intrusion detection system. IDS is evaluated using the KDD-99 Cup. The results demonstrate that our proposed method performs better than other ML algorithms. The proposed model outperforms other machine learning techniques such as SVM linear, SVMrbf, Adaboost, GaussianNB, and Logistic Regression are used to do comparison analysis, and their precision, recall, accuracy and f1-score are determined. In our research, we found that our proposed method ensemble learning with prediction score technique outperforms other machine learning models We were able to get an accuracy of 99.7%, a precision of 99.8%, a recall of 99.8%, and f1-score of 99.3%.

**Keywords:** *Intrusion Detection, KDD-99 Cup, machine learning, deep learning*



## Paper ID: 120: Potato Leaf Diseases Detection Using Deep Learning

TrishitaAcharjee, Sushanta Das, Swanirbhar Majumder

### **Abstract:**

Diagnosis of plant diseases is the key to prevent crop loss as well as value of agricultural output. Studies of the crop disease means studies of visible patterns observed in the plant. Monitoring of health and plant disease detection is critical for the sustainable agriculture. It is very difficult to monitor and detect plant diseases by observing them accurately. In India, it is estimated at 15-25 percentage of crop production that may be lost due to diseases, for this work to take that issue seriously, our country not only needs to increase productivity but also ensures food security as well nutrition. To detect plant diseases, we propose our automatic plant disease detection system which has been developed by integrating high level “Deep Learning” models like Convolution Neural Network (CNN) and Support Vector Machine (SVM). These model gives upto 98about detection on trained sample dataset which includes images of “healthy and unhealthy” plant leaves.

**Keywords:** *Potato Leaf, Plant Disease, Disease Assessment, Disease Detection.*

## Paper ID: 121: An approach towards early stage detection of lung cancer using machine learning

Pawan Kumar Mall, Anurag Shukla and Jaspreet Singh

### **Abstract:**

Since the aetiology of lung cancer is still unknown, and since it is now impossible to prevent the disease, the early discovery of lung cancer is the only method to treat it successfully. The stage of cancer is determined by the size of the tumour and how quickly it spread. Recent breakthroughs in imaging and sequencing technology have made it possible for researchers to make methodical progress in their clinical studies of lung cancer. Approaches that are based on machine learning play an important part in the process of involving and evaluating big and complicated datasets. These datasets have comprehensively described lung cancer by using a variety of viewpoints that are derived from the accumulated data. The

results suggest that our proposed approach outperforms other ML algorithms. The proposed model outperforms other machine learning techniques such as Decision Tree, SVM, KNN, random forest, XG-Boost are used to do comparison analysis, and their accuracy, precision, recall, and f1score are determined. In our research we found that our proposed method outperform other machine learning models. According to the findings of our investigation, the approach that we have presented, ensemble model, performs better than other machine learning models. We were able to get an accuracy of 97.01%, a precision of 99.21%, a recall of 94.7%, and f1-score percentage of 96.9%.

**Keywords:** *lung cancer, machine learning, deep learning, ensemble learning*

## Paper ID: 124: A Comparative Study of LSTM for Rainfall Prediction in India

ChawngthuZoremsanga and Jamal Hussain

### **Abstract:**

Researchers extensively studied the prediction of rainfall due to its significant impact on the environment and the daily lives of individuals. In this study, four LSTM models were applied to predict average monthly rainfall in India, and their performances are compared with a benchmark model found in the literature. Average monthly rainfall data for All-India from 1871 to 2016 were employed for training and testing the four LSTM models. The models are compiled using MSE loss function and Adam optimization technique was employed as the optimizer. The performance of the four LSTM models was estimated using statistical metrics such as MAE and RMSE. This study found that more numbers of neurons and stacking the LSTM layers can improve the LSTM model performance. The LSTM Model\_4 achieved an RMSE of 245.30, whereas the existing benchmark model achieved an RMSE of 251.63.

