

1st Odisha International Conference on Electrical Power Engineering,

Communication and Computing Technology

8TH and 9TH JANUARY, 2021







Department of Electrical Engineering Institute of technical Education & Research (FET) Siksha 'O' Anusandhan

Deemed to be University Bhubaneswar, Odisha, India

1st Odisha International Conference on

Electrical Power Engineering, Communication and Computing Technology

ODICON 2021

08 - 09 January, 2021

Technically co-sponsored by







Organised by

Department of Electrical Engineering

Institute of Technical Education & Research, FET Siksha 'O' Anusandhan Deemed to be University, Bhubaneswar, Odisha, India www.soa.ac.in

About the Conference

A smart city is a place where conventional networks are created with the usage of data, smart and telecommunication methods to enhance its features for the profits of the people. Arrangement of different smart components can create smart cities where, quantity of smart components relies on availability as well as cost of technology. Anticipation of standard of livings has been increased due to major raise of world population in the preceding decades. The employment of Smart cities can be useful for the reduction rate of water consumption, energy consumption, city waste, transportation needs and carbon emission etc. Apart from these, there are many other technologies that have been employed for enhancing the architecture, methodology as well as facilities of smart cities.

1st Odisha International Conference on Electrical Power Engineering, Communication and Computing Technology (ODICON-2021) focuses on both theory and applications related to various green technologies such as Machine learning, artificial intelligence, deep learning, optimization algorithm, IOT, signal processing and computing. ODICON a multidisciplinary conference organized with the objective of bringing together academicians, scientists, researchers from industry, research scholars, and students working in all areas of electrical, electronics, advanced computing and intelligent engineering. The application domain of these green technologies are includes smart city, smart infrastructure, smart grid, smart healthcare, smart transportation, smart agricultural etc. The conference will provide the authors/listeners with opportunities for national/international collaboration and networking among universities/institutions from India and abroad for promoting research and developing technologies. The aim of this conference is to promote translation of basic research into applied investigation and convert applied investigation into practice. This conference will also create awareness about the importance of basic scientific research in different fields matching with the current trends. The conference also aims at bringing together the researchers, scientists, engineers, industrial professionals and students in this fascinating area of research.

Now-a-days, the multi-disciplinary researches have gained a huge attention to fulfil the necessities of smart-cities/countries. Therefore, this book may assist the future development/researches by providing several recent innovations on electrical, mechanical, agricultural, computing and communication engineering.

About SOA

Siksha 'O' Anusandhan (Deemed to be University), Bhubaneswar declared u/s 3 of UGC Act, 1956 is a leading University in India offering professional programmes in the disciplines of Master of Sciences, Engineering, Medicine, Dental Science, Nursing, Pharmaceutical Science, Biotechnology, Management, Law, Hotel Management and Agricultural Sciences. The university offers a vibrant atmosphere for teaching learning, research & development and socially inclusive extension activities through all its undergraduate and post graduate programmes. Today Siksha 'O' Anusandhan (Deemed to be University) has emerged as one of the fastest growing university in the country. True to its mandate to pursue contemporary and interdisciplinary research this comprehensive and multi-disciplinary university is actively spearheading research in emerging area of Technology, Medicine, Science and Management. With current strength of 583 research scholars, 15 post docs and a large pool of post graduate students along with a focused groups of faculty members, the research programmes across different disciplines and 13 research centres in the University have produced visible dividend in the form of 4767 publications with 3697 SCOPUS indexed (h-index-44) and other reputed indices, some of which are in high impact factor bracket (3-9). Recent initiatives in the field of Intellectual Property Right (IPR) have thus far yielded filing of 60 patents. The strong R & D base, increasing number of research scholars and vigorous research activites being undertaken and planned are all set to reach a milestone, transforming this university in near future into one of the fore-front research centres in the country. Siksha 'O' Anusandhan (Deemed to be University), Bhubaneswar is one of the leading University [MHRD NIRF India Rankings 2019 -20th in the University category, 34nd in the Engineering category, 23st in Medical Colleges in India. Moreover, the University is Ranked Internationally by Times Higher Education (THE) World University Rankings 2021 [Ranked in the 601 - 800 ranking bracket for Engineering Programs, 29th amongst Indian Institutes].

Faculty of Engineering & Technology is a constituent of SOAU having fourteen departments with more than four hundred faculty members. The department of Electrical Engineering (EE) is continually working to provide quality research outputs in the areas of control system, power electronics, power system, renewable energy, signal & image processing etc.

Preface

The incessant pursuit for a better, healthier and comfortable life has led to innovation. Innovation in technologies and their application in real life solutions has remained the key driver for of a modern society. The present-day innovation in technology and their approach of application in diverse domain of engineering (such as, electrical, electronics, mechanical, computer, Agriculture and robotics) aims to have a smarter system, such as smart-home, smart-city and smart-society. The innovation in electrical, communication and computing technology are always interrelated. While, innovation in one domain helps solve an identified, it may also additionally help solve a problem or may assist in innovation in another domain. Therefore, continuous research in all these domains along with proper dissemination of the progress or findings is highly important for the development of the global society.

The first international conference entitled "1st Odisha International Conference on Electrical Power Engineering, Communication and Computing Technology", (ODICON-2021) is organized by Department of Electrical Engineering, Institute of Technical Education and Research, Siksha 'O' Anusandhan (Deemed to be University), Bhubaneswar, Odisha, India on 08th and 09th January, 2021. The major focus of ODICON-2021 has concentrated on receiving several innovation thoughts from the global researcher to make the city and society become smatter. In this regard, the contribution of each and every domain of engineering and technological field is essential for the society. Therefore, the 'call for paper' have prepared in such a way that it is able to attract more than 120 online submissions from diverged but related field. From these authors contribution, the editors have selected only 48 high quality submissions based on a rigorous and unbiased peer-review system. The peer-review system has comprised of several knowledgeable researchers with required expertise, the advisory members and programme and technical committee of ODICON-2021. The decision criteria for the selection of paper is directly depends on the major contribution of authors, technicality, novelty and scope of the conference theme. Each phase of the peer-review task has been completed through electronic system.

The Keynote talk is one of the most important parts of any conference for sharing the research and thoughts in front of researchers and scientist from diverse fields and geometry. In this regard, the ODICON-2021 have given its additional effort to arrange several keynotes address matching to the scope of the conference. Moreover, the presentation of author's contributions has been arranged with the significance and interdependency of the articles with reference to the basic concept and motivation of the conference. In this regard, we appreciate the authors' contribution and value the choice that is 'ODICON' for disseminating the output of their research findings. We are also grateful for the help received from each individual reviewer and the Program Committee members regarding peer-review process.

Acknowledgement

The editors feel privileged to have put forward key proposals & significance of the ODICON Conference. ODICON has attracted huge attention of academicians and researchers from all over the globe. The conference provided the most conducive platform to showcase a plethora of original research findings. We were able to have submissions in diverse fields of Electrical, Electronics, Computation Engineering and Agricultural Engineering.

Our sincere thanks and gratitude to all the authors who have enriched the conference through their valuable contributions in terms of their time, expertise and research submissions.

The pre- and post-conference activities and proceedings would not have had a smooth sailing without the timely and appropriate support and guidance of the national and international advisory committees. We extend our heartfelt thanks to all the members of all these committees.

We also extend our profuse thanks to the strong team of reviewers who did a commendable job of holistic and critical review of all manuscripts and provided the remarks and suggestions so critical in upholding the standard and quality of the conference proceeding.

We extend our sincere thanks to all the members of the organizing committee whose tireless effort has made the event a hugely successful one.

Our prolific thanks to the editorial members of the Springer Publishing team for shaping up the proceeding in such an innovative and intelligent way. The ODICON-2021 conference and proceedings receive due acknowledgments before a huge congregation.

Finally, our heartfelt thanks to the Management of SOA (Deemed to be University) and faculty members of the Department of Electrical Engineering, ITER for their continued support and encouragement to make the conference huge success. The editors would also like to thank the Springer Editorial Members for facilitating the publication of the proceedings in "Lecture Notes in Network and Systems" series.





Prof. (Dr.) Manojranjan Nayak Founder President

SIKSHA 'O' ANUSANDHAN (Deemed to be University) Bhubaneswar



Message

It gives me immense pleasure to learn that the 1st edition of International Conference on 1st Odisha International Conference on Electrical Power Engineering, Communication and Computing Technology (ODICON-2021) on 08-09 January 2021. It is also heartening to know that a number of distinguished academicians and top researchers from within the country and abroad will attend the conference.

I have great pleasure in welcoming all the guests to SOA and sincerely hope that organization of such conferences would contribute to the realization of our cherished mission to emerge as a leading centre of higher education and research in the world.

I also congratulate the organizers, participants and other stakeholders involved in the conduct of the conference and wish their endeavour all success.

Prof.(Dr.) Manojranjan Nayak



SIKSHA 'O' ANUSANDHAN

(A Deemed to be University declared u/s 3 of UGC Act, 1956)
Re-Accredited by NAAC with 'A' Grade

Prof. (Dr.) Ashok Kumar Mahapatra M.S, MCh.DNB, MNAMS Vice-Chancellor



MESSAGE

It is a matter of great delight that Department of Electrical Engineering, Faculty of Engineering & Technology, Siksha 'O' Anusandhan Deemed to be University is going to organize 1st Odisha International Conference on Electrical Power Engineering, Communication and Computing Technology (ODICON-2020) on 08-09 January 2021.

It is indeed heartening that over 160 submissions are received across the globe for just available slots of 50 presentations. ODICON is a multidisciplinary conference organized with an intention of sharing knowledge and views among each other by the different background of people, such as academicians, scientists, research scholars, and students working in the areas of electrical, electronics, advanced computing and intelligent engineering. It will also pave the way for young graduates to look at the emerging fields in their respective department.

The most important highlight of the meeting is the assured publication of the presented papers in the conference as proceedings under the aegis of leading publication house Springer.

Prof. (Dr.) Ashok Kumar Mahapatra

Vice Chancellor



Prof.(Dr.) Pradeep Kumar Sahu Dean, FET (ITER) Siksha 'O' Anusandhan (Deemed to be University) Bhubaneswar, India

Message

I am happy to learn that Siksha 'O' Anusandhan Deemed to be University, Bhubaneswar, India is organizing 1st Odisha International Conference on Electrical Power Engineering, Communication and Computing Technology (ODICON-2021) on 08-09 January 2021.

The Conference will provide the authors and participants with opportunities for National and International Collaboration and networking among Universities and Institutions from India and abroad for promoting research and developing technologies. ODICON is a multi-disciplinary conference which focused in the direction of numerous advanced concepts or cutting-edge tools applied for electrical, electronics and computer science domain. Hence I fill that this conference has been rightly planned at an appropriate time to share and discuss on the issue of sustainable and continuous innovation/ research on electrical, electronics and computing domain.

I wish to convey my felicitations to organizers and to all the participating delegates and wish the international conference a grand success.

Prof.(Dr.) Pradeep Kumar SahuDean, FET (ITER)



Prof. Pradipta Kumar Nanda

Dean (Research & Development)

Siksha O Anusandhan, Deemed to be University

Bhubaneswar-751030

Message

It gives me immense pleasure to know that the Department of Electrical Engineering of Siksha 'O' Anusandhan, Deemed to be University, Bhubaneswar is organizing the 1st Odisha International Conference on Electrical Power Engineering, Communication and Computing Technology (ODICON-2021) during 08-09th January 2021. This conference covers a wide range of smart city issues which will be deliberated in three different tracks. Since the city of Bhubaneswar is also in the bracket of smart cities of India, it is quite pertinent and befitting at this juncture to organize this conference in our University to deliberate on different issues for pragmatic solutions to the problems of the smart city. I am sure the different lectures by distinguished researches across the globe will open new vista in different directions. I am also glad to know the research papers presented in this conference will be published in one of the Springer book series. The conference will provide an ideal platform and opportunity to exchange knowledge and have face to face interaction with eminent academicians from around the globe. I am optimistic that many tangible solutions to the smart city problems will be the outcome of this conference.

I congratulate all the organizing team members of the conference for their hard work to make this conference a great success.

I wish the conference a grand success.

Prof. Pradipta Kumar Nanda
Dean(Research & Development)
Siksha O Anusandhan, Deemed to be University
Bhubaneswar-751030



Prof. (Dr.) P. K. Dash,

Ph.D., D.Sc.(Engg.), FNAE, LSMIEEE,

Director (Research & Consultancy)

Siksha 'O' Anusandhan Deemed to be University, Bhubaneswar,

Message

This is my pleasure to welcome all the participants and invited speakers to the 1st Odisha International Conference on Electrical Power Engineering, Communication and Computing Technology (ODICON-2021).

The innovation in engineering domains (such as, electrical, electronics, mechanical, computer and robotics) always plays a direct role in present and future development of our society. Therefore, continuous research in all these domains as well as proper disseminating the work is highly important for the development of the global society. ODICON-2021 is focused in the direction of numerous advanced concepts or innovative tools applied for electrical, electronics and computer science domain. ODICON is a multidisciplinary conference organized with an intention of sharing knowledge and views among each other by the different background of people, such as academicians, scientists, research scholars, and students working in the areas of electrical, electronics, advanced computing and intelligent engineering. By this process, the authors/listeners (national or international levels) have got an opportunity to collaborate their thoughts in the direction of global development.

Finally, I extend my heartfelt thanks to IEEE Publications for sponsoring this conference to organize at Siksha 'O' Anusandhan Deemed to be University, Odisha, Bhubaneswar. I also congratulate the organizing committee members, participants, volunteers, and other stakeholders involved in the conduct of the conference and wish their effort all success.

Prof. (Dr.) P. K. Dash

Honorary General Chair (ODICON-2021)

Message from the desk of General Chairs

On behalf of the 1st Odisha International Conference on Electrical Power Engineering, Communication and Computing Technology (ODICON-2021), we are pleased to welcome you all to ODICON-2021 which is organized by Institute of Technical Education and Research (ITER), Siksha 'O' Anusandhan (Deemed to be University), Bhubaneswar, Odisha, India from 08 Jan 2021 to 09 Jan 2021. It is our great honour and privilege to serve as the Organizing Chairs of this conference.

We hope you will enjoy the conference venue, ITER, Siksha 'O' Anusandhan (Deemed to be University), Bhubaneswar a leading University [MHRD NIRF India Rankings 2020 - 20th in the University category, 34nd in the Engineering category, 23st in Medical Colleges] in India. Moreover, the University is Ranked Internationally by Times Higher Education (THE) World University Rankings 2020 [Ranked in the 601 - 800 ranking bracket for Engineering Programs, 29th amongst Indian Institutes].

This year, we received more than 150 submissions to the main conference from different part of globe. After a thorough review, we accepted 48 papers for oral sessions in the final conference program and achieved over all acceptance rates 33%.

Many people have worked very hard to make this conference possible. We would like to thank all who have helped in making ODICON-2021 a success. Members of our program committees and referees all deserve credit for producing the excellent programs of these conferences that resulted from diligent reviews of the submissions. Special thanks go to the program chairs, organizing chairs and all of the other organizing committee members. We thank the many authors who contributed and all the participants who make this event so special.

We hope you enjoy the conference and that you continue to contribute to our future events as authors, speakers, panelists, volunteers, and participants.



SOA. Bhubaneswar



Prof. (Dr.) Pradipta Kumar Nanda Prof. (Dr.) Subhranshu Samantray **IIT Bhubaneswar**



Prof. (Dr.) Renu Sharma SOA, Bhubaneswar

Message from the desk of Organising Chairs

In favour of the 1st International Conference on Green Technology for Smart City and Society (ODICON-2021), we are pleased to welcome you all to ODICON-2021 which is organized by Institute of Technical Education and Research (ITER), Siksha 'O' Anusandhan (Deemed to be University), Bhubaneswar, Odisha, India from 13 Aug 2021 to 14 Aug 2021. It is our great honour and privilege to serve as the Organizing Chairs of this conference.

Siksha 'O' Anusandhan (Deemed to be University), Bhubaneswar is one of the leading University [MHRD NIRF India Rankings 2019 - 20th in the University category, 34nd in the Engineering category, 23st in Medical Colleges] in India. Moreover, the University is Ranked Internationally by Times Higher Education (THE) World University Rankings 2020 [Ranked in the 601 - 800 ranking bracket for Engineering Programs, 29th amongst Indian Institutes].

To mark this event, Siksha 'O' Anusandhan is going to publish a souvenir comprising of abstract of all accepted and presented papers in the conference. ODICON is a multidisciplinary conference organized with an intention of sharing knowledge and views among each other by the different background of people, such as academicians, scientists, research scholars, and students working in the areas of electrical, electronics, advanced computing and intelligent engineering. It is our pleasure to know that the acceptance rate of the conference is about 33%.

We are confident that ODICON-2021 will provide an ideal platform for sharing new thoughts and research achievements amongst the researches.

We wish the conference a grand success and hope it contributes immensely in the area of electrical power engineering, communication engineering and computing technology. We hope that all the delegates will definitely enjoy these two days stay overhear.



