इलेक्ट्रॉनिकी एवं
सूचना प्रौद्योगिकी मंत्रालय
MINISTRY OF
ELECTRONICS AND
INFORMATION TECHNOLOGY

सत्यमेव जयते

रा.इ.सू.प्रौ.सं
NIELIT

2nd

NIELIT's International Conference on

Communication, Electronics & Digital Technologies

NICEDT-2024

16th-17th FEBRUARY 2024, Guwahati Assam

ABSTRACT BOOK

Conference Organizer :

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

2nd NIELIT International Conference on Communication, Electronics and Digital Technologies 2024

16 & 17th February 2024

Abstract Book

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Message from Director General, NIELIT

I am delighted to extend a warm welcome to all attendees of the 2nd NIELIT's International Conference on Communication, Electronics and Digital Technologies [NICEDT-2024], following the resounding success of our inaugural NICEDT-2023 held in New Delhi. As we gather once again, on 16th and 17th February 2024 at Gauhati University, it fills me with immense pleasure to witness the continuation of this prestigious event.

NIELIT, as an Autonomous Scientific Society under the Ministry of Electronics & Information Technology, Government of India, is proud to continue our tradition of providing a platform for researchers, academic institutes, industries, and research organizations to share their expertise and findings in the dynamic fields of Electronics, Communication, and Digital Technologies.

During the first day of the conference, we will explore the wealth of knowledge shared by researchers in Cyber Security &Forensics, Advanced Computing, and Future Digital Technologies including Biotechnology &Bioinformatics. Conversely, the focus of the second day will be on AI/ML, VLSI & semiconductor Electronics Systems, IoT, and Digital Skilling, addressing the ongoing demand for skilled manpower in the industry, with special emphasis on assistive technology for Divyangjan. This ensures thorough coverage of all 8 tracks on both the days. NICEDT-2024 remains committed to bridging the gap between research and industrial development, driving innovation and progress in these crucial domains, for which I express my sincere gratitude to all authors, speakers and panelist for their invaluable contributions.

Furthermore, as we appreciated Springer's collaboration during NICEDT-2023, I extend gratitude once again for their continued partnership in disseminating the knowledge shared at NICEDT-2024 through their esteemed book series, 'Lecture Notes in Networks and Systems'.

In closing, I extend my appreciation to all participants for your continued engagement and contributions to the conference. Your feedback and insights are invaluable as we strive for excellence and innovation in the realm of digital technologies.

Warm regards,

Thank you

Prof. (Dr.) M. M. Tripathi
Director General, NIELIT

Message from Conference Chairs

It is with great pleasure that we extend our warmest welcome to the 2nd NIELIT International Conference on Communication, Electronics & Digital Technologies (NICEDT-2024). Following the success of NICEDT'23 in New Delhi, we are thrilled to host this conference once again, offering an outstanding opportunity for researchers from universities and stakeholders associated with NIELIT. Our call for papers received an overwhelming response, resulting in the submission of 200+ full-length papers from academia, industry, and research facilities worldwide. Each submission underwent rigorous review by the Program Committee (PC), External Program Committee (EPC), External Review Committee (ERC), and additional expert reviewers, ensuring the highest quality standards. Authors were provided with an opportunity to address reviewer queries and resubmit their work during the review process.

After meticulous evaluation, 80 papers have been selected for publication in Springer's Book Series - Lecture Notes in Networks and Systems, while 10 papers have been chosen for poster presentations. Additionally, we are honoured to feature four invited papers from renowned experts in academia and industry from across the globe. We trust that you will find the program both stimulating and thought-provoking, and that the co-located events will facilitate valuable exchanges of ideas among researchers and practitioners worldwide.

We extend our heartfelt thanks to all staff of NIELIT, seniors from MeitY, panelist, academicians and Industry experts for their generous sponsorship, to our corporate supporters whose contributions are indispensable to the success of the conference, and to the steering committee for their unwavering support and guidance.

Once again, we extend a very warm welcome to each and every one of you, and we eagerly anticipate productive discussions and collaborations at NICEDT-2024.

Dr. Yumnam Jayanta Singh
Executive Director, NIELIT Guwahati

N Debachandra Singh
Director, NIELIT Imphal

গুৱাহাটী বিশ্ববিদ্যালয়
GAUHATI UNIVERSITY

Prof. Pratap Jyoti Handique
Vice Chancellor
E-mail ID : vc@gauhati.ac.in

MESSAGE

It gives me immense pleasure to know that National Institute of Electronics & Information Technology is going to organize its "**2nd International Conference on Communication, Electronics & Digital Technologies (NICEDT-2024)**" on 16th and 17th February, 2024. I appreciate the initiative to publish a book of abstract containing the papers to be presented in the conference. I also take this opportunity to welcome the participants of the Conference and wish a fruitful academic deliberations.

P.J. Handique

Date: 09.02.2024

(Pratap Jyoti Handique)
Vice Chancellor
Gauhati University

Message from Organizing Secretaries

It is with great pleasure and excitement that We extend a warm welcome to all participants and honourable guests to the NIELIT's 2nd International Conference on Communication, Electronics & Digital Technologies (NICEDT-24), set to take place on February 16th and 17th, 2024, at the serene premises of Guwahati University. These gathering promises to be an enriching experience, bringing together industry leaders, scholars, and professionals from diverse sectors both nationally and internationally. Drawing inspiration from the remarkable achievements of NICEDT-23 held in New Delhi last year, we are thrilled to introduce an exciting lineup of engaging sessions that delve deep into the vanguard of technological progress. Covering a spectrum of topics ranging from Artificial Intelligence and Cyber Security to Quantum Computing and Blockchain, our conference aims to offer a holistic platform for navigating through the most recent advancements and shifts in our digital terrain.

As we convene in the vibrant city of Guwahati, nestled along the picturesque banks of the majestic Brahmaputra River, we invite you to immerse yourselves in the rich cultural heritage and natural beauty that this region has to offer. The tranquil surroundings of Guwahati, coupled with the flowing waters of the Brahmaputra, provide the perfect backdrop for meaningful discussions and fruitful collaborations. We are confident that NICEDT-24 will serve as a catalyst for knowledge exchange and innovation, fostering new ideas and partnerships that will drive progress in the ever-evolving landscape of communication, electronics, and digital technologies.

Once again, we extend heartfelt welcome to each and every one of you, and anticipate the insightful conversations and discoveries that await us at NICEDT-24.

Warm regards,

Mridul Pachani

Dr. Saurov Mahanta

Organising Secretaries, NICEDT-2024

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Shri Mridul Pachani, NIELIT Guwahati
Dr. Saurov Mahanta, NIELIT Guwahati

About National Institute of Electronics and Information Technology (NIELIT)

National Institute of Electronics and Information Technology (NIELIT), (erstwhile DOEACC Society), an autonomous scientific society under the administrative control of Ministry of Electronics and Information Technology (MeitY), 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 both in Formal and Non-Formal Education in the area of IECT besides development of industry-oriented quality education and training programmes in state-of-art areas. NIELIT has endeavoured to establish standards to be the country's premier institution form Examination and Certification in the field of IECT. It is also one of the National Examination Body, which accredits institutes/organisations for conducting courses in IT in the non-formal sector.

As on date, NIELIT has forty seven (47) centres 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, Kokrajhar, Kurukshetra, Lakhanpur (Saksharta Kendra), Leh, Luchnow, Lunglei, Majuli, Mandi, Pasighat, Patna, Pali, Ranchi, Ropar, Senapti, Shillong, Shimla, Shilchar, Srinagar, Tezpur, Tura and Tezu with its Headquarters at New Delhi. It is also well-networked throughout India with the presence of 700++ institutes.

Over the last two decades, NIELIT has acquired very good expertise in IT training, through its wide repertoire of causes, ranging from 'O' Level (Foundation), 'A' Level (Advanced Diploma), 'B' Level (MCA equivalent), 'C' Level (MTech level), IT literacy courses such as CCC (Course on Computer Concept), BCC (Basic Computer Course), and other such long-term and short-term courses in the non-formal sector like courses on Information Security, ITeS-BPO (Customer Care/Banking), Computer Hardware Maintenance (CHM-O/A level), Bioinformatics (BI-O/A/B level), ESDM, etc., besides high-end courses offered by NIELIT centres at Post-Graduate level (MTech) 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 Digitisation 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 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 2nd International Conference on Communication, Electronics and Digital Technologies (NICEDT-2024), 16-17 February 2024, Guwahati, India

NIELIT's International Conference on Communication, Electronics and Digital Technologies - NICEDT-2024, is the 2nd International level conference to be organised by the National Institute of Electronics and Information Technology (NIELIT) on 16-17th February 2024 at Guwahati, Assam, India. This conference will cater recent research and development in Information, Electronics and Communication Technology, and allied areas. The international conference targets a wide range of audience and participants from across the globe covering Researchers, Academicians, Industry Professionals and enthusiastic students.

Papers are invited through 8 tracks as follows:

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

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

Track 3 : Advanced Computing- Cloud Computing & Quantum Computing

Track 4 : VLSI & Semiconductors, Electronics System, IOT, EdgeAI

Track 5 : Blockchain and Software Technology

Track 6 : Digital Technologies for Future/ Biotechnology

Track 7 : Assistive Technology for Divyangjan

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

This two-days conference will focus on sharing the finding 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 under different tracks.

Contents

Guest of Honour:

Prof. Pratap Jyoti Handique
Vice Chancellor, Gauhati University
Guwahati, Assam, India

Professor (Dr) Pratap Jyoti Handique, formerly a professor of Biotechnology, Gauhati University, obtained PhD degree from Gauhati University and postdoctoral research on molecular biotechnology at Leicester University, United Kingdom. He is one of the pioneers who worked for the development of Biotechnology in North East India. He has been involved in frontline areas of research in Biotechnology for last 30 years. He was awarded the prestigious Biotechnology Overseas Associateship Award, 2004-05 by the DBT, New Delhi. He has developed several Bioinformatics databases and has made noteworthy research contributions to the field of Bioinformatics. Subsequently, Prof. PJ Handique took a central role in leading the Bioinformatics movement in the Northeastern region, establishing the 'Bioinformatics Infrastructure Facility' at the Department of Zoology, Gauhati University, with ongoing financial backing from the Department of Biotechnology (DBT), Government of India, commencing from 2008. Moreover, he has enriched the field by contributing over 130 DNA and gene sequences to biological databases. Overall, he has contributed to over 153 research papers published in national and international journals, written more than 45 book chapters, authored a research book on Medicinal Plants, and edited two books covering various aspects of Science and Technology. Dr. Handique has successfully completed 17 major R&D research projects on Biotechnology funded by DBT, DST, IACR, NMBP and other government agencies.

Prof. Handique has guided 49 (forty-nine) PhD students till July 2021 on various aspects of Biotechnology. He has coordinated and contributed in the formulations of the State Biotechnology Policy of Assam which has been declared by the Government of Assam under Advantage Assam Policy in 2017. He is a recipient of Fellow of Linnean Society (FLS) of London in the year 2017. He has been associated with and holding key positions in various scientific organisations/ institutions/societies of the country and abroad. He has also contributed a good number of literary articles, stories and poems and popular science articles in Assamese and English languages.

Guest of honour:

Prof. Sri Niwas Singh
Director, ABV-IIITM,
Gwalior, MP, India

Prof. S. N. Singh obtained his M. Tech. and PhD 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 (ABV-IIITM), 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 Vice Chancellor of Madan Mohan Malviya University of Technology Gorakhpur during April 2017 to July 2020.

Dr. Singh has achieved several significant milestones in his career. Notably, he was the first Asian to receive the 2013 IEEE Educational Activity Board Meritorious Achievement Award in Continuing Education. He has also been honuored with the INAE Outstanding Teacher Award 2016 and the IEEE R10 region (Asia-Pacific) Outstanding Volunteer Award 2016. Dr. Singh holds the title of IEEE Distinguished Lecturer of Power & Energy Society from 2019 and Industry Application Society (IAS) for 2019–2021. Additionally, he has received the NPSC 2020 Academic Excellence Award and the 2021 IEEE IAS Outstanding Educator/Mentor Award. With extensive research interests in power systems, Dr. Singh has authored over 500 papers, supervised 40 PhD scholars, and contributed to numerous publications and technical projects globally. He has also been recognized for his popular NPTEL (YouTube) video lectures on HVDC Transmission and Power System Operation & Control. Throughout his career, Dr. Singh has held various leadership roles within IEEE, including serving as Chairman of IEEE UP Section and IEEE R10 (Asia-Pacific) Conference & Technical Seminar Coordinator. Currently, he holds the position of Immediate Past Chairman of IEEE, India Council, and is esteemed as a Fellow of IEEE (USA), IET (UK), INAE, IE(I), IETE, and AvH.

Guest of honour:

Shri Dhrubajyoti Borah (ACS)
Director of Technical Education,
Govt. of Assam.

Shri Dhrubajyoti Borah is an accomplished administrative leader serving as the Director of the Directorate of Technical Education in Assam. With a notable background in administration and governance, he holds the prestigious designation of an ACS (Assam Civil Service) officer. He began his illustrious career in the Assam Civil Service on June 21, 1999. Possessing a Bachelor's degree in Political Science, he has traversed a spectrum of administrative roles, consistently demonstrating excellence and steadfast dedication. Beginning as an Extra Assistant Commissioner in Nalbari from 1999 to 2000, he gradually ascended through the ranks, serving as Extra Assistant Commissioner in Nagaon till December, 2005. His expertise led him to assume the role of Circle Officer in Naharkatia from 2005 to 2008, and later in Sibsagar from 2008 to 2016. Mr. Borah then transitioned to a higher responsibility as Addl. Deputy Commissioner in Tinsukia, Assam, from August 2016 to November 2016. Demonstrating versatility, he served as Addl. Director of Medical Education, Training & Research from 2016, to 2020, followed by a tenure as Joint Secretary of Health & Family Welfare Department, Assam, from 2020 to 2022. His recent appointments include serving as Addl. Director of Medical Education, Training & Research from 2020 to 2021.

Shri Borah's commitment to fostering technical education and skill development in the region underscores his dedication to empowering individuals and driving socio-economic growth. His visionary leadership and strategic initiatives contribute significantly to the advancement of technical education and vocational training in Assam, thereby catalysing progress and prosperity within the state.

Chief guest:

Prof. Rajeev Ahuja
Director, Indian Institute of Technology (IIT)
Ropar/Guwahati

Prof. Rajeev Ahuja has joined the Indian Institute of Technology (IIT) Ropar director from April 2021. Before joining as director at IIT Ropar, Rajeev Ahuja was a professor of computational Materials science at Uppsala University, Sweden. He is one of the most highly cited researchers in Sweden. He has done his PhD from IIT Roorkee in India in 1992. Same year he has joined Uppsala University, Sweden as postdoctoral fellow. He became Assistant Professor in 1996, Associate Professor in 2002 and become Professor in 2007 at Uppsala University, Sweden.

His main area of interest is computational materials science with focus on energy such Batteries, Hydrogen Storage & production, sensors as well high-pressure physics.He has published 1083 scientific papers in peer reviewed journals H-Index of 92, i-10 index 695 & no. of citations more than 41000, of which more than100 are in high profile journals (like Science, Nature, Nature Materials, PRL, etc.). He has been awarded Best Alumnus award from IIT Roorkee for excellence in research for 2021. Ahuja has supervised 30 PhD students, more than 35 postdocs. He has recently elected FRSC (fellow of Royal Society Chemistry), London, UK, APS-Fellow by American Physical Society (APS), USA and Appointed in the advisory Board of Journal of Materials Chemistry A & Materials Advances from Royal Society of Chemistry (England). He is Associate editor of Nano Energy (IF=18). He was also awarded Beller Lectureship for the APS March Meeting 2017. He been awarded the Wallmark prize for 2011 from KVA (Royal Swedish Academy of Sciences), and has previously received the Eder Lilly & Sven Thureus prize and the Benzelius prize from KVS. Ahuja is an elected member of the Swedish Royal Society of Sciences (KVS).

Plenary Speaker

Prof. Isaac Woungang
Toronto Metropolitan University, Canada

Isaac Woungang (Senior Member, IEEE) currently working as a Professor in the Department of Computer Science, Toronto Metropolitan University, Canada has received the Ph.D. degree in mathematics from the University of the South, Toulon-Var, France, in 1994.From 1999 to 2002, he worked as a Software engineer at Nortel Networks, Ottawa, Canada. Since 2002, he has been with the Department of Computer Science at Ryerson University as an Associate professor. In 2004, he founded the Distributed Applications and Broadband Networks Laboratory (DABNEL) R&D group. His Areas of Expertise are Next Generation Wireless Network, Computer Security, Computational Intelligence. Currently, he is working as a Professor in the Department of Computer Science, Toronto Metropolitan University, Canada.

He has published eight books and over 90 refereed technical papers in scholarly international journals and proceedings of international conferences. His current research interests include radio resource management in next-generation wireless networks, big data, Internet of Thin.gs, and cloud computing. He has served as the Chair of the Computer Chapter, IEEE Toronto Section, from 2012 to 2018. He has guest edited several special issues with various reputed journals, such as Computer Communications (Elsevier) and Telecommunication Systems (Springer)

Plenary Speaker:

Prof. Dmitry I Kaplun
Petersburg State Electrotechnical University, Russia

Prof. Dmitry I. Kaplun is a highly accomplished researcher and academician with a distinguished background in the field of digital signal processing, embedded systems, and machine learning. He earned his Ph.D. from St. Petersburg Electrotechnical University "LETI" in 2009, demonstrating a strong commitment to advancing knowledge in his field. His research interests span a range of cutting-edge areas, including digital signal processing, embedded systems, and machine learning, showcasing his versatility and expertise. Prof. Kaplun's research portfolio encompasses diverse projects, including collaborations with industrial partners such as Siemens, ID R&D, and Unilever. He has been involved in several grants funded by the Russian Foundation for Basic Research. Beginning with his participation in youth initiative projects titled 'My First Grant' from 2012 to 2013, the focus was on 'Developing and studying methods of digital filtering and intellectual analysis of information in the tasks monitoring of a wide frequency range'. Following this, in 2015, he contributed to scientific projects led by young scientists under the guidance of PhD and doctors of science within scientific organisations across the Russian Federation, concentrating on the 'Development and research of maximum likelihood digital filters for signals with partially overlapping spectra'. Most recently, from 2019 to 2022, Prof. Kaplun collaborated on a Russian-Israeli (RFBR-MOST) research project titled 'Video-based monitoring of health-related parameters for veterinary healthcare'.

His work extends beyond traditional academic boundaries, demonstrating a keen interest in the practical implementation of research findingsequipped by modern hardware-based GPU and FPGA and software-based Python, Matlab, LabView.