**Keywords:** *Deep Learning, LSTM, Rainfall prediction, Stacked LSTM.*

## Paper ID: 125: Implementation of EMR for maternal women using a cloud-based application

Nupur Choudhury, Rupesh Mandal, Anuran Patgiri and Amrit Krishna Bora

**Abstract:**

The current scenario of maternal and child health is dependent upon complete as well as time-based information which is extremely important for the process of decision-making in terms of medical services. However, this is also a big challenge as the remote areas have constraints related to the various resources. To maintain the data, patient health records need to be maintained manually which is slowly being upgraded to digital records via electronic medical record (EMR) systems. These EMRs are extremely efficient as they could be adopted for supporting the services of healthcare primarily focusing on maternal and child health. These systems have the potential to support the mother as well as the child in tracking as well as monitoring the entire process, quality improvement as well as data exchange between the patient and the healthcare providers for having informed decision-making. We present a system that does the task of Booking appointments, registering patients, storing reports, storing prescriptions, collecting IoT Data, and generating emergency panic waves with the competent authority using a cloud-based mobile application based on an EMR system. The application allows all the stakeholders to keep track of maternal women starting from the phase of conceiving to forty-five days past delivery. A prototype is developed, and the roadmap for data collection and implementation is also described for a specific case study in the Sonapur District of Assam in association with District Hospital Sonapur.

**Keywords:** *Android Application, Booking Appointments, Electronic Medical Record (EMR), Emergency Panic Waves, Health Care, IoT, Maternal, Open Source.*

**Paper ID: 127: AI/ML based Object Detection on FPGA SoC**

Sruthi K, Nandakumar R

**Abstract:**

Recent research on neural networks has shown significant advances in computer vision over traditional algorithms. The in-depth learning solutions for computer vision functions have transformed many industries in recent years. Deep Convolutional Neural Network (CNN) dependant models are best solution for the tasks of object classification and object detection. But they are computationally expensive due to their huge networks. So embedded systems have too many limitations to use modern configuration. CPU platforms are difficult to provide sufficient computational resources to run these large networks. Although GPUs are very capable of processing expensive models, they are power hungry and have low energy efficiency. Currently, the Field Programmable Gate Array (FPGA) based neural network accelerator becomes the subject of research. With specially designed computer platforms, FPGA is the next solution to outperform the GPU with speed and energy efficiency. In

this study, You Only Look Once v3 (YOLO) real-time acquisition of FPGA architecture is opted to reduce its calculation costs and increase power efficiency, while maintaining network accuracy at the right level.

**Keywords:** *Index Terms—FPGA, Power Efficiency, YOLO, Convolutional Neural Networks*

## Paper ID: 128: A Review on Machine Learning in IoT Devices

Imopishak Thingom, N. Basanta Singh

### **Abstract:**

Deployment of machine learning and AI continue to rapidly expand across a range of applications. Billions of devices are getting interconnected using IoT and the number of connected devices continues to grow exponentially. In edge computing the computation and intelligence are being brought closer to the edge devices like the gateways. Recently there is a growing interest in running machine learning models in the low-end devices particularly in embedded devices like microcontrollers (MCUs). Unlike high performance CPUs and GPUs these are resource constrained devices in terms of memory and computing power. This new paradigm of bringing machine learning and embedded devices together is referred to as TinyML. In this paper we present the motivation behind this paradigm, the challenges, and approaches to overcoming these challenges, popular frameworks and future directions.

**Keywords:** *Edge computing, IoT, microcontroller, machine learning, embedded system, tiny machine learning*

## Paper ID: 130: Detection of Brain Tumor using Machine Learning and Deep Learning Technologies

Archana Jaywant Jadhav, Dr. Amit Gadekar

### **Abstract:**

The leading cause of death in the world is cancer which stands at the second number after cardiovascular diseases. Every 6th death happening in the world is due to cancer. Two types of cancer are Benign and Malignant Cancer. One of the malignant cancer is a brain tumor. Brain tumor

can affect all age groups. There are many types of cancers based on the factors such as shape, texture, size, etc. The survival chances of a patient can be increased if the cancer is detected in an early stage. The detection of cancer is done by MRI scan that is Magnetic Resonance Imaging. It is unpainful and economical also. This method gives a clear picture of the brain in 2D or 3D format. This method is popular and precise to detect cancer. The use of Machine Learning and Deep Learning techniques can improve the accuracy of detecting cancer and hence save many lives of people. Different models like CNN, Alex Net etc. provide different accuracies and precision when used with different machine learning models such as SVM, k-NN etc.