Dr. Manoj kumar Debnath SOA, Bhubaneswar



Dr. Binod Kumar Sahu SOA, Bhubaneswar

Keynote Speakers



Prof. (Dr.) Bijay Ketan Panigrahi IIT Delhi India



Prof. (Dr.) Ganapati Panda IIT Bhubaneswar India



Prof. (Dr.) Akshay Kumar Rathore Concordia University, Montreal Canada



Dr. Swagatam Das Indian Statistical Institute (ISI), Kolkata India

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Mr. Debiprasanna Das, SOA, Bhubaneswar, India

ODICON 2021 SCHEDULE



Programme for ODICON-2021

Day 1 (8TH January 2021)

| 9:00 Hrs to 10:00 Hrs (IST) | 10:00 Hrs to 11:00 Hrs (IST) | 11:00 Hrs to 13:30 Hrs (IST) | 14:00 Hrs to 15:00 Hrs (IST) | 15:00 Hrs to 17:30 Hrs (IST) |
|-----------------------------------|---|---|--|---|
| Inauguration | Keynote Lecture-1 (Prof. Bijay K Panigrahi, IIT Delhi) | Regular Session 1.1 Regular Session 1.2 Regular Session 1.3 | Keynote Lecture-2 (Prof. Ganapati Panda, IIT Bhubaneswar) | Regular Session 1.4 Regular Session 1.5 Regular Session 1.6 |

Day 2 (9th January 2021)

| 09:00 Hrs to 10:00 Hrs | 10:00 Hrs to 13:00 Hrs | 14:00 Hrs to 15:00 Hrs | 15:30 Hrs to 16:30 Hrs |
|------------------------|------------------------|------------------------|------------------------|
| (IST) | (IST) | (IST) | (IST) |
| Keynote Lecture-3 | Regular Session 2.1 | Keynote Lecture-4 | Closing Ceremony |
| (Dr. Akshay Ku. | Regular Session 2.2 | (Dr. Swagatam Das, ISI | |
| Rathore, Concordia | Regular Session 2.3 | Kolkata) | |
| University) | Regular Session 2.4 | | |
| | Regular Session 2.5 | | |
| | Regular Session 2.6 | | |

Link for Inauguration, all keynote lectures and Closing ceremony: https://meet.google.com/xav-qint-ump

Technical Session Schedule

Regular Session 1.1: 8th January 2021, 11.00 Hrs to 13.30 Hrs (IST) (Power System Eng.) Session Chair: Prof. Prayat Kumar Rout and Dr. Prakash Kumar Ray

| | Session Chair. 1101. 11avat Kumai Kout and Dr. 11akasii Kumai Kay | | | | |
|-------|---|--|-------------------------|--|--|
| | Session Coordinator: Dr. Basanta Kumar Panigrahi (mob: 9861730703 Mail: basantapanigrahi@soa.ac.in) | | | | |
| Sessi | on Link: | https://meet.google.com/dgp-fbya-ivq | | | |
| Sl. | Sl. Paper Title of the Paper Presenter Name | | | | |
| No. | ID | - | | | |
| 1 | 13 | Optimal Design and Performance Survey of a 100kWP Grid-Connected PV Plant for Installation near the Top Ranked Green City of India | Ali Mahmoud | | |
| 2 | 15 | Frequency control through BESS and SOFC based fuel cell in a Multi source Microgrid. | Subhranshu Sekhar Puhan | | |
| 3 | 21 | Jaya Algorithm Tuned FOPID Controller with First Order Filter for Optimum Frequency Control | Sabita Tripathy | | |
| 4 | 24 | Pre-Installation Analysis of a 8.3kWP Roof-Top Based Stand-Alone PV System for Uninterrupted Power Supply | Ali Mahmoud | | |

| 5 | 28 | Current Control of a PV based Three Phase Inverter Using Fuzzy Hysteresis Controller | Gayatri Mohapatra |
|---|----|--|------------------------------|
| 6 | 31 | Automatic generation control of a renewable energy integrated power system in the presence of fractional order 3DOF controller | Narendra Kumar Jena |
| 7 | 33 | Optimal PMU placement using Fuzzy Logic and WAMS based PMU measurement for Faulted Zone Identification | Subhranshu Sekhar Puhan |
| 8 | 48 | A Modified Least Mean Square Technique for Harmonic Elimination | Buddhadeva Sahoo |
| 9 | 53 | Differential Evolution with Dual-mode mutation for parameter estimation of different photovoltaic models | Dr. Shubhranshu Mohan Parida |

Regular Session 1.2: 8th January 2021, 11.00 Hrs to 13.30 Hrs (IST) (Power System Eng.)

| | <u> </u> | sturi@soa.ac.in) | |
|--------------|---|--|--|
| on Link: | https://meet.google.com/wwy-qqhc-ypy | | |
| Paper | Title of the Paper | Presenter Name | |
| ĪD | - | | |
| 7.4 | Optimal Sizing, Placement and Shading Analysis of a 19.2 | Drive Denier Cetastler | |
| /4 | kW Grid Tied Residential Roof Top PV System | Priya Ranjan Satpathy | |
| 7.5 | | D: 1.1.0 / / | |
| 75 | | Priyambada Satapathy | |
| 70 | | G : D1 1 : 1 | |
| 78 | 1 7 | Sunita Pahadasingh | |
| 84 | | G .: . N . | |
| | | Smrutiranjan Nayak | |
| 86 | Residential Sector Demand Side Management: A Review | Subhasis Panda | |
| 00 | Health Index Prediction of Underground Cable System using | Rakesh sahoo | |
| 88 | Artificial Neural Network | Rakesh sanoo | |
| An efficient | An efficient Robust Random Vector Functional Link | | |
| 99 | network for Solar Irradiance, Power and Wind speed | Dr.Sthita Prajna Mishra | |
| | prediction | 3 | |
| 102 | Application of Harris Hawks Optimization to Solve LFC | Landing di Calan | |
| 103 | Issues in Solar Based Unified System | Jugajyoti Sahu | |
| 104 | Short-term Electricity Price Forecasting Using Kernel based | G | |
| 104 | • | Soumya prateek muni | |
| | on Coord on Link: Paper ID 74 75 78 84 86 88 | Optimal Sizing, Placement and Shading Analysis of a 19.2 kW Grid Tied Residential Roof Top PV System PDPID Plus DDF Cascaded Controller for LFC Investigation in Unified System with Wind Generating Unit TLBO Based CC-PID-TID Controller For Load Frequency Control of Multi Area Power System Performance Comparison of hSGA-PS technique with PIDA controller with AGC of power system Residential Sector Demand Side Management: A Review Health Index Prediction of Underground Cable System using Artificial Neural Network An efficient Robust Random Vector Functional Link network for Solar Irradiance, Power and Wind speed prediction Application of Harris Hawks Optimization to Solve LFC Issues in Solar Based Unified System Short term Electricity Price Forecasting Using Kernel based | |

Regular Session 1.3: 8th January 2021, 11.00 Hrs to 13.30 Hrs (IST) (Power System Eng.)

| Sessi | Session Chair: Dr. Sivkumar Mishra and Dr. Binod Kumar Sahu | | | | |
|-------|--|---|-------------------------|--|--|
| Sessi | Session Coordinator: Mr. Narendra Ku. Jena (mob:7978503490 Mail: narendrajena@soa.ac.in) | | | | |
| Sessi | on Link: | https://meet.google.com/ohu-qbdt-hoe | | | |
| Sl. | Paper | Title of the Paper | Presenter Name | | |
| No. | ID | | | | |
| 1 | 114 | Dynamic stability improvement of a solar penetrated power | Narayan Nahak | | |
| 1 | 117 | system by Fractional optimal IPFC based controller | Tvarayan Tvarak | | |
| 2 | 123 | SBP Based Optimal Power Trading in CEM adopting Hybrid | Dr. Ramachandra Agrawal | | |
| | 123 | DE-PSO Technique | Di. Ramachandra Agrawar | | |
| 3 | 124 | SOS-ELM based Prediction Model for Electrical Load | Jugajyoti Sahu | | |
| | 127 | Forecasting | Jugajyon Sanu | | |
| 4 | 131 | Impact of Environmental Factors on The Performance of | Satyaranjan Jena | | |
| | 131 | Solar PV Cells: An Experimental Study | Satyaranjan Jena | | |
| 5 | 132 | A grasshopper optimized FO- multistage controller for | Prakash Chandra Sahu | | |
| | 132 | frequency control of an AC microgrid | 1 Takasii Cilandia Sanu | | |
| 6 | 146 | Battery SOC Estimation Using extended Kalman Filter and | Pathan Mayeen Avez | | |

| | | ANN with Measurement of Noise | |
|----|-----|---|---------------------------------|
| 7 | 151 | Model predictive controller based load frequency control of isolated microgrid system integrated to plugged-in electric vehicle | Sonalika Mishra |
| 8 | 156 | Management of load demand considering a DG working on islanded mode | Diambomba Hyacinthe Tungadio |
| 9 | 159 | Energy Portfolio Optimization for Rajasthan India | Krishan Gopal Sharma |
| 10 | 161 | Fault Classification for DG integrated Hybrid Power System using Wavelet Neural Network Approach | Anshuman Bhuyan |

Regular Session 1.4: 8th January 2021, 15.00 Hrs to 17.30 Hrs (IST) (Power System Eng.)

| Sessi | Session Chair: Dr. Nakul Charan Sahoo and Dr. Pratap Puhan | | | |
|------------|---|---|------------------------------|--|
| | Session Coordinator: Mrs. Subhadra Sahoo (mob:8249651188 Mail: subhadrasahoo@soa.ac.in) | | | |
| Sessi | | https://meet.google.com/say-dpkq-cwr | | |
| Sl. No. | Paper ID | Title of the Paper | Presenter Name | |
| 1 | 70 | A Unified Scheme of PSS and SVC for Voltage Profile Improvement in Electrical Grid Network | Dr. Subhashree Chodhury | |
| 2 | 163 | Techno-economic planning framework of three phase unbalanced distribution system using multiple DG and Capacitor | Ramesh Bonela | |
| 3 | 165 | Design of a PV based contactless Electric Vehicle Parking Premises | Suraj Kumar Panigrahi | |
| 4 | 173 | Optimal phase compensation of steam turbine governor for power system stabilization | Dr.Ramachandra Agrawal | |
| 5 | 176 | Design and analysis of Multi-stage TDF/(1+TI) controller for Load-frequency control of A.C Multi-Islanded Microgrid system using Modified Sine cosine algorithm | Debashish Mishra | |
| 6 | 177 | Grid tied PV-DSTATCOM system using modified l0-norm Least Mean Kurtosis Algorithm | Byomakesh Dash | |
| 7 | 179 | Isolated household energy storage system improvement using ultracapacitor | Diambomba Hyacinthe Tungadio | |
| 8 | 180 | A robust Multi Verse Optimized fuzzy aided tilt Controller for AGC of hybrid Power System | Prakash Chandra Sahu | |
| 9 | 182 | Assessment of Crop Damage by Wild Animals and Renewable Energy Interventions –A Case Study from Coastal Odisha, India | Sonali Goel | |

Regular Session 1.5: 8^{th} January 2021, 15.00 Hrs to 17.30 Hrs (IST) (Power Electronics & Drives)

| Canai | Session Chair: Dr. Ranjan Kumar Mallick and Prof. Durgesh Prasad Bagarty | | | |
|-------|--|--|-----------------------------|--|
| | | v v | , . | |
| Sessi | on Coord | linator: Mrs. Gayatri Mohapatra (mob: 9437194551 Mail: | gayatrimohapatra@soa.ac.in) | |
| Sessi | on Link: | https://meet.google.com/qbv-txdr-wti | | |
| Sl. | Paper | Title of the Paper | Presenter Name | |
| No. | ID | - | | |
| 1 | 36 | Essential Analysis of MRC-WPT System for Electric | Jagadish Padhi | |
| • | | Vehicle Charging Using Coupled Mode Theory | ougusta auta | |
| • | 61 | Advanced Control Technique based Neutral Clamped | Duddhadana Cabaa | |
| 2 | 64 | Inverter Operation | Buddhadeva Sahoo | |
| 2 | 90 | An Novel Hysteresis Current Control Technique | Asim Varian Day | |
| 3 | 80 | (HCCT) for Single Phase VSI | Asim Kumar Dey | |

| 4 | 115 | SPEED CONTROL OF DC MOTOR USING LINEAR AND NON-LINEAR CONTROLLERS | Amiya Kumar Naik |
|----|-----|---|--------------------------|
| 5 | 144 | The Fume Detecting Dual Tone Modulation Frequency Based Rover Using BLDC Motors | Poorna Mukund Pampani |
| 6 | 145 | SOLAR CELL CONNECTED TO SEPIC CONVERTER USING VARIOUS LOADS FOR POWER TRACKING | Sruti Sagar pattanaik |
| 7 | 155 | Modeling and Simulation of Cuk Converter Using Single Phase Matrix Converter Topology | Mr. Sumant Kumar Dalai |
| 8 | 160 | A Novel Circuit for Battery Charging and Motor Control of Electric Vehicle | Prateek Kumar Sahoo |
| 9 | 164 | VECTOR CONTROL OF 3-PHASE INDUCTION MOTOR | Ananya Pritilagna Biswal |
| 10 | 174 | A comparative analysis between a single loop PI, double loop PI and Sliding Mode Control structure for a buck converter | Soumya Mohanty |

Regular Session 1.6.1: 8th January 2021, 15.00 Hrs to 17.30 Hrs (IST) (Control System)

| Sessi | Session Chair: Prof. Sanjeeb Kumar Kar and Dr. Madhab Tripathy | | | |
|-------|--|---|-------------------------|--|
| Sessi | on Coord | linator: Dr. S.M. Parida (mob:7008851448, Mail: shubhranshup | arida@soa.ac.in) | |
| Sessi | on Link: | https://meet.google.com/uqa-xyeo-xye | | |
| Sl. | Paper | Title of the Paper | Presenter Name | |
| No. | ID | | | |
| 1 | 47 | Implantable Insulin Delivery System based on the Genetic Algorithm PID Controller (GA-PIDC) | Dr. Ramachandra Agrawal | |
| 2 | 108 | Computation of Limit Cycle in a Nonlinear Fractional-Order Feedback Control Plant with Time Delay | Biresh Kumar Dakua | |
| 3 | 133 | Nonlinear Back Stepping Based Sliding Mode Controller Design with Real-Time simulator to Regulate Glucose in Type 1 Diabetic Patients | Debasis Acharya | |
| 4 | 167 | A COMPARITIVE STUDY BETWEEN PID AND FUZZY CONTROLLER | Sonali Satpathy | |
| 5 | 183 | PIλ-PDμ Controller for Suppression of Limit Cycle in Fractional-Order Time Delay System with Nonlinearities | Biresh Kumar Dakua | |
| 6 | 29 | LFC Investigation with SHO tuned 1 Plus Fraction ID Controller | Jyoti Ranjan Padhi | |

Regular Session 1.6.2.: 8th January 2021, 15.00 Hrs to 17.30 Hrs (IST) (Chemistry)

| Sessi | Session Chair: Prof. Mira Das | | | |
|-------|---|---|---------------------|--|
| Sessi | Session Coordinator: Dr. Amiya Kumar Naik (mob:9437172094, Mail: amiyanaik@soa.ac.in) | | | |
| Sessi | on Link: | https://meet.google.com/vhd-fqbh-pxa | | |
| Sl. | Paper | Title of the Paper | Presenter Name | |
| No. | ID | | | |
| | | A REVIEW ON DIFFERENT MODELING SCHEMES | | |
| 1 | 37 | FOR LIQUID-LIQUID EXTRACTION EQUILIBRIUM | Prof. Sujata Mishra | |
| | | OF RARE EARTHS | | |
| 2 | 62 | Impact of climate change to sea ice ecosystem | Rabi Ranjan Prusti | |
| 3 | 63 | Functionally Responsible waste Plastic Material, its Impact | Pratap Kumar Swain | |
| 3 | 03 | on the Environment and Its Bioremediation | Fratap Kumai Swam | |
| 4 | 194 | Assessment of ambient air quality in an industrial cluster as | Suvendu Kumar Dash | |
| 4 | 194 | a tool for environmental health | Suvendu Kumai Dash | |

Regular Session 2.1: 9th January 2021, 10.00 Hrs to 13.00 Hrs (IST) (Communication)

| Session Chair: Dr. Benudhar Sahu | | | | |
|----------------------------------|---|--|------------------------|--|
| | Session Coordinator: Dr. Basanta Kumar Panigrahi (mob: 9861730703 Mail: basantapanigrahi@soa.ac.in) | | | |
| Sessi | on Link: | https://meet.google.com/dgp-fbya-ivq | | |
| Sl. | Paper | Title of the Paper | Presenter Name | |
| No. | ID | | | |
| 1 | 22 | Analyzing the Effect of Dilution of Precision on the | Biswaranjan Pattanayak | |
| 1 | 22 | Performance of GPS System | Diswaranjan Fattanayak | |
| 2 | 30 | Wireless Bus Identification System for Visually Impaired | Arun Agarwal | |
| | | Person | Arun Agarwal | |
| 3 | 98 | Automated Wireless Biometric Fingerprint Based Student | Diamonanian Carain | |
| 3 | | Attendance System | Biswaranjan Swain | |
| | 109 | KEY PREDISTRIBUTION TECHNIQUE BASED ON | | |
| 4 | | MATRIX DECOMPOSITION IN WIRELESS SENSOR | Anakananda Tripathy | |
| | | NETWORK | | |
| 5 | 126 | Artificial Intelligence based Bot Assisted Irrigation System | Siddharth Sahany | |
| 6 | 150 | Consideration of Series-Series and Series-Parallel | | |
| | | Topology in Perspective of Dynamic Resonant Inductive | Sushree Sangita Biswal | |
| | | Coupling Based Wireless Charging | _ | |
| 7 | 157 | Use of complementary feature to enhance the performance | Suganta Samanai | |
| 7 | | of speaker identification system | Susanta Sarangi | |