Plenary Speaker:

Dr. Esha Barlaskar
Queen's University Belfast,
United Kingdom

Dr. Esha Barlaskar is a dynamic researcher and educator in the field of computing, specializing in cloud computing and machine learning. Currently positioned as a Lecturer (Education) in the School of Electronics, Electrical Engineering and Computer Science at Queen's University Belfast, Northern Ireland since 2021, Dr. Esha Barlaskar boasts a remarkable academic journey, culminating in her attainment of a Doctor of Philosophy (Ph.D.) in Computer Science from Queen's University Belfast, where she excelled from 2016 to 2020. Prior to this, she earned a Master's degree in Artificial Intelligence from Assam Don Bosco University, Guwahati, Assam, between 2012 and 2014, and a Bachelor's degree in Computer Science from North-Eastern Hill University, Shillong, Meghalaya, achieved from 2005 to 2009. Building upon her academic prowess, Dr. Barlaskar has accumulated invaluable experience in the realm of education and academia. Prior to her current position at Queen's University Belfast, she previously held the position of Lecturer (Assistant Professor) in Computing at the University of Suffolk in Ipswich, United Kingdom, during 2020-2021. During her tenure, she oversaw final year undergraduate projects and co-supervised a PhD student, demonstrating her commitment to fostering academic growth. Earlier in her career, Dr. Barlaskar contributed her expertise as a Lecturer (Assistant Professor) at the National Institute of Technology Silchar and as a Lecturer in Computer Science at St. Paul's Higher Secondary School. With her blend of academic achievements and hands-on experience, Dr. Barlaskar continues to make meaningful contributions to the fields of computer science and education.

Plenary Speaker:

David Washington White
University of Technology, Jamaica

Mr. David White is a distinguished figure in the realm of academia and technological innovation. He currently serves as the Head of School at the esteemed School of Computing and Information Technology (SCIT) within the University of Technology, Jamaica. With a robust background in the field, Mr. White is renowned for his scholarly contributions and dynamic leadership in advancing the boundaries of computing and information technology. His research interests revolve around the optimization of network communication speed and efficiency, particularly in the context of smart devices and the Internet of Things (IoT). Furthermore, Mr. White's works have practical implications for various stakeholders, including IoT and smart device manufacturers, network administrators, and network application developers. By providing insights into optimizing network performance through the utilization of multiple pathways, his works contribute to the development of more efficient devices and network applications, ultimately enhancing the user experience and operational capabilities in the realm of computing and information technology.

Plenary Speaker:

Dr. Karel Sterxx
Bangkok University, Thailand

Dr. Karel Sterckx is a Belgian national. In 1986, he received a Master of Applied Engineering in Electrical and Electronic Engineering from the Katholieke Industriële Hogeschool der Kempen, currently part of Catholic University Leuven (Belgium). In 1997, he obtained a Master of Science in Optoelectronics and Communications Systems from Northumbria University (UK) and, in 2000, a PhD from Swansea University (UK) for work on infrared wireless communication links. He has experience as a practicing engineer in the Belgian audiovisual industry, and has been lecturing at governmental and private universities in Thailand since 1993. He has been a resident of Thailand for almost 20 years and joined Bangkok University in 2010 as Research Scholar. At present, he is the director of the Bangkok University Center of Research in Optoelectronics, Communications and Control Systems (BU-CROCCS). His research efforts concentrate on Software Defined Communication Systems as well as broadband indoor Optical Wireless Communication, Optoelectronics, Software defined radio/communications

Speaker:

Prof. Amlan Chakrabarti
Director, A.K. Choudhury School of Information Technology
University of Calcutta, Kolkata, West Bengal, India

Prof. Amlan Chakrabarti is a distinguished academic and researcher with extensive expertise in quantum computing, machine learning, computer vision, IoT, and cyberphysical systems. With over 20 years of experience in engineering education and research, Prof. Chakrabarti serves as the CEO of the International Center of Excellence for Data Science, Artificial Intelligence and Futuristic Technologies, a prestigious initiative by the Department of Higher Education, Government of West Bengal. His mission is to foster innovation and collaboration in these emerging fields and to create a global impact through cutting-edge research and education. Prof. Chakrabarti has a strong background and expertise in quantum computing, having completed his PhD and post-doctoral research in this domain from the University of Calcutta and Princeton University respectively. He has also received multiple awards and fellowships for his contributions to engineering science, such as the Young Scientist Award, the BOYSCAST fellowship, and the Senior Member of IEEE recognition. In addition, he possesses extensive knowledge and experience in machine learning, computer vision, cyberphysical systems, and reconfigurable computing, with a publication record of around 200+ research papers and securing several project grants from various national and international agencies and corporates. As the Director of the A.K. Choudhury School of Information Technology at the University of Calcutta, he continues to drive innovation and academic excellence in the field. Prof. Chakrabarti's contributions extend beyond academia, having served in key leadership roles such as Head of Information Technology and Technology Innovation Cell for the Government of West Bengal and Dean of the Faculty of Technology and Engineering at the University of Calcutta. His mentorship has empowered numerous students to secure faculty positions at esteemed institutions worldwide and excel in industry roles at leading organizations.

Speaker:

Dr. Vaibhav Anil Dixit
National Institutes of Pharmaceutical Education and Research (NIPER), Guwahati

Dr. Vaibhav Anil Dixit is currently serving as an Assistant Professor at the National Institute of Pharmaceutical Education and Research (NIPER), Guwahati. Prior to his current position, Dr. Vaibhav Anil Dixit served as an Assistant Professor at the Department of Pharmacy, Birla Institute of Technology and Science, Pilani (BITS Pilani). His research interests primarily focus on drug toxicity and drug metabolism prediction. Currently, he is actively engaged in applying the "Drug Toxicity Index (DTI) concept to injectable medicines to estimate the likelihood of adverse events and organ failures. Additionally, in the field of drug metabolism, Dr. Dixit is in the process of developing a comprehensive methodology for drug metabolism prediction utilizing computational chemistry and machine learning methods. He specializes in computational chemistry, machine learning, and chemo-informatics for pharmaceutical problems. His expertise includes molecular modeling, with notable contributions such as developing halogen-constraints for CYP2C9 substrate docking. Dr. Dixit is skilled in organic and analytical chemistry, handling sensitive reactions and advanced instruments like NMR and LC-MS. He also possesses programming skills in bash, R, C++, and Python.

Speaker:

Prof. Bhaben Tanti
Gauhati University, Guwahati, Assam

Prof. Bhaben Tanti is a highly esteemed academic figure within Gauhati University, boasting an impressive educational background and extensive professional experience. He graduated with distinction, earning a B.Sc. in Botany from J.B. College, Jorhat, Dibrugarh University in 1994, where he secured the 1st Class 1st Position. Continuing his academic journey, he pursued an M.Sc. in Botany with a specialization in Cytology, Genetics, and Plant Breeding at Gauhati University, again achieving the 1st Class 1st Position in 1997. Dr. Tanti furthered his studies with a Ph.D. in Molecular Biology and Biotechnology from Tezpur University in 2006, followed by a Postdoctoral stint in Biochemistry and Molecular Biology at Oklahoma State University, Stillwater, USA, from 2013 to 2014. Throughout his career, he has held various significant roles, including Junior Research Fellow at the Centre for Petroleum Biotechnology, Tezpur University (1999-2000), Lecturer at the Department of Botany, Darrang College, Tezpur (2000-2003), and subsequently served as Assistant Professor (2004-2013), Associate Professor (2013-2016), and currently holds the position of Professor in the Department of Botany at Gauhati University. Notably, Dr. Tanti has also been entrusted with the responsibility of directing the Internal Quality Assurance Cell (IQAC) at Gauhati University since January 2020.

Speaker:

Prof. Nilanjan Dey,
Techno International, New Town, Kolkata

Prof. Nilanjan Dey is an Associate Professor in the Department of Computer Science and Engineering, Techno International New Town, Kolkata, India. He is a visiting fellow of the University of Reading, UK. 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). He was awarded his PhD from Jadavpur University in 2015. He is the Editor-in-Chief of the International Journal of Ambient Computing and Intelligence (IGI Global). He is the Series Co-Editor of Springer Tracts in Nature-Inspired Computing (SpringerNature), Data-Intensive Research (SpringerNature), Advances in Ubiquitous Sensing Applications for Healthcare (Elsevier). He is having 110 books (authored and edited) and over 300 publications in the area of medical imaging, machine learning, computer aided diagnosis, data mining, etc. (over 20,000 Citations, 70 h-index). Furthermore, he is the Fellow of IETE and Senior member of IEEE.

Speaker:

Dr. Tanujjal Bora
Asian Institute of Technology, Thailand

Dr. Tanujjal Bora is the Director of the Center of Excellence in Nanotechnology (CoEN) and is an Assistant Professor of the Bio-Nano Material Science & Engineering program in the Department of Industrial Systems Engineering at Asian Institute of Technology, Thailand. His research primarily focuses on nanomaterial-based solutions for efficient solar energy harvesting, water purification, environmental monitoring applications, nano-biosensors, nanocomposite materials & devices, and material circularity & sustainability.

Dr. Bora is a distinguished member of Sigma Xi: The Scientific Research Honor Society, showcasing his recognition in scientific research. His affiliation with the International Water Association emphasizes his interest in water-related issues. As a member of the Nanotechnology Association Thailand and various prestigious IEEE organizations such as the Nanotechnology Council, Electron Devices Society, and Photonics Society, he is actively engaged in cutting-edge advancements in nanotechnology, electronic devices, and photonics. His diverse memberships highlight expertise across various fields of research and innovation.

Speaker:

Prof. Shikhar Kumar Bora
Gauhati University, Guwahati

Shikhar Kumar Sarma, M.Sc. PhD, is a Professor and Head of the Department of Information Technology at Gauhati University, Assam, India. He also serves as the Chief Investigator for Language Technology Development Projects (NE Wordnet, CLIA), sponsored by the Ministry of Communication and IT, Govt. of India. Additionally, he holds the position of Director at the Centre for Brahmaputra Studies, Gauhati University. Dr. Sarma has had affiliations with IIT-Guwahati and Debub University, Ethiopia.

His research areas primarily include Computer Networks, Natural Language Processing (NLP), and Expert Systems. Dr. Sarma has received several academic awards, including the Manthan Award in South Asia and the Asia Pacific, Certificate of Recognition as a Finalist from Digital Empowerment Foundation in 2012, and the E-North East Award in 2011 with Juries' Special Mention Award from North East Development Foundation in 2011. He also received the IRNet Scholastic Award for the best content for his paper on Expert System based Decision Support Architecture in E-learning Environment from IRNet in 2012.

Speaker:

Prof. Palaiahnakote Shivakumara
University of Salford, UK

Palaiahnakote Shivakumara received B.Sc., M.Sc., M.Sc Technology by research and Ph.D. degrees from the University of Mysore, Mysore, Karnataka, all in computer science. Currently, he is working as an Associate Professor in the Department of Computer System and Technology, University of Malaya (UM), Kuala Lumpur, Malaysia. He worked as a Research Fellow at the National University of Singapore. Besides, he worked as Research Consultant at Nanyang Technological University, Singapore for the period of one year. Based on his work, he has published more than 300 research papers in national, international conferences and journals. He has served as Editor-in-Chief for Artificial Intelligence and Applications (AIA), BonViewPress, Singapore. He has been serving as Associate Editor for IEEE Transactions on Multimedia (TMM), Pattern Recognition (PR), International Journal on Document Analysis and Recognition (IJDAR), CAAI-Transactions on Intelligence in Technology, ACM Transactions on Asian and Low-Resource Language Information Processing (TALLIP), Springer-Nature of Computer Science (SNCS), Malaysian Journal of Computer Science (MJCS). Further, he was the recipient of a prestigious "Dynamic Indian of the Millennium" award by KG foundation, India for his contributions to computer science field. He won "Top Reviewer" award from Pattern Recognition Letters. He has several international collaborators, namely, Nanjing University, China, Hohai University, China, Shantou University, China, Indian Statistical Institute, Kolkata, India, University of Essex, UK, Assiut University, Egypt, University of Technology Sydney, Australia. He has been serving as chairs at different levels for International Conference, namely, ICDAR, DAS, ICFHR, ACPR, ECCV, ACCV, ICCV, CVPR, ACMMM, ICFHR, ICPR etc. His area of research includes video text understanding, document analysis, image processing, personality traits identification and forged text detection related.

Speaker:

Prof. Sunandan Baruah
The Assam Down Town University, Guwahati

Prof. Sunandan Baruah serves as the Dean of the Faculty of Engineering & Technology at Down Town University in Guwahati, Assam. Specializing in Environmental Nanotechnology, he brings extensive experience as a Professor of Electronics & Communication Engineering in higher education. With a proven track record, Prof. Baruah is adept in E-Learning, Lecturing, Science, and Nanotechnology. His research involves the application of cost-effective wet-chemical methods to craft innovative materials and device components. He explores self-assembled functional materials and devices, utilizing microbial objects as templates for creating groundbreaking materials like microwires. Furthermore, his research delves into molecular and single nanoparticle electronics, exploring their applications in fabricating electronic and communication devices. Prof. Baruah has garnered recognition, including an Erasmus Mundus Grant for his research at Uppsala University, Sweden, along with awards acknowledging his contributions to communicating science and addressing environmental concerns.

Speaker:

Prof. Kandarpa K. Sarma
Gauhati University

Dr. Kandarpa Kumar Sarma is a Professor and Head of the Department of Electronics and Communication Engineering at GUIST, Gauhati University, specialises in an array of cutting-edge fields including Mobile Communication, Artificial Intelligence, Machine Learning, Deep Learning, Software Defined Radio, Cognitive Radio, Speech Processing, and Antenna Design. His academic journey includes the completion of an MTech in Signal Processing and a PhD in Mobile Communication from the Indian Institute of Technology Guwahati (IITG). Additionally, Dr. Sarma holds a Postdoc Research qualification from Technical University Sofia, Sofia, Bulgaria (2014-15), and actively participated in a Leadership Development Programme under AICTE-UKIERI in 2019. His commitment to professional development is evident in his qualifications, including a CMI 5 Level Diploma in Management and Leadership from CMI, UK. Dr. Sarma is also an esteemed member of various professional bodies, having been recognised as a Fellow of IETE in 2012, a Senior Member of IEEE in 2011, and a Life Member of the Assam Science Society, ISTE, and CSI in 2010 and 2009, respectively. His multifaceted expertise and active engagement in professional organizations underscore his standing in the field.

Speaker:

Prof. Nitin Kumar Tripathi
Asian Institute of Technology, Thailand

Prof. Nitin Kumar Tripathi, a distinguished academician and researcher, holds a Ph.D. in Remote Sensing from the Indian Institute of Technology, Kanpur, India, earned in 1994. With a robust educational background, including an M. Tech. in Remote Sensing and a B. Tech. in Civil Engineering, Prof. Tripathi serves as a professor specializing in Remote Sensing and Geographic Information Systems (GIS). His research focuses on the application of Geoinformatics in diverse fields such as environment, marine science, health, and agriculture. Notably, he has pioneered the development of wireless GIS, leveraging Internet GIS concepts and wireless devices like wireless LAN and personal digital assistants (PDAs) with mobile phones (GPRS). This technology facilitates real-time spatial data logging and air pollution monitoring. As an educator, Prof. Tripathi imparts knowledge in Geographic Information Systems, Advanced Spatial Analysis Methods, GIS Programming and Modeling, and GIS for Health. His commitment to research and education, coupled with his extensive contributions to the field, establishes Prof. Nitin Kumar Tripathi as a respected figure in the realms of Remote Sensing and GIS.

Speaker:

Prof. Mihir Narayan Mohanty
Institute of Technical Education and Research(ITER)
Bhubaneswar, Odisha

Mihir Narayan Mohanty is currently working as a Professor in the Department of Electronics and Communication Engineering, Institute of Technical Education and Research (ITER), Siksha 'O' Anusandhan (Deemed to be University), Bhubaneswar, Odisha. He has received his M. Tech degree in Communication System Engineering from the Sambalpur University, Sambalpur, Odisha and obtained his PhD degree in Applied Signal Processing. He is the fellow of IE (I), and IETE. Also, he is the member of many professional societies including IEEE, IET etc. With an impressive 25 years of combined teaching and research expertise, he has made significant contributions to academia and beyond. His extensive publication record boasts over 300 papers across various esteemed journals, conferences and book chapters, showcasing his deep commitment to advancing knowledge in his field. Notably, he has authored two influential books, further solidifying his standing as a leading authority in his areas of expertise. Renowned for his expertise, he serves as a respected reviewer for manuscripts from prestigious publishers such as IEEE, Elsevier, Springer, and IGI Global. His diverse research interests encompass Applied Signal and Image Processing, Speech Processing, Antenna technology, and Intelligent Signal Processing, reflecting his multidisciplinary approach and dedication to pushing the boundaries of knowledge in these domains.

Patron:

Prof. (Dr.) Madan Mohan Tripathi
Director General, NIELIT

Dr. Madan Mohan Tripathi is the Director General of National Institute of Electronics & Information Technology (NIELIT). Before joining NIELIT, Dr. Madan Mohan Tripathi was working as Professor with Delhi Technological University (DTU), New Delhi. In DTU he also worked as Director Internal Quality Assurance Cell (IQAC) and Coordinator of Intellectual Property Rights Cell. He started his carrier as Research scientist with Institute for Plasma Research (IPR), Gandhinagar (Department of Atomic Energy, Govt. of India) in 1994 and worked for 5 years on many R&D projects. In the year 1999, he joined Centre for Electronics Design & Technology of India, Gorakhpur as Senior Design Engineer and worked for 10 years on various design and development projects in the areas of Information, Electronics and Communication Technology (IECT). From 2009 to 2012 he was Joint Director at NIELIT HQ, where he worked on various projects such as Digitization and Biometric capture of usual residents of India (NPR), development of manpower in IECT Skills, ICT based Skill Testing and Certification.