**Keywords:** Machine Learning, CNN, Deep-Learning, Image processing, Braintumor, MRI imaging, etc.

## Paper ID: 132: Vehicle Queue Management System at Service Stations in O&G Industry

Priyojit Chakraborty and Amol R. Madane

### **Abstract:**

In the digital era, people are fully dependent on digital technologies and their usage. People are using vehicles to go from one place to another. The number of vehicles on the road is increasing day by day at a rapid pace. So, most people are facing traffic jam issues across the country and worldwide. People are also facing the same issue of congestion while refilling the fuel at service stations. They need to be in queue for an undefined amount of time. They are not sure about how much time is required to refill the vehicle fuel tank. Even, they are not having idea of whether they will get chance to refill the tank or not. We understood the problem and produced a solution which will provide users with the tentative required time, service pump number. This tentative time will give an idea to the user about how much approximate time is required to refill the tank. User can go to specific assigned service pump as per his/her vehicle fuel type.

Using this approach, users need not to be in the queue and wait for their turn. Our developed system is responsible to form virtual queue in system once system received refill entry from the user and assign best possible fuel pump and calculate tentative required time. If the user needs urgent service, then they can opt for service. Our system is enough to provide services across all part of world without any additional cost.

**Keywords:** *Fuel Tanks, Service Stations, Service Pump, Tank refills, Vehicle Queue Management, Virtual Queue*

**Paper ID: 133: Digital Technology and CRM Implementation in the Hospital of Delhi and NCR.**

Dr. Priyanka Gandhi.

**Abstract:**

The implementation of the digital technologies has the capability to improve the customer satisfaction and the productivity of the stakeholders in the healthcare domain. Numerous CRM studies have achieved great strides in industries like banking, manufacturing, and telecommunications, but there hasn't been much work done in the healthcare sector. The aim of the current research is assess the impact of digital technology specifically the CRM Software's in the hospitals of Delhi and NCR. The research is divided into two sections the one the systematic analysis of the secondary data to study the impact of technology in the working of the hospitals and other is the primary data analysis to validate the impact of CRM software's implementation on the dependent variables such as customer satisfaction, employee productivity and the branding of the hospitals. The model is validated using the structural equation modelling using the AMOS Software.

**Keywords:** *Digital technology, Customer Relationship Management, Healthcare, Hospitals.*

**Paper ID: 136: A comparative analysis of deep neural network-based models for short-term load forecasting**

Ksh. Nilakanta Singh, Kh. Robindro Singh, Nazrul Hoque

**Abstract:**

Short-term load forecasting is an essential component of a power grid management system that performs the electric load profile. It is challenging as it depends on nonlinear and stochastic parameters. Although a good number of research works have been published on Short-Term Load Forecasting but still accurate and effective techniques are needed. In this paper, we perform a comparative analysis of different Deep Neural Network architectures frequently employed in Short Term Load Forecasting in recent years. Different state of the art strategy such as

preprocessing, time-dependent feature extraction, feature engineering, feature selection, and feature transformation, are explored. The better performance of hybrid models based on 1D-CNN, LSTM, and GRU is shown using three benchmark datasets. Standard error matrices such as MAPE, MAE, RMSE, and R2 represent these results. The best-performing hybrid models are then compared with existing works from other papers using similar datasets.