Regular Session 2.2: 9^{th} January 2021, 10.00 Hrs to 13.00 Hrs (IST) (Signal/Image Processing)

| Session Chair: Dr. Niva Das | | | | | |
|-----------------------------|--|---|----------------------|--|--|
| Sessi | Session Coordinator: Dr. Kumari Kasturi (mob: 9937588506, Mail: kumarikasturi@soa.ac.in) | | | | |
| Sessi | Session Link: https://meet.google.com/wwy-qqhc-ypy | | | | |
| Sl. | Paper | Title of the Paper | Presenter Name | | |
| No. | ID | | | | |
| 1 | 8 | Effect of Feature Dimension on Classification of Speech Emotions | Niharika Pattanaik | | |
| 2 | 23 | Analysis of Pupil Dilation on Different Emotional States by Using Computer Vision Algorithms | Laxmi Priya Moharana | | |
| 3 | 27 | Integrative Review on Vision-Based Dynamic Indian Sign Language Recognition Systems | Biswa ranjan Samal | | |
| 4 | 41 | An Ensemble Method of Feature Selection and Classification of Odia Characters | Mamata Rani Das | | |
| 5 | 46 | The Classification of Power Quality Disturbances using Statistical S-Transform and Probabilistic Neural Network | LaxmiPriya Samal | | |
| 6 | 49 | Design of Encoder in CNN for Effective Recognition of Odia Numerals | Abhishek Das | | |
| 7 | 57 | Linear Antenna Array Parameter Estimation using a Neuro-computational Approach | Shaktijeet Mahapatra | | |
| 8 | 67 | Role of Millimeter Wave for Future 5G Mobile Networks: Its Potential, Prospects and Challenges | Sidharth Mohanty | | |
| 9 | 89 | A Robust and Secure Way for Sharing Confidential Images | Soumya Prakash Sahoo | | |

Regular Session 2.3: 9^{th} January 2021, 10.00 Hrs to 13.00 Hrs (IST) (AI & IOT)

| Sessi | Session Chair: Dr. Tripti Swarnkar and Dr. Bharati Mishra | | | |
|-------|--|--|----------------------|--|
| Sessi | Session Coordinator: Mr. Narendra Ku. Jena (mob:7978503490 Mail: narendrajena@soa.ac.in) | | | |
| Sessi | on Link: | https://meet.google.com/ohu-qbdt-hoe | | |
| Sl. | Paper | Title of the Paper | Presenter Name | |
| No. | ID | | | |
| 1 | 17 | Composite System Adequacy Assessment Using Monte Carlo Simulation and Logistic Regression Classifier | Sangit Poudel | |
| 2 | 20 | Background Subtraction based on Geometric - K mean Algorithm | Susmita Panda | |
| 3 | 32 | K-medoids Crazy Firefly Algorithm For Unsupervised Data Clustering | Archana Sarangi | |
| 4 | 77 | A Framework to Detect Digital Text Using Android Based Smartphone | Suprava Ranjan Laha | |
| 5 | 82 | AN EFFICIENT APPROACH TO FIND FREQUENT ITEM SETS IN LARGE DATABASE | Ajay Sharma | |
| 6 | 85 | Design and Implementation of ML Based Temperature Forecasting Model for air conditioning using IoT | Biplobi borah | |
| 7 | 97 | Generating Rules to Detect Phishing Websites Using URL Features | Anjaneya Awasthi | |
| 8 | 107 | Design and Development of Arduino Based Portable Air Quality Monitoring System | Shubhajait Vishwas | |
| 9 | 112 | IDMS: An Integrated Decision Making System for Heart Disease Prediction | Abhilash Pati | |
| 10 | 118 | Modified Chaotic Bee Colony Optimization (MCBCO) algorithm for data clustering | Srikanta Kumar Sahoo | |

Regular Session 2.4: 9th January 2021, 10.00 Hrs to 13.00 Hrs (IST) (AI & IOT)

| Session Chair: Dr. Sujata Chakravarty and Dr. Santosh Kumar Majhi | | | | | |
|---|---|--|----------------------------|--|--|
| Sessi | Session Coordinator: Mrs. Subhadra Sahoo (mob:8249651188 Mail: subhadrasahoo@soa.ac.in) | | | | |
| Sessi | Session Link: https://meet.google.com/say-dpkq-cwr | | | | |
| Sl. | Paper | Title of the Paper | Presenter Name | | |
| No. | ID | | | | |
| 1 | 135 | News Text Categorization using Random Forest and | Unacana Davida | | |
| 1 | | Naïve Bayes | Upasana Parida | | |
| 2 | 136 | BUDGET AND EXPERIENCE BASED TRAVEL | S vyshnav Raj | | |
| | | PLANNER USING COLLABORATIVE FILTERING | S vysiiiav Kaj | | |
| 3 | 168 | Automated Phrase Mining Using POST: A Best | Mr.Jogeswar Tripathy | | |
| 3 | | Approach | Wil.Jogeswar Tripadity | | |
| 4 | 170 | An Chaotic Pseduo Inverse Polynomial Perceptron | Dr. Prachitara Satapathy | | |
| 4 | | Network for Short Term Solar Power Prediction | Dr. Fracilitara Satapatiny | | |
| 5 | 193 | CatBoost Ensemble Approach for Diabetes Risk | P. Suresh Kumar | | |
| 3 | | Prediction at Early Stages | 1. Suresii Kumai | | |

Regular Session 2.5: 9th January 2021, 10.00 Hrs to 13.00 Hrs (IST) (Mechanical)

| Session Chair: Dr. Jayanta Nath and Dr. Nirmal Kumar Kund | | | | | |
|--|--|---|------------------|--|--|
| Session Coordinator: Mrs. Gayatri Mohapatra (mob: 9437194551 Mail: gayatrimohapatra@soa.ac.in) | | | | | |
| Sessi | Session Link: https://meet.google.com/qbv-txdr-wti | | | | |
| Sl. No. | Paper ID | Title of the Paper | Presenter Name | | |
| 1 | 140 | Improving Gas Turbine Performance Using Mechanical Chiller: A Thermodynamic Approach | Sabysasachi Sahu | | |
| 2 | 143 | Optimization of Performance and Emission characteristics of CI engine with various biodiesel using Taguchi Method | Nabnit Panigrahi | | |
| 3 | 158 | Optimization of performance and engine emissions of a dual fuel diesel engine using Grey-Taguchi technique | Sweta Shivangi | | |
| 4 | 169 | Thermoeconomic and Exergetic Analysis of waste plastic oil fueled with diesel in compression ignition engine | Amar Kumar Das | | |

Regular Session 2.6: 9^{th} January 2021, 10.00 Hrs to 13.00 Hrs (IST) (Physics & Nanotechnology)

| Sessi | Session Chair: Dr. Manojit De and Dr. Ravi K Chidrala | | | | |
|-------|--|--|----------------------|--|--|
| Sessi | Session Coordinator: Dr. S.M. Parida (mob:7008851448, Mail: shubhranshuparida@soa.ac.in) | | | | |
| Sessi | Session Link: https://meet.google.com/uqa-xyeo-xye | | | | |
| Sl. | Paper | Title of the Paper | Presenter Name | | |
| No. | ID | | | | |
| 1 | 5 | The Effect of Doping and Temperature on DC | Llmali Sahoo | | |
| 1 | | Characteristics of InGaP/InGaAs/GaAs HEMT | Liman Sanoo | | |
| 2 | 18 | Rare Earth Aurivillius Oxides: Synthesis, electrical | Sugato hajra | | |
| | | properties and renewable energy applications | Sugato najia | | |
| | 35 | Improved Particle Swarm Optimization By Means of | | | |
| 3 | | Manipulation of the Weighting Factor Based on Albert | John Saveca | | |
| | | Einstein Theory of Photoelectric Effect | | | |
| 4 | 66 | Self-Assembled Peptide Nanostructured Materials in | Deepti Rekha Sahoo | | |
| | | Drug Delivery Application | Deepti Rekila Sailoo | | |
| 5 | 100 | Strain Mapping in Bulk-Si FinFETs with epi-SiGe S/D | Jhansirani Jena | | |
| | | Stressor at 7 nm Technology Node | Jilansii am Jena | | |
| 6 | 102 | RF Analysis of FinFETs | Sanghamitra Das | | |
| 7 | 185 | Thermally evaporated GaSb thin film grown from TVDS | Dr.Farida A. ali | | |
| / | | method | DI.Failua A. all | | |

ABSTRACT



The Effect of Doping and Temperature on DC Characteristics of InGaP/InGaAs/GaAs HEMT

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Hemanta Kumar Palo

Abstract - Dual-Channel HEMTs (DCHEMT) with multi-coupled delta-doped sheets can provide greater mobility, better sheet carrier density, and higher current driving capabilities. These DCHEMTs using compound materials such as InGaP/ InGaAs/ GaAs has the potential to provide broad microwave operation when associated with multi-delta doped sheets. This motivates the authors to propose and investigate one such dual-channel HEMT using the versatility of InGaP/ InGaAs/ GaAs compound materials with graded triple delta-doped sheets. The microwave and Dual Channel (DC) characteristics are studied and compared based on the InGaP Schottky barrier layer and the triple delta-doped sheets using different doping densities. Results show a higher driving current with an increase in doping profile when the proposed structure is simulated using a 2-D ATLAS simulator from SILVACO.

Keywords: Dual-channel, Delta doped sheet, transconductance, doping profile, mobility



Effect of Feature Dimension on Classification of Speech Emotions

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Abstract - This paper analyses both the static and temporal dynamics of the spectral features in classifying speech emotions. Initially, different frame-level spectral techniques such as the Linear Prediction Cepstral Coefficients (LPCC), Perceptual LP coefficients (PLP), and Mel-Frequency Cepstral Coefficients (MFCC) have been examined. Further, these spectral features are extracted using Wavelet Analysis (WA) for a better emotional portrayal. The extracted feature sets remain high-dimensional and overload the recognizer with redundant features, large memory space, and slower response. To alleviate these issues and fetch more discriminating parameters, the applicability of Vector Quantization in clustering the data has been explored. Machine learning algorithms such as the Gaussian Mixture Model (GMM), the Probabilistic Neural Network (PNN), and the Multilayer Perceptron (MLP) have been simulated with the derived feature sets for their effectiveness in classifying speech emotions. While the GMM has been efficient in classifying the frame-level feature dimension, the NN-based classifiers outperform the GMM for low feature dimensions as revealed from our results.

Keywords: Feature dimension, classification, speech emotion, feature extraction, accuracy

Optimal Design and Performance Survey of a 100kWP Grid-Connected PV Plant for Installation near the Top Ranked Green City of India

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Abstract - Grid-connected PV systems are mainly designed to generate clean energy for meeting the rising energy demand. The operation and performance of the PV systems can be predicted using various installation factors such as location, meteorological data, orientation, optimal component setup, loss analysis and energy yield calculation. This paper focuses on a detailed survey of a 100 kWP grid-connected PV plant in term of location, plant design, orientation, components selection, losses analysis, array generation, inverter performance and energy yield. The investigation has been carried out for a location named Jatani which is near to one of the top ranked green city of India i.e. Bhubaneswar using the most reliable PVsyst software. The study can help the PV installers to determine the appropriate constraints for optimal sizing and designing of a 100kWP PV power plant.

Keywords: Photovoltaic, design, performance, location, generation, energy yield, losses.

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Frequency control through BESS and SOFC based fuel cell in a Multi source Microgrid

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Abstract - Modern day Power System Network with various Renewable and Non-conventional sources play a major role in real scenario. Being intermittent in nature these RE sources requires Energy storage devices like BESS, Fly wheel as a prerequisite for sophisticated operation of Power System. Penetration of these intermittent sources introduces huge challenge for safe frequency operation of Power System in Isolated mode of operation of DC Microgrid. In Grid Tied mode of operation the frequency can easily maintained with the help of Grid but in isolated mode maintaining the safe limit of frequency is a difficult task for power system Engineers. This paper discusses about the application of BESS in frequency control in an isolated DC Microgrid and a performance indicator-based Power Distribution Error (PDE) for Solid Oxide Fuel cell (SOFC). The novelty of the paper is to maintain the frequency of the

system through Battery Energy Storage System (BESS) and SOFC based Fuel cell, whenever there is an integral action failure in case of Governor of Diesel Generator.

Keywords: SOC, PDE, BESS, SOFC, Multiple DGs, Integral action failure.

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COMPOSITE SYSTEM ADEQUENCY ASSESSMENT USING MONTE CARLO SIMULATION AND LOGISTIC REGRESSION CLASSIFIER

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Abstract - This paper presents a new method that combines Logistic Regression Classifier (LRC) and Monte Carlo Simulation (MCS) to evaluate the adequacy of a composite power system. LRC is used to pre-classify the system states as failure or success based on training data set provided by conventional MCS itself, but with a relaxed error tolerance level. The proposed method is applied to the IEEE Reliability test system (IEEE-RTS- 79) to calculate the annualized and annual indices. The results thus obtained are compared with that of conventional MCS. In different cases, the simulation results provide a significant improvement in computational burden and indices calculation time while maintaining reasonable accuracy.

Keywords: Composite system adequacy assessment, Logistic Regression, HDBSCAN, Monte Carlo Simulation

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Rare Earth Aurivillius Oxides: Synthesis, electrical properties and renewable energy applications

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Abstract - There is a huge amount of pollution as well as the critical waste management issues create serious health problems caused by the lead-based ceramics for humans, marine organisms. Several countries are on a strict propaganda to implement the restrictions towards the utilization of lead as a candidate for device engineering. So now the focus shifted towards finding an alternative lead-free piezoelectric material which gives similar type of properties as compared to lead-based piezoelectric materials. In this report a polycrystalline ceramic having chemical formula Ba (Bi0.9Dy0.1) Nb2O9 (BBDNO termed further). The dielectric constant and loss of the ceramics have been examined for a frequency sweep 1 kHz to 1 MHz at different temperatures. The microstructure of the natural sample surface reveals that the presence of grain of various size and EDS spectra confirms all the elements are present without any impurity. The conductivity studies revealed that the experimental data follows the

Jonscher's power law. The impedance spectroscopy suggests that the prepared sample has non-Debye type of relaxation. Further, the pellet was coated with silver electrode on opposite sides and utilized to harvest the biomechanical pressure imparted from finger tapping.

Keywords: solid state reaction, dielectric, conductivity, impedance, renewable energy

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Background subtraction based on Geometric-K mean Algorithm

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Abstract - Background Subtraction is widely used for detection of moving object, traffic management, and video surveillance even when the environmental condition is not favourable such as illumination problem, weather condition and fast moving object. Background subtraction methodology is extensively utilized in the detection of moving entity which is captured through a camera. Foundation for this methodology to identify the moving entity by observing the variation among the input frame and reference frame is described as background image. Fundamentally, background image is an illustration of section of images with no moving entity and that should be consistently modified to adjust with the changing illumination and geometric adjustments. Further composite prototypes were stretched the perception of background subtraction within the accurate significance. In this research, background modelling of Geometric Mean (GM) based lognormal distribution of each pixel is considered, followed by Kmean clustering algorithm is used to separate background from foreground. Finally to enhance the result weighted median filter is used. The proposed algorithm has been tested upon different data sets and the results shows better precision as compared to its ground truth by calculating sensitivity, specificity and accuracy.

Keywords: Geometric Mean, k-mean clustering, lognormal distribution features, weighted median filter

PID **–** 21

Jaya Algorithm Tuned FO-PID Controller with First Order Filter for Optimum Frequency Control

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Abstract - Load frequency control in power system has a major influence in managing the frequency of interconnected system. In this article a novel fractional order based PID controller with first order derivative filter (FOPIDF) is projected to regulate frequency oscillations in hybrid generation type unified electrical system. The various generating sources implemented in the two area model are wind, thermal, diesel & hydro units. Proper selection of controller gains can regulate the frequency of the unified system at desired level. Jaya algorithm is applied to attain the suitable gains of the designed FOPIDF Jaya algorithm tune the controller in the presence of an abrupt disturbance of 2% in control area 1 utilizing integral time absolute error (ITAE) as the objective/fitness function. In the initial analysis the dominance of FOPIDF controller is witnessed over the PID controller during 2% load deviation in control area 1. In the latter case the efficacy of the projected FOPIDF controller is verified by modifying the loading of the control area 1. The examination of the system responses are presented to establish the ascendency of the

projected Jaya tuned FOPIDF controller over existing PID controller on the basis of settling time, undershoots and overshoots.