Conference Chair

Dr. Yumnam Jayanta Singh
Executive Director, NIELIT Guwahati

Dr. Yumnam Jayanta Singh is the Executive Director at the National Institute of Electronics and Information Technology (NIELIT), under the Ministry of Electronics & Information Technology (MeitY), Government of India, with his base of operations in Guwahati, officiating from Shillong as well. He has 19+ years of expertise in Research, Teaching & Management at academic Institutes/ Universities & CMM5i Software Industries. His expertise extends across various esteemed academic institutions including Don Bosco University (India), Swinburne University of Technology (Australia), Malaysia (a QS/World Top 300 University), Misurata University/Nottingham Trent University (in North Africa), and Skyline University (Dubai), among others. He obtained his Master's and Ph.D. degrees in Computer Science from Dr. B.A. Marathwada University, Aurangabad, Maharashtra, in 2000 and 2004, respectively. Hailing from Thoubal, Khekman in Manipur, India, Dr. Jayanta has carved a niche for himself through his contributions to academia and industry. In addition to his academic pursuits, Dr. Jayanta has enriched his professional portfolio through engagements with leading CMM5 IT firms such as NTT DATA/Keane Inc. in Halifax, Canada, where he worked on projects for Philip Morris (USA), and TechMahindra in Mumbai, India, contributing to projects for British Telecom (UK). Throughout his career, he has mentored numerous Ph.D. and M.Tech students, spearheaded various research and development initiatives, and played a pivotal role in capacity-building projects aimed at empowering the youth. Dr. Jayanta's research interests encompass a wide array of cutting-edge topics including Analytical Expert Systems utilizing Blockchain, Data Science, Data Warehousing/Mining, AI, Cloud Computing, IoT, Image Processing, and Agile/Scrum Software Development practices. He is a distinguished member of prestigious professional societies including IEEE, ACM, IETE, IAENG, IACSIT, ASTED, IJET, and EUROSIS, reflecting his commitment to advancing the frontiers of knowledge and innovation.

Furthermore, Dr. Jayanta's passion for addressing socially relevant issues is evident through his involvement in various projects aimed at leveraging technology for the greater good. Some notable projects include implementing 'Flipped Classroom/Blended Training' methodologies for virtual and online education during lockdowns, fostering startups and innovation in Northeast India in domains such as IoTs-Agri/Healthcare, AI Chatbots, VR/Animation, and Electric Vehicle Charging, as well as initiatives focused on enhancing digital literacy and skills development among rural and marginalized communities through programs like PMGDISHA and PMKVY.

Abstracts NICEDT-2024

Invited Paper: Efficient Mechanism for Enhanced Data Speedup in Internet of Things

David W. White, Isaac Woungang, Felix O. Akinladejo, Sanjay K. Dhurandher

Abstract:

The sheer number of IoT devices and the data that these devices transmit across the Internet have seen phenomenal growth rates as the use cases for these devices rises. This implies that more bandwidth will be needed to handle this growth and achieve speedup in data transmission. This paper argues that additional fungible paths can be used to achieve speedup between communicating IoT devices. A theoretical model is designed to predict the speedup expected from the use of additional fungible paths, and experiments are conducted to validate the efficacy of the model. However, our results showed the same or slightly smaller speedup values than our predicted values. We deduced that this might be due to the bottlenecks in line with what other researchers in the field of parallel processing and high-performance computing had found. We recommend that our model be utilized to predict what speedup rates are theoretically possible, then IoT device manufacturers, computer network engineers, and computer scientists could tweak their IoT implementations to achieve the actual speedups as close as possible to the predicted values.

Invited Paper: Optimization in Ensemble Model for Weather Prediction

Mihir Narayan Mohanty, Gyana Ranjan Patra

Abstract:

The daily lives and livelihood of human beings and society are greatly affected and controlled by changes in weather and prediction of the same becomes a useful exercise. Climate changes are becoming more erratic in recent times making the traditional methods less effective and hence more modern approaches of weather prediction are the need of the hour. In this paper a machine learning approach has been employed to predict the weather of a dataset available in the Kaggle forum. An Extreme Gradient Boosting (XGBoost) algorithm has been developed and utilized to classify the weather data amongst 50 different weather conditions. A Bayesian optimisation technique is applied to enhance the accuracy of the XGBoost. The results obtained indicate that the accuracy of the proposed models is superior to other algorithms.

Keywords: Weather Prediction· XGBoost Algorithm· Bayesian Optimisation

Invited Paper: Energy Harvesting in a NOMA based Integrated Satellite-UAV-Terrestrial Network with Amplify and Forward Relay and Imperfect CSI

Ridip Tukaria, Aradhana Misra, Kandarpa Kumar Sarma

Abstract:

Unmanned Aerial Vehicles (UAVs) have transformed wireless communications by providing solutions to energy efficiency challenges. This paper presents a comprehensive analysis of Non-Orthogonal Multiple Access (NOMA)-enabled Energy Harvesting in an Integrated Satellite Terrestrial Network (ISTN) with UAV Amplify and Forward (AF) Relaying. In a novel two-user scenario, the UAV serves as a relay, introducing unique dimensions to current research. The communication links in this system exhibit a shadowed Rician fading channel between the satellite and the relay, and a Rayleigh fading channel between the relay and users. A direct link is present between the satellite and a nearby user, while heavy shadowing prevents direct access for the distant user. The system model is made more realistic by the inclusion of Imperfect Channel State Information (CSI). The research examines four dimensions. Firstly, it analyses the total outage probability against varying Signal-to-Noise Ratio (SNR) conditions, providing insights into overall system reliability. Secondly, it assesses the near user throughput relative to different target rates for the far user, revealing trade-offs and achievable performance metrics. The article investigates the impact of energy conversion efficiency on outage probability across varying SNR values, highlighting the interplay between energy harvesting efficiency and system reliability. Additionally, it explores the relationship between outage probability and the fraction of time allocated to energy harvesting, providing insight into dynamic resource management strategies. Extensive simulations have been conducted to validate the analytical results, characterising the outage and throughput performance of NOMA-enabled UAV Relaying Networks within an energy harvesting context. These findings contribute to theoretical understanding and offer practical insights for the design and optimisation of energy-efficient communication networks.

Keywords: Amplify and Forward· Energy Harvesting· ISTN· NOMA· SIC· UAV

Invited Paper: Generation of YuBraj Twist and YuBraj Twest Weaves

Yumnam Kirani Singh,

Abstract:

Twill weaves is one of the most popular weaves used in weaving. It has been found that twill weaves can be conveniently generated from the left circulant matrices. By introducing a shift parameter in the generation of twill weaves from left circulant matrices, we could generate YuBraj twill weaves which can be considered as generalised twill weaves. Twill weaves are the YuBraj twill for which the shift factor is fixed to 1. With the introduction of shift values, more numbers of weave patterns can be generated. On further study, it has been found that two more variants of circulant matrices, namely right circulant and down circulant matrices can also be used for generation of weave matrices or patterns. The weave patterns generated from right circulant matrices are known as twist weaves and the weave patterns generated from the down circulant matrices are known as twest weaves. These two weave patterns (i.e., twist and twest) weaves has similar characteristics with twill weaves in their generation process. In this paper, we generalise the twist and twest weaves by introducing shift parameter as in YuBraj twill weaves to generate more numbers of twist and twest weave patterns. These generalised twist and twest weaves will also be known respectively as asYuBraj Twist and the YuBrajTwest weaves. In the experimental results, we show the difference between the YuBraj Twill, YuBraj Twist and YuBrajTwest weaves for the same input parameters. For the same input parameters, these weaves give significantly different weave patterns.

Keywords: Plain weave· Twill weave· Satin· Twist weave· Twest weave· YuBraj Twill· YuBraj Twist· YuBrajTwest

Paper ID: 4: **Virtual Assistant and Navigation for the Visually Impaired Using Deep Neural Network and Image Processing**

Palakolanu Harsha Vardhan Reddy, Bhumireddy Kashyap, Bhukhya Charan Naik, Prashant Pal, Shashank Kumar Singh, Saurabh Bansod, Yogesh Kuma

Abstract:

The rapid advancement of leading-edge encourages people to employ available resources to simplify everyday duties and enhance the norm and caliber of living for individuals who are unsighted. This module gives real-time aural advice to enable safe and independent navigation and advises developing a product to assist blind in navigating their environment. The gadget features an inbuilt detection of barriers module utilising artificial intelligence to recognise impediments and give the user portable, hands-free haptic feedback. Additionally, the device has a text identification mechanism which can transform any written content it recognizes to voice which the wearer can perceive through headphones incorporated into their glasses. This module uses image processing techniques to improve accuracy and speed. Users could not have accessed printed elements like menus and signs in this manner in the past. Additionally, the system features a module for recognising sign boards that speak text on signs. Following a comprehensive evaluation that considered factors such as speed, accuracy, and user experience, the Virtual Assistant have the capacity to greatly improve the standard of life for individuals who are unsighted. This study advances assistive technology while demonstrating the amazing power of combining state-of-the-art technologies to solve practical problems. By integrating these qualities into wearable technology, the proposed method could enhance the quality of life and freedom for individuals who are blind.

Keywords: wearable· navigation· haptic feedback· object detection· text recognition module.

Paper ID: 11: **Anomalous Network Packet Detection: A Review of Attacks, Datasets and Techniques**

Mudita Kohli and Indu Chhabra

Abstract:

Anomalous Network Packet Detection is a dire security concern today. ChatGPT era has emerged as a grave concern for computer scientists and programmers. The method of recognising diverged network activity from the typical behaviour of network flows is known as anomalous network packet detection. As networks have expanded in terms of complexity and size, detecting outlier occurrences in such huge and complex networks has become crucial in retaining integrity. Detecting threats quickly and accurately determines the success of any network flow. To ensure reliable behaviour and capacity to model features, deep learning models have emerged as promising tools in recent years. Developing an efficient anomaly detection system necessitates understanding the imbalanced datasets, recognizing changing patterns, and identifying irregularities. The paper outlines attacks, knowledgeable parameters, techniques, and datasets for studying crucial network anomalies by reviewing research for different periods of analysis - before 2000, 2000-2010, 2011-2015, 2016-2018 and 2019-2023. The challenges are addressed and futuristic options for anomaly detection systems are proposed.

Keywords: Anomaly Detection· Intrusion Detection· System Network Anomalies.

Paper ID: 15: **Maintenance and Performance of Solar Water Pump in a Rural Agricultural Community: A Case Study**

Yogesh Shejwal, Jayaraj Kidav and Lakshman Korra

Abstract:

This research report evaluates the maintenance and performance of a solar water pump system in a rural area of India. The purpose of this study is to assess the effectiveness of maintenance practices and identify challenges in optimizing the performance of solar water pump systems. This study examines the overall performance of systems that meet the irrigation water needs of local communities. Data were collected through site observations, analysis of maintenance records, performance measurements, and interviews with stakeholders. The results provide valuable insight into maintenance practices, key performance indicators and challenges facing rural agricultural environment. Findings will have implications for promoting renewable energy solutions, sustainable agricultural practices, addressing water scarcity and supporting rural development.

Keywords: Maintenance· Agriculture· Irrigation· Survey Solar· water pump· Power Electronics

Paper ID: 16: **Potential of AI in Pharma: Bridge the Gap between Data and Therapeutics**

Dheeraj Chitara, Abhishek Verma, Prashant Kumar

Abstract:

Artificial intelligence has emerged as a transformational force in a variety of industries, including the pharmaceutical industry. Integrating AI technologies in pharmaceuticals has led to significant advancements in drug discovery, development, and personalized medicine, revolutionising how medicines are researched, tested, and delivered to patients. In drug discovery and development, AI is revolutionising the process by harnessing the power of machine learning algorithms to analyse the amounts of data. AI algorithms can identify promising drug candidates more efficiently by integrating diverse datasets, including chemical structures, biological interactions, and clinical trial results. This accelerates the discovery phase and reduces costs associated with traditional trial-and-error approaches. AI also facilitates the prediction of drug properties and behaviors, enabling scientists to make more accurate decisions regarding drug design and optimisation. AI is transforming the pharmaceutical industry, empowering scientists, healthcare workers, and manufacturers with advanced tools to improve drug discovery, optimise patient care, and streamline manufacturing processes. AI integration in pharmaceuticals has significant potential for the future, opening the door for more effective and tailored therapeutics, faster drug development timeframes, and enhanced outcomes for patients.

Keywords: Artificial Intelligence · Machine Learning · Drug Designing · Target Predictions · Challenges.

Paper ID: 17: **Design and Development of Parallel Beamformer Model for RTL Verification**

Jayaraj U Kidav, Sreejeesh S G, Saktivel R

Abstract:

Medical ultrasound scanners are among the most advanced signal processing devices in use. The beamformer is the brain of the scanner's whole signal processing system. Beamforming enables targeted or spatially selective message delivery and reception. In the receiver, beamforming is employed to focus the reflected signals from diverse tissue structures in the area of concern. The delay sum beam former is a common approach in which signals from various depths of field are suitably delayed and added to create an ultrasonic beam. High frame rate (HFR) ultrasonic (US) imaging systems commonly use plane-wave transmission followed by parallel reception beamforming. The parallel beamforming improves temporal resolution significantly, and is usually realised as a dedicated hardware module. The hardware realisation is usually in register transfer level (RTL) implementation using any hardware description language (HDL). The proposed work aims to design and develop an effective parallel beamformer golden reference model for module level verification. The hardware module of a parallel beamformer is very complex to verify. Hence, a python-based software model of as a golden reference is developed for verification. Considering the

versatility, ease of use and ability to interface with wide range of HDLs, python model of parallel beamformer is designed. Equivalence checking is performed with MATLAB® model to conclude the correctness of the developed model.

Keywords: Ultrasound Imaging· Delay and Sum (DAS)· high frame rate (HFR)· Beamforming· Golden reference model.

Paper ID: 18: **Spectrum Efficient Resource Allocation Using Deep Neural Network in Underlay Cognitive Radios**

Karan Gupta, Nisha Kandhoul and Sanjay Kumar Dhurandher

Abstract:

In underlay cognitive radio networks, managing the primary and secondary users for resource allocation is a demanding task. This is a crucial issue that must be addressed in an efficient manner. The proposed approach, Spectrum Efficient Resource Allocation (SERA) optimises the spectral efficiency utilising deep neural networks in order to achieve an efficient resource allocation in underlay cognitive radios. Computation time is minimised maintaining the interference of both primary and secondary users. The results obtained by simulation show that the SERA system model offers a spectral efficiency improvement by 94.5% as compared to the IRAWCS and CASE approach.

Keywords: Channel Allocation · Cognitive Radio · Deep Learning ·Spectral Efficiency.

Paper ID: 20: **A PC-Based Ultrasound Colour Doppler Performance Improvement Using Intel ® IPPs**

Jayaraj U Kidav, Akula Sri Rama Pavan and Rajesh M

Abstract:

Ultrasound (US) has emerged as a pivotal non-invasive diagnostic imaging technique for whole-body diagnostics. However, processing time constraints pose challenges to simultaneous mode usage and hinder the development of futuristic imaging techniques, such as 3-D/4-D. This paper presents a multi-faceted approach to address these limitations by implementing Colour Doppler performance using both conventional C/C++ and Intel Integrated Performance Primitives (IPPs). The work unfolds in three key phases: simulating a flow phantom with the FIELD-II tool, verifying beamformed RF data in MATLAB, and implementing the Colour Doppler mode of the Ultrasound system for the generated beamformed RF data with back-end signal processing in PC using conventional C++ code and with Intel Integrated high-performance primitives (IPPs) using Qt embedded framework and tabulating the results. Performance evaluation conducted on a flow phantom with dimensions of 7.5 cm width and 25 cm depth, encompassing 61 scanlines over 10 ultrasound imaging frames, reveals compelling insights. The usage of Intel IPPs demonstrates a significant enhancement in back-end processing performance compared to conventional C++ code. This augmentation results in a substantial increase in frame rates, paving the way for high-speed imaging in ultrasound colour Doppler diagnostics mode.

Keywords: Digital Ultrasound· Ultrasound back-end signal processing ·Colour Doppler· Intel IPPs· Conventional C++· Medical Imaging· Hilbert Transform· FIELD-II· Intel IPP· Qt· MATLAB

Paper ID: 22: **Fruit and Vegetable Recognition System Using Deep Transfer Learning Approach**

Albinus Dkhar, Rubul Kumar Bania

Abstract:

Effectively categorising an extensive range of fruits and vegetables can be accomplished by leveraging computer vision and image processing techniques. This article presents the development of an automated system for recognizing fruits and vegetables, employing deep transfer learning models. To build our image dataset, we combined images sourced from the publicly available "fruit-360 dataset" with images we captured ourselves. The dataset encompasses 26 different types of fruits and 34 distinct vegetable categories. For this research, we primarily leveraged three key techniques: Simple CNN, ResNet50, and MobileNetV2, to carry out the final classification task. The achieved accuracy rates for these models were as follows: 76.67% for Simple CNN, 78.63% for ResNet50, and an impressive 96.52% for MobileNetV2. Furthermore, we have harnessed the power of the MobileNetV2 model to create a novel Android smartphone application within Android Studio. This application is designed to automatically classify fruits and vegetables. Users can take advantage of this app to identify and categorize fruits and vegetables using either their device's camera or images from their gallery. One notable feature of this app is its ability to provide information in three different languages: English, Khasi, and Garo, ensuring accessibility for a wide range of users. With this innovative application, anyone can easily and accurately identify a variety of fruits and vegetables, making it a valuable tool for both consumers and enthusiasts.

Keywords: Fruits· vegetables· Recognition system· MobileNetV2· CNN· ResNet50.

Paper ID: 24 : **Intelligent Retail Shopping System Based on RFID**

Nagesh Raykar, Prashant Kumbharkar and Sonali Rangdale

Abstract:

One of the biggest issues one encounters while shopping in malls is having to wait in line and bill. It is a tiresome process, particularly during festival time or during rush hour. Manual invoicing can occasionally be difficult. Additionally, these existing systems have greater rates of shoplifting, which results in substantial losses for retail vendors and merchants. In the case of manual billing, a lack of staff leads to long lines and influences consumer choice because many people may choose to forego the transaction and not buy any

goods. Customer churn can result from this pattern as well. The objective of this paper is to implement a distributed application which relieve customers from this hassle. The goal of this study is to build an automatic checkout system, where customers can handle billing and payments them-selves. In order to plan production and, ultimately, boost sales, merchants can use the system's Business Analysis Model to analyse customer demand and product sales. The goals of self-service checkout system are to speed up client checkout times, lower labor costs, and provide business analysis to retailers.

Keywords: RFID Based Shopping System· RFID Checkout System· IoT

Paper ID: 31: **Energy-Efficient Encounter, Buffer and Contact Duration-Based Routing Protocol in Opportunistic Networks**

Amit Dutta, Satya Jyoti Borah, Jagdeep Singh

Abstract:

Opportunistic network (OppNet) is a type of advanced wireless mobile network which has evolved from Mobile Ad-hoc Networks (MANETs) and belongs to the category of Delay Tolerant Network (DTN). The unique features that make OppNet different from other wireless network are its intermittent connectivity, unstable topology, no dedicated path to the destination from the source and high node mobility. This further makes the process of data transmission a challenging task. For this a method called "store-carry-forward" is used in which the battery-operated intermediate nodes stores the message, discover suitable relay node and forwards the message to that node. This further leads to the depletion in the battery power or energy of the node in due course of time. In this context, there is a necessity of developing routing models by taking the current energy status of a node into consideration. In this paper, the authors proposed an energy-efficient version of a popular routing mechanism EBC, termed as E-EBC where the selection of the next suitable node depends upon the battery power (referred to as Energy) of that node. This model is then compared with existing benchmark protocols- Epidemic, Prophet, EDR, E-Prophet, E-EDR and EBC. Simulation results (using ONE Simulator) depict that the proposed model performs much better than that of the benchmark models respectively by around 42.73%, 41.46%, 58.19%, 32.03%, 65.99% and 44.77% in terms of average latency, messages dropped, hop count average on increasing the Message Generation Interval, TTL, Buffer Size and number of nodes.

