Abstract Proceedings of

CCSN2023

12th International Conference on

Computing, Communication and Sensor Networks

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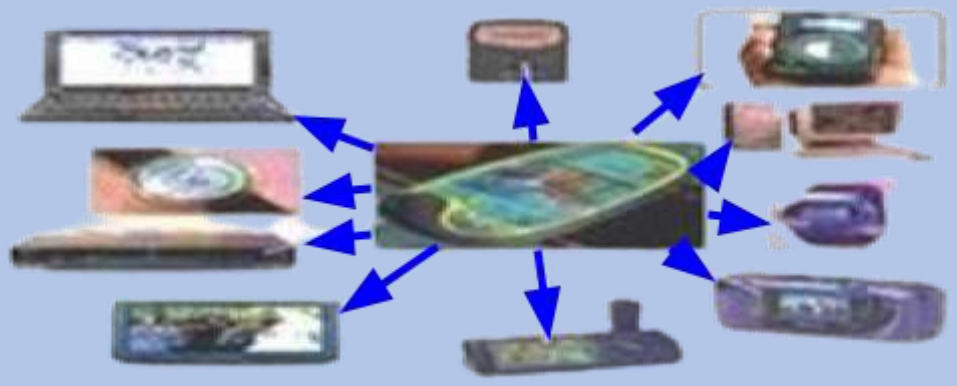
15th to 17th of October, 2023



Organizer:
Applied Computer Technology, Kolkata, West Bengal, India.

In Association with:
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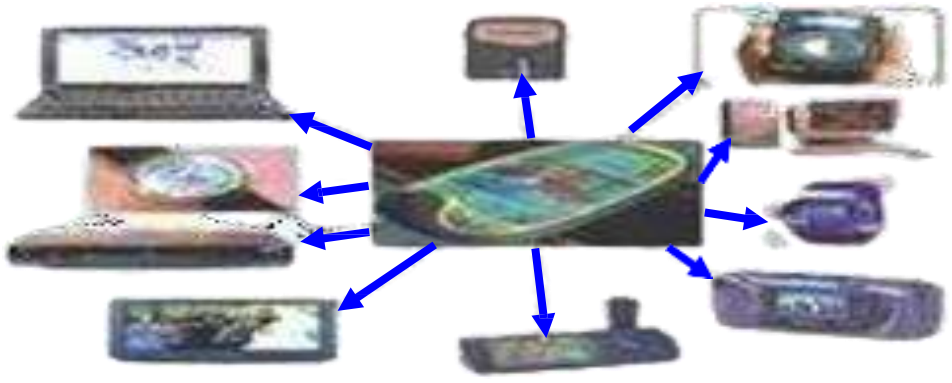

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CCSN 2023

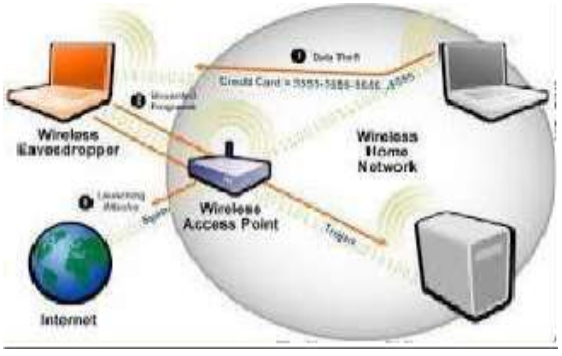
12th International Conference on

Computing, Communication and Sensor Networks

15th October 2023
Venue: **NOVOTEL Mumbai Juhu Beach, Maharashtra, India.**
Offline Conference

16th and 17th, October 2023
Venue: **Online Conference**

Website of conference: **actsoft.org/ccsn2023**



Proceeding Book with abstract of papers
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Inaugural Song:

Prayer

Translated in English
By
Hillol Ray
http://www.iwvpa.net/rayh
http://www.iwvpa.net/rayh/index-hra.php

Desires are all yours, you
are the universal star-
You do your own works, God,
People say, I do them from a far!!

You stuck elephant into clay,
And push a handicap to ascend hill-
To some, you offer "Brahmo" feet,
And make others descend
downhill!!

I am a machine, you are the machinist, I
am the home, you are the homemaker-

I am the chariot, you are the charioteer,
You drive as you like, and I am a happy taker!!

"Milestone"
June 25, 2019
Garland, Texas, USA

Editorial

These abstract proceedings book contains abstracts of all registered papers, summary of keynote and invited talks, program schedule, list of speakers and session chairs etc.

In the light of current exceptional circumstances, CCSN2023 has been re-envisioned as a Hybrid mode of conference having facilities of online and offline presentations. The virtual format will provide an opportunity for our community to present their research works online which can be followed by the researchers across the globe.

About 85 papers were received and among those only 55 papers were selected for presentations. Papers are in the areas of wireless technology, application of IoT, algorithms, software engineering, Artificial Intelligence Methods, Machine Learning, applications of various types of Sensor networks, VLSI design for wireless communication, antenna design etc.

The CCSN2023 conference will convene experts in the field of Computing, Communication and Sensor Networks for technical communications through presentations and discussions, providing a fantastic opportunity to network with like-minded professionals from around the world. This conference, as in hybrid mode, will feature invited talks and keynotes, and will give the opportunity to exchange thoughts, share and collaborate different institutions to work together throughout the Globe.

We look forward for the active participation of all our delegates and participants in the CCSN2023. With due thanks and best wishes to all our team including the Chief Guest, other invited speakers, Chair persons, authors, participants etc. for sparing their valuable time in making the event a success.

These abstract proceedings are prepared with the abstracts of all papers for the delegates of the conference and for getting concept about the paper. This abstract book is distributed as free of cost with only abstracts of the registered papers. After the completion of the conference, most of the papers will be forwarded for possible publications in Special Issue of the Journal of Microsystem Technologies, SCI indexed, Springer-Nature publisher or in different proceedings as Book Chapters as per theme of the paper. This publication will not make any conflict and should not be considered as published paper for any plagiarism checking.

The EditorsCCSN2023
Prof. (Dr.) Kandarpa Kumar Sarma, Gauhati University, Assam, India.
Dr. Nitin Namdeo Pawar, Alamuri Ratnamala Institute of Engineering and Technology, Shahapur, Mumbai, Maharashtra, India.
Dr. Chandramauleshwar Roy, Vellore Institute of Technology, Chennai, Tamil Nadu, India.
Prof. Dulal Acharjee, Applied Computer Technology, Kolkata, West Bengal, India.

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Speech of

Prof. Dulal Acharjee
Executive Chairman, CCSN2023 and
Director, Applied Computer Technology, Kolkata, W.B., India.

Today, I am here before you with great pride and enthusiasm to celebrate the inauguration of 12th international conference on 'Computing, Communication and Sensor Networks', in short CCSN2023. This moment marks not only a significant milestone in our academic journey but also a testament to our commitment to advancing technology for the betterment of society.

On the dais, all respected professors, delegates and Guests, I offer my heartful thanks and welcome to all of you in the CCSN2023. I cordially welcome (1). Dr. Suresh A Shan, Chairman, Computer Society of India (CSI), Mumbai Chapter, (2) Dr. Dinesh K Aswal, Director, Health, Safety and Environment Group, Bhabha Atomic Research Centre, Mumbai (3). Dr. Jerzy Szymanski, University of Technology and Humanity Radom, Poland, (4). Dr. Narendra Shekokar, Professor & HOD, Department of CSE, Dwarkadas J. Sanghvi College of Engineering, (5). Dr. Sandip Chanda, Professor, Gani Khan Choudhury Institute of Engineering and Technology (GKCIET), Malda, West Bengal, India, (6). Dr. Chandramauleshwar Roy, dept. of ECE, VIT, Chennai, (7) Dr. Marta Zurek-Mortka, Senior Researcher, Lukasiewicz Research Network - Institute for Sustainable Technologies, Radom, Poland, and to all other professors, students and authors who have gathered here in CCSN2023. Most of the authors will present as online mode and some foreign Professors/authors will deliver their talks as online mode.

Computing and Communication Science has played a pivotal role in shaping the modern world. It has revolutionized the way we connect, communicate, and process information. In today's interconnected and data-driven society, our discipline holds the key to unlocking countless opportunities and addressing some of the most pressing challenges facing humanity.

From the invention of wireless communication by G. C. Bose in 1894, invention of telegraph, the rise of the internet, proliferation of smartphones, invention of Cloud Computing, Sensing data and its Networking sciences have not only transformed the way we conduct business, education, and research but have also reshaped the fabric of our social and cultural lives. The PARAM Supercomputer development of India was another success in the history of Computing. The recent successful landing of Rocket of India on the surface of the Moon required very skilled software and signal transporting technology.

Like the past many years, we are planning to publish a special issue of the Journal of Microsystem Technologies, a SCI indexed journal of Springer-Nature publisher and some other papers will be invited for other Journals/ Proceedings for possible publications. Hope, after presentations and interactions with the experts, session chairs and Judges, authors will be able to improve the qualities of their papers.

Hope, by your active participation, research people of these subjects will get more efficient support to furnish their research projects and the World would be a better sustainable space for the human being.

Keynote Speech

Building Resilient Autonomous Space Exploration Missions

Professor Mike Hinchey
University of Limerick, Ireland

Abstract-Space exploration missions represent some of the largest, most ambitious, and most costly engineering systems yet developed. They attract public attention and enthusiasm but the potential for failure is great, resulting in great financial loss and the loss of potentially decades of effort and research. From the field of software engineering, we describe approaches to building autonomous missions that are more likely to be successful, are far more ambitious, and are more resilient in harsh environments.

BIOSKETCH:

Professor Mike Hinchey is Professor of Software Engineering at University of Limerick, Ireland, where he was previously Head of Department of Computer Science and Information Systems and Director of Lero-the Science Foundation Ireland Research Centre for Software, a national research centre headquartered at University of Limerick. He is Past President of IFIP, the International Federation for Information Processing (www.ifip.org) and Past Chair of the IEEE UK & Ireland Section. He is Director-elect of IEEE Region 8 (Europe, Middle East, Africa) and serves on IEEE Computer Society Board of Governors. Prior to joining University of Limerick, Professor Hinchey was the Director of the NASA Software Engineering Laboratory. In 2009, he was awarded NASA's Kerley Award as Innovator of the Year and is one of only 36 people recognized in the NASA Inventors Hall of Fame. Professor Hinchey holds a B.Sc. in Computer Systems from University of Limerick, an M.Sc. in Computation (Mathematics) from University of Oxford and a PhD in Computer Science from University of Cambridge. Professor Hinchey is a Chartered Engineer, Chartered Engineering Professional, Chartered Mathematician and Chartered Information Technology Professional, as well as a Fellow of the IET, British Computer Society, Engineers Ireland, and Irish Computer Society, of which he is also Past President. He is Editor-in-Chief of Innovations in Systems and Software Engineering: a NASA Journal and Journal of the Brazilian Computer Society. In 2018, he became an Honorary Fellow of the Computer Society of India and was the SEARCC Global ICT Professional of the Year 2018. He is a candidate for IEEE Computer Society President-elect (please see **mikehinchey.info**).