Keywords: Jaya Algorithm, PID controller, Fractional Calculus, Load Frequency Control, First order Filter, Multi-generation system.

PID **–** 22

Analyzing the Effect of Dilution of Precision on the Performance of GPS System

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Abstract - Geometrical error such as Dilution of Precision (DOP) is a principal factor affecting the performance of Global Positioning System (GPS). It mostly depends upon the angle between the satellites, i.e. the satellite geometry. DOP also depends on the number of satellites which are visible at a particular time, it alters with time and position of any location. As an effort to know the DOP for any number of visible satellites, at any time, for any earth station and for any geographical area, this paper aims to create a DOP map on a selected geographical area so that this may be a useful data for civil and military operations. Out of all the DOP's, only Geometric Dilution of Precision (GDOP) is taken as the primary point of discussion in this paper. The algorithm for the calculation of all the DOP's of a larger geographical area for 12 hrs with 1 hr interval is implemented by using MATLAB environment.

Keywords: GPS, DOP, GDOP, Accuracy, Satellite Geometry.

PID **–** 23

Analysis of Pupil Dilation on Different Emotional States by using Computor vision Algorithm

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Abstract - Measurement of pupil diameter can be helpful to study human mental health. In medical science pupillary tracking helps the clinicians to detect the level of depression, stress and anxiety. Many studies have been undertaken to detect emotional states of a person from his pupil movement as well as size. Pupil diameter measurement follows the stages of detecting face, detecting eyes and detecting pupil. In this paper we have analyzed the effect of three emotions, i.e., happy, sad and surprise on the pupil diameter using the computer vision techniques.

Keywords: face detection, eye detection, pupil detection, pupil dilation.

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Pre-Installation Analysis of a 8.3kWP Roof-Top Based Stand-Alone PV System for Uninterrupted Power Supply

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Abstract - Adoption of sustainable and clean energy has shown a rising demand for roof-top stand-alone PV systems in India due to source availability and reliability. The installation of the off-grid PV system in a building involves optimal system designing, sizing, selection and analysis that depend on various factors such as geographical location, meteorology, orientation, losses and proper load calculation. In this paper, a detailed design of an 8.3kW roof-top based stand-alone PV system for uninterrupted power to two research laboratories of a building is presented. The optimal system design is done by considering the major installation factors such as the geographical location of the site, meteorological data, orientation, PV array sizing, components selection and loss analysis. The entire design and investigation are carried out in the PVsyst software tool. The performance analysis of the designed system is conducted in term of yield, components behavior and loss analysis.

Keywords: Photovoltaic, stand-alone, power generation, battery, yield, losses.

PID **–** 27

Integrative Review on Vision-Based Dynamic Indian Sign Language Recognition Systems

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Abstract - Human-computer interaction is capable of solving the complex problems and challenges faced by human beings, among many of the complex jobs Sign Language Recognition is one of them. Therefore, automatically detecting the sign language is a broad area of research many works have been done in this area, and still, the work is going on. A variety of sign languages can be found throughout the globe sometimes the sign languages can be diversified by the country or region, the sign language(SL) which is available in India is known as the Indian Sign Language(ISL). Indian sign language requires the involvement of both hands, face, and upper body part movement which makes it difficult from the other single-handed sign languages. If we compare the Static gesture identification with the dynamic gesture identification, it's obvious that the former is easier. In real-life scenarios, a system should have the ability to identify the continuous and dynamic gestures, so that it can become an interface between the hearing impaired people and the normal people. Therefore, an Integrative review has been presented here which strongly summarizes the works on Indian Sign Language Recognition(ISLR) systems capable of identifying the dynamic and continuous Vision-based gestures without using any gloves or sensor-enabled wearables.

Keywords: Indian Sign Language, Support Vector Machine, Neural Network, K-Nearest Neighbor Classification, Euclidean Distance



A Current control of PV based three phase inverter Using fuzzy hysteresis controller

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Abstract - In this article, a fuzzy based hysteresis controller is suggested to control the load current of the three phase induction motor. The grasshopper algorithm (GHO) optimized gains of the fuzzy logic controller with an objective of attaining minimum distortion of the load current. The dynamic response of the system is observed by implementing PID and fuzzy controllers independently with hysteresis controller to minimize the error. The supremacy of the fuzzy based hysteresis controller is justified in terms of harmonic contents.

Keywords: Fuzzy Logic controller: Hysteresis controller: Grass Hopper Algorithm.

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LFC Investigation with SHO tuned 1 Plus Fraction ID Controller

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Abstract -

This paper illustrates the Load Frequency Control of solar-thermal system by applying PID and 1 plus fractional order integral-derivative (1 Plus FID) controller. A new evolutionary technique called Selfish Herd Optimization (SHO) is applied. For getting a better result a perturbation of 10% in area-1 has been applied. This research suggests that 1 plus fractional order integral-derivative controller performs better performance as compared to previously connected PID controller. SHO tuned1 Plus FID controller regulates the system frequency during alteration in system load condition. A better result of applied technique is confirmed by enhancing the loading in the control area 1.

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Wireless Bus Identification System for Visually Impaired Person

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Abstract -The goal of this work RF based Wireless communication is to simplify the traveling and movement of visually impaired person. As someone who is totally blind, every day presents its own challenge. But the biggest problem still remains are traveling in public transport. Usually travelling by bus is considered to be safe and comfortable but when it comes to outdoor environments then it very difficult to manage navigation for people who are born completely blind. In the bus transport system, the route numbers are only displayed on the number plate due to which a visually challenged person has to rely on sighted assistance that also makes them dependent on others and lowers their self-esteem. Visually impaired people have adopted various measures to access public transport that make them dependent on others that are sometimes unreliable. So, keeping in mind these problems we have come up with an idea to help exclusively for visually impaired persons who are the daily commuters accessing public transport by the use of recent advancements in the technology. The purpose of this is to design and propose a model that will help the visually disabled person to navigate in outdoor surroundings and fulfill their requirement of identification. The proposed system consists of two detection subsystems: (i) Visually impaired person's personal assistance segment, and, (ii) Bus driver's segment. When the user (blind person) reaches the bus station and switches on his device, the ultrasonic sensor senses the presence of the bus in the nearby area and transmits the bus presence to the Arduino. To this, the buzzer beeps and the visually impaired person get to know about the presence of the bus in the nearby area. The blind person then turns on the toggle switch on the user module, thereby indicating his presence to the bus driver. Henceforth, begins the working of bus driver's module. The information transmitted by the blind person is received by the receiver installed on bus driver's module and thereby gets notified by a buzzer. In order to reply to the blind person, the bus driver takes the help of a Bluetooth application which has a wireless connection with the Bluetooth module installed over the user's module from his phone. The bus driver sends an acknowledgement to the blind person by entering an alphabet 'a' from the Bluetooth app. The second buzzer installed in the blind person's device beeps on receiving the acknowledgement, thereby confirming his presence. Thus by this way, wireless communication is carried out between the bus driver and the visually impaired person using RF module. The result shows that the proposed system is exhibiting a better safety, cost and practicality in performance.

Keywords: RF, visually impaired, arduino, Bluetooth, wireless communication module,



Automatic generation control of a renewable energy integrated power system in the presence of fractional order 3DOF controller

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Abstract - The prime aim of this paper is to address automatic generation control of a bulky, and intricate power system containing boiler dynamics, generation rate constraints, and governor dead band non-linearities. Along this, the instability caused by inertia less photovoltaic (PV) source is brought into the discourse. To bring the deviations of frequency, and tie-line power inside a particular limit, a reliable, proficient, and expert controller is essential. To have this, higher degrees-of-freedom (DOF) structure is conglomerated with proportional-integral-derivative (PID) controller coordinated by

fractional-order (FO) operator to develop 2/3DOF-FOPID controller. Further, these controllers are upgraded to 2/3 DOF-FOPIDN controller by adjoining derivative filter (N). The PID, 2DOF-FOPIDN, and 3DOFFOPIDN controllers are designed by SOS algorithm. The performance shows that the higher DOF based controllers outweigh the 1DOF-PID controller, and simultaneously, the 3DOF-FOPIDN controller works fabulously over 2DOFFOPIDN controller. Close by this assessments, the potential, and reliability of 3DOF-FOPIDN controller has been inspected by injecting variable load/PV generation.

Keywords: Frequency control; Independent loop based control strategy; Non-integer control; SOS

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K-medoids Crazy Firefly Algorithm For Unsupervised Data Clustering

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Optimization.

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Abstract - Data clustering is an unsupervised process in which identical data are collected in groups. A clustering algorithm divides a set of objects into different subsets, these subsets are non-overlapping in nature, and each subset is considered as a cluster. In this paper, a modified clustering approach is developed on integration of k-medoids clustering algorithm with crazy firefly algorithm. The proposed algorithm is experimented on four different datasets. The main aim of the suggested algorithm is to give fast and accurate user specified clustering results from given datasets. Finally, the outcome obtained from the proposed algorithm is compared with both k-medoids clustering algorithm and k-medoids firefly clustering algorithm. The results of the suggested algorithm are better than the k-medoids algorithm and the k-medoids firefly clustering algorithm.

Keywords: K-medoids, Crazy firefly algorithm, K-medoids firefly algorithm, K-medoids crazy firefly algorithm

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Optimal PMU placement using Fuzzy Logic and WAMS based PMU measurement for Faulted Zone Identification.

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Abstract - Impediments of Traditional backup protection schemes like 1) relying on local measurements which may mal operate during stress condition and may not be able to discriminate properly between the abnormal and faulty condition, 2).restriction under heavy loading condition, 3).miscommunication between different protection zones which may led to cascading tripping over emphasise the Power System Engineers to think on Backup Protection scheme. The issues related to conventional protection scheme can be resolved by using an adaptive wide area backup protection scheme (WABPS) based on Phasor measurement units (PMU) measurements. In this paper we have proposed a Fuzzy logic based method for optimal PMU placement and backup protection scheme relying on Wide Area Monitoring Systems (WAMS) based PMU measurement for identification of faulted Backup Protection zone (BPZ). Numerous case studies have been presented like base case optimal PMU placement and line contingency PMU placement with application to WSCC 9 Bus system for validation purpose.

Keywords: WAMS, PMU, WECC, Smart Grid, Conventional

Improved Particle Swarm Optimization By Means of Manipulation of the Inertia Weighting Factor **Based on Albert Einstein Theory of Photoelectric Effect**

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Abstract - Particle Swarm Optimization (PSO) has been praised by many researchers in the field of Engineering and computer science since its introduction in 1995. This is due to its fast convergence and ability to reach optimal solutions during problem optimization. However, like any other Evolutionary algorithms it has its own drawbacks. PSO suffers premature convergence and getting stuck on local minima sometimes. This paper proposes an improved PSO based on the theory of photoelectric effect by Albert Einstein. The constrained and unconstrained benchmark functions have been used to validate the optimization performance of the proposed method. The statistical results showed that the proposed method is able to explore best solutions faster and effective during optimization for both constrained and unconstrained problems compared to the traditional method.

Keywords: Particle Swarm Optimization, Improved Particle Swarm Optimization, Photoelectric Effect, Photon Kinetic Energy, Weighting factor, Light.

Essential Analysis of MRC-WPT System for Electric Vehicle Charging Using Coupled Mode Theory

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Abstract - In wireless Electric Vehicle (EVs) charging, Power Transfer Efficiency (PTE) is considered as one of the performance indicator. However, PTE is seen depending upon a large no of parameters and the relations between those parameters are appealing too. In this paper, frequency characteristics of PTE in relation to design dependant parameters like coil radius, self inductance of the RF coils, mutual coupling between the coils, intrinsic loss ratio, coupling to loss ratio, ohmic resistance and radiation resistance have been reported using Coupled mode theory (CMD). Moreover, different coil misalignment conditions with their PTE characteristics of the WPT system for EVs charging system have been outlined. The theoretical analysis and simulation results articulate important information in designing an efficient WPT system for EVs charging.

Keywords: Wireless Power Transfer, Power Transfer Efficiency, Electric Vehicle, Magnetic Resonance Coupling

A review on different modeling schemes for liquid-liquid extraction equilibrium of rare earth

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Abstract - In general, specific mathematical models used for rare-earth extraction process are exceptionally diverse due to the complexity of the systems. The errors in predicting the distribution ratios, percentage of extraction and separation factors are somewhat large with conventional modeling techniques. The neural network and novel computational techniques prove highly proficient in prediction of extraction data with high accuracy. In this review, an overall analysis of the rare earth extraction equilibrium employing various modeling techniques has been presented and discussed.

Keywords: liquid-liquid extraction, rare earths, mathematical models, chemical models, computational models.

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An ensemble method of feature selection and classification of Odia characters

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Abstract-- Offline Handwritten Character Recognition of Odia scripts have drawn remarkable attention by re- searchers. In the area of Pattern recognition, most challenging task is to classify and recognize characters with human like accuracy. Feature selection methods are widely used in various sectors of machine learning, bioinformatics, and Pattern recognition. In high dimensional datasets, not all the features are relevant to the problem; some of them interfere and reduce accuracy and also the causes of curse of dimensionality. To overcome the above problems, we have experimented different feature selection technique i.e. filter and wrapper methods, to select a subset of relevant and non-redundant features that have the strongest relationships with the output variable. Filter and wrapper based methods are implemented, on vowels of Odia script of OHCS 1.0 database for Odia character recognition, by selecting top 'k' important features and their accuracy is analyzed. The Random Forest (RF) technique, which is an ensemble of decision trees, incorporates Gini importance based feature selection and influences greatly the model's accuracy. By varying the number of decision tress in the Random Forest, the accuracy and the execution time for building the tree before feature selection and after feature selection is compared. After discarding many features that do not carry any information for class prediction, the ensemble model results on an average of 99.2% accuracy with reduced feature set.

Keywords: Feature selection, OCR, Gini index, Chi square test, Random Forest, Odia Character, Filter and rapper Methods.

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The Classification of Power Quality Disturbances using Statistical S-Transform and Probabilistic Neural Network

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Abstract - This article compares the ability of the Probabilistic Neural Network in the classification of several Power Quality Disturbances (PQD) using statistical parameters. The objective is to investigate the effectiveness of the classifier in modeling the low-dimensional feature vectors describing several PQD disturbances. In the process, several statistical parameters such as the mean, RMS value, standard deviation, skewness, Kurtosis, form factor, Crest factor, Energy, normalized entropy, log entropy, and Shannon entropy have been extracted using the Feature vectors of the well-known Stockwell Transform (ST). The statistical coefficients corresponding to ten-PQDs have been fetched and fed to the chosen PNN for efficient modeling. A comparison of the recognition accuracy of the PQDs has been made to that of the conventional statistical parameters extracted directly from the synthetic raw signals. The ST statistical parameters have shown to outperform with an average recognition accuracy of 92.6%. On the contrary, the conventional statistical parameters have provided a lower accuracy of 79.5%. In the case of PNN, the number of hidden layer neurons is made equal to the number of training data. A suitable selection of the spread factor leads to better recognition accuracy as revealed from our results.

Keywords: Power quality, Feature extraction, Recognition accuracy, Statistical parameter, Stransform, spread factor

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Implantable Insulin Delivery System based on the Genetic Algorithm PID Controller (GA-PIDC)

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Abstract - The intention of this manuscript is to formulate a GA-PIDC for monitoring the Blood Glucose (BG) in TIDM patients. In this strategy, the conventional PIDC is redesigned by use of the Genetic Algorithm (GA) concept to upgrade the control accomplishment. The endorsement of the upgraded control accomplishment of GA-PIDC is set up by comparative outcome examination with other well-known control strategies. The overall results clearly uncover the better execution of the prescribed methodology to screen the TIDM elements inside a consistent territory concerning the robustness, exactness and stability.

Keywords: Patient, carbohydrate, insulin, PIDC, GA

A Modified Least Mean Square Technique for Harmonic Elimination

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Abstract - A modified least mean square (MLMS) technique-based shunt active filter is proposed for selective harmonic elimination in a grid integrated non-linear system applications. To provide a better and cost-effective solution, a reduced switch voltage source inverter (RSVSI) is used for a three-phase active filter operation. In addition to that, for better power quality, a MLMS technique is applied to separate the positive and negative sequence components from the non-linear load current. The MLMS technique improves its performance by estimating the appropriate current error through an adaptive step size selection. To validate the MATLAB/Simulink designed the proposed approach, different test conditions are presented. From the comparative analysis, the proposed system shows that the implementation of the novel technique leads to a substantial gain in the signal to noise ratio, by which the distribution system reduces the output error and significantly improved the convergence speed through an adaptive harmonic cancellation.

Keywords: reduced switch voltage source inverter (RSVSI), modified least mean square (MLMS), power quality (PQ), Nonlinear load, distributed system (DS).