**Keywords:** *Short-term load forecasting, Electric load prediction, Deep learning, Deep neural network, Convolutional neural network, Long short-term memory, Gated recurrent unit, and Hybrid deep neural network.*

## Paper ID: 137: Detection and Counting of Connected Lentil Grains using Convex Deficiency for Quality Estimation

Yumnam Kirani Singh, AmitavaAkuli

### **Abstract:**

Proposed here is a simple and effective method for identification of connected grains in an image. The grains considered here are the whole lentil grains which are circular in shapes. These circular shapes can be considered as convex polygons. When two or more such convex polygons are connected or partially overlapped, there are concave regions along the boundary line of the connected region. Such concave regions form the convex deficiencies for the convex hull of the connected or overlapped grains. Finding the number convex deficiencies in the convex hull of connected object boundaries allows us to identify whether connected component is formed by connecting two or more objects or grains. Also, it allows us to exactly count the number of connected objects and simplifies the finding the segmentation boundaries. The method is simple, fast and gives good accuracy of counting connected grains without actually segmenting the connected grains.

**Keywords:** *Convex hull, Convex Deficiency, YCbCr color model, Image segmentation, Connected components, Counting of lentil grains, Quality estimation.*

## Paper ID: 140: Entertainment world 4.0 and the Digital Motion Picture

Dr.Siddhantkumar, VasantaoWadmare

### **Abstract:**

The global media industry is currently experiencing a similar Fourth Industrial Revolution.

Computerized models of various media parts (objects) of the work and the blend and get together of these models into a variety of media work in accordance with a craftsman's overall expectation will be the creation units of this upset, Film Industry 4.0. Advanced movie industrial facilities will be the frameworks of coordinated mechanical arrangements.

The creation of a computerized movie plant is a film as a total and mix of advanced models of varying media items and situations of activity and association that are joined by the creator's imaginative idea, as the current regulation defines a film as "a varying media work... comprising of pictures fixed on film or other types of transporters consolidating them into a topical entire of interconnected sequential frames..."

**Keywords:** *Multi-modal audiovisual content, the Fourth Industrial Revolution, the Digital Motion Picture Factory, the Digital Model, and the Technological Platform*

## Paper ID: 142: Digital Citizenship - A Pathway for Digital Skilling through 21st Century Learning Design

Akanksha Saini, Tanvir Singh

### **Abstract:**

In today's world, every click leaves impact on the society. It can create huge turbulence as it has the power to do so. It comes with both pros and cons, the only concern is what skill can be taught for effective use of that particular click. The Skill which can be used for the purpose is Digital Citizenship. It is the need of an hour to interact meaningful on the social media platforms or simply online. This paper reflects the deep study on various guiding principles supporting Digital Citizenship which is a pathway for Digital Skilling through 21st Century Learning Design.

**Keywords:** *Digital Citizenship, 21st Century Learning Design, Digital Skilling*



## Paper ID: 144: Strategy For Digital Skilling for Building a Global Future Ready Workforce.

Karthick Srinivas S, Prof. Valliappan Raman

### **Abstract:**

Digital skills are becoming a mandatory skill for each individual to function his or her daily life. Every Individual is posed with a challenge to use the digital skills in some way or other, as the eco-system we living in is transforming towards digitalization at a rapid pace. Starting from ordering food, booking transportation facilities, to carrying out transactions with banks and the usage of communication and messaging tools, all demand the individual to get accustomed to the digital world.

Let's consider the human generations starting from 1901, we had GI Generation (1901 - 1924), Silent Generation (1925 - 1945), Baby Boomers (1946 - 1964), Generation X (1965 -1980), Millennials or Generation Y (1981 – 1994), Generation Z (1995 - 2012), and Generation Alpha (2013 - 2025). Comparing the digital literacy of these generations we find that, until Generation X there are a very less number of individuals that know about Digital work and also applications. Also given the fact that, the tools used by them are mostly for industrial purposes. However, the development of technology has taken an exponential raise from the period of Generation Y (roughly speaking) pushing the individual to adopt the technology in the interests of long – term growth. The digital knowledge gained by Generation Alpha is much more efficient and widespread when compared to the previous generations. This is also a factor that fuels the growth of the digital work across all domains.