Keynote Speech:

Machine learning assisted image processing for remote bio-medical sensing and diagnosis

Prof. (Dr.) Zeev Zalevsky
Faculty of Engineering and the Nanotechnology Canter, Bar-Ilan University,
Ramat-Gan 52900, Israel

Abstract- I will present a photonic sensor that can be used for remote sensing of many biomedical parameters simultaneously and continuously. The technology is based upon illuminating a surface with a laser and then using an imaging camera to perform temporal and spatial tracking of secondary speckle patterns in order to have nano metric accurate estimation of the movement of the back-reflecting surface. The capability of sensing those movements in nano-metric precision allows connecting the movement with remote bio-sensing and with medical diagnosis capabilities.

The image processing techniques applied to analyse the temporal-spatial changes of the captured speckle patterns implement machine learning concepts and artificial intelligence image processing modalities.

The proposed technology was already applied for remote and continuous estimation of vital bio-signs (such as heart beats, respiration, blood pulse pressure and intraocular pressure), for molecular sensing of chemicals in the bloodstream (such as for estimation of alcohol, glucose and lactate concentrations in blood stream, blood coagulation and oximetry) as well as for sensing of hemodynamic characteristics such as blood flow related to brain activity.

The sensor can be used for early diagnosis of diseases such as otitis, melanoma and breast cancer and lately it was tested in large scale clinical trials and provided highly efficient medical diagnosis capabilities for cardiopulmonary diseases.

The capability of the sensor was also tested and verified in providing remote high-quality characterization of brain activity.

Invited Speech

New approach towards green energy power system and EV battery chargers in industry

Dr. Hab. Eng. Jerzy Ryszard Szymanski, University Professor
Kazimierz Pulaski University of Radom, Poland - UE
Faculty of Transport, Electrical Engineering and Computer Sciences
Department of Electrical Drives and Industrial Electronics

Abstract- Major changes are expected in the construction of the power system adapted to cooperate with distributed energy sources: PV and wind power plants - for the needs of residential and public utility buildings, including electric passenger cars and nuclear and hydrogen power plants - for the needs of heavy industry and heavy-duty vehicles and machines. In the new approach to the construction of the power grid, it is important to use low- and medium-voltage DC microgrid and to replace traditional transformers with bi-directional power electronic converters.

The idea of solid-state transformers (SSTs) has evolved in recent years in various fields, including smart grids. This is a promised key element of future smart grids. SSTs are expected to replace conventional low-frequency transformers in smart grid as they provide efficient and more controlled bidirectional power flow control options, as well as the ability to implement functions such as reactive power compensation, short-circuit current limitation, power factor correction, harmonics compensation, voltage drop compensation, and voltage drop compensation to the distribution network as input and output frequency variability. Future smart grid design and research focus on improving the reliability, efficiency (loss reduction in smart grids), and distributed power quality, such as short outages or prevention of voltage fluctuations. However, SST has several drawbacks that have not yet resulted in its replacement of conventional transformers. The expense of SST in comparison to a traditional low-frequency transformer is one of the most significant drawbacks.

The electrification of the transportation sector is progressing at a rapid pace. All car manufacturers have strong programs to electrify their car fleet to meet the demands of society and customers by offering carbon-neutral technologies. Power electronics technology is, in this evolution, essential and also in rapid development technology-wise. Battery energy management is up till now one of the very important tasks for consideration by scientists and engineers. The problem with energy management in the energy storage– (or batteries) is very complex.

Common all vehicle electrical solutions are that power electronics technology is used to convert power in many aspects - motor drivetrain, battery management system, battery charging, and power supply to all auxiliary units in a vehicle. There are requirements for batteries of cars and self-propelled electric industrial machines which concern the battery parameters, topologies and properties of battery charging converters, simulation research and design of energy storage and charging stations for electric vehicles, energy management system (EMS) and battery management system (BMS) in smart transformer stations. In order to ensure close access to the battery charging points of industrial vehicles, is proposed to use frequency converters commonly used in electric motor drives by introducing additional functionality. The DC voltage of the EV battery during charging is obtained by rectifying the three-phase voltage of the PWM inverter. The local 600 V DC microgrid was used to power the drive inverter working as a battery charger.

Invited Speech

Possibilities of magnetoelectric energy harvesting for powering IoT devices

Dr. Karol Kuczynski,
Assistant professor at the Institute of Radio electronics and Multimedia Technologies

Abstract-Faculty of Electronics and Information Technology, Warsaw University of Technology. He deals with magnetoelectric sensors, energy harvesting and modelling of sensors. The Internet of Things (IoT) is a concept in which objects can directly or indirectly collect, process, or exchange data through wired and wireless communications. The concept can be used in production, city management, health care, household appliances, and mobile devices. Especially in the latter, it is increasingly necessary to solve the problem of power supply for a long period of time when they are not directly connected to the power grid. In recent years, much attention has been paid to various methods of converting energy from electromagnetic, mechanical and radio frequency vibrations used to power wireless sensors [1, 2]. Problems related to the power supply of IoT devices are described in [3-4]. The development of modern amorphous and nanocrystalline tapes characterized by high values of magneto strictive strains and piezoelectric with a high value of the piezoelectric coupling coefficient and small values of the loss angle tangent creates new possibilities for the construction of ring magnetoelectric transducers [5]. The principle of operation of these transducers is based on the magneto strictive effect of the tape on the piezoelectric material. This interaction is described in the literature as the magnetoelectric effect (ME) [6, 7]. The possibility of using ring-shaped magnetoelectric transducers for energy recovery was considered by the authors in [8]. Various magnetic and piezoelectric materials were used in studies on flat-panel transducers, which influenced the amount of energy obtained [5]. For this reason, tests were carried out for ring transducers, which are characterized by a closed magnetic circuit, differentiated by the PZT materials used and their dimensions.

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Invited Speech

Innovative power generation and conversion systems based on renewable energy sources

Dr. Marta Zurek-Mortka
Lukasiewicz Research Network - Institute for Sustainable Technologies, Radom, Poland

Abstract- Primary energy consumption is constantly growing. Worldwide, the industrial sector is a major contributor to greenhouse gas emissions, accounting for nearly one-third of global emissions. In Europe, the industrial sector accounts for around 17% of greenhouse gas emissions, and reducing these emissions is essential to achieving the EU's climate neutrality goal. For this reason, increasing attention is paid to increasing the share of energy from renewable sources in global consumption and improving the energy efficiency of classic heating systems, as well as reducing the share of carbon dioxide in transport systems. Promising technologies to address these challenges are artificial intelligence and digital twins to offer a step-change opportunity to reduce energy use, increase energy efficiency, and decrease carbon emissions. The global intention to proceed with the low-carbon energy transition has become more prevalent and intelligent control has become more important wh en installing and using more renewable energy capacities. The smart consumption tools powered by AI also change how consumers use and save energy. Decentralized power grids impact the balancing of energy inputs and outputs using the previously collected data. The use of artificial intelligence, and in particular, machine learning based on collected data, revolutionized the approach to the use of electricity and influenced providing efficient control regarding economic and environmental goals. Moreover, there are some possibilities for implementing the postulate of increasing the energy efficiency of thermal systems such as the use of thermoelectric generators for the local production of auxiliary energy for such systems. The use of renewable energy sources and energy storage to supply fast-charging stations for electric autonomic work machines and transport means is also particularly important. The search for a solution to the problem of fast-charging EV batteries without the negative impact on the power system is the subject of most research. The lecture includes recent research regarding the integration of hybrid fast-charging stations for electric vehicles and autonomous electric work machines using a new type converter cooperating with the microgrid, RES, and energy storage and presents innovative solutions for generating electricity from waste heat as well as hydrogen-based systems. Further research will be focused on AI systems to support energy modelling and simulation, as well as developing AI-driven solutions to promote green energy in cross-sectoral production, intelligent and energy-aware resource management for digital twins, as well as energy and emission monitoring and management for the optimal utilization of local energy potential and carbon footprint savings potential.

Invited Speech

A Demand Response algorithm to improve Transient Stability Margin for Smart Electrical Grid

Dr. Sandip Chanda
Associate Professor and Head
Ghani Khan Choudhury Institute of Engineering and Technology, Narayanpur, Malda, West Bengal, India.
A CFTI under Ministry Education. Govt. of India

Abstract- Smart grids represent a unique generation of power systems that incorporate advanced technologies to improve efficiency and sustainability. The grids use advanced sensors and control systems to monitor, analyse, and control power generation, transmission, and distribution in real-time. Smart grids combine these technologies to maximize energy efficiency, reduce energy waste, and improve power system performance. Power system stability is a key challenge in smart grid operation when loads, generation sources, and other dynamic factors change. To address this challenge, transient stability constrained optimal power flow (TSC-OPF) can be used. To ensure continued system stability, TSC-OPF optimizes generation and transmission of electricity based on the dynamic characteristics of the power system, including voltage and frequency fluctuations. In smart grids, renewable energy sources like wind and solar power pose significant challenges due to their intermittency and unpredictability. By optimizing the distribution and utilization of renewable energy sources and taking into consideration the transient stability constraints of the system, TSC-OPF is able to mitigate these challenges. For example, renewable energy sources can be managed in order to match demand, energy storage systems can be utilized to smooth out fluctuations in energy supply, and electric vehicle charging can be controlled to avoid overloading the grid. Furthermore, TSC-OPF facilitates the efficient operation of demand response, energy storage, and electric vehicle charging, which are essential components of smart grids. Smart grid operators can achieve optimal system performance by integrating these components into the TSC-OPF framework while maintaining stability and reliability. As a result, energy costs can be reduced, system efficiency increases, and carbon emissions can be reduced.

This work presents a Demand Response (DR) algorithm for the improvement of Transient Stability in Smart Grid in pre-perturbation conditions. The operating point in a Smart power grid is not only a balance between supply and demand but also optimal pricing, congestion, transmission loss, voltage profile and use of Renewable energy sources (RES) are needed to be considered. Introduction of dynamic loads and RES may perturb the operating point as they vary throughout the day for techno-economic reasons and weather. This introduces transient stability problems in the Grid. The proposed algorithm takes care of rotor angle stability in a way that it minimises the relative deviation of rotor angles of the generators of the grid by optimally scheduling the generation and the load demand. This assists the machines to stay in synchronism and also helps in reaching a stable operating point quicker is post perturbation condition. The proposed algorithm referred here as Transient stability constrained Social Welfare optimisation as it also causes optimal benefit simultaneously to GENCOs, TRANSCOs and DISCOs adhering to transient stability constraint of the grid. This work also validates the results of the optimisation (Optimal generation and load schedule), demonstrating how the proposed solution provides shorter time for rotor angle restoration and comparatively lesser relative deviation of rotor angles of the generators during a few cases of simulated faults in MATLAB SIMULINK environment. For the complexity of the objective function a differential evolution modified quantum Particle Swarm Optimisation (DEQPSO) algorithm has been proposed in this work.