Keywords: Contact· E-EDR· E-Prophet· Encounter· Energy· Epidemic· Neighbour· ONE (Opportunistic Network Environment)· Opportunistic network· Prophet; Simulator

Paper ID: 33: **Deep Reach Centrality: An Innovative Network Centrality Metric Grounded in Distance and Degree, with Its Performance Analysis Applied to the SARS-CoV-2 Protein-Protein Interaction Network**

Nirmala Parisutham, Blesson Deep

Abstract:

Centrality measures are widely valued in graph-related data applications, as they play a crucial role in predicting highly influential nodes. This enables subsequent processes to be efficiently formulated, guided by the influence and directionality of these central nodes. Centrality measures have practical utility across diverse fields and situations where the analysis of networks, the assessment of node significance, and the evaluation of information propagation are critical concerns. These applications span a range of domains, including Social Network Analysis, Transportation and Infrastructure Planning, as well as Biology and Bioinformatics. The computation of a node's centrality value using the proposed centrality measure involves a comprehensive approach. It doesn't solely rely on finding the shortest paths to all other nodes but also takes into account whether nodes with high degrees can be reached in fewer hops. In this regard, the proposed method identifies the most influential node by considering the attributes of neighborhoods with higher degrees, reachable within a shorter hop distance to access all other nodes in the graph. Efficiency and comparative analysis were conducted on the proposed deep version of reach centrality in conjunction with 13 existing centrality measures within SARS-CoV-2 protein-protein interaction networks. The Pearson correlation coefficient was employed to assess the degree of similarity and dissimilarity between the proposed centrality measure and other existing measures. To reduce the dimensionality of the centrality values and identify the most influential measure, an unsupervised learning technique known as Principal Component Analysis (PCA) was applied. For evaluating the cluster tendency of the data, both the silhouette method and the elbow method were utilized. Furthermore, the K-means algorithm was implemented to cluster the centrality measures based on their responses within SARS-CoV-2 networks. These analyses yielded significant results, providing evidence for the effectiveness of the proposed measure.

Keywords: centrality measure· closeness centrality· reach centrality· protein-protein interaction network analysis· Similarity Analysis· Graph theory· Data Science· Bioinformatics

Paper ID: 34: **Online Voting Platform Using Blockchain Technology**

Nagesh Raykar, Prashant Kumbharkar and Sonali Rangdale

Abstract:

It has long been difficult to create a safe electronic voting system that provides the transparency and flexibility provided by electronic systems, while maintaining the fairness and privacy of present voting schemes. In this draft article, The goal of paper is to build system which assess a blockchain application for implementing distributed electronic voting systems. The objective of this study offers a novel blockchain-based electronic voting system that tackles some of the drawbacks of current systems and assesses some of the well-known blockchain frameworks in order to build a blockchain-based e-voting system. Through the explanation of a case study, specifically the election process and the deployment of a blockchain-based application that enhances the security and efficiency of voting, we specifically assess the potential of distributed ledger technology. The results of the system shows significant improvement in security as compare to traditional voting system.

Keywords: Blockchain· Voting· Bitcoin· IoT

Paper ID: 35: **Text-Based Emotion Detection: A Review**

Tulika Chutia, Nomi Baruah

Abstract:

Textual language is the most natural carrier to express the emotions of human beings. Emotion Recognition and analysis is a major challenging and emerging topic in the research area of Natural Language Processing (NLP) due to its significant academic and commercial potential. Along with the growth of the Internet, people use social media or digital platforms to share their feelings and feedback. Hence, it is important for a machine to understand the emotions, feedback, and textual dialogues to provide emotionally aware responses to users in today's digital world. This survey has been inspired on the well-known fact that, despite there is a lot of work on emotional detection systems, a lot of work is expected to be done yet. The increment of these systems is due to the large amount of emotional data available in Social Web. Detecting emotions from text have attracted the attention of many researchers in computational linguistics because it has a wide range of applications. This paper presents a literature review of existing literature published between 2013 and 2023. This review has meticulously examined the various emotion models, techniques, datasets, research and evaluation metrics in the detection of emotions from the text useful for researchers in carrying out emotion detection activities. We also discussed about the different challenges with their future direction.

Keywords: Deep Learning· Emotion Detection· Machine Learning· Natural Language Processing.

Paper ID: 36: **CNN Based Sign Language Recognition for Specially Disabled People**

Nagesh Raykar, Prashant Kumbharkar and Sonali Rangdale

Abstract:

Since the majority of people do not understand sign language, there needs to be a bridge built so that the community can interact with the deaf. The use of image processing technology as a translator tool is one way that technology, which is constantly improving and working to better people, can be utilized to build a communication bridge between the community and deaf individuals. The goal of this study is to create a model for recognition of sign language with the help of Indian sign language. The model is implemented with modified CNN deep leaning methodology. The Convolution Neural Network (CNN) algorithm in the Deep Learning method can be a classification tool, with the ability of the Convolution Neural Network (CNN) to learn several things. The model is implemented to capture images of palm signs using web camera, system conclude and display the name of capture images. With the use of convolution neural networks. The CNN is used in this model to convert the Indian Sign Language to text and voice. In this study, CNN method has been successfully carried out for sign language recognition with the results being able to increase the accuracy value to 99.4%. So that the results of the research increase the higher accuracy value.

Keywords: Sign Language· Hearing Disability· Convolutional Neural Network· OpenCV

Paper ID: 38: **A Comprehensive Investigation on the Performance of Traditional Machine Learning in Comparison to Deep Learning for Early Cardiovascular Disease Diagnosis**

Md Sakir Ahmed, Gypsy Nandi and Abhijit Bora

Abstract:

Cardiovascular diseases are one of the leading causes of death and as such it has become a necessity to find a solution for decreasing the overall numbers. This study is directed towards the study of machine learning algorithms in comparison to deep learning algorithms for early diagnosis of cardiovascular disease to identify who is at risk of developing it, and find which algorithms give a more accurate prediction. However, due to the nature of the dataset being small, the deep learning algorithms are at a disadvantage. This study aims to provide a roadmap to find optimal algorithms for developing ML or DL based technologies that help in early detection, which may also aid in the study of the risk factors that contribute to the development of cardiovascular diseases. According to the study, among machine learning algorithms, the Gaussian Naive Bayes model demonstrated the highest accuracy rate of 88.2%, and among deep learning algorithms, the ANN Architecture demonstrated the highest accuracy of 87.2% in test data.

Keywords: Machine Learning· Deep Learning· Neural Network· Cardiovascular disease· Data Analysis· Data Science

Paper ID: 39: **Mitigation of Security Attacks in MANET Using Cryptography Based Novel Routing Protocols**

Sayan Majumder and Debika Bhattacharyya

Abstract:

Since MANETs are ad hoc, one of their primary functionalities is dynamic topology, which exposes them to many security risks. The hash function-based AODV protocol is an entirely new concept, even though there are several routing protocols and techniques available to identify and prevent WormHole attacks in MANETs. In this study, we provide Cryptography Based AODV and OLSR, novel routing protocols. First, we used Dijkstra's technique to determine the shortest path length between the origin and the destination node. Next, we used the hash function technique to secure the data-filled packets inside the nodes. If the packets are verified to be accurate after decryption, they are passed to the next node and so on until they arrive at their destination. Our crypto-based AODV protocol is much more secure and environmentally more friendly than the crypto-based OLSR in terms of performance, as measured by throughput, end-to-end delay, and the data transfer success rate during a WormHole attack.

Keywords: AODV· PDR· Throughput· WormHole.

Paper ID: 41: **Emerging Area of Research: Building an Assamese AI Chatbot for Educational Institutions Using Bi-LSTM Model.**

Surajit Sarma and Nabankur Pathak

Abstract:

With the evaluation of technological advancements and the increasing demand for educational resources in regional languages, AI chatbots have become one of the emerging areas of research. Assamese is one of the languages that the majority of people speak in the northeastern part of India, especially in the state of Assam. Compared to other languages such as English, building an AI chatbot in the Assamese language is a challenging task due to a lack of available resources. In this research work, we have developed our own Assamese dataset for chatbots by gathering data from various sources like student support services, FAQs, emails, Facebook, etc., from educational institutions and converted them into the Assamese language. The bag-of-words (BOW) method is used for extracting features from raw data. We then developed five deep learning models: FFDN, RNN, LSTM, GRU, and bi-LSTM, and tested the dataset with these models. This paper begins by highlighting the significance of AI chatbots in educational institutions and the need for regional language support. The next section presents the methodology, containing brief details of data collection, pre-processing of Assamese text data, and deep learning models and parameters used. Next, the

performance of the deep learning model is measured using metrics such as recall, precision, and F1 Score, and compared with other models to decide the best one. The bi-LSTM model has been able to achieve an accuracy of 89.87% compared to other models. Lastly, we present the limitations of the study and future prospects.

Keywords: Deep Learning· Chatbot· Assamese.

Paper ID: 42: **Hybrid-Multi Channel Deep Neural Network for Fake News Detection**

D. Haritha, D. Kavitha, M. V. Sumanth

Abstract:

Nowadays, the peril of Fake news is badly affecting every individual, from a common man to the president of the world's top country. In this Internet era, fake news spreading on social media is getting easier day by day. Initially, traditional Machine Learning algorithms were used to identify fake news. With the advent of many Deep Learning techniques, significant research work is being carried out on the application of Deep Learning techniques in fake News detection in recent years. In this paper,we propose a Hybrid-Multi Channel Deep Neural Network (MCDNN) model with word embedding (Glove) for content-based fake news Detection. This paper demonstrates the better performance of the proposed model compared to the other standard deep Learning models; a simple Multi-Layer Perceptron (MLP) neural network, Long Short-Term Memory (LSTM), combined LSTM plus CNN(Convolution Neural Network) network, and Gated Recurrent Unit (GRU) with hyper parameters tuned for optimal performance. The Proposed Hybrid-MCDNN model was observed to give 99.60% accuracy of fake news detection on news collected at the 2016 US Presidential election time and 83.53% on the LIAR dataset.

Keywords: Fake News· Deep Learning· Multi-layer Perceptron· Long Short-Term Memory· Gated Recurrent Unit· Hyper Parameters.

Paper ID: 44: **Integrated Gaussian - GLCM Butterfly Optimisation with CNN (IGGBOCNN): A Hybrid Approach for Ovarian Cancer Classification in Medical Image Analysis**

Monita Wahengbam, Tonjam Gunendra Singh

Abstract:

Cancer has become a common and often fatal illness. Ovarian cancer is a particularly persistent and aggressive type of gynecologic cancer. Basic epithelial ovarian cancer is classified into four different subcategories: mucinous, serous, clear cell, and endometrioid. The four distinct types in the cytological pictures that the pathologist's eyes and intellect correctly identify are frequently difficult to distinguish from one another. However, there is a great likelihood of inaccuracy if individuals evaluate and determine a large number of photos. Consequently, the investigation has used technological advances in pathology prediction to lower the risk of error and acquire an accurate diagnosis. In this work, we suggest an extensive approach for classifying ovarian cancer that combines conventional ML (Machine Learning) approaches with optimisation strategies. Butterfly Optimisation (BO) is used to optimise the model parameters for Support Vector Machines (SVM), Random Forest (RF) and Convolutional Neural Networks (CNN) in particular. Moreover, preprocessing methods are used to improve the quality of input data, such as feature extraction with the Gray Level Co-occurrence Matrix (GLCM) and noise removal with a Gaussian filter. The results of our experiments show that the suggested combination of methods—namely, classification using CNN, the model parameter tuning by BO, the texture feature extraction through GLCM, and the noise removal through Gaussian filter—produces better outcomes in terms of accuracy of 91%, precision of 0.90 and recall of 0.87 respectively. The Python programming language is the analysis device.

Keywords: Ovarian cancer classification· Butterfly Optimisation· Gaussian filter· Medical image analysis· Machine learning· Feature Extraction· Image preprocessing· Classification accuracy· Precision· Recall· Early cancer detection.

Paper ID: 48: **Early Detection of Oral Cancer Using Image Processing and Computational Techniques**

Mohd Umair Ali Siddique, Sonu Moni Rabha, Janoo Periwal, Nupur Choudhury and Rupesh Mandal

Abstract:

This study aimed to develop and evaluate a platform for the detection of oral cancer using biopsy samples of histopathological images. This study demonstrated the effectiveness of image pre-processing techniques in improving the performance of the Convolutional Neural Network (CNN) models. These findings suggest that the use of advanced computational techniques in conjunction with histopathological images can significantly improve the detection of oral cancer in clinical practice, potentially leading to better patient outcomes and a reduction in healthcare costs. Using CNN, we developed models VGG16, VGG19, InceptionV3, AlexNet, ResNet50 that showed high sensitivity and specificity for detecting oral cancer, with the testing accuracy of 84%, 82%, 67%, 76%, 42%, respectively. The study underscores the potential of deep learning and image-processing methods to revolutionise cancer detection and diagnosis.

Keywords: CNN· Oral cancer· Image pre-processing· Deep learning.

Paper ID: 49: **LoRa Enabled IoT Sensor Framework for Monitoring Urban Flood in Guwahati City**

Rupesh Mandal, Nilay Nishant, Dibyajyoti Chutia, S. P. Aggarwal, Bobby Sharma

Abstract:

In the present scenario, urban floods have become a difficult and a major problem, which is being faced all over the world, that leads to economic losses ranging from human to properties. Since the rate of urban flood related deaths as well as the financial losses are increasing at an alarming rate, the requirement for the improved flood risk management is the need of the hour. Since flood is a natural disaster, hence it cannot be prevented or completely removed, however the catastrophic impact of flood can be significantly brought down or mitigated to a great extent. Internet of Things (IoT) along with other advanced technologies could be used for prediction of flood. These technologies help in early warning systems so that evacuation operations could be done in advance to safe places thereby saving lives and preventing economic losses. This work focuses on the development and deployment of such a system which could provide risk mitigation through early warning of flood by making use of the data which is received via the IoT devices.

Keywords: Urban Flood· Internet of Things· LoRa.

Paper ID: 50: **IoT Under Attack: Designing Techniques for Mitigating Energy-Oriented DDOS Attacks on Smart Home Networks**

Prince Bhardwaj and Rajeswari Mukesh

Abstract:

The proliferation of Internet of Things (IoT) devices has made smart homes a potential target for Energy-oriented Distributed Denial of Service (E-DDOS) attacks. These attacks leverage the combined power consumption of several devices to disrupt network connections and bring down systems. Traditional mitigation strategies, such as network segmentation and firewalls, have limits in fighting against such attacks. To overcome this issue, we suggest deploying a power management system to prevent E-DDOS attacks on an IoT smart home network. Our system continuously analyses each device's power usage and takes action depending on specified power usage levels. It uses power usage data from linked devices to identify and respond to E-DDOS attacks in real time. We can effectively limit the impacts of an attack and maintain a stable network environment by intelligently managing the power consumption of devices. The solution allows you to create custom thresholds and receive alerts when they are surpassed. We observed that our power management system considerably minimises the impact of E-DDOS attacks on IoT networks through thorough testing, making it a crucial tool for maintaining the security and reliability of connected devices. By implementing this system, we can safeguard the integrity of our smart home networks and continue to enjoy the benefits of the IoT.

Keywords: Energy Consumption· Energy-Based DDOS (E-DDOS) Attack· Internet of Things (IoT)· Power Management· Smart Home Network.

Paper ID: 53: **A Survey on Real Time Crowd Detection and Management Using Vineland Social Maturity Scale: Deep Learning Study**

Sonali Rangdale, Nagesh Raykar, Nitesh Jadhav, Sujit Solav, Narayan Gayake and Samarth Nanware

Abstract:

Nowadays crowd Management is big issue for public safety. By using deep learning methodology, the behaviour of big crowd can be managed easily. The goal of the paper is to review deep learning methodologies for crowd detection and management. The system involves the use of cameras, sensors, and other technologies to monitor and analyze the movement and behavior of large groups of people in public spaces, such as airports, railway station, stadiums, and shopping malls. The goal of crowd detection and management is to improve safety, security, and efficiency in these spaces by identifying potential crowd

related problems, such as congestion, stampedes, and suspicious behavior, and providing timely updates to prevent or mitigate them. The objective of this study is to build a system which will be Effective solution for crowd detection and management. To build this application requires a multidisciplinary approach that integrates knowledge from computer science, engineering, psychology, and sociology. In this paper existing deep learning methodology Vineland Social Maturity Scale (VSMS) approach can be used or implementation of the application which will be used for public safety, event planning and public transportation. This paper is organised in different sections. Section 1 consists of Introduction. Section 2 gives Literature Survey of the research papers which are referred for study. Section 3 consists of algorithms used in papers, Section 4 is proposed architecture of the system. Section 5 is Implementation framework. Section 6 is Methodology.

Keywords: Crowd· Detection· Camera

Paper ID: 54: **Enhancing Brain Tumor Detection through Deep Learning: A Comparative Study of CNN and Pre-Trained VGG-16 Models**

Dhritiraj Barman, Amal Satheesh, James Vanlalpeka, Abhijit Bora, Gypsy Nandi

Abstract:

In this investigation, we present a comprehensive analysis of deep learning approaches employed in the detection of brain tumors. Our focus centers on evaluating the effectiveness of two distinct classification models: a CNN sequential architecture and a pre-trained VGG-16 model. Through a comparative review, we shed light on the unique advantages and disadvantages of these methodologies. Our study offers valuable insights into optimal deep learning algorithms for diagnosing brain tumors, derived from thorough experimentation and analysis. After assessing multiple models, we observed that our proposed model exhibited remarkable accuracy compared to others. Analyzing a dataset comprising 7023 MRI images, our CNN model achieved an outstanding accuracy rate of 96%. These findings contribute significantly to ongoing endeavors aimed at improving the identification and treatment of brain tumors, serving as a valuable resource for medical image analysis and deep learning researchers and practitioners.