## Paper ID: 147: Enhanced Marathi Speech Recognition Using Double Delta MFCC and DTW

Rajashri G. Kanke, Ramnath M Gaikwad, Manasi R. Baheti

### **Abstract:**

This paper describes the technique Mel-Frequency Cepstral Coefficients (MFCC), Delta MFCC, and Double Delta MFCC for Extract the Features and DTW for Pattern Matching of Automatic Speech Recognition (ASR) for Marathi. These studies present a speaker-independent Speech Recognition System for Marathi. The Dataset of Created of Speech being natural data and Speech disordered people's speech data in the Marathi language. The dataset of speech samples was created with samples of Marathi Digits and words with and without speech disorder. 'PRAAT' was used for these recordings. Various feature extraction techniques are available, but MFCC is widely used and here, Double Delta MFCC is used to increase the recognition rate along with DTW for Pattern Matching.

Speech being natural interaction medium technology can be used to develop small interfaces which can be used for various applications to help interaction between human and computer systems. This research aims to have good interaction between the Human and Computer Systems and, the patient suffering from Speech disorders peoples. That means the "Voice Technology" has been improved in the Marathi Language.

**Keywords:** *Automatic Speech Recognition (ASR), Double Delta Mel-Frequency Cepstral Coefficients (DD MFCC), Dynamic Time Warping (DTW), Small Vocabulary Marathi Speech (SVMS)*

## Paper ID: 149: Augmenting Cyber Physical Systems through Data Collection & Machine Learning: A Perspective

Siddiq Moideen, Haritha Deepthi, Jacqueline Dorothy

### **Abstract:**

Industry 4.0, destined to an astounding breakthrough in the field of Production & Manufacturing through leading-edge Cyber Physical Systems, Monitoring systems & Automation. The next big Industrial Revolution focuses on digitalizing the industries which is popularly known as Digital Twinning, any changes to the Digital Twin reflects the Real Physical World. Cyber Physical Systems are the key players in the 4th industrial Revolution, Cyber Physical Systems are amalgamation of Theory of Cybernetics & Mechatronics where Physical Plant i.e., Full-Fledged Hardware component Controlled/Monitored by Computational platform i.e., Computer-Based Algorithms moderated by Network Fabrics & Sensors. CPS integrates the dynamics of physical processes, software & networking. Where components of Physical and Computational elements are deeply intertwined. The Backdoors of the system aren't robust enough to tackle modern-day Cyber Threats. Digital Twinning gives us an upper-hand in both Security and Production perspectives. Our paper aims at enhancing the production & security of the CPS through Machine learning approach, analysing the digital asserts statistically to set a favourable pay.

**Keywords:***Industry 4.0, Cyber Physical Systems, Game Theory, Deep Learning, Transfer Learning, Simulated Systems, Digital Twin, Security Mechanisms, Cloud Manufacturing, Big Data Analytics, NoSQL*