Invited Speech

Privacy preserving computation techniques used in Deep Learning networks for Health care applications

Dr. M Thamarai
Department of Electronics and Communication Engineering,
Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh, India.

Abstract- The importance of Machine Learning (ML) is proliferating towards solving societal issues in crucial decision-making. Deep Learning (DL) algorithms have resulted in widespread adaptations in existing industries. However, the areas or applications dealing with private and sensitive data like healthcare or finance have lagged due to various constraints to protect user data. Data privacy is central in training and testing deep learning models, especially sensitive data to train and infer the model. Currently, researchers are working towards providing privacy in ML/DL models by network design concepts. This lecture covers the privacy preserving computation techniques used in Deep learning networks. First, the applications of deep learning in healthcare and the need of privacy computations in healthcare applications. Next, the privacy preserving computation techniques used in Deep Learning for secured computations will be discussed.

Deep Learning in Healthcare: Deep learning Networks are more helpful to the radiologist for analysing X-Ray, PET-Scan, and CT-Scan images for disease diagnosis and its stage detection. Also, the DL Networks can automatically detect tumor cells in a patient's body. These Networks support automated radiation dose estimation by analysing a patient's health condition in Radiotherapy.

In clinical support, DL algorithms are used to predict an accurate diagnosis of life-threatening diseases such as cancer, brain tumor, heart diseases, etc.; the trained networks accurately differentiate/classify the malignancy and benignancy cells by analysing the patient's histological images. It supports computerized diagnosis and treatment for Alzheimer's diseases, organ segmentation, etc.,

The Electronic Healthcare record which is maintained in Hospitals contains patient's health data, past disease history, treatment taken, etc.; deep learning networks act as a secure carrier for portable medical records, reduce health care fraud and provide secure access to emergency medical information.

Privacy perspective of Deep learning networks: Given the privacy perspective of deep learning, the user data and the model information should be kept secret. This information should not be revealed during the training and inference phase to a third party. There is a possibility of predicting the training data by simply observing the network's output. So, the integration of data privacy in the emerging deep learning is required. In DL, privacy is required in various stages such as training, input, output, and model. The first three are related to data privacy, and the fourth one involves deep learning model privacy. Training data privacy protects from the reverse engineering of the training data by a malicious actor. Input data privacy protects accessing the party's input data during the inference phase by other parties in the model. The output privacy guarantees parties model output data accessed by other parties in the learning model.

The privacy preserving computation techniques used Deep Learning networks for medical data processing is analysed into three categories as follows.

- Privacy-Preserving in the cloud environment: Describes the privacy preservation computation techniques to protect patients' medical data and model parameters in client /Server or cloud-based computation environment for medical diagnosis and storage.
- Privacy-based computation in Private Deep Learning networks: Describes techniques used in the privacy-preserving Deep learning networks at the user end for data privacy.
- Modifications in the CNN structure for Privacy preservation: Describes the deep learning network structure modifications and polynomial approximation of activation function for privacy-based computation of medical data. Finally, the challenges in privacy preserving computations implementations in deep learning networks, and the future research directions also discussed.

Invited Speech

Transforming healthcare with the Internet of Medical Things (IoMT)

Dr. Abhishek Das,
Associate Professor and former Head
Dept. of Computer Sc. & Engineering
Aliah University, Kolkata, West Bengal, India.

Abstract- The healthcare industry is undergoing a remarkable transformation thanks to the Internet of Medical Things (IoMT), a network of interconnected medical devices, sensors, and systems. IoMT has ushered in a new era of healthcare, where the focus is shifting from reactive treatment to proactive and personalized care. With wearable devices monitoring vital signs, chronic conditions, and even medication adherence in real-time, healthcare providers can detect health issues at their earliest stages. This early intervention not only improves patient outcomes but also reduces the burden on healthcare systems by preventing costly hospitalizations and emergency interventions. Moreover, patients themselves are becoming active participants in their healthcare journey, empowered by access to their health data and the ability to communicate with healthcare professionals through telehealth platforms.

One of the most promising aspects of IoMT is its potential to drive down healthcare costs. Continuous monitoring and remote patient management enable healthcare providers to allocate resources more efficiently, reducing the need for frequent in-person visits. Moreover, the vast amounts of data generated by IoMT devices can be harnessed for predictive analytics and research. This data-driven approach can uncover valuable insights into disease management, treatment efficacy, and public health trends, ultimately leading to better healthcare outcomes and cost savings. However, as we embrace the advantages of IoMT, it's essential to address the challenges related to data privacy and security, as sensitive medical information is being transmitted across networks. Stringent measures and robust cybersecurity protocols are crucial to protect patient data and maintain trust in this transformative healthcare technology.

In the years ahead, the Internet of Medical Things is set to revolutionize healthcare even further. It will foster a more patient-centric approach, where individualized care plans are based on real-time data and predictive analytics. Additionally, as IoMT continues to mature, it will likely expand its scope to include not only treatment and monitoring but also health and wellness promotion. As a result, healthcare will become more accessible, efficient, and effective, improving the overall well-being of individuals and communities while ensuring the sustainability of healthcare systems in an ever-changing world.

Professor Mike Hinchey
University of Limerick, Ireland

He is Professor of Software Engineering at University of Limerick, Ireland. Prior to joining Lero, Professor Hinchey was Director of the NASA Software Engineering Laboratory; he continues to serve as a NASA Expert. In 2009 he was awarded NASA's Kerley Award as Innovator of the Year. Hinchey holds a B.Sc. in Computer Systems from University of Limerick, an M.Sc. in Computation from University of Oxford and a PhD in Computer Science from University of Cambridge. The author/editor of more than 15 books and over 200 articles on various aspects of Software Engineering, at various times Hinchey previously held positions as Full Professor in Australia, UK, Sweden and USA. He is a Chartered Engineer, Chartered Engineering Professional, Chartered Mathematician and Charted Information Technology Professional, as well as a Fellow of the IET, British Computer Society and Irish Computer Society. He is President of IFIP (International Federation for Information Processing) and Vice-Chair (and Chair-Elect) of IEEE UK & Ireland section. He is also Editor-in-Chief of Innovations in Systems and Software Engineering: a NASA Journal and Journal of the Brazilian Computer Society.

Prof. (Dr.) Zeev Zalevsky
Faculty of Engineering and the Nanotechnology Canter, Bar-Ilan University, Ramat-Gan 52900, Israel

He received his B.Sc. and direct Ph.D. degrees in electrical engineering from Tel-Aviv University in 1993 and 1996 respectively. Zeev is currently a full Professor and the Dean of the faculty of engineering in Bar-Ilan University, Israel. His major fields of research are optical super resolution, biomedical optics, nano-photonics and fiber-based processing and sensing architectures. Zeev has published more than 570 peer review papers, 340 proceeding papers, 9 books (6 authored and 3 as an editor), 32 book chapters and about 100 patents. Zeev gave about 620 conference presentations with more than 220 invited/keynote or plenary talks. He is a fellow of many large scientific societies such as SPIE, OSA, IEEE, EOS, IOP, IET, IS&T, ASLMS, AIMBE and more. He is also a fellow of the American National Academy of Inventors (NAI). For his work he received many national and international prizes such as the Krill prize, ICO prize and Abbe medal, SAOT prize, Juludan prize, Taubelnblatt prize, young investigator prize in nanotechnology, the International Wearable Technologies (WT) Innovation World Cup 2012 Prize, Image Engineering Innovation Award, NANOSMAT prize, SPIE startup challenge prize, SPIE prism award, IAAM Scientist Medal Award, International Photonic Award, Dr. Horace Furumoto Innovations Professional award, The Asian Advanced Materials Award, Edison Award, IEEE distinguished lecturer award, VEBLEO Scientist Award, Joseph Fraunhofer Award/Robert M. Burley Prize, Lotfi Zadeh Memorial Award, E&T Innovation Award, CES (Consumer Electronics Show) 2022 Innovation Awards, German Innovation Awards 2022, the Humboldt research prize, SPIE 2023 Chandra S. Vikram Award for Metrology and more.

Besides his academic research activity, Zeev is also very active in commercializing his inventions into start-up companies. Zeev was and is involved in technologically leading of more than 10 startup companies.

Dr. Hab. Eng. Jerzy Ryszard Szymanski,
University Professor
Faculty of Transport, Electrical Engineering and Computer Sciences
Department of Electrical Drives and Industrial Electronics
Kazimierz Pulaski University in Radom, Poland

He is working as professor in the Faculty of Transport, Electrical Engineering and Computer Science at University of Technology and Humanities in Radom (UTH Radom), Poland. He has graduated Doctor of Philosophy (Ph.D) in Electrical Engineering from Warsaw University of Technology. His research areas include Power Electronics Converters in Drive Applications, Application of Power Converters in Renewable Sources and Battery Electric Vehicles, EMC Compatibility in Power Converters Systems, Hybrid Power Systems in Electric Industry Drives, Energy Storages for BEV and Active Power Filters etc. He has about 75 scientific publications, 3 patents, supervisor of 5 doctoral students. Member of Organizing a Program Committees of International Conferences. Member of the Doctoral Council of the UTH in Radom in the discipline of automation, electronics and electrical engineering. He has experiences of working in industry like ELPOL Ltd as a board member from 2000 to 2010.

Dr. Eng. Karol Kuczynski
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He graduated from the Faculty of Mechatronics at the Warsaw University of Technology, in the field of "Automation and Robotics" and specialization "Industrial Measuring Systems". During the implementation of his master's thesis, he developed a concept and built a computer station for measuring magneto strictive strains. He was a scholarship holder of the development program of the Warsaw University of Technology. Since 2006 he has been writing articles in the nationwide monthly magazine "elektro.info" being the thematic editor of this magazine. For over 15 years he has participated in the development of fair guides for the International Trade Fair ENERGETAB in Bielsko-Biala. In 2015-2016 he collaborated in creating the weekly of the Association of Polish Electrical Engineers, entitled "Week in SEP". In 2017 he received the Medal of prof. Michał Doliwo-Dobrowolski from the President of the Association of Polish Electrical Engineers (SEP). He is the author of the highest rated scientific article (2nd prize) at the 9th International Computing, Communication and Sensor Network Conference in Calcutta in 2020. In 2022 he defended his doctoral thesis "Evaluation of Operating Parameters of the Magnetoelectric Sensor Using Artificial Intelligence Methods". On September the 29th, 2022 the Senate of the UTH in Radom awarded him the degree of Doctor of Engineering and Technical Sciences in the discipline of: automatic control, electronics and electrical engineering. In 2022 he received the Medal of the 100th Anniversary of the Association of Polish Electrical Engineers in recognition of his merits in promoting electrical knowledge and in gratitude for cooperation with SEP. Currently, he works as an assistant professor at the Institute of Radio electronics and Multimedia Technologies at the Faculty of Electronics and Information Technology of the Warsaw University of Technology. He deals with magnetoelectric sensors, energy harvesting and modeling of sensors.