Keywords: Brain Tumors· Deep neural network· Convolutional neural network· VGG16

Paper ID: 56: **Design and Implementation of Deep Learning Assisted Smart Wheelchair**

Nupur Choudhury, Rupesh Mandal, Anura Patgiri, Jayantajit Gogoi, Sashank Nath

Abstract:

This research paper delves into the multifaceted world of smart electric wheelchairs, focusing on their advanced control modes, wireless communication protocols, and AI-based movement capabilities. The introduction sets the stage by emphasising the potential advantages of these wheelchairs for individuals with mobility disabilities, highlighting their transformative impact on autonomy and daily life. The literature review explores technical challenges, including the absence of standardized communication protocols and the need for enhanced obstacle detection and navigation algorithms. Additionally, it discusses the integration of AI technologies, which hold promise for further enhancing these wheelchair's capabilities. The methodology section details the approaches employed for manual, remote, mobile application, and AI-based control modes. The AI-based movement mode is particularly intriguing, utilizing computer vision and image recognition to enable autonomous wheelchair following. Data preparation and dataset creation are explained, along with the YOLOv8 model architecture used for AI-based movement. The results and discussion section showcases successful implementation of control modes, with users effectively operating the wheelchairs. Additionally, the AI model demonstrates excellent performance in object detection and following tasks. In summary, this research paper provides a comprehensive exploration of smart electric wheelchairs' features and capabilities, shedding light on their potential benefits for individuals with mobility impairments and offering insights into the technical and AI-driven advancements in this field.

Keywords: AI-based movement· AI model (YOLOv8)· Assistive technology· Autonomous navigation· Smart electric wheelchairs· Wireless communication protocols.

Paper ID: 59: **Towards Development of Machine Learning Models for Fake News Detection and Sentiment Analysis**

Janrhoni M Kikon, Rubul Kumar Bania

Abstract:

The surging popularity of social media has yielded an abundance of textual data, greatly enhancing its potential for analysis. Users freely express their opinions and sentiments around the clock, irrespective of time or place. Moreover, the widespread dissemination of misinformation on social media platforms has reached alarming levels. This study focused on the development of machine and deep learning-based models namely, Random Forest (RF), Naïve Bayes (NB), Logistic Regression (LR), a Majority Voting-based Classifier, and Bidirectional Long Short-Term Memory (Bi-LSTM). These five models are designed to analyze text data for the identification of fake news and the classification of customer review sentiments. Utilising an 70%-30% train-test split, the Bi-LSTM model demonstrated an impressive accuracy of 97.11%, 92.01% in the classification of fake news and customer review sentiments, respectively.

Keywords: Text data· Sentiment analysis· Fake-news· Machine learning.

Paper ID: 60: **SEPA-CRT: SDN Enabled Direction Based Privacy-Preserving Authentication Scheme Using Chinese Remainder Theorem (CRT) for VANET**

Himun Jyoti Nath

Abstract:

Vehicular Ad-Hoc Network (VANET) provides an exchange of crucial, general safety, and traffic-related information among vehicles. However, before the exchange of this information, the vehicles must be authenticated to prevent unauthorised access. There are different techniques for authenticating the vehicles, but group-based authentication is preferred. For this reason, authentication schemes proposed by researchers are mostly group-based. However, sorting vehicles based on their moving direction has not been addressed in any of these group-based authentication schemes. A direction-based group of vehicles is possible in situations like a convoy of trucks, ambulances, or a military unit. Additionally, considering the rapid mobility of the deployed vehicles, tasks such as the formation of the group and then selecting a group leader for assigning the credentials to communicate poses a difficulty. Therefore, an authentication scheme that includes the benefits of Software Defined Networking (SDN) can administrate the data and control planes to oversee the frequent transmission of data. In this manuscript, an SDN-enabled privacy-preserving

authentication scheme using the Chinese Remainder Theorem (CRT) and IOTA Tangle, called SEPA-CRT has been proposed. The reliability and robustness of SEPA-CRT in the face of potential security vulnerabilities have been established by applying the Random Oracle Model (ROM) and the automated Scyther Tool. The effectiveness of SEPA-CRT, relative to other schemes in the literature, is validated through a performance evaluation utilizing the renowned MIRACL library.

Keywords: privacy· security· group communication· CRT· SDN· DLT

Paper ID: 62: **A Study on Measures Based on Overlapping Area for Interval Data**

Irani Hazarika and Anjana Kakoti Mahanta

Abstract:

Interval data, a specific type of symbolic data, are increasingly widespread across various fields, particularly in the domain of Data Mining. Evaluating the dissimilarity or similarity between two intervals holds significant importance in these applications. This paper provides a comprehensive review of three distinct measures commonly employed for interval data. Furthermore, it conducts a complete analysis of these measures, shedding light on their respective properties and characteristics.

Keywords: Clustering · Dissimilarity measure · Distance measure · Interval data

Paper ID: 68: **Gaussian Noise Removal in Handloom Images via Edge-Adaptive Total Variation Model**

Anindita Das, Aniruddha Deka, Sneha Sharma

Abstract:

In digital images eradicating noise plays a significant role in image processing and image analysis. Even though a wide range of techniques proposed for the intent of noise elimination in digital images, the problem still remains an open challenge in research. For a framework like an automatic handloom system where a deep learning-based network for design generation and defect detection needs a standard database for training. To produce quality output, the training input images need to be pre-processed. This paper implemented a strong edge preservation, and variational attribute model for reducing noise accordant with an edge-adaptive total variational model. The findings of the study indicate that the approach not only completely eliminates Gaussian noise, but adequately maintains the principal edge content. The performances of the method are assessed on the basis of metrics like Peak Signal-to-Noise Ratio (PSNR) and Structural Similarity Index (SSIM) evaluated in contrast to other existing methods.

Keywords: Edge-adaptive total variational model· Gaussian Noise· Handloom Image· Image Denoising· Median Filter.

Paper ID: 69: **Study and Implementation of Smart Positioner Prototype for Industrial Applications**

Rajesh M, Dhinesh Kumar S, Manoj N, Ardhra C Sunny, Sreenath Narayanan K

Abstract:

Control valves are an increasingly vital component of modern manufacturing around the world, since control valves are mechanical devices, their performance is less than ideal, and degrades over time. For a plant to perform optimally control valve performance must be tracked and maintained. Industrial positioner systems are often costly to install and maintain, with complex control systems that can be challenging to design and troubleshoot. Pneumatic valves Positioner typically are very simple and do not implement integral control. In this project a novel low-cost Smart Positioner is designed and developed to improve the performance of control loops. A new, cost-effective, and easily controllable system is required to meet these needs. This paper proposes a smart embedded-based positioner system built with the STM32 MCU and FreeRTOS operating system. Supporting multiple communication protocols such as UART, I2C, SPI, and Bluetooth through which the system can be seamlessly integrated into existing industrial control systems. The system's hardware design includes sensors, actuators, and communication modules, along with a rotary encoder to read the angle accurately and is used to give feedback signals to the controller of the current position of the control valve. A specially designed smart embedded control system which is cascade in nature increases the performance of the control system and the performance metrics such as Rise time, Settling time and Steady state errors evaluated found improved after implementing smart Positioner. The low-cost smart Positioner uses a cortex M4 microcontroller and open IDE for building the software to run the proposed system.

Keywords: STMicroelectronics· ARM Cortex· FreeRTOS· Bluetooth

Paper ID: 70: **Enhancing Accessibility for the Visually Impaired: A Multimodal Approach**

Rohit Saini, Anita Budhiraja, Dr. Sarwan Singh

Abstract:

In order to empower people with visual impairments, this paper reveals a carefully constructed tapestry of technology that effortlessly blends the powers of artificial intelligence, computer vision, and increased accessibility. The suggested solution integrates state-of-the-art models (CLIP, YOLO, BART) with real-time data from Weather and Location APIs to accurately interpret the nuances of the user's environment. What comes out is a subtle, yet potent, awareness that empowers blind people to navigate the world with renewed confidence. The quiet translation of data into understandable, context-aware Text-to-Speech (TTS) audio is

the true beauty of this innovation. Users are guaranteed to receive not just data but also a subtle, nuanced narration of their surroundings thanks to this inconspicuous transformation. It is a technological symphony played in a gentle, empowering key that allows people who are visually impaired to engage with the outside world in a more personal and meaningful way. The paper presents a redefined picture of accessibility through the subtle integration of advanced technologies, subtly altering the dynamics of human-robot interaction.

Keywords: Image Captioning· Multi-model fusion· Object Detection· Text Summarization· Visually Impaired.

Paper ID: 72: **Blockchain-Based Certificate Verification System: A Decentralised Approach**

Lovnish Verma, Anita Budhiraja and Sarwan Singh

Abstract:

As technology continues to shape aspects of society there is an increasing demand, for secure methods to verify academic certificates. This research paper introduces an approach that utilises technology to address this crucial challenge. The goal of the research is to create, implement and assess a system powered by Blockchain that enhances the security and trustworthiness of verifying certificates. Using techniques smart contract development and leveraging technology our methodology ensures that academic certificates are securely stored and validated. By decentralising the verification process and utilising trustless contracts this approach reduces the risk of claims while also providing scalability and cost effectiveness. This paper contributes to the field of education technology by offering a solution for verifying certificates taking advantage of the transparency and security features inherent in Blockchain technology.

Keywords: Academic Certificates· Blockchain Technology· Certificate Verification· Cost Effectiveness· Decentralised Verification· Education Technology· Security· Smart Contract Development· System Implementation· Technology Trustworthiness

Paper ID: 73: **Automatic Schizophrenia Detection Using Discrete Wavelet Transform from EEG Signal**

Sweta Bhadra and Chandan Jyoti Kumar

Abstract:

This study investigates the integration of Discrete Wavelet Transform (DWT) with both machine learning (ML) and deep learning (DL) techniques to enhance the diagnosis of schizophrenia (SZ) using EEG data. Current diagnosis relies on subjective clinical assessments, presenting challenges in differentiation from other mental disorder. DWT, with its ability to capture both temporal and spectral information, serves as a valuable feature extraction method. ML models, including Support Vector Machines (SVM), Random Forest (RF), and Gradient Boosting, demonstrate improved performance with feature reduction, achieving accuracy rates up to 77.81%. DL models, particularly Multilayer perceptron and Convolutional Neural Network (CNN), outperform ML models, with Multilayer perceptron reaching an impressive accuracy of 88.96% and CNN at 81.77%. These results highlight the potential of DL techniques for precise SZ diagnosis, paving the way for efficient treatment approaches and outcomes in the future.

Keywords: Schizophrenia· DWT· Machine learning· Deep learning· CNN

Paper ID: 76: **An Overview of Optimisation Methods in Leaf Defect Detection**

Srabani Patikar, Anindita Das,and Sahil Kumar Singh

Abstract:

For agricultural production and food security to be achieved, plant leaf disease identification is essential. This study investigates an advanced way to handle this challenge by using picture segmentation approaches that have been optimized by state-of-the-art algorithms. The project concentrates on precisely identifying and characterising diseased areas on plant leaves in order to enable quick and targeted actions for disease prevention. The suggested methodology combines segmentation, optimisation, and image processing techniques to improve the efficacy and accuracy of leaf disease identification. The input images first undergo noise reduction, normalisation, and feature extraction preprocessing procedures. Segmentation techniques are then used to distinguish between damaged and healthy leaf sections. During this stage, the segmentation procedure is polished utilising optimisation techniques such genetic algorithms, particle swarm optimisation, or glow swarm optimisation. These optimisation techniques make segmentation parameter adjustments iteratively to achieve the best fit for the supplied dataset. The paper assesses and contrasts various optimisation algorithms, taking into account their computational effectiveness, accuracy, and speed of

convergence. Selecting the best optimisation strategy for the particular leaf disease dataset under consideration is made easier with the use of comparative analysis. Experimental findings suggest that the proposed method is superior to conventional ones, with greater accuracy rates and fewer false positives. In addition to improving the accuracy of disease identification, the optimized picture segmentation also enables real-time or almost real-time analysis, which is vital in agricultural environments where quick responses are crucial.

Keywords: Genetic Algorithms· Glow swarm optimisation· Image segmentation· Optimisation algorithms· Particle Swarm Optimisation

Paper ID: 78: **Efficient Handwritten English Word Detection with Neural Networks**

Subhrojit Saikia, Monita Wahengbam, Jyotirmoy Deka

Abstract:

In today's digital era, the imperative to digitise documents is undeniable. As the world transitions towards an increasingly paperless environment, the need for accurate and efficient methods of converting handwritten content into digital format becomes crucial. This research addresses this demand through the development of an Intelligent Word Recognition (IWR) model. Employing advanced deep neural network architectures, including Convolutional Neural Networks (CNN) and Long Short-Term Memory (LSTM), the model is meticulously trained on a dataset sourced from Kaggle. The outcome of Convolutional Bidirectional Long Short-Term Memory Connectionist (CBLC) IWR model endeavour is a highly effective system that achieves a remarkable 96.71% word accuracy, showcasing its proficiency in the accurate extraction of handwritten english words. This research contributes to the ongoing efforts in enhancing document digitisation processes, offering a potent solution for handwritten word detection.

Keywords: Intelligent Word Recognition (IWR)· Convolutional Neural Networks (CNN)· Long Short-Term Memory (LSTM)· Connectionist Temporal Classification (CTC)· Neural Networks· Convolutional Bidirectional Long Short-Term Memory Connectionist (CBLC).

Paper ID: 82: **Homology Modeling and Molecular Dynamics Simulation Study of *Balitora brucei* Gray, 1830 HSLBB Cytochrome Oxidase Subunit-1 Gene**

Gitartha Kaushik, Saurav Mahanta, Sabitry Bordoloi

Abstract:

Present study describes the homology modeling and MD simulation study of HSLBB COI gene of Balitora brucei. The barcoded sequences of the selected fish species (KY800366; KY867680) were processed by Modeller and 38 related homologs were obtained. Based on the lowest E-Value, 3AQ2A was selected as the template for the analysis. Among the five obtained, AQP2.B7777906 was found to be the best model with the smallest DOPE value. ERRAT score of generated model was found to be 86.818%. The ProQ result shows the LG score of the model as 3.708 which signifies that the model lies in good-quality protein model range.

Keywords: Homology modeling·*Balitora brucei*· Cytochrome oxidase subunit-1 gene· Simulation study·Ranganadi·Assam.

Paper ID: 83: **MuBDA: Multimodal Biometric Data Analysis for Gender Classification Using Deep Learning Techniques**

Shivanand Gornale, Sathish Kumar, Kruthi R

Abstract:

In recent years, technological advancements have led to an increased focus on security measures for individuals due to the prevalence of inappropriate behavior in society. Biometric applications play a vivacious role in the security authentication and authorisation of individuals in day-to-day life activities. These applications are used in a diversity of fields, including healthcare, forensic applications, and in the court of law. The proposed work emphasises the importance of multimodal biometric traits in the demographic characteristic analysis of an individual. A total of 3510 faces and offline handwritten signatures were collected from 193 male and 158 female volunteers. Transfer learning models were used to analyse the features and classify the data. The algorithms outperformed state-of-the-art techniques and produced comparable results.

Keywords: Face Images·Offline Handwritten Signatures· Multimodal Biometrics· Transfer Learning Architectures.

Paper ID: 86: **Spectral Insight: Doppler Spectrogram Analysis via CFFT with DSP and MATLAB CCS**

Harsha Jain, Yogesh Kakasaheb Shejwal, Pawan G Alhat

Abstract:

Doppler spectrogram computing is a crucial technique in several fields, including radar systems, remote sensing, and medical imaging. This abstract provides an overview of a method for computing the Doppler spectrogram using the Cooley-Tukey Fast Fourier Transform (CFFT) with Digital Signal Processing Suite (DSP) and MATLAB Code Composer Studio (CCS). The process begins with the collection of raw data using a Doppler radar or ultrasound device and inputting it into a DSP suite. In addition, MATLAB CCS provides tools for real-time visualization and analysis of spectrograms, allowing engineers and researchers to monitor Doppler shifts and monitor moving objects or tissue properties in real time. This technique bridges the gap between raw data acquisition and meaningful spectrogram visualisation, making it invaluable in areas where Doppler analysis is essential. Using the computational power of CFFT and the flexibility of MATLAB CCS, this approach improves the accuracy and efficiency of Doppler spectrogram calculations, ultimately promoting research and applications in areas such as radar systems, remote sensing, and medical imaging.

Keywords: Doppler Spectrogram· Remote Sensing· Digital Signal Processing in Real Time· Medical Imaging Radar· Time-Frequency Analysis· Ultrasound Doppler

Paper ID: 87: **Audio Data Feature Extraction for Speaker Diarisation**

Vinod Pande, Vijay Kale and Sumegh Tharewal

Abstract:

In many applications, such as transcription, speaker identification, and audio indexing, speaker diarisation—the process of dividing audio data into different speaker segments—is crucial. The speaker diarisation algorithms for audio data utilising the Python Librosa module are the main topic of this research study. A strong Python library for analysing audio and music is called Librosa. It offers a number of features for extracting audio features, including MFCC, Spectrogram, Chromagram, and Spectral Contrast. This study offers helpful advice on how to extract features from audio data.

Keywords: Speaker Diarisation· Spectral Contrast· Feature Extraction· MFCC· Chromogram· Spectrogram.

Paper ID: 94: **Application of Secure Data Transmission by Integrating QR Code with Visual Cryptography**

Anil B. Alde, Vikas T. Humbe

Abstract:

A QR code is a Quick Response code and it is a two-dimensional barcode that can be read by a QR code scanner, a smartphone with camera or by a QR code reader application. QR codes are often used to provide quick access to information or to link users to a website or application which is often helpful for growing business. With the wide application of QR code, the security problem of QR code is serious, such as information leakage and data tampering. Anyone can scan the QR code and access the data hidden in the QR code, which means access to the data is public or global and not used for private purposes or for sharing confidential data. To solve all these problems, this paper proposed a methodology to secure confidential data as well as provide multilevel security while transmitting data through communication channels by integrating QR codes with Visual Cryptography (VC). By using the proposed methodology, QR codes can used for private purposes to transfer confidential information securely and hiddenly over the internet.

Keywords: Mean Square Error (MSE)· Random Grid Visual Cryptography Scheme (RGVCS)· Visual Cryptography (VC).

Paper ID: 98: **Event Uncertainty for Twitter Data Using Thematic Context Vector**

Vaibhav Khatavkar, Swapnil Mane, Parag Kulkarni

Abstract:

One of the critical steps in text mining is keyword extraction. Extracting keywords along with their respective contextual events in Twitter data poses a significant challenge due to language informality, encompassing acronyms, misspelled words, synonyms, transliteration and ambiguous terms. The current systems for keyword extraction rely on either pattern-based or event-based approaches. In this paper, keywords are extracted using contextual events with the assistance of data association. The thematic context vectors for events are identified using the uncertainty principle in the proposed system. The system is tested on the Twitter COVID-19 dataset and proves to be effective. It extracts event-specific thematic context vectors from the test dataset and ranks them. The extracted thematic context vectors are then utilized for the clustering of contextual thematic vectors, improving the silhouette coefficient by 0.5% compared to state-of-the-art methods, namely TF and TF-IDF. The thematic context vector can be applied to other applications such as cyberbullying detection, sarcasm detection, figurative language detection, etc.