## Paper ID: 150: Partnering with Museum for an experimental project on holistic education

G.S. Mani, Neha Sharma, Sanjeevani Joglekar

### **Abstract:**

Museums provide ample opportunity for holistic education with humanistic orientation. Project EKAM is an experimental project on holistic education conceptualised by Pune Section of Institute of Electrical and Electronic Engineers and Tata Consultancy Services of Pune in partnership with Raja Dinkar Kelkar Museum at Pune. A major objective of the experiment was to establish the suitability of the ambience provided by the museum for the learning environment. Major initiatives taken up as part of the experiment included Activity based Learning workshops, Cultural enrichment programs, Concept to Product Projects, apart from lectures, webinars and Discussion Forums. The paper presents details of the experiment, observations noted and conclusions drawn. It is presumed that these details will be useful for those who are pursuing similar activities elsewhere, and for scaling up future initiatives of similar nature. Museums provide ample opportunity for holistic education with humanistic orientation. Project EKAM is an experimental project on holistic education conceptualised by Pune Section of Institute of Electrical and Electronic Engineers and Tata Consultancy Services of Pune in partnership with Raja Dinkar Kelkar Museum at Pune. A major objective of the experiment was to establish the suitability of the ambience provided by the museum for the learning environment. Major initiatives taken up as part of the experiment included Activity based Learning workshops, Cultural enrichment programs, Concept to Product Projects, apart from lectures, webinars and Discussion Forums. The paper presents details of the experiment, observations noted and conclusions drawn. It is presumed that these details will be useful for those who are pursuing similar activities elsewhere, and for scaling up future initiatives of similar nature.

**Keywords:** *Holistic education, Museum, STEAM, Culture, Tradition, Activity based Learning, Cultural enrichment, Concept to Product*

G.S. Mani, Neha Sharma, Sanjeevani Joglekar

### **Abstract:**

Museums provide ample opportunity for holistic education with humanistic orientation. Project EKAM is an experimental project on holistic education conceptualised by Pune Section of Institute of Electrical and Electronic Engineers and Tata Consultancy Services of Pune in partnership with Raja Dinkar Kelkar Museum at Pune. A major objective of the experiment was to establish the suitability of the ambience provided by the museum for the learning environment. Major initiatives taken up as part of the experiment included Activity based Learning workshops, Cultural enrichment programs, Concept to Product Projects, apart from lectures, webinars and Discussion Forums. The paper presents details of the experiment, observations noted and conclusions drawn. It is presumed that these details will be useful for those who are pursuing similar

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**Keywords:** *Holistic education, Museum, STEAM, Culture, Tradition, Activity based Learning, Cultural enrichment, Concept to Product*

## Technical Schedule/ Paper presentation Schedule:

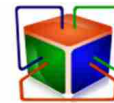
Time	Nalanda Auditorium [Ground floor]	Conference Hall1 [2 <sup>nd</sup> Floor]	Conference Hall2 [2 <sup>nd</sup> Floor]
11.30AM-1:00PM	<b>Track1: Artificial Intelligence, Machine Learning, Big Data, Data Analytics (Parallel session)</b> <ul style="list-style-type: none"> <li>• <b>Speaker: Dr Saibal K. Pal</b> - Research Scientist - DRDO,</li> <li>• Chair/Track Coordinator: Prof. Pratick Then, Dr Saibal K. Pal / Dr. Manish Arora</li> <li>• Nos. of papers to be presented: 08 out of 18 <b><u>Paper ids (T-1): 63, 37, 69, 88, 119, 73, 80, 71</u></b></li> </ul>	<b>Track1: Artificial Intelligence, Machine Learning, Big Data, Data Analytics(Parallel session)</b> <ul style="list-style-type: none"> <li>• <b>Speaker: Col Inderjeet Singh</b>, CCO, Vara Technology Pvt Ltd</li> <li>• <b>Topic: <i>Secure System/ Metaverse</i></b></li> <li>• Chair/Track Coordinator:Col Inderjeet Singh /Shri D. S. Oberoi</li> <li>• Nos. of papers to be presented: 10 out of 18</li> </ul> <b><u>Paper ids (T-1): 84, 101, 130, 59, 105, 107, 136, 120, 149, 147</u></b>	<b>Track 2 : Cyber Security &amp; Forensic, Network and Mobile Security</b> <ul style="list-style-type: none"> <li>• <b>Speaker: Prof. Rajiv Mishra</b>, IIT Patna</li> <li>• <b>Topic: <i>Cloud, Edge Computing</i></b></li> <li>• Chairs/Track Coordinator: Prof. Rajiv Mishra, Prof. Valliappan/Dr. Sanjeev Jha/</li> <li>• Nos. of papers to be presented: 04</li> </ul> <b><u>Paper ids (T-2): 54, 114, 67,68</u></b>
	<b>Lunch Break [1:00PM- 2:00PM]</b>		
2:00 PM-3:45PM	<b>Track 4: VLSI &amp; Semiconductors, Electronics System, IOT, EdgeAI (Parallel Session)</b> <ul style="list-style-type: none"> <li>• <b>Speaker: Prof. Siddhartha Bhattacharyya</b>, Christ University</li> <li>• <b>Topic: <i>Quantum Computing practices</i></b></li> <li>• Chair/Track Coordinator: Prof. Siddhartha/ Dr.Pratap Kumar S</li> <li>• Nos. of papers to be presented: 07 out of 15</li> </ul> <b><u>Paper ids (T-4): 100, 102, 07, 09, 52, 53, 127</u></b>	<b>Track 4: VLSI &amp; Semiconductors, Electronics System, IOT, EdgeAI (Parallel Session)</b> <ul style="list-style-type: none"> <li>• <b>Speaker: Dr.M.P.Pillai</b>, NIELIT</li> <li>• <b>Topic: <i>VLSI practices</i></b></li> <li>• Chair/Track Coordinator: Dr.M.P.Pillai/ Dr. Jayaraj U Kidav</li> <li>• Nos. of papers to be presented: 08 out of 15</li> </ul> <b><u>Paper ids (T-4): 109, 137, 128, 76, 104, 85, 58, 110</u></b>	<b>Track 7: Assistive Technology for Divyangjan (People with disabilities)</b> <ul style="list-style-type: none"> <li>• <b>Speaker: Prof. G.S. Mani</b>, IEEE Pune Section</li> <li>• <b>Topic: <i>Partnering with Museum for an experimental project on holistic education</i></b></li> <li>• Chair/Track Coordinators: Prof. G.S. Mani, /Dr. Shalu Gupta, Dr. Sarwan Singh</li> <li>• Nos. of papers to be presented: 05</li> </ul> <b><u>Paper ids (T-7): 94, 112, 56, 117, 46</u></b>
	<b>Tea Break –[3:45 PM- 4:00PM]</b>		