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Design of Encoder in CNN for Effective Recognition of Odia Numerals

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Abstract-- Deep learning is highly appreciated in the field of image processing as it follows the human brain like a training process. In general, artists look at a model and implement the structure in the canvas by observing the important features. Similarly, Autoencoders have attracted the attention of researchers as it learns the important features from the trained data to generate the structures similar to the data provided for training. Autoencoders are the basic building components of generative models. In this work, we have designed an Autoencoder (AE) to generate a large number of data to support the Generative Adversarial Network (GAN) Model applied to the IIT Bhubaneswar Odia handwritten numeral database. In this work, we have designed an encoder that generates the feature vectors by applying Convolutional layers activated by Leaky-ReLU followed by max pooling. It is verified that the decoder recognizes the features due to proper training. The generated images are quite similar to original data that validate the proposed AE is well reconstructive. To measure the performance of the model loss is calculated using mean square error. The proposed model of AE is trained with Adam Optimizer.

Keywords: Deep Learning, Odia handwritten numerals, Autoencoders, CNN, Adam optimizer

PID **-** 53

Differential evolution with Dual-mode mutation for parameter estimation of different photovoltaic model

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Abstract-- In order to design a photovoltaic (PV) system having superior performance, it is necessary to ensure that the PV system parameters are estimated properly. In the recent past, it is perceived that several authors have given emphasis to the estimation of PV parameters. The problem of PV parameter estimation is formulated in the form of a single objective function expressed as root mean square error (RMSE) between the experimental current and the estimated current values of the PV model under consideration. This objective function is intended to be minimized by evolutionary approach. Although different variants of the Differential Evolution (DE) were proposed in the past, but here Differential Evolution with dual-mode mutation (DEDMM) is projected. This mutation strategy brings improvement in exploration and exploitation capability of DE resulting in better solutions. The experimental I-V datasets are taken into consideration for estimating the parameters of a single-diode and a double-diode based PV cell models and PV module model. The results portray the effectiveness of DEDMM as compared to other methods suggested recently for parameter estimation of different PV models.

Keywords: Photovoltaic models, Parameter estimation, PV module, Differential Evolution, Dual-mode mutation

PID **–** 57

Linear Antenna Array Parameter Estimation using a Neuro-computational Approach

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Abstract-- The power of estimating after learning as provided by artificial neural network has helped a lot of researchers to determine solution to many a problem in antenna research. The solutions to most of the problems involved unwieldy and lengthy computations. In this paper, the relationship of beamwidth and gain with respect to the number of antenna elements in a linear antenna system is modelled using a neuro-computational model. The model uses a multi-layer perceptron network. It was found that the network accurately modeled the relationship. The mean square error (MSE) was found to be of the order of 10^-9.

Keywords: Antenna Array, Beamforming, Beamwidth, Gain, Multi-layer Perceptron Network

PID - 62

Impact of climate change to sea ice ecosystem

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Abstract-- The sea ice ecosystem is the largest one on the earth. It gives foodstuff to a large group of animals and other organisms. The uneaten natural substance of the ice sinks through the water segment and feeds benthic sea ice ecosystems. As the level of sea ice decreases, the algae contributes a small fraction of the total organic matter produced in polar waters. Recent changes in the temperature, atmospheric pressure, stratification, intake of nutrients, the oxygen content, and acidification in sea ice ecosystem with potentially growing organisms are related to increasing atmospheric CO2 and climate changes. The effect of poles and tropics is particularly revealing because polar ecosystems are sensitive to sea-ice retreat and poleward organisms relocation and due to their susceptibility to mild climate

changes. Enhanced economic impacts can change the energy flow and material as well as biological systems which subsequently affect the ecosystem as a whole and the services that depend on people and communities.

Keywords: Ecosystem; Biological system; Algae; Climate change; Temperature; Nutrient.

PID - 63

Functionally responsible waste plastic material, its impact on the environment and Bioremediation

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Abstract-- Plastic is now becoming a very essential product in our day to day life of modern man. Its use has been noticed in almost all the important fields. Production of plastics and their extensive use cause of a significant threat to the living organisms. The annual production of the plastic in the world is approximately estimated to be 300 million metric tons and almost 50% of the total plastic produced has been rejected after use without proper recycling and management in every year. Their extensive production and use are the cause of huge accumulations of plastic wastes in both land & oceanic environments. The management, safe disposal of plastic wastes now becoming a serious global issue. Thus, recycling of plastics is now an acceptable necessity in order to protect our environment from hazardous plastic pollution. Recycling of plastic is associated with very high cost, more consumption of electricity, expensive transportation, problems of segregation, etc. The recycling of plastic comprises a variety of approaches viz. renewing, carbon sequestration, synthesis of carbon nano tubes etc. This review gives emphasis on the bioremediation of waste plastic materials for existence of a sustainable environment.

Keywords: Macromolecules, incineration, carbon sequestration, bioremediation, sustainable environment.



A Modified Least Mean Square Technique for Harmonic Elimination

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Abstract - The proposed manuscript deals with an advanced control technique (ACT) based multilevel inverter approach to resolve the power quality (PQ) problems that occurred in the renewable energy system (RES) based microgrid system. A three-level neutral clamped inverter (NCI) is proposed to facilitate the single-stage operation by integrating the solar energy-based RES. In addition to that, an incremental conductance (IC) based MPP algorithm is used to improve the solar system performance by producing maximum voltage and current. The proposed ACT is used to compute the fundamental parameters of the grid current and multiplied with the in-phase unit current component to generate the reference signals for NCI operation. Detailed mathematical modeling of the ACT is presented. To validate the proposed ACT-based NCI approach, the obtained results are compared with the traditional approach results during different test conditions.

Keywords: solar system, advanced control technique (ACT), neutral clamped inverter (NCI), maximum power point (MPP), power quality (PQ)



Self-Assembled Peptide Nanostructured Materials in Drug Delivery Application

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Abstract - Now rapid revolutions in the field of nanomedicine are continually increasing and the application of nanotechnology in biomedical field is given a strong attention to researchers. Now significant development of novel nanomaterial facilitates the formulation of self-assembled peptide nanostructured materials with many promising properties, which are required in biomedical and pharmaceutical fields. In the 20th century a number of chemical techniques have been developed for synthesizing self -assembled peptide nanomaterial applied specifically for drug delivery, diagnostics, cancer therapy, cell therapy, gene delivery, molecular biology, tissue engineering. The most basic and important theme is tracking the transplanted nanoparticles for the gene delivery into the stem cells, self-assembling peptides and the scaffolds that beneficial for biomedical field for the tissue cell cultures, clinical application and transplantation. The major objectives of this study are providing basic information regarding the development of self-assembled peptide and their potential application in drug delivery.

Keywords: Biomedical application, Drug delivery, Nanotechnology, Nanomedicine, scaffolds



Role of Millimeter Wave for Future 5G Mobile Networks: Its Potential, Prospects and Challenges

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Abstract —5G mobile communications targets at having high data bandwidth, endless networking ability for information exchange and huge signal coverage capability to the end users in order to support a well-off range of high-quality adapted services. Making this 5G vision a reality governs concept of 5G New Radio (NR) defined by 3GPP, a air border design that will bring new levels of elasticity, scalability, and efficiency to meet the increasing connectivity needs in the next era and beyond. It has determined the usability of the beneath-exploited milli meter-wave (mm Wave) radio spectrum for the upcoming 5G broadband wireless communication networks. The mm Waves propagation channel fact is required to its core based for the effective placement of mm Waves mobile communication systems. It exists between series of 3- 300GHz bandwidth in mm Waves spectrum ranges. The main trials, keys and benefits linked in perspective with evolving of 5G mobile wireless networks. This paper extant the features the mm Waves propagation channel, and highpoint.

Keywords: 5G, Millimeter wave; 3GPP; new radio; scalability; data bandwidth



A Unified Scheme of PSS and SVC for Voltage Profile Improvement in Electrical Grid Network

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Abstract - Power System Stabilizer (PSS) plays a very vital role in enhancing the power system stability and ensuring maximum power transfer in response to a disturbance. However only use of PSS to damp out the oscillations during transient conditions may not be sufficient enough to enhance system stability. Further PSS also introduces great variations in the voltage levels. So, this paper aims to focus on the enhancement of power system stability of a two-machine system imperiled to a LLLG fault with the help of the PSS being coordinated with Static Var Compensator (SVC). SVC not only further enhances the voltage stability and brings about better dynamic voltage control but also controls the amount of reactive power in the transmission lines. The system is designed and tested using MATLAB/Simulink environment. The figures found out signifies that the dynamic responses of the system are better in case of unified use of PSS and SVC than that using PSS alone.

Keywords: power system stabilizer, static var compensator, voltage profile, transient stability, FACTS devices.

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Optimal Sizing, Placement and Shading Analysis of a 19.2kW Grid-Tied Residential Roof-Top PV System

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Abstract - This paper proposes a grid-tied PV system for a residential home located at the green city Bhubaneswar, India. The investigation involves the PV system sizing, designing, geographical location, components selection, orientation, placement, shading evaluation and performance analysis. At first, the 19.2kW on-grid PV system is designed in the PVsyst software considering meteorological data of the site, available components and various loss parameters. Later on, the 3D modelling of the roof is done in Sketchup Skelion environment for optimal placements of the modules to avoid unexpected shadow formation during the operational hours. Also, the shading losses, area required and approximate system size are calculated. The model is exported to PVsyst for performance analysis of the PV system that includes power generation, loss calculations, PV array and inverter performance and annual energy yield. It has been found that the approximate system size proposed by both the software matches greatly and the maximum production of the proposed system is calculated as 25MWh/year with maximum array and system losses as 0.93 and 0.44kWh/kWp/day.

Keywords: Photovoltaic, on-grid, power generation, yield, shading, losses.

PDPID Plus DDF Cascaded Controller for LFC Investigation in Unified System with Wind Generating Unit

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Abstract - A hybrid innovative Proportional derivative Proportional integral derivative plus double derivative filter controller has been suggested to make balance system frequency over an unequal two area reheat turbine based thermal-wind power grid network. This research paper has implemented SOS algorithm to optimize the constriction of hybrid controller with presence a disruption of 0.01 p.u. to validate system sturdiness in area 1 as well as in both areas. A cost function called as integral time absolute error (ITAE) has been considered to achieve the finest gain values of the projected novel controller. The vigorous outcomes of the modelled hybrid cascaded controller have compared with normal PID controller over modelled power system network. Finally, the proficiency of the executed hybrid cascaded controller is examined by introducing GDB (governor dead band) as well as GRC (generation rate constraints).

Keywords: Controller Parameter Optimization, Reheat Turbine, Wind Power System, SOS Technique, PDPID plus DDF controller, Load frequency Control

PID **-** 77

A Framework to Detect Digital Text Using Android Based Smartphone

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Abstract - In this technology 2.0, there is a huge demand for storing knowledge available in paper documents format into a hardware disk. Text recognition application is an application of this modern technology era that attempts to develop an automatic data processing (ADP) system with the flexibility to automatically read the text from images. Using this application, one can reuse this information by the searching process. One simple method to store information from these paper documents into a computer system is to first scan the paper documents and to store them as images. But to reuse this information, it's totally difficult to read the individual contents and searching the contents form these documents line-by-line and word-by-word. The challenges involved during this are the font characteristics of the characters in the paper documents and standard of the images. To overcome these

challenges, there is a need of an application called text recognition application. In this paper, we have discussed about the text recognition application which uses the recognition mechanisms to convert the documents in paper format to electronic format. For this, we are using android studio as a tool to develop an android based application to extract the text from images. The objective of this paper is to help others to get rid of their difficulties by making the process smooth. The application which we made will help students to copy their missed E-documents, assignments and laboratory records while submitting all in time. By this, filling up the form will become easier also. Along with this, we can make our on-line bill payment mechanism and digital on line payment system smoother.

Keywords: font characteristics, electronic format, ADP system, text recognition, android



TLBO Based CC-PID-TID Controller for Load Frequency Control of Multi Area Power System

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Abstract - This study discloses the design of a cascade controller to control the frequency and power interchange among control areas. Teaching learning based optimization (TLBO) algorithm is functional in three area thermal-hydro system to attain the constraints of cascaded-tilt integral derivative (CC-TID) controller. The recommended controller is the synchronization of both conventional and fractional-order calculus to minimize the error. Here, TID controller applied in primary loop to retain steadiness between generation and demand whereas proportional-integral-derivative (PID) controller applied as supplementary loop to control the frequency and tieline power deviations. Routines of CC-PID-TID controller are achieved by using an objective function as integral of time multiplied absolute error (ITAE). Preeminence of this controller is verified by concerning the outcomes with lately available methodology such as cascade PI-TID controller for three area system employing same objective function. Furthermore, the performance of TLBO is assessed and related with differential evolution particle swarm optimization in terms of dynamic behaviours.

Keywords: Load frequency Control (LFC), Step Load Perturbation (SLP), secondary control (SC), Tilt-integral derivative (TID) controller



An Novel Hysteresis Current Control Technique (HCCT) for Single Phase VSI

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Abstract - Several HCCT and modified HCCT (MHCCT) are implemented for Single Phase VSI (SPVSI). This paper suggests an novel HCCT for the same converter which provides the benefit of both unipolar and bipolar switching technique. This novel HCCT reduces switching loss, eliminates the EMI effect by reducing the higher order harmonics and further more diminishes the Sub and Inter Harmonics (SIH) of the load current. Authors also compared results of the proposed control technique with some of existing HCCT. The simulation results, harmonic analysis of the load current of the novel

control technique and other existing techniques are proposed and compared in the article. Hardware result of load current with the novel control technique is projected and also matched with simulation results for a motor Load.

Keywords: Novel HCCT, SPVSI, Harmonic Analysis, SIH, Switching Technique.

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AN EFFICIENT APPROACH TO FIND FREQUENT ITEM SETS IN LARGE DATABASE

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Abstract - In recent years, Data Mining [1] [2] is a constitutive technique for finding useful knowledge from large transactional dataset. Association rule mining [3] is one of the resuscitative data mining techniques. It finds the interesting patterns from large datasets to maximize the profit of the future business. Several algorithms are available to find frequent patterns. Apriori and FP-Tree [4] [5] algorithms are most common techniques for discovering frequent item sets. The Apriori algorithm uses a breadth-first search approach to find all significant frequent patterns. This is performed by candidate generation method which takes several number of database scans. The FP-Tree algorithm scans the whole database twice to discover significant frequent patterns without generation of candidate. So the main motive behind this proposed approach to discover frequent patterns from transactional database in minimum execution time. The proposed TR-FC-GCM (Transaction Reduction – Frequency Count – Generate Combination Method) finds all significant frequent patterns by generating all possible combinations of an item with single database scan and also works better for null and full datasets. The comparative results of TR-FCGCM, Apriori and FP-Tree algorithms with different transactions and thresholds, it clearly shows that TR-FC-GCM algorithm outperforms than Apriori and FP-Tree algorithms.

Keywords: Apriori, FP-Tree, TR-FC-GCM, mininum support threshold.



Performance Comparison of hSGA-PS procedure with PIDA regulator in AGC of Power System

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Abstract - With Proportional Integral Derivative and Acceleration (PIDA) controller, Search Group Algorithm and Pattern Search (hSGA-PS) technique oversee Automatic Generation Control (AGC) of intensity structure. A three nonlinear force framework with PID regulator is thought of regulator boundaries are adjusted via Search Group Algorithm (SGA). In varied-region power structure, single zones are between related with each other zone by methods for transmission lines. Here, three districts warm game plans of different cutoff points with non-linearity's are considered for assessment At that point in the subsequent stage, PID regulator is supplanted with PIDA regulator and the ideal increases of PIDA regulator are streamlined utilizing SGA procedure. Global optimizing methods like

GA/PSO/FA is hybridize with local optimizing methods like PS improves the performance. IDA controller employed for torsional resonance suppression. SGA tuned PIDA regulator upgrades introduction through and through differentiated and SGA upgraded PID regulator. Example Pattern Search, a nearby streamlining strategy utilized to adjust PIDA regulator boundaries conveyed.

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Design and Implementation of ML Based Temperature Forecasting Model for air conditioning using IoT

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Abstract - For accurate prediction of any physical parameter including ambient temperature by taking inputs from sensors, machine learning (ML) techniques are often preferred. In this paper, prediction and analysis of environmental real time temperature has been done using two ML models viz. Recurrent Neural Network (RNN) and Long Short Term Memory (LSTM). For analysis of collected data, traditional statistical methods such as Regression Analysis have been used. With the real time temperature sensor, data is collected periodically each day and then is used to train the ML models. During model development, various trails have been undertaken and the LSTM model has been found to be the most suitable. Various parameters of the model such as epochs, batch size have been further analyzed and with increase in the accuracy of the model, the predicted value is observed and a generalized performance is noted for real time use of the system. Further, the work involves the design of an internet of thing (IoT) set up as part of which the ML model works. Together the set-up becomes an intelligent IoT system which is used for remote monitoring through an android application. From experimental results the system has been found to be accurate.