Keywords: Event identification· thematic context vector· keywords extraction· Time Series· event clustering.

Paper ID: 99: **An Advanced Object Detection and Face Recognition System to Assist Visually Impaired People**

Aniruddha Deka, Parag Jyoti Das

Abstract:

Vision is the most important sense among the five human senses. It is required for a person to interact with his surroundings. Being visually impaired hinders a lot of day-to-day activities. Thus, it is very necessary for blind people to understand their surroundings, and to know what objects they interact with. This work proposes a system which will detect objects, estimate distance of objects and recognise faces to aid a visually impaired person to understand his/her environment by describing the presence of objects and faces in the form of audio. This system is implemented in a form of a portable, battery powered wearable device which consists of a single board computer, stereo camera and headset components. It integrates object detection and face recognition algorithms to build a fast and efficient application which will narrate the description of the environment to the user.

Keywords: Object detection· COCO dataset· Face Recognition· Visually Impaired· Tiny YOLO V2.

Paper ID: 106: **A Brief Study of Prompting Techniques for Reasoning Tasks**

Satyavrat Gaur, Anjali Dagar, Aanchal Punia, Pushpendra Kumar

Abstract:

In recent times, there has been a growing interest in the capabilities of Large Language Models (LLMs). Prompting techniques give an efficient way to guide the LLM and get better results. The process of designing a prompt that can generate the desired output is iterative. Here, we review different prompting techniques available for solving complex reasoning tasks. It discusses how these techniques affect the accuracy and efficiency of LLMs when they are used to address reasoning tasks. Furthermore, this survey may work as a starting point for individuals who are new to the field of prompting. This work also contains a comparative analysis of the results of different prompting techniques to assess their accuracy.

Keywords: Natural Language Processing· Prompting, Reasoning· LLM.

Paper ID: 109: **Digital Sign Language Interpreter to Let World Learn and Communicate- A Developmental Approach**

Sandeep Kumar Ahlawat

Abstract:

Understanding Natural Languages by machines with development in Natural Language Parsing (NLP) and Artificial Intelligence (AI) has exhibited various transformations and has emerged with various use cases of interest to human specifically decision making. Intent of present-day researchers is to achieve General Intelligence in machines. Around 5% of the world population is hearing impaired and India has a high volume of dead people. The Indian Sign Language (ISL) being used in India sub-continent though it has many variants specific to local regions commands high size of user base (i.e. 1,500,000 users) after the American and Chinese Sign Languages. All sign languages exist with variations at different levels of phonology, lexicon, and grammar. So far, interpreters of various sign languages are needed for communications at meetings and conferences etc. The requirement of a global sign language remained evident and always supported by international academic and business communities. Application of Natural Language Parsing (NLP) and AI on developing machine interpreters of Sign Language(s) and Natural Language(s) would be game changer towards developing, maturing various prevalent sign languages and validating these across the globe. It would not only be opening up communication barriers among communities of Deaf and Dumb persons across the globe, rather the persons having normal hearing would be able to communicate easily with Deaf and Dumb persons. An Intelligent Interpretation Model is outlined which would pave the way to develop sign-based communication systems capable of generating sign animation based upon text or voice and also to interpret sign language video to text and or voice. It would open up communications among deaf communities and others with global validation that would self-enhance its intelligence along with its usage.

Keywords: Speech· Hearing· Impaired· Sign Language· Natural Language Parsing· Artificial Intelligence· Digital Interpretation.

Paper ID: 110: **Data Extraction on Damaged Mobile Device: A Forensic Case Study**

Surajit Paul, Binoy Das, Debaraj Rana

Abstract:

Data extraction from damaged mobile phones is essential in digital forensics and recovery. Mobile phones have become essential to modern life and contain a wealth of personal, financial, and confidential information. However, accidents, hardware failures, and other mishaps can damage our phones and make it difficult to access the stored data. Forensic laboratories are regularly faced with mobile phones being exposed to damage that can be the outcome of purposeful attempts to abolish device data permanently. This article will cover an essential case study of a mobile device seized in a damaged or broken condition whose analysis of the circuit board and consequent actions led to getting vital evidence from it. This article examines the various processes of data extraction from nonworking mobile phones that could become vital evidence on that mobile device. Also, this discussion will highlight emerging technologies and their impact on dead or damaged phones based on the extracted evidence.

Keywords: Mobile forensics· JTAG· Chip off· JTAG· Chip-Off· data extraction· data description.

Paper ID:113: **Comparative Analysis of Negative Customer Review of Payment Apps: A Data Mining Approach**

Ranjit Singh, K Kajol, Bhartihari Pandiya, Lokendra Puri, Lata Pandey, Suman Agarwal, Sahiba Khan

Abstract:

The Digital Payment market is growing at unprecedented rates in India. This can be attributed to the introduction of the Unified Payment Interface (UPI). It has completely disrupted the digital payment space by effectively increasing the user base of digital payments multiple times in India. However, any market innovation's success or failure is heavily influenced by how consumers perceive it. Therefore, the study aims to know the perception of UPI users by using the sentiment analysis technique. The data on consumer behaviour was scraped from the latest Google Play Store reviews using Python scripts. After the data pre-processing, Exploratory Data Analysis and Word Cloud Analysis were done. Interesting findings from the analysis were found concerning the top three payment apps: GPay, Paytm and PhonePe. The research also presents a few managerial implications which could be applied for better customer experience. The goal of these payment apps should be toconvert negative customer reviews into positive ones.

Keywords: Payment Apps· Mobile Payments· Negative reviews· Python· Exploratory Data analysis.

Paper ID: 115: **Examination of Broken or Non-Responsive Touch Screen Display Mobile Phones**

Locktongbam Nato

Abstract:

Non-responsive touch screen or broken touch screen display panels in mobile phones which may be caused deliberately or accidentally are encountered by the Mobile Forensic Examiner. In such cases, extraction of data from mobile phones is extremely difficult as the mobile phones require a debugging process to synchronise with the tools for extraction. In routine practice, debugging settings are carried out on the touchscreen display panel of mobile phones. As such, extraction of data from mobile phones with non-responsive or broken touchscreen display panels is usually unsuccessful. An approach has been made to extract data from these types of mobile phones using the Bootloader method in Cellebrite UFED Touch2. The methodology and results are presented in this paper. The objective of this study is to explore the possibility and probability of extraction of data from an aberrant environment of mobile phones in Digital Forensics.

Keywords: Bootloader · Broken display · Mediatek Chipset· Mobile Forensics· Non-responsive display· UFEDTouch2.

Paper ID:116: **Tactile Internet: A Next Gen IoT Technology**

Dharmendu Sekhar Rout and Md. Iftekhar Hussain

Abstract:

The Tactile Internet aims to empower communication technology and move towards the environment to fabricate everyday life effortless. A remarkable communication network is an intrinsic part to perceive touch and real-time haptic feedback through haptic devices and suitable robotics. The sixth generation (6G) will hinge on this emerging internet to make it the epitome of the modern communication horizon. This paper constitutes the fundamental belongings of the Tactile Internet, various techniques, simulations and the communication network, i.e., 6G. The Tactile Internet's architectural components and primary technology needs, AI-based capabilities, strong communication network and slicing techniques are outlined here. This paper also emphasises on the impact of Tactile Internet in industry segment specifically healthcare to make it virtually driven sagaciously.

Keywords: Tactile Internet· Sensor· Actuator· 6G· IoT·Mobile Internet, Haptic Communication· Ultra Reliable Low Latency· Network Slicing·WiFi· WIMAX.

Paper ID: 118: **A Deep Learning Approach for Hardware Trojan Detection in Netlist of Integrated Circuits with Graph Neural Networks**

Anindita Chattopadhyay, Siddharth Bisariya and Vijay Kumar Sutrakar

Abstract:

Ensuring the integrity and security of integrated circuits is paramount in today's digital age, as hardware Trojans (HT) pose a significant threat to both critical systems and sensitive data. In this paper, a deep learning approach for HT detection using graph neural networks (GNNs) in list-based designs is presented. GNN's ability to capture intricate patterns and relationships within the data is utilized by modeling the circuit as a graph, with components as nodes and their connections as edges. The approach focuses on learning the inherent structure of the Netlist, thereby enabling the automatic identification of anomalous and potentially malicious insertions. The proposed GNN model shows an average accuracy of 99.6%, recall of 95.2%, F-measure of 96.4%, and precision of 100%. The above parameters are obtained across different designs considered in the present paper.

Keywords: Deep Learning· Graph Neural Network· Hardware Security· Hardware Trojan Detection· Netlist

Paper ID: 119: **A Transformer-Based Approach for Fruit Spoilage Identification**

Mayuri Sharma, Hemanta Chutia, Chandan Jyoti Kumar

Abstract:

One of the most significant problems in the fruit industry is fruit spoilage, which creates categories of losses across all fruit types. The main objective of the current study is to develop a transformer-based system for identifying spoilage of fruit and reducing waste. It employs Vision Transformer (ViT) to identify fresh and spoiled fruit categories among eight types of fruit. The experimental findings indicate that transformer-based fruit spoilage identification system can attain a high performance without the need for destructive analysis. With a high accuracy (99.89%) attained in distinguishing fresh fruit from spoiled fruit, the proposed system may be useful for improving real-time fruit quality and spoilage assessments, thereby improving food management efficiency.

Keywords: Fruit· Spoilage· Transformer· Machine Learning· Deep Learning

Paper ID: 122: **Epidemic Modeling and Applications of Lagrangian Model through MATLAB Tool**

Rima Devi, Balendra Kumar Dev Choudhury

Abstract:

In the present work, Lagrange's equation of motion is applied to analyse the dynamic nature of the as-developed SIR model and to accurately estimate the Chicken pox outbreak in the Kharghuli area in the Kamrup (M) district of Assam, India. The dynamical system of Ordinary Differential Equation (ODE) is used to study the as-developed model, incorporating the partial Lagrangian function of the suspected population assuming that the death rate at any epidemiological compartment is greater than or equal to 0 and a birth rate equals the death rate, thus ensuring that the total population size is constant. For an outbreak duration of 10 days, the dynamic rate of the suspected population is analyzed, and observed that the possibility of recurrence of the disease is also an important factor as human mobility is multi-scale in temporal and spatial dimensions.

Keywords: Epidemiology· Lagrange's equation· SIR Model· Mobility.

Paper ID: 123: **A Study on Performance of Mathematics, Programming and Practical Courses Among Female Students from Technical Education Using a Deep Learning-Based Interpretability Framework**

Mousoomi Bora, Rupam Baruah

Abstract:

The Mathematics, Programming, and Practical courses are herculean task for most of the students pursuing their study in the field of engineering and technology. This study has explored the performance of female students in these three categories pursuing Bachelor in Technology (BTech) in Computer Science and Engineering (CSE). A Deep Learning (DL) based prediction model is proposed to evaluate the academic performance of students at the end of their BTech days measured by cumulative grade point average (CGPA). The model is based on two deep learning methods - Convolutional Neural Network (CNN) and Bidirectional Long-Short-Term-Memory (BiLSTM). The overall predicted results are interpreted using an interpretable supervised clustering framework. A comparative study is performed using two baseline models – Long-Short-Term-Memory (LSTM) and Gated Recurrent Unit (GRU) to check the acceptability of the proposed model. The empirical results confirm that the losses encountered in the proposed model in terms of Mean Square Error (MSE) and Mean Absolute Error (MAE) are less than the other two base-line models that improve the overall performance. The results mirrored from the proposed model has established the fact that the trend of female student's performance in Mathematics, Programming and Practical courses is comparatively lower compared to the male students.

Keywords: Sequential dataset· CNN- BiLSTM· Performance metrics· Interpretability framework

Paper ID: 124: **A Comparative Study of JPEG and Similar Compression Standards for Wireless Communication**

Priyanka Hazowary, Nilotpal Talukdar, Sushanta Kabir Dutta, Rupaban Subadar

Abstract:

Image compression should save storage space while preserving the image's quality information. Due to the significance of compression, different approaches, and methods to store and transmit pictures across the networks have been periodically developed. Wireless networks are largely utilized as channels for the transmission and reception of multimedia files, including pictures, sounds, and movies. We have examined the performance of three commonly used transform-based image compression approaches using Discrete Cosine Transform, Discrete Wavelet Transform, and Discrete Sine Transform in terms of Peak Signal-to-Noise Ratio and Mean Square Error when transferring pictures via wireless channels. This paper introduces a consistent quantization table and DST as a tweak to the widespread JPEG compression approach. Comparisons are made between the proposed approach and current standards, and its performance is evaluated.

Keywords: Image compression· JPEG· DCT· DWT· DST.

Paper ID: 125: **Nanomaterials for Wound Healing Applications: A Review**

Nairika Deka, Devabrata Sarmah, Sunandan Baruah

Abstract:

Proper wound care management is a substantial clinical concern and now wound care products are in high demand. In recent years, research and development have reached new heights in the development of dressing material for wounds and there is a much better understanding of the pathophysiology of chronic wounds. Nanotechnology provides exceptional techniques to accelerate the healing of delayed, acute and chronic wounds by stimulating appropriate movement through the various healing phases. Small nanomaterials, nanoscaffolds, nanofibers and biomaterials are utilised in nanotechnology for topical medicine delivery and healing of wound. The usage of nanomaterials for biomedical and pharmacological applications has grown in popularity in recent years. As a result, a significant proportion of nanomaterials are used in diverse biomedical applications such as dressings for wound. Nanoparticles such as silver, gold, zincoxide, titaniumdioxide, ironoxide, etc. are being increasingly used for their favorable effects on healing wound, also for treating and preventing bacterial infections. This review focuses on current studies concerning the usage of nanomaterials in healing wound.

Keywords: Wound, healing· nanomaterials· nanocomposites· antimicrobial· bandages.

Paper ID: 126: **Streamlining Examination Seating Arrangements through Prompt Engineering: An Innovative Approach**

Vanlalhmangaiha Khiangte, Vanlalhruaia, T. Gunendra Singh

Abstract:

Academic institutions place great importance on the efficiency and fairness of their examination seating arrangements. To address this, our paper introduces an innovative strategy termed "Prompt Engineering" that seeks to simplify and enhance the process of creating these seating plans. "Prompt Engineering" utilises advanced technologies, such as generative AI and optimisation techniques, with the goal of fundamentally transforming the design and execution of seating arrangements. The primary objective is to streamline the traditionally labor-intensive task of allocating students to seats. By harnessing the power of these cutting-edge tools, this approach promises to significantly expedite the process and ensure equitable, bias-free, and optimised seating plans for academic examinations. This pioneering strategy thus goes beyond mere expeditiousness; it champions a holistic transformation in the examination seating paradigm, promising not just efficiency but also equity and optimisation. In essence, "Prompt Engineering" emerges as a cornerstone for academic institutions striving to enhance the examination experience, ensuring that the seating arrangements align with the evolving landscape of technology and educational fairness. In addition to its technological prowess, "Prompt Engineering" fosters a culture of transparency and accountability in the allocation process. The utilisation of optimizstion techniques means that decisions regarding seat assignments are not arbitrary; rather, they are based on a nuanced analysis of various criteria. This transparency not only instills confidence in students and faculty but also provides a data-driven foundation for continuous improvement.

Keywords: Generative AI· Palm API· AESA· Prompt Engineering

Paper ID: 128: **Exploring the Challenges and Opportunities of Making STEM More Accessible to Specially-Abled Persons Using Assistive Technology**

Binoy Das, Jayanta Pal

Abstract:

In recent years, the importance of accessibility in education has been increasingly recognised. People with special disabilities face many challenges when accessing Science, Technology, Engineering and Mathematics (STEM) education. These challenges range from physical barriers to cognitive difficulties, but they all contribute to significant inequalities in educational opportunities. STEM education plays an important role in shaping the future of society and must be accessible to everyone, including people with special disabilities. On the other hand, Assistive Technology (AT) has proven to be a powerful tool to address these challenges and make STEM fields more inclusive. Various initiatives have been reported for the facilitation of Assistive Technology in improving the accessibility of STEM. However, there exist numerous challenges in implementing the same for the person with disabilities. On the flip side, with the advancement of technology, an ample amount of opportunities have been knocked in. This research report explores the challenges people with special disabilities face in accessing STEM education and identifies various assistive technologies that can help overcome these barriers. The potential benefits of STEM accessibility to the SAPs are also investigated along with the opportunities.

Keywords: Specially-Abled Persons· Assistive Technology· Learning Disabilities· Cognitive Science· STEM

Paper ID: 130: **Prompt Engineering for the Automated Generation of Weaving Pattern**

Vanlalhruaia, Vanlalhmangaiha Khiangte

Abstract:

This research explores the concept of prompt engineering as a powerful methodology for the automated generation of weaving patterns. We investigate the application of generative AI methods to facilitate the creative process of designing new weave patterns employing fundamental weave patterns as the foundation. Prompt engineering involves meticulously constructing prompts and instructions to leverage the capabilities of AI models in producing novel and complex weave designs. The study underscores that prompt engineering not only expedites the weaving pattern creation process but also serves as a catalyst for heightened creativity and efficiency within the textile industry. By carefully curating prompts, designers can guide AI models to produce designs that seamlessly blend traditional craftsmanship with cutting- edge technology. This fusion not only pushes the boundaries of creative expression but also facilitates the incorporation of technological advancements into the age-old art of weaving. The research marks a significant stride toward revolutionising textile design methodologies. It showcases the transformative potential of AI-driven prompt engineering, offering a bridge between artisanal practices and contemporary technological tools. As the textile industry embraces these innovative approaches, the synthesis of human creativity and artificial intelligence becomes a powerful force, paving the way for a future where intricate and unique weaving patterns are crafted collaboratively by human designers and intelligent machines.

Keywords: Generative AI· Palm API· Prompt Engineering· Weave Pattern

Paper ID: 131: **IoT-Based Transport Monitoring System for Pharmaceutical Industry**

Jisna Thomas, Ishant Kumar Bajpai, Shoukath Cherukat, Lalmohan KS

Abstract:

Medications have a crucial impact on patient's lives, serving as essential resources for managing and enhancing health. They address a wide range spectrum of medical conditions from acute illness to chronic diseases, helping in relieving symptoms, controlling disease progression, and enhancing overall well-being. On the other hand, they are highly sensitive products that require meticulous attention to their storage and transportation due to their delicate composition and the critical role they play in healthcare. The IoT-based transport monitoring system for the pharmaceutical industry is a technological solution that is designed to ensure the safe and efficient transportation of medical supplies, medications, and other healthcare products. The primary goal of the system is to maintain the integrity and quality of sensitive goods throughout the entire transportation process from the point of origin to the destination. Many medical products such as vaccines, medications, insulin, etc. are highly sensitive to temperature fluctuations, and humidity levels, for instance, vaccines can become ineffective if exposed to temperature outside the recommended range. A growing range of medical products now necessitate controlled storage and transportation environments, specifically within the temperature range of 2°C to 8°C. It is imperative to ensure that these medical items are consistently kept within this narrow temperature range, just above freezing, throughout the entire distribution process.The comprehensive monitoring system is developed as a multi-node system and has multiple embedded modules, which read the temperature and humidity values, using the sensors placed strategically placed within the transport container or the packaging unit. These sensors continuously measure the conditions and transmit real-time data to a central hub via the gateway using the ZigBee-based RF communication, and from there the data is uploaded to the cloud and the users can access data using an Android app.