4:00PM-5:00PM	<b>Track5: Blockchain and Software Technology</b>	<b>Track6:Digital Technologies for Future/ Biotechnology</b>	<b>Track 8 : Strategy for Digital Skilling for building a global Future Ready workforce</b>
	<ul style="list-style-type: none"> <li>• <b>Speaker: Dr.Mani Madhukar, IBM</b></li> <li>• <u>Topic: <i>Blockchain practices</i></u></li> <li>• Chairs/ Track Coordinator: Dr.Mani Madhukar, Prof. Shanta Laishram/ Shri Alok Tripathi</li> <li>• Nos. of papers to be presented: 06</li> </ul> <p><b><u>Paper ids (T-5): 57, 124, 34, 65, 98, 121</u></b></p>	<ul style="list-style-type: none"> <li>• <b>Speaker: Prof.AlakK.Buragohain</b>, Chancellor, Girijananda Chowdhury University, Assam</li> <li>• <u>Topic: <i>Digital Technology in Bioscience: Impact and Prospects</i></u></li> <li>• Chair/Track Coordinator: Dr.Tufan Naiya /Dr.Saurov Mahanta</li> <li>• Nos. of papers to be presented: 10</li> </ul> <p><b><u>Paper ids (T-6): 132, 81, 66, 74, 133, 115, 89, 93, 95, 108</u></b></p>	<ul style="list-style-type: none"> <li>• <b>Speaker:Ms.Akanksha Saini, IIT Bombay</b></li> <li>• <u>Topic: <i>Digital Citizenship - A Pathway for Digital Skilling through 21st Century Learning Design</i></u></li> <li>• Chairs/ Track Coordinator: Ms. Akanksha Saini /Dr.Vanlalhruaia</li> <li>• Nos of papers to be presented: 05</li> </ul> <p><b><u>Paper ids (T-8): 90, 142, 144, 150, 140</u></b></p>

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