Keywords: ML, RNN, LSTM

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Residential Sector Demand Side Management: A Review

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Abstract - Demand side management (DSM) plays a significant function in the smart distribution system to make informed decisions from both consumer and supplier side with regards to energy consumption to redesign the load profile and to decrease the peak load demand. This study extensively reviews the demand side management (DSM) strategies along with both demand response and energy efficiency policies. The major objective of this paper is to enumerate the relevant features responsible to strengthen the DSM effectively, particularly for residential energy demand and the limits to energy indicators. Secondly, the large untapped and hidden potential and the associated barriers to energy efficiency enhancement are focused and surveyed for formulating a better number of potential policy responses. This further explores the portfolio approach with bundled strategies to reflect on the power market through enhancing the strength of individual residential measures through complementary policies to reduce the weaknesses. This concludes at last with the findings of possible holistic measures related to various approaches and attribute findings that reinforce the DSM strategies to enhance the energy management and cost-

effectiveness. Apart from that the architecture, formulation of optimization problems, and various approaches are presented to help the readers to develop research in this direction to maximize the total system peak demand, overall load factor, and utility revenue with the minimized customer electric bill.

Keywords: Demand Side Management; Demand Response; Prosumers;

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Health Index Prediction of Underground Cable System using Artificial Neural Network

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Abstract - The application of machine learning (ML) towards the prediction of the insulation health condition of high voltage XLPE cable was emphasized in this work. Deterioration due to aging and partial discharge is the primary cause of cable insulation failure. However, replacement and maintenance of underground cable circuits during the period of excavation are very expensive. The information regarding the severity of the insulation level assists to make smarter informed decisions for system planning and repair prediction. In this work, the interpretation and recognition of the insulation health condition analysed with the help of an Artificial Neural Network (ANN). The classification based on the ANN requires a pre-processing of the input data obtained from the test results. The test result provided information about each sample's Partial Discharge (PD) magnitude, Aging, Neutral corrosion, Loading, Visual condition, etc. This work mainly focused on the application of deeplearning, i.e. multiclass classification of five different health index classes based on the acquired dataset.

Keywords: – Partial Discharge, Underground Cable Aging, Artificial Neural Network (ANN), Health Index



A Robust and Secure Way for Sharing Confidential Images

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Abstract - With advent of increased Internet consumption, most of our exchanges occur through a digital medium. We share a lot of information with our family, friends, colleagues & people with whom we deal businesses & services. All this information we usually share via Smartphone's using popular messaging apps like WhatsApp or Messenger and similar social media apps. Most of these apps are secure in terms of security when it comes to informal discussions of information, but not very

secure when it comes to sharing of sensitive information in form of images. Sensitive images of debit card, bank passbooks, identity cards or confidential documents usually gets stored in devices of recipient and thus can get misused knowingly or unknowingly. In this paper we discuss a robust and secure method of sharing the images (color) as well as important confidential codes in the form of images. As cases of malwares and other spywares are increasing in mobile platforms, it becomes important to address the issue where potent attackers can steal sensitive data like images stored in the device without the user's consent.

Keywords: Encryption, Secure transmission, Spywares, Camouflage image, Secret image.

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Generating Rules to Detect Phishing Websites Using URL Features

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Abstract – Phishing, a well-known type of the cybercrime, is a fraudulent activity created and executed by cyber criminals all over the cyberspace worldwide. Several techniques are used by these cyber criminals or scammers to carry out these attacks on the user to deceive a user. There are also some dangerous types of phishing attacks such as: by using Email messages and the Multimedia Internet Mail Extensions (MIME) attachments with the email messages that are delivered to the targeted users that include newbies as well as old and experienced users. Other types include botnet based attack that is performed using malwares sent either through emails or somehow forcing users to click on the links planted wherein these malicious messages are attached by the scammers in the body of email text or their webpages. Spear attacks are also dangerous kind of phishing attacks. In this kind of attack an individual or a company is targeted by these people to steal the sensitive data over web. Keeping in mind this very purpose, emails and malicious codes are used as their primary weapons. In present paper, Apriori algorithm is used to generate the rules so that these rules can play a vital role in detecting & predicting the phishing and non-phishing website URLs. In order to give the web users a basic idea against this threat, an effective tool is used to spread the word among the users, so that users may get the required knowledge about these and developing a tool to make users able to identify the phishing websites/content while working online.

Keywords: Phishing, Apriori, MIME, Botnet, Cybercrime

PID **-** 98

Automated Wireless Biometric Fingerprint Based Student Attendance System

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Abstract - This paper aims to establish an automated wireless system that records and maintains the students' attendance system for the modern education sector. As in 2002, 75% attendance was made compulsory PAN India, the practice of recording and maintaining the attendance become essential. It's been 18 years since then but the conventional method remains the same that leads to a high probability of human errors, misplacement of the documents, redundant entry of the attendance manually, more chances of student giving proxy on behalf of their classmates. The automated wireless biometric fingerprint-based student attendance system, not only upgrades the practice of the conventional method but also makes it automated and more convenient and more secure to record and maintain the attendance, as well as completely eradicating the malpractice of proxy. It is a very cheap device compared to the ones available in the general market. The whole system is comprised of a Fingerprint sensor, Arduino, OLED display, Arduino to USB cable, and an Android Smartphone with an app specially designed to control the device. The image enhancement and orientation of field estimation of the fingerprint image have been applied through MATLAB Fingerprint Recognition Toolbox. The whole systems working is summed up in three steps, first is the enrolment of the student, loading data of the specific group or batch whose attendance is to be recorded and finally taking the attendance, thus also saving an ample amount of time which gives the students a clear opportunity to interact with the professor and clear their doubts. And also playing a major role in Digital India by automating the system and by eradicating the use of paper which is initially made of trees contributing towards the noble act of sustainable development.

Keywords: Automated wireless system, Biometric attendance, Fingerprint recognition, Arduino, Android App

PID **–** 99

An efficient Robust Random Vector Functional Link network for Solar Irradiance, Power and Wind speed prediction

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Abstract - This paper proposes an efficient technique for prediction of solar irradiance, solar power and wind speed at different time intervals (i.e. 5min, 10min and 60min). With the deliberation of historical solar irradiance, power and wind speed data, an ultra-short Prediction model has been established which is known as Robust Regularized Random Vector Functional link (RRVFL) network. This method utilizes a weighted factor in ridge regularized model, for training the samples to assess the weights in output layer. A Huber's cost function has been applied to gain the robustness here. To get the accuracy of the proposed methodology, the test has been carried out with solar and wind for various time intervals in different atmospheric condition. The result shows that the proposed RRVFL method is very superior as compared with other models (i.e. Random vector functional link (RVFL) and Robust Extreme learning machine(R-ELM), etc. Solar and wind data of California, USA has been taken here. The proposed model can be validated in real time scenario by using test bench application and in industries of solar and wind farm.

Keywords: Random vector functional Link, Robust RVFL, solar irradiance, solar power, wind speed

PID **–** 100

Strain Mapping in Bulk-Si FinFETs with epi-SiGe S/D Stressor at 7 nm Technology Node

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Abstract - Beyond the 22 nm technology node, the planar architecture in silicon CMOS has now been replaced by nonplanar 3D structures with fully depleted channels. The introduction of strain/stress in non-planar structures also enhances the device performance essential for future CMOS technology nodes. FinFET structures have shown great potential for both the digital and analog applications. Strain tuning in semiconductor devices is essential for the design and optimization of advanced devices. In this work, we have simulated a realistic PMOS bulk-Si FinFET with epi-SiGe as a source/drain (S/D) stressor at 7nm technology node. The strain enhancement mechanisms have been used in the diamondshaped bridges patterned on SiGe S/D stressor. The stress in the channel due to epitaxial S/D stressor has been calculated using the stress history model and the theory of elasticity. A 30% improvement of the 'on current' in the channel as compared to the device without stress is demonstrated.

Keywords: SiGe S/D, Stressor, TCAD, FinFET, Fabrication process.

RF Analysis of FinFETs

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Abstract - FinFETs have emerged as the solution to short channel effects in the sub 50 nm technology nodes. The analog and RF performance of trigate FinFETs is an important concern and these depend on the device geometrical parameters. In this paper, we have studied the effect of FinFET geometry parameters (channel length and fin height) on the RF figure of merits by using TCAD simulations. . The variation in the cutoff frequency, maximum frequency of oscillation and gain bandwidth product (GBW) with the change in gate length and fin height are shown. We found improvement in the RF parameters by decreasing the channel length or increasing the fin height.

Keywords: FinFET, fin height, cutoff frequency, gain bandwidth product

Application of Harris Hawks Optimization to Solve LFC Issues in Solar Based Unified System

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Abstract - This paper illustrates the Load Frequency Control of solar-thermal system by applying PID and 1 plus fractional order integral-derivative (1-FOID) controller. A new evolutionary technique called Harris Hawks Optimization (HHO) is applied. For getting a better result a perturbation of 0.01 p.u. in area-1 has been applied. This research suggests that 1 plus fractional order integral-derivative (1-FOID) controller performs better performance as compared to previously connected PID controller. HHOtuned1-FOID controller regulates the system frequency during alteration in system load condition. A better result of applied technique is confirmed by enhancing the loading in the control area 1.

Keywords: Harris Hawks Optimization, Solar Based System, Fractional order controller, Load Frequency Control.

Short-term Electricity Price Prediction Using Kernel-based Machine Learning Techniques

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Abstract - The consumer behavior so as the load pattern frequently changes in a dynamic power system environment. In the case of a deregulated market, it leads to a complex price profile. To make the supplier as well as the consumer a perfect balance should be maintained. Forecasting the marketclearing price (MCP) in these kinds of markets is the most common and essential task to maximize the benefit of both supplier and consumer. This can be done with the help of neural networkbased prediction algorithms. It can map the complex interdependencies between electricity price, historical load, internal and external factors. In this work historical data of the Australian market is taken into consideration for short-term price prediction. The most sought after method Extreme learning machine (ELM) is compared with an advanced Kernelbased technique. To give the prediction algorithm more weight interval prediction is also focused on this work. The volume of data is carefully chosen keeping in mind to avoid premature convergence and overfitting. The performance indices like error measurement units in case of point prediction and width and probability assessment units in case of interval prediction are considered in this study. To make this analysis more extensive seven kernel functions are compared with the ELM algorithm.

Keywords: Microgrid, ELM, KELM, Prediction interval, Error, Prediction Width

Design and Development of Arduino Based Portable Air Quality Monitoring Systems Sayantan Saha, Monali Nath

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Abstract - Air pollution can have a terrible impact on the environment and human health Because of the release of lethal gases by vehicular emissions, factories, and elevated amounts of inhalable particulate matter in the atmosphere. It leads to Harmful effects on ecosystems, human health, and climate changes. Therefore, monitoring of pollutant levels in the air is required. In this paper, an Arduino microcontroller-based air quality monitoring system has been developed for measuring the various atmospheric parameters viz. carbon-monoxide, temperature, humidity, and methane using the respective sensors. The measurements were taken based on the parts per million (PPM) metrics and the

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data were collected through the sensors based LCD/serial-monitor for analyzing the result. Both graphical and numerical formats of results can help the user to a better understanding of the pollutant level in the air by which he/she can take necessary action.

Keywords: Arduino UNO; Pollution; Toxic gases; Sensors; Pollution monitoring.

PID **–** 108

Computation of Limit Cycle in a Nonlinear Fractional-Order Feedback Control Plant with Time Delay

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Abstract—This paper predicts the presence of the limit cycle for a class of nonlinear fractional-order feedback control plants with separable nonlinearities. The concept of describing function along with the Nyquist contour is extended to evaluate the amplitude and frequency of such periodic oscillations for a fractional-order time-delay system. The critical value of plant gain is evaluated below which the system response shows convergence and oscillations fail to sustain. The accuracy of the proposed technique has been substantiated by comparing it with the results from MATLAB/SIMULINK applications.

Keywords: Nonlinear System, fractional-order system, timedelay system, describing function, limit cycle.

PID **–** 109

Key Predistribution Technique based on Matrix Decomposition in Wireless Sensor Network

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Abstract - In many applications wireless sensor networks are used and are installed in hostile environment for sensing different data. To secure data, cryptographic techniques are used. The sensor nodes in the network are distributed randomly in the network and these communicate with the node present within the range of the node. In order to have secure communication by maintaining confidentiality and authentication, key predistribution technique is used. Key predistribution also reduces the memory overhead of storing the key information in the sensor node. In this method key is predistributed in the network before communication. The paper proposes key predistribution method based on matrix decomposition technique known as Cholesky decomposition technique. In this method the key matrix decomposes into lower and upper triangular matrix. The upper triangular matrix is the transpose of lower triangular matrix. Each node stores the row and column information. The nodes involve in communication exchange the row information of the decomposed matrix to

generate the secret key which is used for secure message communication. This method provides better key connectivity and also needs less memory to store the polynomial store in the node to generate the key.

Keywords: Cholesky Decomposition, Memory, Key Connectivity, Polynomial

PID - 112

IDMS: An Integrated Decision Making System for Heart Disease Prediction

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Abstract - Heart Disease, one of the deadliest human diseases worldwide, should be properly diagnosed in time and treatments should be carried out accordingly. To predict Heart Diseases, decision making systems based on classification techniques have been widely proposed in various studies. In this paper, an Integrated Decision Making System (IDMS) has been introduced for prediction of heart disease. In addition, it uses Principal Component Analysis (PCA) for dimensionality reduction, Agglomerative hierarchical clustering technique for clustering and Random Forest (RF) for classification purpose. Then, the results are compared with other six conventional classification techniques. Some experiments are performed using Cleveland Heart Disease Dataset (CHDD) sourced from UCI-ML repository and Python language concluding that the proposed system provides better results comparing with other conventional methods. The proposed integrated decision making system will help out the doctors to diagnose the heart patients professionally and it may be useful for further investigation and predictions using different datasets and resulting valuable knowledge on Heart Disease.

Keywords: Data Mining (DM), Machine Learning (ML), Artificial Intelligence (AI), Classification Techniques, Prediction, Heart Disease

PID **-** 114

Dynamic stability improvement of a solar penetrated power system by Fractional optimal IPFC

based controller

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Abstract - Fractional interline power flow controller (IPFC) is proposed in this work for enhancing dynamic stability of a random solar penetrated power system. IPFC being a seriesseries FACTS device

is much versatile damping controller. Here the damping action is provided by IPFC based fractional lead-lag controller. The controller gains are optimized by a random walk grey wolf optimizer (RGWO). A random variation in solar output is more prone to system oscillations as compared to fix solar generation. So separate cases have been conducted in this work pertaining to step and random solar power variations. The effectiveness of proposed control action has been compared with lead-lag controller and proposed optimization technique with standard PSO and GWO algorithms. Detail analysis has been performed in time domain with eigen analysis and it is found that fractional RGWO tuned IPFC is much robust to damp system oscillations subject to variable solar penetration in comparison to PSO and GWO tuned lead-lag controller.

Keywords: FACTS, IPFC, solar photovoltaic, fractional lead-lag, dynamic stability

PID **–** 115

SPEED CONTROL OF DC MOTOR USING LINEAR AND NON-LINEAR CONTROLLERS

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Abstract - The main aim of this paper is to keep guidance over the speed of a separately excited DC motor utilizing both linear and nonlinear controllers. PID controller is considered as a linear controller and SMC (Sliding Mode Controller) is considered as a nonlinear controller. Both the controllers are used for analysis. The first goal of this paper is to design a SMC based on variable structure systems which is a robust non linear control insensitive to external disturbances and parametric changes with aim to decreasing the settling time, undershoot, maximum overshoot and rise time of a separately excited DC motor as compared to PID controller. A dynamic model of separately excited DC motor is created and both conventional PID controller and SMC are implemented separately for speed control using MATLAB/SIMULINK. The simulation results obtained from both the controller are studied and compared, which shows that SMC has excellence dynamic performance than conventional PID as speed regulator of DC motor. While in occurrence of disturbances SMC is robust, the ideal speed is impeccably followed.

Keywords: DC motor, PID controller, VSC Variable Structure Control, SMC controller

PID **-** 118

Modified Chaotic Bee Colony Optimization (MCBCO) algorithm for data clustering

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Abstract – Results of the heuristic search-based optimization algorithms largely depend on the initial

guess. When the initial guess is closer to the optimal result, then the algorithm converges faster. But for large datasets, the probability of getting this closer guess is difficult. In this paper, a Modified Chaotic Bee Colony Optimization (MCBCO) algorithm is proposed for data clustering. It is capable to explore the solution space in all directions, despite of initial guesses. The chaotic bees that are created using chaotic sequences enable the algorithm to do this. It uses steady state selection tactic for better exploration. The algorithm also uses Gaussian mutation for further exploitations in the solution. The simulation results and analysis reflects that the algorithm is competent for the data clustering problem.

Keywords: Bee Colony Optimization, Data Clustering, Bioinspired clustering, Partitional clustering, Meta-heuristic search.

PID **–** 123

SBP Based Optimal Power Trading in CEM adopting Hybrid DE-PSO Technique

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Abstract - The offering dynamic issue is contemplated from a provider's perspective in a spot advertise condition. The dynamic issue is figured as a Markov Decision Process - a discrete stochastic improvement technique. All different providers are displayed by their offering parameters with correlating probabilities. A precise strategy is created to ascertain change probabilities and prizes. An improved market clearing framework is additionally remembered for the usage. A hazard unbiased chief is accepted, the ideal technique is determined to amplify the normal award over an arranging skyline. Reenactment cases are utilized to delineate the proposed technique.