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She obtained a Doctor degree at the Faculty of Transport, Electrical Engineering and Computer Science at the University of Technology and Humanities Kazimierz Pulaski in Radom in the field of Electrical Engineering. She was an Erasmus Ph.D. Student at the Faculty of Electrical Engineering at the University of Ljubljana in Slovenia in 2019-2020.

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Paper Id.: 10

A Transient Stability Constrained Optimal Power Flow Algorithm for Smart Electrical Grid

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Abstract—This work presents a few new OPF algorithms for Smart Grid operational optimisation which takes care of rotor angle stability along with the other important controllable like generation cost, transmission line active power loss, voltage profile, transmission line congestion and load curtailment by producing optimal generation and load schedule without conceding any limit violation. The most prominent result was obtained from one of the proposed algorithms which have been referred here as Transient stability constrained Social Welfare optimisation as it causes benefit simultaneously to GENCOs, TRANSCOs and DISCOs adhering to transient stability constraint of the grid. This work also validates the results of the optimisation (Optimal generation and load schedule), demonstrating how the proposed solution provides shorter time for rotor angle restoration and comparatively lesser relative deviation of rotor angles of the generators during a few cases of simulated faults in MATLAB SIMULINK environment. For the complexity of the objective function a differential evolution modified quantum Particle Swarm Optimisation (DEQPSO) algorithm has been proposed in this work.

Keywords—Renewable Energy Sources (RES), Smart Grid, optimisation framework, social welfare, Demand Response (DR) programme, DEQPSO

Paper Id.: 11

Design of a new Folding XOR algorithm based chaotic image cryptosystem

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Abstract- The increasing popularity of cloud exchanges and social networks has resulted in images playing a significant role in global image transmission and storage. To prevent security breaches, different image security techniques have been suggested by research communities. The encryption technique has good prospects for securing image data by confusing and diffusing the image pixels. However, many existing cryptosystems suffer from high computational complexity and do not provide satisfactory levels of security. Considering this, we have designed a chaotic image encryption scheme using a new Folding XOR algorithm which shuffles the image pixels horizontally and vertically for the confusion purpose. Before applying the Folding XOR algorithm, the plain images were additionally scrambled by utilizing the pixel values of a random image matrix and generated Balanced-box values. A pseudo-random sequence generator is designed for the purpose of diffusion in the proposed scheme. The logistic map is used in both the confusion and the diffusion process. The performance and security analysis of the proposed scheme shows that it has a high degree of randomness and can resist statistical attacks, differential attacks, brute-force attacks and entropy-based attacks. Results and analysis support the claim that the suggested method is reliable, extremely sensitive, and performs noticeably better than other comparable state-of-the-art schemes.

Keywords- Image Encryption, Confusion, Diffusion, Folding XOR, Security, Logistic map.

Paper Id.: 12

Advanced Copy-Move Forgery Detection: Leveraging AKAZE Algorithm for Image Forensics

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Abstract- In this modern era of advance digital technology and easily available high end digital image editing software, proficiency in manipulating digital images has become effortless. Miscellaneous tools for editing are easily accessible and typically employed to improve the quality of images. However, this widespread use of editing techniques has also made manipulated images commonly known as image forgery. Detecting image forgery poses a considerable challenge. One of the prevalent methods used for image manipulation called copy-move forgery, where a pre decided area of an image is copied, and the copied portion is pasted in another portion of that image, compromising the authenticity of the original digital image. In this paper we have introduced a method for detecting forgery called Copy Move Forgery Detection (CMFD) that exceeds the effectiveness and precision of existing methods such as SURF, SIFT etc. The proposed methodology employs the AKAZE (Accelerated-KAZE) algorithm to identify key points in grayscale images and utilizes the Histogram of Oriented Gradients (HOG) for feature description. By leveraging these methods, the suggested approach enhances the efficiency and accuracy of forgery detection and localization. Using a sum of squared differences (SSD) and nearest neighbour distance ratio (NNDR), the feature vector is correctly categorised across the feature space to discover an appropriate match. RANSAC is used to re- move anomalies that correspond to an earlier phase. Various performance metrics were evaluated, including Precision, Recall, and Fscore. The experimental results demonstrate that the proposed algorithm outperforms other existing methods in terms of performance measures. Additionally, it exhibits resilience against various geometrical attacks, including noise, scaling, and rotation.

Keywords- Image forgery · CMFD · AKAZE · HoG · RANSAC

Paper Id.: 13

Circuit-Level Technique to Mitigate Impact of High-Energy Particle

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Abstract- In the rapidly advancing field of space technology, the reliability of SRAM memory cells is a critical factor affected by soft errors. We present a novel radiation-hardened 10T SRAM cell design that mitigates the impact of high-energy particles in space technology, outperforming RHBD-10T and QUATRO-10T cells. With a higher critical charge of 2.7fC as compared to other cells, it resists radiation-induced charge deposition, granting immunity to SEUs at all sensitive nodes. The design offers lower hold power consumption (less leakage Power), faster read operations, and improved write stability. Although read stability is slightly reduced, reliable data storage remains intact. Simulation results validate its superiority, making it ideal for data storage in radiation-prone environments. Our study enhances space technology by providing valuable insights into radiation-hardened SRAM cells, ensuring reliable memory systems in challenging radiation conditions.

Index- Radiation hardened, SEU (Single Event Upset), RSNM (Read Static Noise Margin), WM(Write Margin).

Paper Id.: 14

Photovoltaic Power assessment using Long Short Term Memory networks method

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Abstract- For thousands of years, civilization has relied on burning fossil fuels to provide electricity, but in the modern world, doing so is becoming problematic. The usage of renewable energy in the right way is the solution to the entire problem mentioned above. Renewable energy is energy that is created by natural processes and is continuously renewed. Installing solar photovoltaic systems (SPS) is currently the primary activity to achieve the widespread adoption of renewable energy sources (RES) in India's urban and rural areas. Tthe authors have presented a novel approach to assess the photovoltaic power output using neural networks in this research paper. The proposed method aims to forecast the photovoltaic power output with high accuracy by utilizing historical data on weather conditions and photovoltaic power generation. Mainly LSTM types of NN is used in this paper. The LSTM network is trained with a large dataset of photovoltaic power output and corresponding weather data. Utilizing several performance criteria, including mean absolute error and root mean squared error, the trained model is assessed. The results show that the proposed method outperforms the traditional forecasting methods and achieves high accuracy in predicting the photovoltaic power output. It has been determined that the suggested strategy may be utilized to effectively plan and manage photovoltaic power-producing plants.

Keywords- Renewable Energy, Photovoltaic generator, Artificial intelligence, RNN, Long Short-Term Memory

Paper Id.: 15

Design and Analysis of Metasurface MIMO Antenna for RF energy Harvesting Applications

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Abstract— When analysing the performance of MIMO antennas, the distance between Microstrip patches is a crucial factor. With a FR4 substrate serving as the dielectric material, the antenna design used a meta surface and coaxial feeding. The antenna is appropriate for 5G and WiMAX applications since it works in three frequency bands with 5.2 GHz at its centre. It should be noted that the antenna showed a good front-to-back ratio and a high gain of 5.85dB. An output voltage of 2.64V was produced by the proposed antenna during testing. HFSS and ADS software were used for the duration of the design and assessment processes.

Keywords— MIMO, Front to back ratio, RF energy harvesting.

Paper Id.: 16

Impact of mechanical and electrical hydro governing systems on the LFC of hydro thermal power system under TIDDF controller

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Abstract- This paper aims to demonstrate the effect of employing the mechanical and electrical governing systems of the hydro unit on the load frequency control (LFC) of an interconnected hydrothermal power system (IHTPS). The IHTPS has the thermal unit in area 1 and the hydro unit in area 2, and the performance is analysed for injecting 10% step load disturbance (SLD) in both areas. The investigation is performed under the tilt-integral-double derivative filter (TIDDF) controller optimised with the crow search optimisation algorithm (CSOA). However, the performance sovereignty of TIDDF is demonstrated by the other regulators. Initially, the analysis of IHTPS is performed by considering the hydro unit with the mechanical governing system, which is later extended to the consideration of the electrical governing system under the same disturbance loadings. Simulation results reveal the significance of employing an electrical governing system with the hydro unit for better frequency regulation of IHTPS.

Keywords- Load frequency control, crow search optimization algorithm, TIDDF controller, governing system, 10%SLD.

Paper Id.: 19

Automatic Bug Priority Prediction Using Deep Learning

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Abstract- The procedure of manually prioritizing bugs is laborious and time-consuming. To save most time, it is preferable to create a model that prioritizes bugs automatically. Therefore, we wish to propose a deep learning model to instantly ascertain the priority of reports. We preprocess text from bug reports using natural language processing (NLP) techniques, turning it first into tokens and subsequently into a sequence of integers. Then using textual data as input, we train a model-based classifier that outputs a prioritized list from P1 to P5, with P1 of high priority and P5 of low priority.

Keywords- Deep Learning, Bug Reports, Convolutional Neural Network (CNN), Natural Language Processing (NLP), Prioritization.

Paper Id.: 21

Node localization in Wireless Sensor Networks using Felis bee technique for energy-efficient communication in IoT-assisted WSN

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Abstract—Localization of sensor nodes is of utmost importance as the information collected by sensor nodes may be meaningless without the knowledge of its origin. Due to limited battery life and non-uniform data loaded in the network, some of the sensor nodes may exhaust their battery early and may cease their intended function. In this paper, the node localization and the position estimation of the dead nodes during routing are more effectively identified by the proposed Felis bee optimization-based localization. The node localization is significant for effective communication and data transfer throughout the network with high signal strength. The proposed method assists to identify the dead nodes and replace with less localization error thus, the signal strength of the receiver side is maximum. By utilizing the information of the exact position of the anchor nodes, the unknown location of the dead nodes can be estimated by the proposed Felis bee optimization-based localization.