Keywords: IoT· Pharmaceuticals· Ubimote-SEZ microcontroller· Gateway·ThingSpeak· ZigBee communication· Android App.

Paper ID: 133: **Non-intrusive Remote Apiculture Monitoring System**

Shoukath Cherukat, Ishant Kumar Bajpai, Priya Tharshini S, Nabeela Gulam Khader, Lalmohan KS

Abstract:

This paper presents the design and implementation of a remote bee hiving technology for providing beekeepers a remote facility to gather information related to bees inside the hive. Bees help at least 30% of the world's crops and 90% of the world wild plants to thrive via cross pollination. Studies show that beekeepers lose significant percentages of the bee colonies during certain environmental conditions. Causes for this decline are overall hive health. The healthier the hive the more likely it is to survive. At present the most difficult problem is to understand the internal situation of the beehive with least disturbance to the bee colony. The production of honey depends on many factors, some of which are environmental factors such as temperature and relative humidity. Apiculture monitoring is the process of systematically observing and managing bee colonies, typically within the context of beekeeping or apiculture. Monitoring is crucial for the health and productivity of bee colonies, as it allows beekeepers to assess the condition of the hive, identify potential issues, and take appropriate actions to ensure the well-being of the bees. In the system proposed here, it has the process of collecting parameters like temperature, humidity and weight of a beehive and sending that data to the bee hive farmer. The prototypes are developed with Arduino Uno and ARM Microcontroller platforms. With this non-intrusive and low-cost system, farmers can monitor their beehive's characteristics non-intrusively from long distance using a mobile phone. The system has been implemented with prototype designs. The first protype of this remote monitoring system for beehive is developed using Arduino Uno Board and the Arduino IDE software tool. The second advanced prototype is developed with ARM Cortex M4 based hardware and Keil uVision software tool. In addition, CubeMX is used as a code generator tool. The DHT11 sensor is used for collecting physical parameters such as temperature and humidity condition of the bee hive, and load cell HX711 weight sensor for the purpose of weighing the weight of honey hive. GSM module is used to transfer the data to the beehive farmer through message.

Keywords: Remote Monitoring· Beehive· ARM Cortex Microcontroller· GSM Module· sensor· message.

Paper ID: 134: **IoT Network Intrusion Detection Using Federated Learning**

Linthoingambi Takhellambam, Urikhimbam Boby Clinton, Yambem Ranjan Singh, Chinglensana Chandam, Khumukcham Robindro Singh, Nazrul Hoque

Abstract:

With the enhanced facilities the Internet of Things (IoT) provides, everyday life has become more convenient, enabling us to control home security, monitor patients, and even self-driving cars. While regular users find this ubiquitous nature of the IoT network convenient, malicious users or attackers view it as a vulnerable target for launching attacks. The IoT architecture's inherent vulnerabilities in each layer create opportunities for potential security breaches. One of the immediate concerns in the various vulnerabilities of IoT networks is data privacy and security. Therefore, to tackle the issue of data privacy, we have experimented on a Federated Learning (FL) technique to identify IoT network intrusion using Deep Neural Network (DNN). To implement the FL scenario, we leveraged the client-server (C-S) socket communication technique. The C-S-based FL models are validated on three IoT intrusion datasets, viz., MQTTset, N-BaIoT, and the ToN_IoT dataset. The experimental analysis demonstrates that the FL method excel the centralised learning (CL) approach, ensuring data privacy for multiple clients (Cs).

Keywords: Data-privacy· Deep Neural Network· Federated Learning· IDS· IoT.

Paper ID: 135: **Impact of Repair and Maintenance of Hospital Equipment on Health Services in Government Hospitals in North –Eastern Region of India**

Kumar Amitabh, Anurag Mathur

Abstract:

The electro-medical devices play an important role in any hospital and health care institution in providing better health services in terms of treatment and diagnostics, to the people. The repairing and maintenance of electro-medical equipment and proper management of regular maintenance is an important aspect of any health care institution, particularly in the North-Eastern regions of India where there is scarcity of spare parts of electro-medical equipment and poor maintenance services due to geographically hard region thereby effecting the health services critically. It helps to improve the health services, keep the devices in proper working condition which is essential for accurate diagnostics and proper treatment, avoid the unwanted expenditure in procurement of new devices and increases the life cycle of medical devices. The present work was focused on survey of the health status of electro-medical equipment, do the repair and maintenance of lower and medium range equipment and analyze the impact of the same on health services. For this, the government hospitals in the state of Tripura, were chosen and a comprehensive survey was done from 2013 to 2017. During this duration, repair and maintenance was also carried out and impact analysis on health services were done. Training of basic maintenance procedures was provided to more than 75 hospital personals and others working in related areas. Analysis of the data revealed that the basic cause of failure or malfunctioning of electro-medical equipment were – miss handling of the device, lack of knowledge of basic maintenance, unavailability of spare parts and lack of prompt maintenance services by the professionals. Timely repair and maintenance of electro-medical devices helped to improve the health services provided by the respective hospitals. It also helped to prevent the malfunctioning of the devices, reduce the down time and increased the life time of the device. The training to the hospital staff helped to improve them know how about the maintenance procedure of the electro-medical devices.

Keywords: electro-medical devices· preventive maintenance· breakdown maintenance· malfunctioning· downtime

Paper ID: 136: **Electricity Theft Detection in India Using Big Data Analytics and Machine Learning**

Meenu Dhir

Abstract:

Electricity theft is a longstanding concern in India, leading to significant revenue losses and disparities in energy distribution. With the growing digital transformation in the energy sector, there is an emerging opportunity to leverage Big Data Analytics, Internet of Things (IoT) and Machine Learning (ML) to address this challenge. This article presents a comprehensive system designed to detect electricity theft using data analytics and anomaly detection. Drawing on a rich dataset from electricity metres and IoT devices, our model applies ML algorithms to identify suspicious patterns indicative of theft. By integrating this model with Tableau-based reporting tools, utilities can visualise theft-prone regions and take corrective action. While the potential benefits are substantial, implementing such a system in the diverse Indian landscape presents itsown set of challenges, from infrastructure constraints to ethical considerations. The article concludes with future directions, emphasising scalability, real-time detection capabilities, and expanding the model's applicability beyond electricity theft.

Keywords: Big Data, Machine Learning, Anomaly Detection, Real-time detection Capabilities, Electricity Theft

Paper ID: 137: **Large Language Model in Various Fields: Opportunities, Challenges and Risks**

Rudra Chandra Ghosh, Pasi Shailendra, Ganesh Bahadur Singh

Abstract:

Pre-trained large language models are gaining much popularity in a very short time, more than any social media platform due to their capability and potential to perform tasks like classification, summarization, text generation and question answering etc. Its performance on this language based task exceptionally outperforms all traditional deep learning methods. This paper discussed some new research on LLM applications in some critical fields agriculture, climate, finance and education all these fields are critical and sensitive and effectively important for the whole world population. the study involves applied LLMs and other deep learning methods in these fields and shows the potential capability of LLMs in applications is significant and studied different types of fine tuned LLM models and strategies used in the application for task-specific, the paper also describes the challenges and limitations of these model and framework in applications their comparisons with existing methods for the task.

Keywords: Large language model· Transformer· Deep learning· Agriculture· Climate· Finance· Education.

Paper ID: 138: **Design and Analysis of Enhanced Bandwidth Slotted Logarithmic Spiral Patch Antenna for 5G Communication.**

Mohammad Hannan, Saptarshi Ghosh

Abstract:

This paper introduces a design of a Logarithmic-Spiral Patch Antenna (LSPA) tailored for Fifth Generation (5G) communication applications. Resonating at a core frequency of 28 GHz, the proposed antenna exhibits remarkable performance characteristics. Its bandwidth spans from 26.2 GHz to 30.6 GHz. These qualities make it suitable for many 5G communication systems that require high-frequency functioning. At 28.10 GHz, Reflection Coefficient (S11) is 16.061, which is the antenna's performance indicator. At the centre frequency, the Voltage Standing Wave Ratio (VSWR) is also measured at a very favorable value of 1.70. The LSPA design is successful in providing low signal loss and great efficiency within the designated frequency as seen by these superior S parameters and low VSWR value. The LSPA design is physically small, with dimensions of 6 mm in length, 4.5 mm in breadth, and just 0.254 mm in thickness. This small form factor makes it possible to develop compact, integrated devices that are also simple to install and integrate into contemporary communication networks. The LSPA is constructed on a Rogers RT Duroid 5880 substrate material to preserve structural integrity and high-frequency performance. The antenna's longevity and capacity to function efficiently in the millimeter-wave frequency spectrum are guaranteed by the substrate material selection. In summary, this study introduces a unique Logarithmic-Spiral Patch Antenna with wide bandwidth, superior S parameters, low VSWR, and small physical dimensions. The antenna is a good choice for high-speed and high-capacity wireless communication systems due to its eligibility for 5G communication and its central frequency of 28 GHz, which supports the development of next-generation connectivity.

Keywords: Logarithmic spiral patch antenna· 5G· High frequency structural simulator· Reflection Coefficient (S11)· Bandwidth· Voltage standing wave ratio

Paper ID: 139: **Handwritten Digit Prediction Using Machine Learning Algorithms**

Bipul Roy and Udit Kashyap Bhuyan

Abstract:

The reliance of humans over machines has never been so high such that from object classification in photographs to adding sound to silent movies everything can be performed with the help of deep learning and machine learning algorithms. Likewise, Handwritten text prediction is one of the significant areas of research and development with a streaming number of possibilities that could be attained. Handwriting recognition (HWR), also known as Handwritten Text Recognition (HTR), is the ability of a computer to receive and interpret intelligible handwritten input from sources such as paper documents, photographs, touch-screens and other devices. Apparently, in this paper, we have performed handwritten digit recognition with the help of MNIST datasets using Support Vector Machines (SVM), Multi-Layer Perceptron (MLP) and Convolution Neural Network (CNN) models. Our main objective is to compare the accuracy of the models stated above along with their execution time to get the best possible model for digit recognition. Keywords: Deep Learning, Machine Learning, Handwritten Digit Recognition, MNIST datasets, Support Vector Machines (SVM), Multi-Layered Perceptron (MLP) and Convolution Neural Network (CNN).

Keywords: Deep Learning · Machine Learning · Handwritten Digit Prediction · MNIST datasets · Support Vector Machines (SVM) · Multi-Layered Perceptron (MLP) · Convolution Neural Network (CNN).

Paper ID: 147: **Integrative Analysis of Cancer Gene Expression Using Bio-Inspired Algorithms and Machine Learning: Identification of Key Genes**

Ashimjyoti Nath, Chandan Jyoti Kumar

Abstract:

Background: Understanding the genetic basis of cancer is essential for effective diagnosis, prognosis, and treatment. With an extensive array of gene expression data, pinpointing relevant genes is a significant challenge. This study employs a combination of machine learning and bio-inspired algorithms to isolate important genes within a Breast Cancer gene expression dataset.

Methods: The research utilised a Breast Cancer dataset encompassing 24,481 Affymetrix probe IDs from 97 samples. The initial step involved using the Fisher scores method to select the top 1,000 probe IDs. This list was further refined to the top 100 probe IDs using five bio-inspired algorithms: Salp Swarm Algorithm, Grey Wolf Optimizer, Artificial Bee Colony, Ant Colony Optimization, and Multi Objective Spotted Hyena Optimizer. These probe IDs were then evaluated using five classifiers: K-Nearest Neighbors, Support Vector Machine, Random Forest, Naive Bayes, and Nearest Centroid. The final stage involved using BLAST for aligning the probe IDs and determining their corresponding gene names.

Results: The study integrated results from all bio-inspired techniques and classifiers to identify frequently recurring genes. A new Breast Cancer dataset was created by merging gene selections from each algorithm. The genes were then analyzed based on their frequency of appearance across the optimizers, categorized into groups of 4, 3, and 2 occurrences. For genes consistently appearing across all algorithms and classifiers (with 2 occurrences), Recursive Feature Elimination (RFE) was applied. This process led to the successful pairing of 107 high-quality probe IDs using BLAST, with 62 of these IDs aligned to specific gene names.

Conclusion: This in-depth and multi-layered approach identified 107 genes as potential key contributors to cancer progression. Notably, 17 of these genes have a direct link to cancer, while two may have potential associations. The study underscores the efficacy of combining bio-inspired algorithms with machine learning for genomic data analysis and suggests the need for further biological validation to establish the clinical significance of these genes in cancer.

Keywords: Bio-inspired algorithms· Salp Swarm Algorithm· Grey Wolf Optimizer· Artificial Bee Colony· Ant Colony Optimization· Multi Objective Spotted Hyena Optimizer· Genomic data analysis· Prognostic markers.

Paper ID: 148: **Designing a Robust Concealer for Emotion Detection Using Various Paradigms for Machine Human Interaction**

Fayaz Ahmad Fayaz, Arun Malik, Shameem Khan, Anita Sharma, Ashaq Hussain Dar

Abstract:

Human sentiments are irrational responses to things or situations that have a variety of physiological, behavioural, and cognitive processes associated with them. According to its many applications in fields include human-computer interaction, virtual reality, self-driving, electronic document leisure, behavioural monitoring, and health; the scientific community is becoming more and more interested in emotion recognition. Brain-generated electroencephalogram (EEG) waves are being used increasingly in the development of brain-computer interface technology. Specific topic or cross-subject emotions research is missing from the present methods for emotion detection from EEG signals. Multimodal techniques that combine EEG data with other modalities are also lacking. This research proposes an effective hybrid technique for cross-subject sentiment identification using EEG and facial movements in light of the aforementioned shortcomings. The suggested method combines a spectrum of directed variations and local binary pattern characteristics with spectral and statistical features taken from the facial dataset. The next step is to classify emotions using support vector machines, k-nearest neighbour, and ensembles. Also, the up-sampling method is used to address the category misbalance issue. On even a dataset of sentiment analysis utilising physiological data and tenfold cross-validation, the proposed technique's efficiency is evaluated. This survey originates outcome which are encouraging, with the greatest accuracy levels for valence and arousal being 96.25% and 97.10%, accordingly.

Keywords: Human Computer Interaction· EEG· ML· Multimodal· Artificial Intelligence

Paper ID: 149: **GPT Vision Meets Taxonomy: A Comprehensive Evaluation for Biological Image Classification**

Angsuman Das, Bhabana Das

Abstract:

This study assesses the proficiency of GPT Vision, a multimodal language model, in the classification of biological images across taxonomic ranks. Utilising a meticulously curated dataset from A-Z Animals, Wikipedia, and eLife Sciences, the model's performance was analysed at various levels from Phylum to Species. Our quantitative analysis, supported by Python libraries like Pandas, Matplotlib, Seaborn, SciPy, and Statsmodels, revealed a trend of high accuracy at broader taxonomic categories, with a notable decrease at more specific levels. The overall accuracy peaked at 78.95% for Phylum but dropped to 11.58% for Species. Misclassification and null value analyses were conducted, indicating both the strengths of GPT Vision in identifying certain taxa and its limitations, especially at narrower taxonomic levels. The findings underscore the potential of GPT Vision in biological classification while highlighting the necessity for further model refinement, particularly for lower taxonomic ranks.

Keywords: GPT4· GPT-Vision· Biological Image Classification

Paper ID: 150: **IoT-Based Remote Control and Monitoring of Electrical Appliances Using ESP8266, MQTT, Node.js, and Real-Time Updates with Socket.IO**

Jaskirat Singh Nagi, Digvir Singh Raina, Lovnish Verma and Sarwan Singh

Abstract:

The advent of the Internet of Things (IoT) has engendered paradigmatic shifts in residential and industrial domains, wherein the remote control and monitoring of electrical appliances have become quintessential. This research presents a novel system architecture, underpinned by ESP8266 microcontrollers, MQTT as a communication protocol, Node.js and Express.js for server-side scripting, and Socket.IO for the facilitation of real-time interactions. This confluence of technologies affords a synergistic platform, expediting efficacious and secure remote control of electrical appliances, while obviating the requisite for webpage refreshes. The comprehensive exposé of this research illuminates the intricacies of the underlying hardware and software architecture. Methodological explication encompasses the orchestration of MQTT for command propagation, SQLite as the archival repository, and the augmentation of real-time user engagement by way of Socket.IO. Empirical findings underscore the functional tenability of the system, attesting to its superlative utility with respect to remote appliance control and data retrieval. The salient attributes encompass low-latency operability and fidelity in performance. The ensuing discourse aspires to contextualise the research within the overarching spectrum of IoT advancements. It delineates the methodological significance, elucidates

potential applications and articulates uncharted vistas of prospective enhancement. The study offers a cogent evaluation of the system's efficacy vis-à-vis established analogues in the field. In summation, this research endeavors to provide cogent insights into the ontogenesis and deployment of an IoT-based system, which amalgamates MQTT, Node.js, and Socket.IO, realizing remote control of electrical appliances and enabling real-time user interaction. The system promulgates opportunities for the ascendancy of contemporary home automation, ushering in a renaissance of safe, efficient, and accessible IoT-anchored solutions.

Keywords: ESP8266 microcontrollers· Express.js· IoT· MQTT· Node.js· Remote appliance control· Socket.IO· SQLite System· System architecture· Tenability

Paper ID: 151: **Resume Summarisation - An application of Generative AI**

Chandan Saroj, Sarwan Singh, Anita Budhiraja, Sheetal Chopra

Abstract:

This project utilises the fundamentals of Generative AI and NLP for abstractive text summarisation and selection of the candidate resume, ease job application process by reducing human efforts and minimising time consumption in candidate selection. This research explores summarisation techniques using generative AI and natural language processing. The primary objective is to eliminate unnecessary content of resume while maintaining the readability of the document. Highlights the profile, skills, and work experience of the candidate. The project analyses a large number the given resume from candidates and elaborates the candidate's main skills and experiences. It compares resumes and helps employers to find the best fit candidate for the specific job. Now a days there is huge competition in industries for a particular job role in various fields in industry. The ratio on single job position and number of candidates is extremely high. It is impossible to see every resume and figure out the best candidate out of it. Reading every section and points in resume of the thousands of resumes and finding the best resume for the job role seems impossible these days. There is a requirement of a system that can resolve this issue. This project converts the resume into a concise summary and elaborates the resume content in simple and enhances the readability of the text. Additionally, the explores the summarisation abstractive and extractive summarisation techniques and contrasts the optimal techniques for summarisation. The project implements the combination of both summarisation techniques using fine-tuned pre-trained T5 transformer, textRank model. Setups Generative adversarial networks (GANs) architecture and develops a fully automated resume summarisation system.