Keywords: NE, Bidding Strategy, MO, MCP, CEM

PID **–** 124

SOS-ELM based Prediction Model for Electrical Load Forecasting

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Abstract - Load forecasting is an interesting issue in which the electrical load demands are dynamic and non-linear in nature. This paper develops a forecasting model in which, the next hour load is predicted. The most popular machine learning algorithm called as Extreme Learning Machine (ELM) is implemented for the load prediction. The performance of ELM mainly depends on the output weights which are determined from the input weights and biases. In this paper both machine learning algorithm and optimization technique have been applied for optimal design of input weights and

biases for getting a better result. Symbiotic Organism Search (SOS) algorithm has been implemented for determination of the optimal weights and biases.

Keywords: Keywords — Extreme learning machine, Symbiosis organism search, Electrical Load Demand

PID - 126

Artificial Intelligence based Bot Assisted Irrigation System

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Abstract - This paper elucidates the most significant approaches for self-learning schemes, to create a self-learning algorithm and an appropriate physical model for efficient vision in real-life applications. The scheme designated in this paper is comprehended with the Neural Network method to design and implement an efficient bot assisted irrigation system. Irrigation is an irreplaceable part of the agriculture sector. Adequate water supply ensures maximized crop yield and in turn food security for the population. Advanced irrigation methods can boost water utilization efficiency, attaining commercial advantage while also reducing effects on the environment. In the presented work an automated agricultural system is proposed to ease the process of farming and reduce irrigation wastage. Microcontroller assisted automaton with a self-learning approach will traverse and collect soil parameters, suitably guiding the dedicated sprinkler system. The guidance is possible through the exchange of data between the interconnected components using the online information highway. The simulator has been established in MATLAB to be as close as possible to the physical model. Simulation results show that the neural network method makes the simulated agent can steer in an unidentified atmosphere, while the physical model only handles stationary hindrances due to physical restrictions and project time scale. An artificial intelligence-based working model has been designed to control a robot wirelessly. This system helps in efficiently fulfilling the soil moisture requirements without constant supervision and makes work simpler on a huge scale where the process of automation empowers human effort and save water in many aspects.

Keywords: Artificial Intelligence; Microcontroller; Automaton; Irrigation wastage; Soil Moisture Sensor.

Impact of Environmental Factors on The Performance of Solar PV Cells: An Experimental Study

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Abstract - Nowadays the conventional generation system is not able fulfill the exponential growth of electricity demand and in the other hand; the conventional resources are diminishing at a faster rate. To meet the future energy demand the use of renewable energy sources has increasing considerably. Among all sources, the use of solar energy is increasing rapidly due to its availability and advancement in Photovoltaic technology. But the main drawback of the photovoltaic system is its low efficiency. Some of the natural factors like temperature, irradiance, dust, shading, color spectrum, humidity, wind velocity, snow are affecting the solar PV performance. In this paper effect of natural factors on the output of solar panel and how they co-related to each other is analyzed by an experimental work.

Keywords: Temperature, irradiance, dust, shading, color spectrum; humidity.

PID **–** 132

A grasshopper optimized FO- multistage controller for frequency control of an AC microgrid

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Abstract - The microgrid has an ability to electrify most of isolated and remote areas significantly. Microgrids are commonly structured with the integration of various renewable energy based distributed generating (DG) sources like wind plant, solar plant, fuel cell along with few conventional micro sources such as diesel engine generator, micro-turbine etc. Most of DG systems experience low inertia and large dynamics which could affect the system frequency seriously. The uncertainties like wind fluctuation, solar energy variation and load dynamics degrades the system performance especially frequency of the mcrogrid seriously. A control action has to be highly required to maintain nominal frequency under above uncertainties. The present research paper proposes a robust fractional order multi stage controller to make necessary control over system frequency under wind and solar power uncertainties. A novel grasshopper algorithm has been employed to design optimally to the above projectrd controller. Finally, the suggested grasshopper designed fractional order multi stage controller is found to be more useful in observe to the frequency control of micrograd model.

Keywords: Multistage PD-(1+PI) controller, AC Microgrid, Grasshopper algorithm, Distributed generation (DG), Wind turbine, Energy storage devices.

PID **–** 133

Non Linear Back Stepping Based Sliding Mode Controller Design with Real-Time simulator for Regulating Glucose in Type-1 Diabetic Patient

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Abstract – This paper presents the application of backstepping based sliding mode control (B-SMC) to regulate glucose in type-1 diabetic patient. Therefore, a type 1 diabetes mellitus (T1DM) model is considered. MATLAB-2018 is considered to implement and simulate the systems. A comparison of result of B-SMC for T1DM model is done with existing ones. To check the effectiveness of the designed controller, the real time simulator (OPAL-RT) is used. The real time simulation result shows better in real time.

Keywords: Blood glucose concentration (BGC), Type 1 diabetes mellitus (T1DM), Sliding mode control (SMC), Backstepping

PID **-** 135

News Text Categorization using Random Forest and Naïve Bayes

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Ajit Ku. Nayak Dept. CS&IT S'O'A Deemed to be University Bhubaneswar,Odisha ajitnayak@soa.ac.in Abstract - As this whole world is gradually digitized in every aspects, there is an exponential increase of amount of data in every fields. Retrieving valuable information from this unstructured, unorganized raw data is challenging and time consuming. There are so many techniques has been proposed in the field of information retrieval to organize the unorganized data efficiently. Text Categorization is one of the techniques introduced for this purpose of categorization of documents into pre-determined categories depending on their contents. This is one of the sub technique of text classification. Text Categorization is also known as Topic Spotting. The experimental study is done on standard benchmark news data set of Reuter using machine learning techniques like Random Forest and Naïve Bayes. TFIDF Vectorizer and Count Vectorizer is used for extracting features from the data set efficiently. Chi-Square is used for reduction of feature set from the extracted feature set to select the best features to accelerate performance. The result is captured in form of the two metrics accuracy and kappa statistics to analyze the effect of different features extractions and classification technique on news data set. This experimental evaluation will improvise the future research of the use of different machine learning techniques on news data set.

Keywords: Random Forest, Naïve Bayes, TFIDF Vectorizer, Count Vectorizer, Chi-Square.

PID **-** 136

BUDGET AND EXPERIENCE BASED TRAVEL PLANNER USING COLLABORATIVE FILTERING

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Abstract - Travellers in the modern era face many challenges. Budget and time are the major constraints for a traveller. So a good travel plan should be satisfying these constraints and provide maximum enjoyment to the traveller. The proposed 'Budget and Experience-based Travel Planner' allows a traveller to create a travel plan that satisfies the above-mentioned constraints as well as other factors such as the experience of the traveller. The collected data from different sources are filtered and places that have missing fields that are relevant such as tags, district, coordinates, rating, reviews, etc are removed along with places having irrelevant tags. After filtering, the database contains over 600 destinations with 77 unique tags. Using suitable machine learning algorithms considering the constraints, the recommendation engine recommends places. We have created a routing algorithm which minimizes the distance covered to reach the different destinations considering the various cases that could happen. Suitable algorithms are used for scheduling the travel itinerary. The time, budget and destination are provided by the user and a suitable travel plan is provided back to the user.

Keywords: Collaborative Filtering, Recommendation Engine, Web Scrapper

Improving Gas Turbine Performance Using Mechanical Chiller: A Thermodynamic Approach

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Abstract – The improvement in gas turbine power plants by integrating a mechanical chiller to it for cooling the inlet air is the prime objective of this study. The bucket cooling method adopted in this study to cool the turbine buckets has been chosen as film cooling. The selected input parameters have been varied to analyze the power plant output and efficiency at varying conditions and then select the best alternative which will help the design engineers. The integration of mechanical chiller significantly augments the plant output and efficiency. This improvement is more pronounced in hot and humid climates. It was observed that as the compressor inlet temperature is reduced the bucket coolant mass flow rate decreases and the mass of fuel energy input increases. The increase in specific work and efficiency is calculated to be 14.59 % and 4.46 % respectively when the ambient temperature drops to 283K. The work ratio increases with increase in value of ratio of inlet temperatures (rIT) upto 5.6 after which it starts decreasing. There is an optimum rIT at any pressure ratio (rp,c.)at which the work ratio is maximum. The heat rate increases with increase in rIT and decrease in rp,c.

Keywords: Mechanical Chiller; film blade cooling; gas turbine performance; inlet-air cooling; ambient.

PID **–** 143

Optimization of Performance and Emission characteristics of CI engine with various biodiesel using Taguchi Method

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Abstract - This paper deals with biodiesel blend i.e. neem, mahua, polanaga and simarouba oil methyl ester of each. Experimental analysis has been performed separately in a CI engine. Performance along with emission analysis has been conducted. The control parameters selected were Compression ratio (CR), Fuel fraction FF (in %), and Load P (in kg) which have influence on the response. The three selected control parameters at three levels indicates nine trials of experiments have been conducted for each fuel, with the stage of every factor for all test run as specified on the arrangement. The optimal conditions for the control parameters gave optimum responses. The response variable have been optimized was Brake Thermal efficiency (BTE) for maximum value, Brake Specific Fuel Consumption (BSFC) and NOx by the least as much as possible. The signal optimal settings of the parameters were accomplished by the ratio of signal to noise (S/N) that helps in data investigation and prediction of the optimal result.

Keywords: biodiesel, parameter, performance, emissions, taguchi analysis.

The Fume Detecting Dual Tone Modulation Frequency Based Rover Using Brushless Direct Current Motors

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Abstract - The purpose of this project is to improve the control and precision of any rover by replacing the convention direct current motors or servo motors with brushless direct current motors. The BLDC motors are much accurate to control because of the sensors they are equipped with. The telephonic signal from the transmitter generates two frequencies one is a lower frequency and the other is a higher frequency. The higher frequency is used to drive the motors. The signal is then sent to the receiver which then transmits the dual tone modulation frequency signal to the DTMF decoder. The DTMF decoder then decodes the received signal and then transmits to the gate driver IC (which is connected to the Arduino for motor control). The Gate Driver IC which has the BLDC motors connected to it drives the motors. Furthermore this rover is being operated by Dual Tone Modulation Frequency (DTMF). In addition the rover is equipped with a Gas Sensor.

Keywords: Dual Tone Modulation Frequency, Brush Less Direct Current Motor, Electronic Speed Controller, Pulse Width Modulation Signals, MQ-2 Gas Sensor

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Solar Cell Connected To SEPIC Converter Using Various Loads for Power Tracking

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Abstract - Renewable energy can be categorized as a noticeable source for generation of electrical energy. Solar energy has acquired a prodigious importance in current generation. To harness this energy photovoltaic configuration is utilized. This paper defines simulation and mathematical analysis of a PV cell using SIMULINK/MATLAB. Electrical behavior of Photovoltaic cell is estimated in accordance to environmental parameter changes such as irradiation and surrounding temperature. To obtain significant results simulation is exploited at Maximum Power Point (MPP) using an efficient Maximum Power Point Tracking (MPPT) Algorithm. This paper enumerates implementation of Perturb and Observe Algorithm for MPPT using SEPIC converter. This model deals with V-I characteristics and P-V characteristics as well as estimation of voltage, current and power at MPP. A meticulous comparison between MPP using P&O and without using P&O are analyzed and presented. On comparison simulations shows that P&O method is able to track MPP competently and more effectively.

Keywords: Photovoltaic, SEPIC converter, Maximum Power Point Tracking (MPPT), Perturb and Observe (P&O)

Battery SOC Estimation Using extended Kalman Filter and ANN with Measurement of Noise

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Abstract - Estimation of State of charge (SOC) has always been the crucial segment of battery management system (BMS). However, SOC cannot be determined accurately, it can only be estimated. In this work, an electrical equivalent circuit of the Li-Ion polymer battery of rating 11.5 Ah based on Randel's model has been simulated in MATLAB using the results obtained from a practical model. The non-linear nature of the battery is considered with the model dependent on State of Charge (SOC) and temperature variations. In this paper, Extended Kalman Filter (EKF) algorithm and an Artificial Neural Network (ANN) algorithm have been employed for SOC estimation. Through EKF method, the simulation results show that the error is less than one percent between true SOC and estimated SOC. Through ANN algorithm, when properly trained with sufficient training data - Neural Network consisting of a single layer is capable of adequately appropriating the non-linear characteristics of a battery. It is found that at 271 epochs, it is able to achieve an error as low as 0.010291 where SOC values are varied from 0 to 1. These methods are equally applicable to other battery models.

Keywords: Artificial Neural Network(ANN), Battery management system (BMS), Extended Kalman Filter (EKF), Li –Ion polymer Battery, Non – linear battery model, Randel's model, State of Charge (SOC).

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Consideration of Series-Series and Series-Parallel Topology in Perspective of Dynamic Resonant Inductive Coupling Based Wireless Charging

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Abstract - It is well apparent, compensation is essential in loosely coupled system for efficient power transfer. However, selection of compensating topology in Resonant Inductive Coupling based Wireless Charging System (RIC-WCS) is very much application dependant. Among different existing topologies, Series-Series (SS), Series-Parallel (SP) are deemed to be appropriate and more frequently used in charging scenarios. The choice of these topologies (SS & SP) in perspective of charging conditions under varied receiver coil position in relative to the transmitting coil is evaluated in this article. In addition to this, the implicit relation between Power Transfer Efficiency (PTE) and Power Delivered to Load (PDL) on varying coupling coefficient resulted due to the change in position of the receiving coil under varied frequency have been illustrated through circuit model analysis and theoretical simulation.

Keywords: Loosely Coupled; Resonant Inductive Coupling; Topology; Dynamic Charging.

Model predictive controller based load frequency control of isolated microgrid system integrated to plugged-in electric vehicle

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Abstract - This paper introduces a model predictive controller for load frequency control of an isolated ac microgrid system, clustered with the wind system, solar system, and plugged in an electric vehicle. The model predictive controller is an active model-based control which predicts a signal for future control action based on past, present, and future variable of the system. The present study involves a model predictive controller for microgrid load frequency control in the presence of an electric vehicle as a maiden work. The controlled structure formed on the basics of minimization of controller error. The robustness of the controller is tested under a different type of source power fluctuation, load power fluctuation, and simultaneous source and load fluctuation. The predominance of the projected approach is related to conventional GA tuned PID and PI controller. The pragmatic picture of the efficiency of this work is shown by testing it against sinusoidal load perturbation.

Keywords: microgrid, load frequency control (LFC), plugged in heavy electric vehicle (PHEV), the model predictive controller (MPC)

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Modeling and Simulation of Cuk-Converter Using Single Phase Matrix Converter Topology

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Miss. Rojalin Sahu EE Dept. M-Tech, Student, CAPGS Rourkela, India Miss. Tamanna Samal EE Dept. M-Tech, Student, CET Bhubaneswar, India tamanna.samal123@gmail.com **Abstract -** This paper demonstrates the implementation of Cuk-Converter using a single-phase matrix converter topology (SPMC). A modified switching technique is used here to use SPMC as a Cuk-Converter. The pulse width modulation (PWM) is used to estimate the gate pulse of switches. Cuk-Converter is well known as a DC-DC converter in which demanded output voltage from a fixed DC input supply. Cuk-Converter can be used as a step-up circuit or step down the circuit. The main advantage of Cuk-Converter is that output can be higher or lower than the input supply voltage and the output voltage is the reverse of the input voltage. In this paper, Cuk-Converter is implemented by SPMC using PWM Technique. To overcome the spikes of output voltage safe commutation technique used.

Keywords: Single Phase Matrix Converter (SPMC), DCDC Converter, Cuk-Converter, Sinusoidal Pulse Width Modulation (SPWM), MATLAB-Simulink.

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Management of load demand considering a DG working on islanded mode

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Abstract – This paper presents a load demand management of interconnected distributed generation (DG) working on islanded mode. The development of technology related to network integration and the use of energy renewable source continues to attract researches, today these sources can generate over a thousand kilowatts, that why it important to look after the management of load supplied by the DG specially when working in islanded mode. The proposed load management model took into account the energy from the storage system and the tie-lines power flow transfer constraints applying the optimal control theory. The proposed methodology considers two loads types: critical and non0critical and proposes a load management of DG interconnected system. All optimization problems were solved using Matlab environment.

Keywords: load management, distributed generation, renewable energy, battery energy storage.

PID **–** 157

Use of complementary feature to enhance the performance of speaker identification system

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relative improvement due to the fusion of SFCC with ISFCC is up to 4% and 7% over MFCC and IMFCC, respectively.

Keywords: Speaker identification, MFCC, IMFCC, mel scale, Speech-signal-based scale, SFCC, ISFCC



Optimization of performance and engine emissions of a dual-fuel engine using Grey-Taguchi technique

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Abstract - Performance of a compression ignition engine running in dual fuel mode with biogas was optimized by Grey- Taguchi technique. The variations in engine load, biogas flow rate (BGFR) and compression ratio (CR) were investigated to observe their influence on brake thermal efficiency, unburnt hydrocarbons and nitric oxide. The obtained result shows that, optimal factor setting with engine load at 80%, CR at 18 and BGFR at 0.6 kg h-1 gave the best result for the selected responses. Analysis of variance determines the relative contribution of CR, engine load and BGFR were found to be 43.18, 20.93 and 33.71% respectively. This indicates that, variation in engine load has the lowest contribution on the

desired output responses as compared to CR and BGFR.