Keywords—WSN, node localization, optimization, Cluster head selection, position estimation

Paper Id.: 22

A Survey on Dynamic State Estimation strategies deployed for protection and control of modern Power Grid

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Abstract— This paper presents a survey on various strategies of Dynamic State Estimation (DSE) used for protection and control of modern power grid. While covering some works related to DSE in Power systems, the main focus of this paper is a comparison study of different research already done in power system, based on Dynamic State Estimation (DSE). The paper discusses a few critical topics of DSE for control and protection applications in modern power systems like importance of robustness and security in Estimating the dynamic state of a synchronous generator in a power system particularly in the face of cyber-attacks, Robust Cubature Kalman Filter (RCKF) algorithms for estimating the dynamic state of synchronous machines in the presence of non-Gaussian measurement noise and outliers, unscented transformation, Kalman filtering, particle filtering, and neural networks, performance comparison of different methods including extended Kalman filter (EKF), unscented Kalman filter (UKF), square-root unscented Kalman filter (SR-UKF), cubature Kalman filter (CKF), and an observer- based approach for dynamic state estimation (DSE) in power systems under data integrity attacks. Both conventional and modern data-driven and probabilistic techniques have been reviewed and identified few limitations of those methods. To overcome these limitations new methodology is proposed. Hence, proposed work is comparison study on conventional method with new Machine learning based dynamic state estimation method.

Index—Dynamic state estimation, Robust Cubature Kalman Filter (RCKF), extended Kalman filter (EKF), unscented Kalman filter (UKF), square-root unscented Kalman filter (SR-UKF, cubature Kalman filter (CKF), Machine learning, power systems networks

Paper Id.: 23

A Comparative Study for Various Approaches on Spam Detection of Mobile Phone SMS

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Abstract-The usage of SMS in mobile phones has expanded significantly, which has caused trouble of Spam SMS unwanted Messages to Users. As a result of these technological break throughs and increases in smart phones supporting content promotion, reports indicate that the standard of SMS Spam is gradually getting better. These spam SMS may also result in the loss of personal information. Detecting SMS spam, which is roughly equivalent a substitute area, but lacks a comprehensive research review. Various machine learning approaches are frequently used to deal with SMS detection, and one such technique is SMS spam filtering, which distinguishes between spam and legitimate SMS. This study seeks to consider spam detection as a straight forward classification problem involving two classes of texts. A classification method with extraction and various datasets collected that utilise a classification feature to filter the messages will make up the classification. With detailed study on this, work focuses on developing we will focus on developing a Naive Bayes support vector machine that can identify spam messages.

Keywords- SMS Spam, Detection, Machine Learning Techniques,

Paper Id.: 24

Improved Fruit Fly Optimization Algorithm Tuned Fuzzy Intelligent Controller for Multi Area Power System Stability

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Abstract- This work analyses the possibility of a fuzzy intelligent integral-double derivative including filter (IDDF) (FIDDF) controller for the dynamical stability of a multi-area multi- fuel power system (MAMFPS). The suggested FIDDF is designed optimally using the heuristic technique of the improved fruit fly optimization algorithm (IFFOA). The assessment of MAMFPS dynamic behaviour is initiated by laying area 1 with a 10% step load disturbance (SLD). The performance efficacy of FIDDF has been validated with other regulators in the literature. The MAMFPS of the investigative model is deliberated with all possible types of non-linearity with the intention of deliberating the work in a real-time environment. Moreover, the significant impact of one of the nonlinear constraints, such as communication time delays (CTDs), on MAMFPS's dynamic performance is revealed. Further, the MAMFPS operation is carried out with the territorial strategy of a Thyristor-controlled series compensator (TCSC) and super capacitors (SCs) for better improvement in the system performance.

Keywords- Fuzzy IDDF controller, Communication time delays, improved fruit fly algorithm, TCSC-SCs strategy, MAMFPS model.

Paper Id.: 26

A mixed method for order abatement using Bonobo Optimizer and Stability Equation Method

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Abstract- A mixed method of Order Abatement (OA) of a High Order System (HOS) has been proposed. The combination of a Conventional method of OA using the Stability Equation Method (SEM) and an optimization-based OA method using the Bonobo Optimizer (BO) algorithm have been utilized. The numerator coefficients of the Abated System (AS) are determined by BO and denominator coefficients are estimated by SEM. It is always desirable for OA with minimal error hence Integral Square Error (ISE) has been considered in this work as an Objective Function (OF). Two test systems have been considered for testing the efficacy and superiority of the proposed mixed method over well-known existing methods of OA. Various performance indices parameters have been compared with the proposed mixed method and well-known prior existing methods for both test systems. Step response and Frequency response of the Proposed mixed method and existing methods comparison have been also made.

Keywords- Order Abatement, Stability Equation Method, Bonobo Optimizer, Abated System, Integral Square Error.

Paper Id.: 27

Multi-objective Particle Swarm Optimization based analysis of Combined Economic & Environmental Load Dispatch

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Abstract - Coal-based power plants contribute near about 45% energy in global energy sector. Therefore, the economic and emission load dispatch of thermal power plant plays a significant role in the aspect of cost effectiveness, emission of CO2, SO2, NOx etc. into the atmosphere and increasing rate of diminish of coal. Economic and environmental load dispatch without shedding any load are the objectives of this paper maintaining equality and inequality constraints. a popular swarm behaviour- based meta-heuristic technique named Particle Swarm Optimization has been applied for 40 units test model and a comparison study for different types of PSO has been projected in this work. A weight aggregation method approach has been applied in this paper for multi-objective optimization.

Keywords: Combined Economic & Environmental load dispatch (CEELD), Particle Swarm Optimization (PSO)

Paper Id.: 28

Comparative study of Brain Tumor Detection Using SVM & CNN

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Abstract- A brain tumor is the most common disease on earth and it is harmful to people. Tumors are the uncontrolled growth of cells and tissues in the human brain is called tumor. The image is acquired using the CT scans and Magnetic Resonance Image. The identification of tumors at an early stage is critical so difficult and challenging for researchers. A patient comes to the hospital when he starts suffering of pain, headache, omitting etc and at that time, if he has a tumor, To recognize the tumor early stage it is very different to identify whether it is benign (non-cancerous) or malignant (cancerous), many techniques or methods are available for detection of tumor here we apply SVM algorithm and CNN on brain Magnetic Resonance Images for classification of benign or malignant tumor. Here, we propose a system based on the new concept of simply tumor detection that used a feature extraction technique, segmentation algorithm and classification. To identify similar patients who have or do not have brain tumor, as well as to ascertain the type of tumor they have and their tumor sizes. By comparing both SVM & CNN which technique is more beneficial and which one is better in both. The performance of SVM classifiers is measured in terms of training effectiveness and classification accuracy. With 95% accuracy, it manages the process of brain tumor categorization in MRI scans. The efficacy of training and classification accuracy of the CNN classifier is compared (96.33%). Both the methods are getting high accuracy but as compare to SVM, CNN provide more accuracy and consume less time for execution.

Keywords- Digital image processing, Brain Tumor, Edge detection, Morphological operation, segmentation, Support Vector Machine, Convolution Neural Network.

Paper Id.: 29

IoT-Health AI: Intelligent Wearable Device Pack for Advanced Health Monitoring of the Elderly

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Abstract- In this work, we report the design of an intelligent wearable device pack conceived especially for continuous health monitoring of the elderly persons. Several sensors and an artificial intelligence platform are associated with the design. The system initially gathers data from pulse sensors and electrocardiogram (ECG) module. The data accumulated using an Arduino and then sent through the Node MCU to a cloud-based platform is used to train a few machine learning methods. Immediately at the end of the necessary processing by the cloud resident artificial intelligence (AI) platform, the device is able to provide predictive diagnostic support as an aid to the patient. We employ decision tree (DT), support vector machine (SVM) and random forest (RF) classifiers (cloud resident) along with a host of sensors to obtain accurate and real- time predictive analytics regarding the evolving health condition of elderly patients.

Keywords- ECG, Prediction, Machine Learning, Random Forest, ESP32,

Paper Id.: 30

Revolutionizing Agriculture with Smart Agro Device: Understanding Soil Behaviour and Soil Nutrients for Efficient Crop Yield in Vellore District

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Abstract-The primary objective of this research is to employ predictive models for determining soil nutrients and various other soil variables, thereby enabling the selection of appropriate crops and recommending suitable fertilizers for agricultural land in Vellore district. The ultimate goal is to facilitate informed decision-making within the data analytic system, addressing soil nutrient deficiencies, fertilizer utilization, and crop selection. The study demonstrates that IoT-based data processing techniques play a crucial role in accurately predicting the optimal crops for specific fields and suggesting the appropriate fertilizer dosage for each crop. The soil analysis in Vellore district revealed that it naturally contains approximately 60% potassium, organic carbon, and nitrogen, with a moderately alkaline pH level. In the absence of organic carbon as a nutrient, the main nutrients become potassium and nitrogen. Although phosphorus remains an essential nutrient, its significance is slightly lower than that of nitrogen. This emphasizes the importance of pH level balance in maintaining soil fertility rather than solely relying on excessive fertilizer application. By considering these factors, farmers in the Vellore district can make well-informed decisions regarding crop selection to achieve higher yields and increased agricultural production. The main objective of this paper is to revolutionize the agricultural sector by introducing the innovative Smart Agro Device. This device is designed to accurately measure micronutrients, macronutrients, and various physical parameters of the soil. By doing so, it facilitates the selection of the most appropriate crop for a specific area based on its nutrient levels, ultimately leading to higher crop yields.

Paper Id.: 31

Design and Development of Spirometry Device to Examine Lung Health

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Abstract- Using an Arduino Uno microcontroller, an air pressure sensor, and a barometric pressure sensor, the project's objective is to build a spirometry device. The three measurements of forced vital capacity (FVC), forced expiratory volume in one second (FEV1), and their ratio (FEV1/FVC) are used to assess the state of the lungs. The most crucial factor to gauge is air pressure. This device is used to gauge a patient's breathing pressure. Using support vector machines (SVM), we split a database of 1000 patients into two parts: a doctor's database and a machine database. The doctor's database had a better accuracy rating (91.7%) when we compared the databases' degrees of precision. Our system's accuracy is lower, at 89.4%. This device can be used for asthma screening.

Keywords- Spirometry, COPD, Cystic fibrosis, pulmonary fibrosis, Forced Vital Capacity, Potentiometer, Arduino UNO

Paper Id.: 32

Machine Learning - Based Handwritten Isolated Urdu Character Recognition: Comparative Analysis

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Abstract- This study describes the implementation and comparison of two commonly used machine learning models for recognizing patterns in a set of isolated handwritten Urdu characters. The first model is built with Support Vector Machines (SVM), whereas the second is built with Convolutional Neural Networks (CNN). The SVM approach did not offer spectacular results; however, the CNN-based implementation achieved an accuracy of 98.82% on the test set, which is the best result produced thus far and serves as a benchmark for the publicly available Urdu dataset HUCD. When comparing the metrics of the results, the resource and time usages of the implementations, as well as the most crucial aspect: accuracy, are taken into account. The procedures were not adjusted to the input in order to generate the most generic outcomes.

Keywords- Optical Character Recognition (OCR), Support Vector Machines (SVM), Convolutional Neural Networks (CNN), Deep Learning Model, Pattern Recognition.