Keywords: Generative AI· Artificial intelligence· Natural Language Processing· Transformer· Generative adversarial networks· Text Summarisation

Paper ID: 152: **A Review in Assamese Handwritten Character Recognition**

Bidur Bhushan Handique, Pranab Das

Abstract:

Detection and recognition of handwritten characters has been an existing field since the early age of computing. The main purpose of character recognition is to detect characters from the digitised form of a printed or handwritten document. Though much work remains, two relevant factors are preventing OCR systems from recognising handwriting at its best: the variance in handwriting and the large number of scripts in use worldwide. As a result, a specific solution to the handwriting recognition problem is not achieved. Assamese script, the official writing system for the Assamese language, is spoken in the Indian state of Assam. Its characters are distinct and intricate, making it difficult to recognse. This study assesses how well the current recognition systems function when used with the Assamese script and numerous other Indian scripts. Though the paper is meant for Assamese script an abundance of discussions is briefed according to the research meant on scripts around the world and in India. The paper also shares a comparison among various recognition techniques.

Keywords: OCR· Optical Character Recognition· offline· offline character recognition.

Paper ID: 153: **KDSR: Hybrid Machine Learning Solution for Intrusion Detection in Fog Computing Environment**

Partha P. Adhikari, Pawan Kumar Mall, Abhinav Mishra, Swapnita Srivastava

Abstract:

Fog computing, that hip cousin of cloud computing, acts as the mediator between cloud data hubs and our gadgets, providing computing, storage, and network services. It's all about putting smarts right at the edge, speeding up those on-the-fly decisions and cutting down the data traffic to the cloud. Both fog and cloud computing are susceptible to various types of cyber-attacks that could result in unforeseen losses. For example, malware, phishing attempts, denial-of-service (DoS) and distributed denial-of-service (DDoS) attacks, SQL injections, and assaults rooted in Internet of Things (IoT) vulnerabilities possess the capability to impede legitimate users. This research introduces an intrusion classification model that harnesses the power of stack machine learning model. The models considered in our study include K-Nearest Neighbors, Decision Tree, Support Vector Machine, and Random Forest (RF). Our model exhibits superior performance when compared to conventional machine learning approaches, as revealed through a comparative analysis. The model is intended for deployment in fog layer responsible for monitoring network traffic and detecting cyber-attacks. This implementation ensures the safeguarding of cloud servers and fog layer devices against malicious users, thus ensuring uninterrupted service provision to IoT devices.

Keywords: Intrusion Detection· UNSW-NB15· machine learning· deep learning

Paper ID: 156: **IoT Based Real-Time Automatic Number Plate Detection Using OpenCV**

Anil Kumar Shaw, Payel Sarmah, Bittu Mishra, TH Bikash Singh

Abstract:

In recent times, there has been a high increase in vehicles plying on the road, due to the high increase in population as well as other geographical constraints. Consequently, an accurate vehicle detection system for traffic control is required. With the advancement and development of powerful and low-cost single-board computers, developing a fully automated system is becoming much easier than ever. An embedded system capable of executing deep learning models for object detection has been implemented in this paper. The main aim of this paper is to develop an Automatic Number Plate Recognition (ANPR) system that recognises license plates using a deep learning object detection model and optical character recognition (OCR). A Raspberry Pi with a camera is used in the setup to automatically recognise number plates. Multiple techniques have been used to deploy on the Raspberry Pi which includes the implementation of state-of-the-art object detection models such as Single Shot MultiBox Detector (SSD) Mobilenet, libraries such as OpenCV, making it a standalone system that does not rely on another device to do the processing. The data is sent over the internet using Google Cloud APIs. This makes the system a low-cost, fully automated system that is portable and can be easily deployed at any remote location.

Keywords: Automatic Number Plate Recognition· Object Detection, Optical Character Recognition· Deep Learning· Single-Shot Detector· IoT

Paper ID: 157: **Machine Learning, Malware Detection: SecureAI**

Nishit Kashyap, Anita Budhiraja and Sarwan Singh

Abstract:

This research focuses on the importance of Cybersecurity in today's fast-changing digital world. It highlights the urgent need for modern and adaptable detection methods in the face of constantly changing malware threats. Malware, in all its forms, presents a challenge that requires innovative strategies for detection due to its ever-changing nature and thus better efforts must be provided for reducing the threat posed.The integration of machine learning offers endless promising ways to combat advanced threats. The research has a major focus on machine learning's application in this ongoing battle.The research highlights the continuous importance of a comprehensive ML based Malware detection system one which adapts to our requirement of continuous adaptability and self-improving capabilities.It provides an overview of some of the past work done in machine learning-based malware detection, stressing on the importance and urgency of staying ahead of Cyber threats. As the digital world becomes more interconnected with daily life, the need for powerful, adaptive, and state-of-the-art Cybersecurity measures is not just a necessity but a priority.

Keywords: Cybersecurity· Cyber Threats· Machine Learning· Malware Detection

Paper ID: 158: **Inner Line Permit Using Hyperledger Fabric**

Prangana Das, Noni Deori, Apurba Dey, ImopishakThingom, Pankaj Shukla, Dharitri Brahma

Abstract:

The Inner Line Permit (ILP) system, widely employed in various regions to regulate the entry of nonresidents into specific areas, has historically operated in a centralized manner. While this approach has facilitated permit issuance and control, it has also introduced security concerns, data vulnerabilities, and inefficiencies. This research paper delves into the existing centralised ILP systems, scrutinising the security challenges they face and proposing a transformative solution through the implementation of Hyperledger Fabric, a permissioned blockchain technology. By leveraging Hyperledger Fabric, ILP systems can ensure that permit issuance, verification, and associated records are tamper-proof, transparent, and accessible only to authorised stakeholders involved in the ILP process. Additionally, the immutability of blockchain records enhances auditability, aiding in compliance with legal and regulatory requirements. Smart contracts are utilized to digitally authenticate and verify permit applications, reducing the risk of fraud and unauthorized access. The permissioned blockchain ensures data privacy and security by granting access only to authorized parties. Furthermore, we analyse case studies and practical implementations of Hyperledger Fabric in ILP systems to highlight real-world benefits, such as reduced reliance on intermediaries, efficient processing of permit applications, and increased trust among users and authorities.

Keywords: Blockchain· Smart Contract· Immutable Record· Distributed Ledger· Hash· Application

Paper ID: 160: **Pharmacokinetic and Molecular Docking Studies of *Centella asiatica* Phytocompounds to Explore Potential Anti-tuberculosis**

Narayan Sarkar, Dhruba Som, Saurov Mahanta, Bhaben Tanti, Mami Das

Abstract:

Tuberculosis is caused by the bacterium Mycobacterium tuberculosis. The first line drugs available for treatment of TB are isoniazid, rifamsin etc. Second line drugs are Paraminosalicylate, kanamycin etc. Numerous reports have demonstrated the cause and emergence of multi-drug resistance of *Mycobacterium tuberculosis*. It is necessary to discover new drugs to control these new strains of *M. tuberculosis*. Computer aided drug discovery (CADD) is a new approach to discover new drugs from plants or other sources by the help of digital technologies. First step of this process is to select a suitable drug target. Next screening of the ligand against these targets to determine the binding affinities of these ligands and receptors. In this study, the two enzymes of Mycobacterial shikimate pathway shikimate dehydrogenase and chorismate synthase were selected as drug targets. The 6 phytocompounds from traditionally used medicinal plant *Centella asiatica* was screened against these targets. Molecular docking study was done to check the receptor(protein)-ligand (phytocompounds) binding. The result of molecular docking study shows the different binding affinities of these phytocompounds with these two enzymes. So, these phytocompounds may inhibit the activity of these two enzymes and may block the shikimate pathway of *M. tuberculosis*. Later, to establish as drug molecules pharmacokinetic analysis of these phytocompounds was done. All these phytocompounds have drug like properties, they obey Lipinski's rule of 5 and have less toxicity.

Keywords: *Centella asiatica* · molecular docking · shikimate pathway · pharmacokinetics

Paper ID: 161: **MQFURP: An Overprovision Strategy Supporting Performance Interference Management in Cloud**

Ayush Pandey, Nirbhay Chandorkar, Kumar Vaibhav, Ajith K John

Abstract:

Cloud computing has become a prevailing trend within the computing landscape, enabling users to access computational resources on-demand through the deployment of virtual machines on physical servers. To enhance resource utilisation, cloud administrators commonly employ a technique known as resource overprovisioning, where more virtual resources are allocated to clients than what is physically available. This practice optimises the utilisation of computing resources and is frequently adopted by well-known virtual machine monitors (VMMs) like KVM to maximise the efficiency of cloud data centers. Resource overprovisioning strategies are designed to support more virtual machines (VMs) with limited resources. However, a challenge arises in the form of performance interference among VMs co-located on the same physical host. This interference issue may be exacerbated by re source overprovisioning, which aims to accommodate more VMs within the same physical machine. The performance degradation results from contention over shared resources among co-hosted VMs, leading to a violation of VM quality of service (QoS) standards. Resource contention occurs when the demand for resources being shared surpasses the incoming request as a result of co-hosting virtual machines. In our paper, we introduce a resource overprovisioning strategy called the Multi-level QoS Framework Using Resource Pooling (MQFURP). This strategy aims to establish a multi-level QoS environment within a cloud by utilising Linux control groups. These control groups enable the differentiation of QoS levels for virtual machines, allowing for better and more flexible control over resource management. Our evaluation was conducted within our private cloud infrastructure, which is built on OpenStack. The results of our evaluation demonstrate that MQFURP successfully ensures that each VM meets its performance requirements even when co-hosted with other virtual machines on the same physical machine.

Keywords: overprovisioning· cloud computing· virtual machine· physical machines· performance interference· resource utilisation· quality of service

Paper ID: 162: **Blood Disease Detection System Based on Haemogram Report Using Decision Tree Algorithm**

Deepali K. Gaikwad, Asha Gaikwad, Ashok Gaikwad

Abstract:

There is enormous amount of medical data in healthcare systems gathered from numerous medical tests performed in numerous fields. In order to diagnose diseases early on or even before they manifest, it is still necessary to extract hidden information from medical data. The classifiers use the characteristics of the complete blood count to forecast information about potential blood illnesses in early stages, which may improve the likelihood of a cure. The art of machine learning is in charge of building predictive models based on prior data. The illness prediction procedure may decrease the number of fatalities and improve the quality of life for those tracts these diseases. In this study, we applied decision tree classifier on blood test report dataset and identified various blood diseases like anemia, leukemia, lymphoma, sickle-cell, etc.

Keywords: Blood Disease· Decision Tree· Machine Learning· Supervised· Unsupervised.

Paper ID: 165: **Development of SPR Sensor-Based System for Copper Ion Detection in Water**

Devabrata Sarmah, Kandarpa Kumar Sarma, Sunandan Baruah

Abstract:

Heavy metal contamination in water is one of the main environmental issues and considerable thought is provided to its remedy worldwide. Metals are essential to sustain a biological system and drinking water should comprise metals below a certain ppm (pieces per million) level. The majority of urban individuals depend on existing water supplies. Copper (Cu^{2+}) is one of the most toxic ions present in water among all metal ions. Copper is a transition metal that is robust in its crystalline state. Water consumption from a supply scheme that involves copper pipes significantly boosts copper levels in water. It is therefore essential to evaluate water quality in the laboratory before consumption. The price of water testing in a laboratory is quite large for an individual and needs elaborate tools. A small price, convenient and easy-to-use machinery is therefore necessary so that everyone can perform tests rapidly. The sensor that can be used for this type of equipment is a Surface Plasmon Resonance (SPR) sensor. The main objective is to design a very low-cost electronic system based on SPR to detect the concentration of Copper (Cu^{2+}) ions in the water sample.

Keywords: Surface Plasmon Resonance· Optical sensor· Gold nanoparticles· Chitosan· Poly Acrylic Acid· Copper.

Paper ID: 166: **Nanostructured Sensors for Pesticide Detection in Tea**

Baharul Islam, Devabrata Sarmah, Rishu Jha, Sunandan Baruah

Abstract:

Tea is widely consumed beverage around the world. After China, India is the world's second-largest producer of tea. Assam in northeast India contributes around 52% of total output of India's tea production. Pesticides are frequently used in tea gardens to protect tea plants from different insects and mites and to increase yield. Quinalphos, Fenazaquin, Thiamethoxam and Emamectin Benzoate are some insecticides often used in Assam tea gardens. To maintain the safety of human life, the tea estates need to follow the maximum pesticide levels given by the Food Safety and Standards Authority of India (FSSAI). Pesticide levels that exceed the permitted range can cause different health issues. Detecting pesticide residue on tea leaves before processing can help tea companies reduce losses. There are many methods for detecting pesticides in processed tea. However, the application of nanotechnology-based sensors offers a possibility for pre-processing detection. The goal of this review is to provide insight into nanomaterial-based sensors and techniques for pesticide determination from tea leaves.

Keywords: Quinalphos·Fenazaquin· Thiamethoxam·Emamectin·Nanosensor·ZnO nanorod

Paper ID: 172: **Phishing in the Inbox: A Systematic Examination of Email-Based Cyber Threats**

Swapnil P. Goje, SumeghTharewal

Abstract:

The main problem in today's Internet era is malicious email which is in the form of phishing email, which may contain malicious links or it may copy some malicious code which reside at victim site in form of malware. There is much difficulty to differentiate between legitimate and malicious email, as malicious emails are looks like same as legitimate email. The main motivation or objective of malicious emails is financial loss to individual who receives that email or it may relate to gather sensitive information of the receiver. There are numerous anti-malicious email filtering techniques are available, but yet the problem is still not solved properly. The main topic related to malicious email detection is email mining, extracting its contents and applying some classification algorithms. The malicious emails are characterised by some features which are used as a parameter for detection of malicious email. This paper reviewed ways to detect and counteract against phishing, current malicious email mitigation techniques by different researchers; different evaluation techniques of these filtering methods is carried out in literature survey.

Keywords: Malicious email· phishing· spam· email classification· Features· attacker· victim

Paper ID: 178: **Screening and Characterisation of Aroma and Flavour-Producing Bacteria and Yeast From Traditional Fermented Food and Beverages of Northeast India**

Debashree Borthakur, Esha Barlaskar, Smriti Priya Medhi, Bipin Kumar Sharma

Abstract:

Fermented foods in India are diverse and play a significant role in the country's culinary traditions. These foods are often categorized based on their base material and include a variety of items with reported medicinal properties. Some examples of these fermented foods are: Dahi, Gundruk, Sinki, Inziangsang, Iromba etc. While there were initially limited reports on the extraction of lactic acid bacteria (LAB) from Indian fermented dishes, the growing awareness towards the health benefits associated with LAB has spurred increased research in this domain. LAB are known for their probiotic properties, promoting gut health and overall well-being. The increasing interest in the health benefits attributed to lactic acid bacteria (LAB) offers a valuable opportunity for food microbiologists to delve deeper into the study and exploration of fermented foods. In the current study bacteria and yeast were isolated from the different traditional fermented foods of north-east and their potential of flavour production were studied. These isolated strains were used to check the potential of undergoing fermentation, and flavour production by inoculating the isolated strains in the raw milk for the development of novel probiotic products.

Keywords: Starter Culture · Flavour Production · Fermented Foods · Lactic Acid Bacteria.

Paper ID: 179: **Optimisation of Computational Efficiency of GP2U Accelerated Grid Applications on a Non-Dedicated Desktop Grids: A Speed-Up Factor Analysis**

Subrata Sinha

Abstract:

Phenomenal growth in the field of biology has motivated computer science to scale-up high-performance computing (HPC) frameworks to cater the ever-growing demand of today's biologists. High cost of HPC hinders the progress of study in financially weak research teams so Non-dedicated desktop grid is makeshift arrangement for such research groups, in which there is a set of existing desktop computers. Gaining maximum possible performance out of such non dedicated desktop grid is a challenge. In this paper an attempt has been made to gain maximum speed-up of grid enabled application deployed in a non-dedicated desktop grid. The grid enabled application developed has been GPU Accelerated, Load Balancing Algorithms performance parameters has been optimised along with node provisioning resulting an overall speedup of 16.01 with 8 nodes only.

Keywords: Grid Enabled Application · Load Balancing · Node Provisioning · GP2U Acceleration.

Paper ID: 180: **MindWell: A Dataset Related to Mental Health**

Pushpendra Kumar, Aanchal Punia, Anjali Dagar, Satyavrat Gaur

Abstract:

Mental health research plays a pivotal role in understanding and addressing the complex challenges faced by individuals worldwide. However, existing datasets in this field often lack comprehensive and diverse information, limiting the scope of analysis and the development of effective interventions. In response, this study aims to bridge this gap by creating a new dataset on mental health. Through a rigorous data collection process, we gathered data from multiple sources, including surveys, available online documents etc. The introduced MindWell dataset comprises a diverse sample of participants across different demographic groups, capturing a wide range of mental health dimensions, such as symptoms, diagnostic information, treatment history, lifestyle factors, and socio-economic variables.

Keywords: Clinical Records· Dataset· Data Quality· Mental Health.

Paper ID: 184: **Gadolinium Dilemma: Navigate Water Contamination in the Face of Indispensable Medical Advancements**

Subhrata Dutta, Sunandan Baruah, Papia Dutta

Abstract:

The rare earth element, Gadolinium (Gd+3) has strong paramagnetic nature, due to which it is being extensively explored in MRI. The Gd (+3) ions are converted into different chelate forms by using different derivatives of ethylenediaminetetraacetic acid (EDTA) and administered as contrast agents. However, repetitive doses of Gd (+3) ion cause harmful effects towards physiological processes of human health; and when these metal complexes are released into the surface water as medical sewages, they disrupt even the aquatic balance. This review article aims to raise awareness about the health issues caused due to the elevated use of the metal ion in medical field and its related toxicity. It also highlights about the development of some cost effective, innocuous, natural plant-based as well as synthetic metal-based nanomaterials, which may help in the breakdown or removal of the Gd (+3) metal ion from the waste water making it less toxic.

Keywords: Contrast agent· Gadolinium· MRI· Nanomaterials· Toxicity.

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