Paper Id.: 33

A Self-VTH-Compensated Modified Dickson Charge Pump for RF Energy Harvesting

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Abstract- Self-reliance of appliances including communication nodes is gaining attention over the last years. This can be attained with the use of a Radio frequency energy harvesting (RFEH) system where the low power rectifier plays the crucial role. The design of the RFEH rectifier is challenging as it must be capable of offering satisfactory power conversion efficiency (PCE) at a lower input power. Though the MOSFET based designs are preferred for its lower power consumption and fabrication ease, its threshold voltage limits the PCE. This needs to be enhanced with the use of an effective yet simple self- threshold voltage (Vth) compensation technique. This paper presents a simple and novel Vth compensation technique for a TG based Dickson Charge Pump for RFEH application. The circuit attains 92% of PCE at the input power of -10dBm while offering 79% at -15 dBm and 60% at -20dBm. This is an improvement of 4% of PCE after the integration of the compensation technique. This design can harvest energy over wide range of frequency including GSM bands. Furthermore, merely by adding two MOSFETs to the fundamental TG DCP, this is accomplished with six MOSFETs and two passive components. The proposed DCP is extremely useful to any standalone RFEH system due its simplicity, performance and area efficiency. This is capable to provide uninterrupted power to any intended low power appliances.

Keywords- RF energy harvesting, power conversion efficiency, self-threshold voltage (Vth) compensation, Dickson charge pump

Paper Id.: 34

Instantaneous Power Theory-Fuzzy Intelligent Controller (IPT-FIC) Based Improved Low Voltage Ride-Through Strategy for Grid Connected Photovoltaic System

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Abstract- Installation of Renewable Energy Sources (RESs) has increased tremendously in few decades. Due to large- scale grid integration of RESs, most of the countries are bound to modify their grid codes. For smooth operation during contingencies, the grid code demands the Low Voltage Ride-Through (LVRT) operation of the inverter where the inverter should connect till the stipulated duration and provide necessary support to the grid. In this article, Instantaneous Power Theory-Fuzzy Intelligent Controller (IPT-FIC) based improved LVRT strategy has been implemented to control the grid-connected Photovoltaic (PV) inverter. This improved strategy helps to provide the necessary active and reactive power support to the grid efficiently during the occurrence of faults or voltage sag. Here, the simulation work has been performed in MATLAB/SIMULINK-2021 environment.

Keywords- Instantaneous Power Theory, Low Voltage Ride-Through.

Paper Id.: 36

Fish Freshness Monitoring using Smartphone

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Abstract- Fish is a great food to consume as it is nutritious and delectable, but has very limited shelf life. Consuming the fish after that short window of time can damage people's health. In this work, we have developed an application software to determine fish freshness by dint of images recorded using a smartphone camera. The captured images of fish gills are processed by the mobile application where at the backend image processing algorithms are incorporated to determine qualitative measurement of freshness index. Experimental results demonstrate that the developed application can effectively determine the freshness level. The proposed application is based on colorimetric changes associated with freshness level of the fish samples, has the potential to improve the safety of fish products and to help consumers make informed decisions instantly about the fish they purchase.

Keywords- fish freshness, mobile application, image processing.

Paper Id.: 37

Real-Time Object Detection Using Mobile Camera System

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Abstract- Detecting items in real-time and translating them into auditory output used to be a challenging task. However, recent advancements in computer vision have paved the way for a wide range of real-time object identification applications. Inspired by the difficulties faced by individuals with visual impairments, we embarked on creating a solution tailored to their needs, leveraging simple mobile applications on smartphones. Our research culminated in the development of user-friendly Android software designed to empower visually impaired individuals with knowledge about their surroundings. This innovative solution utilizes a smartphone's camera to capture images in real-time, employing the object detection API for TensorFlow to swiftly identify objects. Subsequently, the identified objects are seamlessly converted into auditory output through the Android text-to-speech module. What sets our approach apart is the integration of TensorFlow Lite, which enables the processing of complex algorithms offline. This enhancement greatly enhances the efficiency and accessibility of our solution, making it a valuable tool for individuals with visual impairments.

Keywords- Object Detection, TensorFlow, Text-to-Speech, Android, SSD Mobile-Net.

Paper Id.: 40

Creating Marathi Sentiment Analysis Library with Senticnet

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Abstract- In this work, we cover the process of creating a Marathi Sentiment Analysis Library based on Senticnet. The library includes Marathi-specific pre-processing techniques such as Bag-of-words (Bow), tokenization, stop-word removal, stemming, and Removing Low-Frequency Words. The technique Support Vector Machine (SVM) and Nave Bayes Classifiers (NBC) because of sentiment analysis (SA) in Marathi is described in this study. Overall, this article demonstrates the efficacy of using Senticnet for Marathi sentiment analysis and emphasises possible applications in social media monitoring, brand perception analysis, and customer feedback evaluation. Our work advances sentiment analysis approaches for regional languages, allowing us to gain a better understanding of human emotions and perspectives across varied linguistic landscapes.

Keywords- Sentiment Analysis, Machine Learning classifier, Natural Language Processing (NLP), Senticnet

Paper Id.: 42

Image Processing Techniques in Localization of Diabetic Foot Ulcers

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Abstract- Diabetic Foot Ulcers (DFUs) are a prevalent and consequential consequence of diabetes that, if not promptly detected and treated, can result in the need for amputation. A considerable proportion of individuals with diabetes, ranging from 15 to 25%, are prone to developing diabetic foot ulcers during their lifetime. Early detection is vital to prevent complications such as infections and the need for amputations. Image processing techniques are utilized to differentiate between normal and DFU feet, creating a dataset comprising foot images with and without DFUs. This dataset which is a collection of normal and foot ulcer images will be helpful for a model to be trained for DFU detection. In this project, a novel convolutional neural network (CNN) architecture and Mobile Net architecture are employed to identify and distinguish features between healthy skin and DFUs effectively. Additionally, a user portal is developed, allowing patients to upload their foot images to verify the presence of a foot ulcer.

Keywords- Diabetic Foot Ulcer, Image processing techniques, CNN architecture, Mobile NET architecture, User portal.
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Paper Id.: 43

Analysis of predictive features in Radiation-Induced Skin Toxicity using Machine Learning Techniques

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Abstract-Radiation-Induced Skin Toxicity (RIST) represents a significant adverse consequence of radiotherapy, impacting the well-being of cancer patients. To optimize radiation treatment and minimize RIST, the development of effective predictive and assessment methods is essential. Recent years have witnessed a surge in the application of artificial intelligence and machine learning to various aspects of radiation therapy, particularly in the prediction and grading of RIST. This study offers a comparative evaluation of the performance of diverse machine learning models for the screening and grading of RIST severity. Furthermore, it focuses on the identification of the most influential feature set for this classification task. Our dataset comprises 2000 records, incorporating 18 clinical attributes from patients who underwent radiotherapy treatment at an Indian hospital. We conduct thorough statistical analyses of features derived from these clinical attributes, utilizing different feature subsets for model training and evaluation. Intriguingly, we find that by utilizing just five selected clinical attributes, machine learning models achieve nearly equivalent performance to using the entire attribute set. In terms of model performance, Support Vector Machine excels in the screening task, while Multilayer Perceptron stands out in the gradation task among single models. Within the ensemble methods, Random Forest surpasses AdaBoost in both the screening and gradation tasks.

Keywords: Radiation-Induced Skin Toxicity, Machine Learning, Skin Toxicity prediction, Feature engineering

Paper Id.: 47

TabLSTMNet: Enhancing Android Malware Detection through TabNet-LSTM Fusion Approach

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Abstract—The rapid surge in the utilization of Android applications and their widespread popularity within the smartphone industry has led to an increase in the infiltration and exploitation of malware. Malicious Android applications pose substantial risks to both the security of the system and the overall well- being of the user, as they have the potential to gain unauthorized access, manipulate devices remotely, and breach privacy. This study employs the NATICUS droid dataset consisting of 29,332 samples of native and custom Android permissions. Native permissions are default access rights granted by the Android Operating System (AOS), while app developers define custom permissions. The proliferation of these native and custom permissions presents numerous avenues for acquiring control over devices and sensitive information. Thus, the custom permissions introduced are crucial in identifying current malware threats. This paper introduces an Android malware classification framework named TabLSTMNet, which combines the interpretability of TabNet with the long short-term memory (LSTM) architecture. This model effectively classifies benign and malicious applications. The proposed TabLSTMNet model achieved a remarkable precision of 0.9350, recall of 0.9300, specificity of 0.9300, a low false positive rate (FPR) of 0.0675, f1 score of 0.9325 and impressive accuracy of 0.9300.

Keywords— Android operating system, TabLSTMNet, Tab- Net, LSTM, Feature Mask, Interpretability.

Paper Id.: 48

Vision Transformer-Based Model for Early Detection of Dysgraphia among School Students

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Abstract-Learning disorders, an umbrella term for a range of learning difficulties, impair a person's capacity to learn new skills. Dysgraphia is one of the prevalent learning disorders among children all over the globe. It is defined as a child's functional restriction in establishing accurate letter or word construction, inadequate speed, and readability of written text. Lack of availability of experts who can diagnose and high diagnostic cost, makes it important to discover a diagnostic approach for dysgraphia that is accurate, accessible and simple to use. Analyzing handwriting is the most common technique to detect dysgraphia which can be automated through image processing techniques. The use of deep learning algorithms has become increasingly widespread in image processing over the course of the last few decades and analysis. However, the effective classification of these handwritten images presents a number of challenges like low accuracy, inadequate availability of labelled data for training purposes. Considering the notable efficacy demonstrated by the Vision Transformer (ViT) in image classification, we proposed a ViT-based classification model in this paper. This model splits handwriting images into patches and then process those through a transformer. Just like word embedding, these input image patches are passed in a sequence to the transformer. To compare performance of proposed model, we also applied transfer learning techniques VGG16, VGG19, ResNet50 and InceptionV3. After comparing the results, it was found that Vision Transformers are best suitable for the classification. Vision transformer has outperformed with accuracy value 0.99 for the classification. Out of all pretrained models InceptionV3 performed best with the accuracy value 0.98. The findings of this study indicate that ViT-based model has the potential to assist experts in the early detection of dysgraphia.

Keywords- Dysgraphia detection, Vision Transformer, Transfer Learning**.**

Paper Id.: 52

Design and Analysis of photo-electrical characteristics of Si/Graphene Nanowire Photo detector: A potential photo-detector for applications in IR detection

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Abstract- In this paper, authors have proposed the prospect of Si/Graphene Nanowire vertically doped p-i-n Photo-Detector in infrared (IR) wavelength region. Si/Multi Graphene Layer-NW (Si/MGL-NW) and Si/Multi Graphene Layer-Multi nanowire (Si/MGL-MNW) p-i-n photo-detectors has been developed by the inclusion of single SiNW and multiple SiNW in between the top and bottom layer of the device. The performance of the proposed p-i-n Photo-Detectors are analysed by developing a Quantum Corrected Schrodinger–Poisson DD (QCSP-DD) model. The photo-electric characteristics of the device are studied in terms of dark current, photo-current, quantum efficiency and photo-responsivity. The inherent properties of the Device under Test (DUT) are improved significantly by the inclusion of Multiple Graphene Layer (MGL) into the top and bottom layer of the active region of the device. The validity of the developed QCSP-DD model is established by comparing the results of experimental and simulation observations under alike operating conditions. The authors have established the superiority of the QCSP-DD model through this validation. After establishing the validity, QCSP-DD model is used to analyse the electrical/ optical characteristics of Si/MGL-NW, Si/MGL-MNW p-i-n Photo-detectors and the results are compared with SiNW photo-detector at the same operating wavelength. The analysis reveals that the Si/MGL-NW and Si/MGL-MNW p-i-n Photo-detector outperforms its SiNW counterpart in terms of quantum efficiency (SiNW:0.71; Si/MGL-NW:0.81; Si/MGL-MNW:0.90) and photo-responsivity (SiNW:0.71A/W; Si/MGL-NW:0.76A/W; Si/MGL-MNW:0.86A/W) for optical irradiation with IR source at 1800nm wavelength. It also reveals that the Sensitivity in case of Si/MGL-NW and Si/MGL-MNW enhance to 84% and 92% respectively compared to its SiNW counterpart. In contrast to the reported work till date, the newly developed photo-detector shows enhanced performance in IR wavelength region.

Paper Id.: 54

Advancing Plant Phenotyping through Conventional RGB and Hyperspectral: A Case Study on Maize Plant.

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Abstract- Plants hold a vital role in sustaining life on Earth, impacting human health, ecosystems, and environmental processes. Addressing food security challenges is essential in achieving Sustainable Development Goals, prompting researchers to explore strategies like Site-Specific Management, Precision Agriculture, and plant breeding. These approaches, empowered by DNA sequencing and genotyping, demand extensive field trials and phenotypic measurements, a labour-intensive process [2][4][5]. To enhance efficiency, this study leverages computer science techniques, including Computer Vision, Machine Learning, Image Processing, Remote Sensing, and Geographic Information Systems, to analyse maize plants, a globally significant crop. The study delves into various remote sensing techniques, such as Multispectral Imaging, Hyper spectral Imaging, LiDAR, and Thermal Imaging, used for plant analysis [2]. Hyper spectral Imaging, in particular, captures data across a wide spectrum, offering valuable insights into plant characteristics based on reflectance patterns. Two experiments were conducted using the UNL plant phenotyping dataset. The first experiment focused on RGB image processing, involving plant trait measurements like height, width, and size. Linear regression analysis revealed genotype and greenhouse position effects on these traits. The second experiment employed hyper spectral imaging, utilizing the Normalized Difference Vegetation Index and stem-leaf segmentation to isolate regions of interest (ROIs). Principal Component Analysis visualized data variations across different wavelengths. This research underscores the importance of plant analysis, especially in maize cultivation, and demonstrates the potential of computer science techniques to automate and enhance phenotyping processes. These advancements are crucial for addressing food security challenges and ensuring sustainable agriculture practices.

Keywords- RGB image, Hyper spectral image, Image processing, Feature extraction and selection, HIS classifier

Paper Id.: 55

Using the Box Counting Approach Estimation of the fractal dimension of COVID Positive and Pneumonia Disease

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Abstract- The dimension identification of medical pictures is now a topic of interest, presenting challenges and opportunities for advancements in precise measurement of clinical imaging. This field focuses on utilizing fractal dimension detection approaches to enhance the precision of these measurements. The accurate identification of dimensions poses a significant barrier in the medical diagnosis of infections, mostly attributed to the fractal nature of medical objects. The results demonstrate that the utilization of fractal dimension detection techniques yields superior performance compared to other contemporary methods in extracting diagnostically significant information from clinical images. Fractal geometry has emerged as an effective tool in the analysis of medical images, contributing to the field of fractal dimension detection approaches. In this research paper, a unique methodology is proposed for the automatic prediction of different cases of patients mainly pneumonia, COVID-19 and normal patients. So, mainly based on the idea of using a box counting technique to assess the fractal dimension, a novel methodology for fractal dimension identification of different types medical X-Ray images is proposed by the authors. A range of fractal dimension values are also calculated for all three types of X-ray images. After that the results of ImageJ tools have been compared to the proposed technique as well as evaluated against other recent approaches in the field. The final outcomes of the proposed algorithm visually support the mathematical derivation of the machine learning approach.

Keyword- Fractal Dimension, SARS-CoV-2 images, COVID 19, Diagonostic imaging, Box-Counting, ImageJ, Pneumonia.

Paper Id.: 58

A Novel MEMS Based Vibrating Beam Accelerometer for Early Earthquake Warning System

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Abstract- The paper pursues the development of a Micro Electro mechanical System (MEMS) Vibrating Beam Accelerometer (VBA) for Early Earthquake warning system with dimensional analysis. By using a finite element method (FEM) model, a natural frequency of 124 kHz is determined. The primary benefits of this type of device are its thickness independence over capacitive accelerometer. Although the anchor dimensions have a significant impact on the vibrating beam accelerometer and the natural frequency. To see the parametric analysis, several single beam dimensions simulated through the letter. As a result, the proposed electro-mechanical and moment of inertia model of vibrating beam is used to validate the simulation model.

Keywords: MEMS, Accelerometer, FEM, Natural Frequency, VBA

Paper Id.: 59

Arrhythmia Detection in Patient ECGs Using Deep Convolutional Neural Networks with IoT-Enabled

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Abstract- Cardiac arrhythmia, a type of heart condition, is responsible for 12% of global deaths. While IoT- based health monitoring has advanced, the manual methods used have several limitations. Therefore, there's a need for an automatic healthcare approach, specifically for identifying arrhythmia. We propose using an optimized deep convolutional neural network for this purpose. In our plan, we'll use an IoT network to collect ECG signals from patients. These signals will be analyzed to classify arrhythmia, ensuring continuous patient health monitoring. Our proposed model, Accuracy sensitivity and specificity of an existing method to access its effectiveness using a performance matrix is compared with deep optimize convolutional neural network.

Paper Id.: 61

Evaluating Diverse Classifiers for Predicting Students' Academic Efficacy

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Abstract- Evaluating students' academic efficacy has major consequences for educational institutions looking to improve learning outcomes as well as offer personalized guidance. The present research aims to make a contribution to this essential subject by systematically assessing the usefulness of several classifiers to predict students' academic achievement. The dataset used in this experiment is educational student dataset which contains 480 student records, 16 attributes. We compare some of the most popular classification algorithms including naive Bayes, j48, and random forest in the present research. The experiments were undertaken out using a data set of student performance. Random Forest was the algorithm that produced the best overall results in the classification.

Keywords- Educational Data Mining, Predictive models, Classification, Decision Tree, Machine Learning.

Paper Id.: 62

Design and Analysis of Double Ended Tuning Fork for MEMS Based Vibrating Beam Accelerometer

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Abstract- The utility of MEMS vibrating beam accelerometer is highly accessible in the field of seismometry. The Double Ended Tuning Fork (DETF) design is prominent over the single beam due to high performance and stability. For pronounced stabilization the role of dimensions always comes across with a greater responsibility. Following the quoted fact, dimensional analysis of the resonator has been dragged out throughout the paper. Thickness independency is the aesthetic fact of the DETF alike single beam resonator. The validation of the simulated results with the analytical one has been checked via natural frequency values with 278.86 kHz to 278.9073 kHz.

Keywords- MEMS, Vibrating Beam Accelerometer, FEM, Natural Frequency, Seismometry, Double Ended Tuning Fork

Paper Id.: 64

Performance Analysis of Hetero-Stacked Source Dual Metal T-shaped Gate Tunnel Field-Effect Transistor

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Abstract:- In this work, a novel Hetero-stacked Source Dual Metal T-shaped Gate TFET is proposed, exhibiting significantly improved DC performance and switching performance over existing TFET topologies. The proposed structure incorporates an overlapped gate pocket with a dual metal Molybdenum-Aluminium Gate. Due to resulting alterations in electron flow and tunnelling behaviour within the device, improvement in multiple performance attributes is seen- an ION/IOFF ratio of 1014 is achieved with an ON-state current of 5.18×10-4 A/μm and an OFF-state current of 2.47×10-18 A/μm. A highly reduced sub-threshold slope (lower is better) of 8.28 mV/dec is showcased, indicating the superior transient performance of the device. The exhibited DC characteristics indicate the potential of using composite material gates for low power applications over their conventional single metal counterparts.

Keywords- Tunnel-Field-Effect-Transistor (TFET), T-gate, Composite-Gate, Molybdenum, Subthreshold Slope.

Paper Id.: 65

Characteristics and Behavioural Study of Circular, Hexagonal and Square Shaped Membrane Based CMUT MEMS

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Abstract- Study of MEMS based CMUT for analytical and simulation is considered. In this research paper, the characteristics and behavioural study of circular, hexagonal and square shaped membrane is present. From the study, it is observed that the shape of the device has affected the performance and behaviour. It plays an important role in characterizing the device. The circular CMUT provided better performance regarding membrane displacement, frequency and capacitance. But when it comes to array formation, substrate area is wasted. The frequency of square is higher than circular CMUT. Although circular CMUT offers higher displacement, in the context of array creation, hexagonal CMUT is more preferable since it has reduced wastage of space compare to circular CMUT.

Keywords- CMUT, COMSOL, MEMS, ultrasound, circular, hexagonal, square, membrane, displacement.

Paper Id.: 66

Adaptive Neural Network based Multi-loop Control Design for a Multi-Variable System

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Abstract- This paper addresses a multi-variable PID controller design based on an adaptive neural network. In addition to this adaptive single-neuron PID, a DOB observer-based controller is addressed. Further, a simulation study is pursued in the presence of parametric uncertainties and stochastic noise to show the efficacy of the designed controller. The simulation response clearly indicates that both loops are achieving good set-point tracking and adequate disturbance rejection performances.

Index Terms-Disturbance observer, MIMO, PID controller, Disturbance rejection

Paper Id.: 67

Investigation and Comparison on the Battery State of Charge Estimation Techniques for Electric Vehicle

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Abstract- As new energy electric vehicles and smart grids progress rapidly, there is a growing need for batteries.The battery management system (BMS) has an essential role in the energy storage system powered by batteries. Developing an effective BMS remains a challenging endeavour for electric vehicles (EVs). Monitoring the batteryis essential in the majority of EVs, as the State of Charge (SOC) concept plays a critical role in ensuring both safety and operational performance. Due to the significance of battery State of Charge (SOC) as a key parameter reflecting battery performance, so accurate SOC estimation serves multiple purposes. It not only safeguards the battery, preventing both overcharging and over-discharging while enhancing battery life, but also enables applications to implement rational control strategies aimed at energy conservation. This paper provides SOC (State of Charge) estimation for batteries in different discharge scenarios. It explored two distinct classes of estimation techniques, each possessing its own distinct characteristics. Some approaches exhibited impressive results when applied in scenarios with a consistent discharge current, while others performed exceptionally well in situations where discharge currents fluctuated."

Keywords – Electric Vehicles, State of Charge (SOC), Battery Management Systems (BMS).

Paper Id.: 68

Modeling and Simulation of DG SOI MOSFET with Fringing Capacitance and High-k Material

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Abstract- In this article, double gate (DG) silicon on insulator (SOI) MOFET has modelled with the conception of inner fringing capacitance to improve the accuracy of device modelling with the simulation. Three different types capacitance namely front, back gate and silicon substrate capacitance are calculated with and without fringing capacitance. The oxide material SiO2 is substituted by high-k dielectric and consequences are compared with the TCAD outcomes. The idea of Fringing Capacitance raises the surface potential. The amount it raises greatly depends on the gate oxide material. The changes in threshold voltage and drain current with concept of fringing capacitance are negligible when compared with the simulation result. The analytical model of SMDG SOI MOSFET is established on the elucidation of two dimensional (2-D) Poisson's calculation**s.**

Keywords- Doubel Gate, Fringing capacitance, High-k, Surface potential.

Paper Id.: 73

A Novel Approach of ECG Signals Classification Using Adaptive Deep Neural Network based on CWT

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Abstract- The rapid global adoption of Internet of Things (IoT) technology allows universal connectivity and access. The IoT-enabled devices have revolutionized healthcare, enabling remote patient monitoring. The precise interpretation of Electrocardiogram (ECG) signals is pivotal for diagnosing potentially serious conditions. ECGs are widely used by cardiologists to assess heart health. This study presents an IoT-based ECG monitoring system utilizing a heart rate sensor and an intelligent hybrid classification algorithm. The research introduces WISE, a real-time health monitoring system, using a body area sensor network (BASN) and cloud infrastructure. The model addresses class imbalance in ECG data, enhancing the development of a reliable IoT-driven healthcare system. The proposed model boasts 99.41% accuracy in predicting abnormal ECGs. Comparative analysis with other classification models validates its accuracy and applicability.

Keywords-ECG monitoring, IoT, CWT, ANN, EPNN, RNN, K-NN, ADNN classification.

Paper Id.: 74

Metal-free Terahertz Absorber/Sensor Using Patterned Graphite

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Abstract- In this paper, metal-free absorber is implemented at terahertz (THz) frequency for generation of multiband resonance peaks. Absorber is designed by introducing a semicircle notch and rectangle slot in graphite sheet. Effect of the dimension of notches and slots are analysed in details for selecting the appropriate dimension of the absorber. It is found that a proposed absorber can generate multi band resonance with higher absorption efficiency. By varying the dimension and thickness absorber can also provide merging and separation of resonance peaks. Further, Polarization insensitivity of the proposed absorber is also studied for the wide range of incidence angle (θ) for both TE and TM mode. Performance sensitivity of the proposed absorber is analyzed to shows the use in sensing devices.

Keywords- Terahertz, metal-free, absorber, multiband, absorption enhancement, graphite

Paper Id.: 75

IoT-Based Crop Monitoring and Selection for Precision Agriculture

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Abstract— IoT, or the Internet of Things, is a game-changer for many fields, including farming. It allows you to monitor and control things remotely, which makes tasks easier. Agriculture is super important, especially with more people needing food. But farmers can struggle to meet the high demand. Instead of just doing more farming, we can use smart techniques with lot, like precision farming. Precision farming uses sensors to watch things like temperature, humidity, and soil moisture. This helps farmers pick the best crops and manage them better. It is better than the old methods because it reduces the risk of crop problems, waste, and too much water or chemicals. All the data from these sensors goes to the cloud (like internet storage), where it's checked and shown as pictures and graphs for farmers. This helps them make good decisions about their crops and helps them to grow more food and do it smarter.

Keywords — IoT, KNN, GPS, DHT11

Paper Id.: 77

Performance of Dielectric Modulated Dual Cavity MOSHEMT for Biosensing Applications

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Abstract. In this paper, the authors developed a novel detection technique based on a dielectric modulated-dual cavity metal-oxide-semiconductor high electron mobility transistor (DMDC-MOSHEMT) using high-K material for fast, precise, and reliable detection. The effect of high-K materials on the performance and behavior of dual cavity MOSHEMT-based biosensors is investigated. In two-dimensional electron gas (2DEG), the use of high-K material reduces off-current and enhances carrier confinement. As a result, the current generation of devices has been improved. Silvaco Atlas is used for numerical modeling. The simulation is used to investigate various performance parameters and compare them to SiO2 MOSHEMT-based biosensors which is useful for detection of biomolecules. Experimental observation is used to verify and validate the proposed model. The use of high-K materials in AlGaN/GaN dual cavity MOSHEMT biosensors for effective label-free biomolecule detection is described for the first time in this article. Using high- K materials, AlGaN/GaN MOSHEMTs are excellent candidates for biosensor fabrication.

Keywords: Biomolecule, Biosensor, DMDC-MOSHEMT, 2DEG, High-K dielectric, Threshold voltage, Sensitivity, Label-free detection.

The Lotfi A Zadeh Memorial Award

The Lotfi A Zadeh Memorial Award was being given to **Prof. (Dr.) Hab Eng. Jerzy Ryszard Szymański** in 9th International Conference on Computing, Communication & Sensor Networks. CCSN2020. Venue: On 17th and 18th October, 2020 as Online mode. Organizer: Applied Computer Technology, Kolkata, W.B., India. This award is handover as physical mode in this Conference on 15th October 2023 at Hotel Novotel Mumbai Juhu Beach.

The Vidyasagar Award

The Vidyasagar Award is being given to **Dr. Nitin Namdeo Pawar**, as physical mode in this Conference on 15th October 2023 at Hotel Novotel Mumbai Juhu Beach.

Dr. Nitin Namdeo Pawar's remarkable dedication to enhancing education and social welfare in Tribal areas is truly inspiring. Over the past three years, he has spearheaded numerous initiatives, notably organizing transformative Augmented Reality/Virtual Reality events in 100 Tribal schools. Through these events, he introduced students to cutting-edge technology, nurturing curiosity and digital literacy. Collaborating effectively with the National Service Scheme (NSS), he empowered underprivileged students with essential computer skills, equipping them for the digital age. His commitment extended beyond academics; he conducted educational sessions for youth, addressing critical topics like personal hygiene and healthy habits. During the challenging times of the COVID-19 pandemic, Pawar exhibited outstanding leadership. He coordinated vaccination drives for young individuals and the elderly, demonstrating proactive and compassionate efforts to ensure community well-being. His proactive stance was further highlighted through initiatives like blood donation camps, organ donation awareness campaigns, and orchestrating Entrepreneurship Development Programs (EDP). Under his guidance, numerous startups have flourished, showcasing his ability to foster entrepreneurial spirit among students. Mr. Pawar's expertise also extended to intellectual property rights, where he conducted comprehensive faculty development sessions, enlightening individuals about the significance and practical implementations of intellectual property concepts.

CCSN2023

12th International Conference on Computing Communication and Sensor Networks.

15th of October 2023 offline mode at hotel Novotel Mumbai Juhu Beach

and

16th & 17th of October 2023 online mode.

List of Invited Guest of Honour/ Chief Guest /Speakers/ Session Chairs

Guest of Honour:

Dr. Dinesh K Aswal,

Director,
Health, Safety and Environment Group, Bhabha Atomic Research Centre, Trombay, Mumbai 400085, India. Senior Professor, Homi Bhabha National Institute Former President, Metrology Society of India President, Acoustic Society of India Former Director, CSIR-NPL, New Delhi (2015-2021) Former Chairman (AC), NABL, Gurugram (2019-2020) Former Director (AC), CSIR-NISTADS, New Delhi (2018-2019) Former Director (AC), CSIR-CEERI, Pilani (2019-2020) Former Secretary, DAE-AEES, Mumbai (2012-2015).

Keynote Speaker:

Dr. Mike Hinchey.

Professor of Software Engineering University of Limerick, Ireland, Professor Hinchey was Director of the NASA Software Engineering Laboratory; he continues to serve as a NASA Expert. In 2009 he was awarded NASA's Kerley Award as Innovator of the Year. Hinchey holds a B.Sc. in Computer Systems from University of Limerick, an M.Sc. in Computation from University of Oxford and a PhD in Computer Science from University of Cambridge.
Talk Tile: Building Resilient Autonomous Space Exploration Missions.

Invited Speaker:

Dr. M. Thamarai,

Professor, Department of Electronics and Communication Engineering,
Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh, India.

Talk Title: Privacy preserving computation techniques used in Deep Learning networks for Health care applications

Invited Speaker:

Dr. Hab. Jerzy Ryszard Szymanski

Professor, Kazimierz Pulaski University in Radom, Radom, Poland.
Talk Tile: New approach towards green energy power system and EV battery chargers in industry.

Chief Guest:

Dr. Suresh A Shan,
Chairman, Computer Society of India (CSI), Mumbai Chapter, India

Invited Speaker**:**

Dr. Karol Kuczynski,

Assistant professor at the Institute of Radio electronics and Multimedia Technologies, Faculty of Electronics and Information Technology, Warsaw University of Technology. He deals with magnetoelectric sensors, energy harvesting and modelling of sensors.
Talk Title: Possibilities of magnetoelectric energy harvesting for powering IoT devices.

Invited Speaker:

Dr. Sandip Chanda

Professor, Department of Electrical Engineering, Ghani Khan Choudhury Institute of Engineering and Technology (GKCIET), Malda, West Bengal, India

Talk Tile: A Demand Response algorithm to improve Transient Stability Margin for Smart Electrical Grid.

Keynote Speaker:

Prof. Zeev Zalevsky

Professor and the Dean of the faculty of engineering Bar-Ilan University, Israel. His major fields of research are optical super resolution, biomedical optics, nano-photonics and fiber-based processing and sensing architectures. His Google Scholar Citation is: 14685 (on 29/04/2021).

Talk Tile: Machine learning assisted image processing for remote bio-medical sensing and diagnosis

Invited Speaker:

Dr. Abhishek Das
Associate Professor, CSE, Aliah University,
New Town, Kolkata, West Bengal, India
Talk Tile: Time Series Forecasting using Deep Learning

Invited Speaker:

Dr. Marta Zurek-Mortka

Senior Researcher, Lukasiewicz Research Network - Institute for Sustainable Technologies, Radom, Poland,

Talk Tile: innovative power generation and conversion systems based on renewable energy sources

Invited Speaker:

Dr. Narendra Shekokar

Professor & HOD, Department of CSE,

Dwarkadas J. Sanghvi College of Engineering (DJSCE),

Thane, Mumbai

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Conference date: **30th -31st of December, 2023**

Abstract Proceeding of CCSN2023

Editors:

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