Keywords: compression ignition engine, dual fuel, analysis of variance, biogas, performance.



Energy Portfolio Optimization for the State of Rajasthan

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Abstract - The power sector in Rajasthan has shown substantial improvement over the past few years or in a decade due to an increase in generation capacity, renewable generation, strengthening of network infrastructure leading to an improvement in the overall power supply position of the state. But still, there is a gap to be fulfilled between demand and the supply from capacity tied up under power long-term, bilateral contracts, short-term contracts, and making the renewable generators as must-run plants. Distribution Company continues to be an insufficient supplier to serve the entire demand across various time blocks for the state of Rajasthan. The state continues to depend on peak load power plants, typically gas-based or diesel-based-close to load centers for meeting their deficit peak and uncertain seasonal demand increase. A linear optimization mathematical model has been developed to address the delinquent of power purchase and its planning encountered by the distribution utilities and large consumers. A power procurement framework is much needed for the state of Rajasthan that can provide the three major distribution utilities, and other power procurement suppliers and producers better views in respect of procuring the right quantum of power from various available markets sources under different time scenario to counter the demand.

Keywords: bilateral, fixed price, market, optimization, power purchase agreement (PPA), variable cost.

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A Novel Circuit for Battery Charging and Motor Control of Electric Vehicle

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Abstract - A new method of battery charging and motor controlling of an electric vehicle (EV) is disclosed in this paper. The entire system consists of two major divisions, those are, EV charger and motor controller, which determine the arrangement of the battery, acting as load or source, and the motor that comes into action during the driving mode. Both the charging and motor control can be performed by two separate highly efficient DC-DC converters named as TA converter which is a Buck-Boost by its nature. While charging a battery it is necessary to make the charging process effective. Microcontroller employs to control all parameter of EV in all conditions. When the motor draws over current, the invented circuit will be tripped through the microcontroller. The supply for the charger will be either from the renewable source or rectified output from the grid.

Keywords: Electric Vehicle, DC-DC Converter, PI & Hysteresis Controller

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Fault Classification for DG integrated Hybrid Power System using Wavelet Neural Network Approach

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Abstract - This paper presents a novel fault classification technique which uses Wavelet Neural Network (WNN) based approach. The data for the fault classification is obtained using MATLAB Simulation program for 30kv, 100km, Distributed generators (DG) integrated hybrid network. The two DGs connected in the proposed test system are Wind DG and Photovoltaic (PV) DG. The target of this work is to classify the fault correctly in the proposed test system. The data set collected from the point of common coupling (PCC) is with various conditions of fault with a distinct resistant level. It is clear from the results that the proposed method of classification of faults using WNN is able to correctly recognize the faults with very high accuracy in the simulated model of hybrid network.

Keywords: Photovoltaic (PV), Wavelet Neural Network (WNN), Distributed generators (DG), Point of Common Coupling (PCC)



Techno-economic planning framework of three phase unbalanced distribution system using multiple DG and Capacitor

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Abstract - Distribution systems across many parts of the globe have the problem of high system loss, high voltage unbalance and poor maintenance of system voltage profile. The major aim in allocating Distributed Generation (DG) and Shunt Capacitor is to reduce line loss, decrease voltage unbalance and to maintain the voltage profile in the practical unbalanced distribution system. In this paper DG and Shunt Capacitor are injected at identified weak bus and performance in terms of technical and economic parameters are analyzed. Voltage profile, system loss and voltage unbalance are the technical parameters selected for judging the system parameters by incorporation of the device. Net present value (NPV) is chosen as the financial indicator in this paper which is used to judge the economic performance. Instead of random allocation, DG and capacitors are injected at the selected weak bus to enhance the system performance. To validate the proposed methodology IEEE 13 bus unbalances network is chosen. The system performance is analyzed both for normal load and heavy load

condition. Open Distribution system simulator software (Open DSS) which is primarily used for electric power utility distribution network is used for three phase unbalanced power flow analysis of the network. Result of the work validates the effectiveness of this approach

Keywords: Electrical distribution system, Distributed Generation, Shunt capacitor, voltage unbalance, power loss reduction, Net Present Value

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VECTOR CONTROL OF 3-PHASE INDUCTION MOTOR

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Abstract – Induction motor is the key point when it comes to industrial applications and when an electrical drives system is to be designed we can represent induction motor in both mathematical and graphical models. In vector control strategy it's analysis can be done in either of the two methods i.e, symmetrical three-phase or unsymmetrical two-phase version. As the induction motor is nonlinear we need to control in a linearized manner as a DC motor. The objective is to develop a new model to make it suitable for the vector control method. This control principle suggests that the d-q areas unified approach for all kinds of induction motors. Space vector modulation is a very effective tool in the modeling of symmetrical induction motors. Electrical motors analyzed and described considering various types of reference frames and state-space analysis with different types of mathematical modeling are explained. The vector control strategy is implemented practically by digital signal processors (DSP). By using these discrete models, a mathematical model of induction motor is implemented to obtain high-efficiency drives and stability is also analyzed.

Keywords: Induction Motor, Variable Frequency Drive, Field-Oriented Control.

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Design of a PV based contactless Electric Vehicle Parking Premises

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Dr. Durga Prasanna Kar Dept.of Elecronics and Communication Engineering, ITER, SOA Deemed to be University Bhubaneswar, INDIA durgakar@soa.ac.in **Abstract** - The increasing natural gas price and huge climatic change have made the path for the development as well as commercialization of Hybrid Electric Vehicles (HEVs) and Electric Vehicles (EVs). Renewable energy resources have greater impact on environmental cleanliness because these are clear, safe, proficient, green, emission free. In EV technology for charging and usage of battery has faced many challenges till now. This paper projected a convenient method to charge the HEVs and EVs from a clean energy supply. For long term basis, a reliable and cost effective PV based wireless or contactless charging station prototype is being developed and designed. Here a charging station of 0.5 kW has been designed, simulated and corroborated by using MATLAB/Simulink software. More over obtained outcomes are illustrated.

Keywords: Contactless Charging Station, PV module, Boost Converter

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A COMPARATIVE STUDY BETWEEN PID AND FUZZY CONTROLLER

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Abstract – Students earlier were reluctant to adopt smart techniques for controlling for various reasons like stabilizing properties and characteristics of performance could not be verified, analytical comparison of its advantages/disadvantages over other conventional methods were not known and moreover the approaches were not widely used by working engineers. Whereas newer intelligent control technologies like fuzzy, neural and hybrid controls are being adopted now-a-days. Fuzzy logic is an effective controller tool where variable relationships can be represented in logical form. Fuzzy logic quantifies the linguistic variable terms so that they can be described as continuous values and allows mathematical equations to represent the system characteristics and responses. In process or manufacturing industries like PI or PID techniques of control, are widely adopted due to their simple method, their easy operation, and its tuning techniques are easy to understand.

Keywords: Fuzzy logic controller (FLC), classical Proportional-Integral-Derivative (PID) controller.

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Automated Phrase Mining Using POST: The Best Approach

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Abstract - Phrase mining is the way toward deriving aspects of expressions from the collection of texts. Several uses of phrase mining include information retrieval/extraction, taxonomy construction, and topic modeling. The existing strategy requires a prepared linguistic analyzer and has an unacceptable execution for new areas since it requires human specialists for labeling the phrase. The phrase generated in those systems for a given input text contains only a single word that may be often unambiguous to the user. The aim is to automate the phrase mining process and enhance its performance. The proposed method is a framework that requires minimal human labeling effort and only shallow linguistic analysis. A POS_tagger is used to extract the important words (nouns and noun phrases) from a text after which text ranking is applied. Then cosine similarity is used to identify the quality phrase from the text. Phrase quality can be estimated at two levels, once after POS_guided segmentation and then re-estimate the score at the end. Compared to the existing method, the proposed method has shown significant improvement in effectiveness and efficiency across different domains. This technique can be reached out to support any language up to a normal learning base (e.g. Wikipedia) of comparing vocabulary is accessible.

Keywords: Phrase Extraction, Key Word Extraction, Automatic Title Extraction, Phrase Ranking.

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Thermoeconomic and Exergetic Analysis of waste plastic oil fueled with diesel in compression ignition engine

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Abstract – Due to ever rising demand and inabundant storage of fossil fuels required for transport systems, attentions have been stared for budding potential and high enduring alternative fuels with affordable cost. With the purpose of attain higher performance and trim down environmental effects of the engine, it is indispensable to realize the mechanism to provide better enhancements in fuel economy and engine power by using renewable fuels in conventional diesel engine. The paper aims to carry out thermodynamic, exergetic and thermo economic study of a compression ignition engine operated while using various blend of wpo and its mixtures with pure diesel in order to access behavior of various performance parameters. The present work includes working with energy, exergy and cost rate energy production, fuel consumption and losses for whole system. In concluding part, the thermodynamically economic analysis was executed for equilibrium-condition engine control volume by applying and resolving energy, exergy and economic equilibrium. The results demonstrated the most excellent thermodynamic conditions, the engine attained when fueled with diesel. However, the most cost-effective working circumstances happened while fueled by 20% waste plastic oil by volume with diesel. **Keywords:** waste plastic oil, thermoeconomic analysis, exergy analysis.

An Chaotic Pseduo Inverse Polynomial Perceptron Network for Short Term Solar Power Prediction

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Abstract - High precision prediction of solar power generation is very much necessary with the continuous increase of grid connected solar electricity. The accurate power prediction is extremely important for the optimal scheduling and safe operation of the grid. In this paper, an Chaotic Water Cycle Algorithm (CWCA) based Pseudo Inverse Polynomial Perceptron Network (PIPPN) is proposed to accurately predict the solar power for different weather condition and for different time horizon. The random input layer weights of the PIPPN are optimized using the CWCA. Here, a sinusoidal chaotic map is applied to diversify the populations to improvise the performance of the basic PIPPN. The chaos in proposed Chaotic PIPPN (CPIPPN) helps to predict the future solar power very efficiently. The performance of the proposed CPIPPN model is verified through various performance measures. The dominance and diversity of the proposed CPIPPN method is verified against the basic Polynomial Perceptron Network (PPN) and PIPPN for 5 minute and 1 hour ahead time horizon.

Keywords: Polynomial Perceptron Network (PPN), Pseudo Inverse (PI), Chaotic, Water Cycle Algorithm (WCA), Solar Power Prediction.

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Optimal phase compensation of steam turbine governor for power system stabilization

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Abstract - The usage of governor control has been much emphasized in present deregulated market for optimal use of existing infrastructure. In this context the efficacy of existing steam turbine governor system needs much improvement for power system stabilization. In this work optimal phase compensation of steam turbine governor is proposed to damp electromechanical oscillations in power system for stabilizing power system. The compensation and steam turbine governor parameter are optimized by Salp Swarm Optimization (SSO) algorithm and has been compared with swarm and evolutionary algorithms like DE and PSO. The disturbance considered is step and frequent change in the mechanical input power to generator. Time and frequency response analysis are performed to justify the effect of proposed control action. It was observed that with optimal phase compensation in the turbine governor loop, the electromechanical oscillations can be damped much effectively without affecting voltage control loop.

Keywords: Power system stabilization, steam turbine governor, compensator, SSO algorithm, small signal stability.

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A comparative analysis between a single loop PI, double loop PI and Sliding Mode Control structure for a buck converter

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Abstract - This paper presents the performance of a buck converter using three different types of control structures namely PI Controller based single loop structure, PI Controller based double loop control structure and Sliding mode Controller based control structure. The major objective of this work is to focus on the control structure of the buck converter to provide robust and accurate performance irrespective of any variation, either in the input side or in the output side or else in any parametric variations like Inductances and Capacitances variations. Moreover the result shows the efficacy of the sliding mode control to be much more reliable and efficient as compared to other two control structures. The entire system is simulated and results are obtained using MATLAB/Simulink platform.

Keywords: Sliding Mode controller, single loop PI controller, double loop PI controller, parametric variations, buck converter.

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Design and analysis of Multi-stage TDF/(1+TI) controller for Load-frequency control of A.C Multi-Islanded Microgrid system using Modified Sine cosine algorithm

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Abstract - This research work presenting an innovative approach to design AC off-grid Multi Microgrid system and proposing an analytical aspect of load frequency control using the Modified sine cosine algorithm based Multi-stage tilt TDF/(1+TI) controller. A Multi Micro-Grid system unites distinctive advantages identical to RES (Renewable energy sources), photovoltaic system model, wind turbine model, etc. The asymmetrical property of RES causes a contradiction between the load ultimatum and the source of the Multi Microgrid system. This asymmetrical property of renewable energy sources affects the system frequency adversely. So, nowadays there is a major challenge to stabilize the frequency oscillations in a Multi Microgrid system. Despite all these complications, this paper proposes an approach to stabilize the system frequency by a Modified sine cosine algorithm (MSCA) tuned Multi-stage tilt TDF/(1+TI) controller. To enhance the modern power system capability to meet the recent nonlinear load demand, Microgrid plays an important component to fulfill the critical loading effectively. To establish the efficacy of the proposed Multi-stage tilt TDF/(1+TI) controller, it has been analyzed by the dynamic responses of the classical PI & PID controller. The effectiveness of the MCSA has been validated by the comparative analysis of responses over the most popular responses obtained by the GA & PSO method.

Keywords: Microgrid, Load Frequency Control, Photovoltaic system, Wind Turbine Model, tilt TDF/(1+TI) controller.

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Grid tied PV-DSTATCOM system using modified 01-norm Least Mean Kurtosis Algorithm

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Bidyadhar Subudhi School of Electrical sciences IIT, GOA Ponda,India bidyadharnitrkl@gmail.com Abstract - This paper presents a grid-tied renewable photovoltaic (PV) Distributed static compensator (DSTATCOM) system using a modified 10 norm Least Mean Kurtosis (LMK) algorithm. The proposed system meets the power demand of the load side during day time and maintains the power quality of the system as per the IEEE standard. Excess power during this time is transferred to the grid. During night time it improves the power quality of the system. The voltage at the DC point is kept up at its specified value using Perturb and Observe (P&O) based MPPT algorithm. The proposed algorithm ameliorate the performance of the system during the transient condition and reduces steady state error.

Keywords: PV, DSTATCOM, LMK, P&O

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Isolated household energy storage improvement using ultracapacitor

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Abstract – This paper dealt with the off-grid household energy system improvement by developing a control based on battery storage system embedded with an ultracapacitor. The hybrid energy system is constituted with photo-voltaic arrays, battery, ultracapacitor, and active load. Non-conventional sources of energy such as photo-voltaic generation is characterized by high variability of parameters due to their dependency to the weather and variable active demand power (load). Partial charge or discharge cycles can happen which has a detrimental effect on energy storage system life span and rating. The ultracapacitor based storage energy system provides the greatest power demanded to keep the reliability and the good level of energy quality on the short time and log-time duration. A high of energy supply can be obtained in an isolated household system generation. Optimization model was developed to combine the battery coupled with an ultracapacitor.

Keywords: load, energy storage system, photo-voltaic, ultracapacitor, state of charge, optimal-control.

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A robust Multi Verse Optimized fuzzy aided tilt Controller for AGC of hybrid Power System

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Abstract -The research work employs a robust fuzzy aided tilt controller as secondary frequency control loop to obtain stability in frequency and active power of a hybrid power network under different loadings. A novel multi verse optimization (MVO) technique has been proposed to choose best optimal parameters of suggested fuzzy tilt controller. The automation of power generation irrespective of demand is called automatic generation control (AGC) and has great impact over system stability. The study goes through different comparative studies such as technique comparison and controller comparison to defend superiority of proposed MVO algorithm and suggested tilt fuzzy controller. The research study on AGC has been carried in MATLAB smulink environment. An advanced fitness function called integral of time multiplied absolute error (ITAE) has been suggested to develop improved performance of the system under different disturbances. It has been concluded that projected MVO oriented fuzzy tilt controller shows outstanding performance for governing active power generation of the proposed hybrid system.

Keywords: Hybrid Power Network; Automatic Generation Control (AGC); Multi Verse Optimizer (MVO); Fuzzy Tilt Controller; Objective function; Area Control Error (ACE)

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Assessment of Crop Damage by Wild Animals and Renewable Energy Interventions -A Case Study from Coastal Odisha, India

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Abstract – Wild animals cause special challenge to the farmers across the globe. Forest animals such as elephant, wild boar and deer etc. migrate in to the nearby agricultural fields in search of food and caused a huge damage to the crops not only by eating but also by trampling the crops by foot, in some areas crop damage to the extent of 50-60% and sometimes 100% crop is damaged by wild animals. This paper presents the assessment of crop damage caused by wild animals in eastern coastal region of Odisha and discussed about the feasibility and economic aspects of installation of an acoustic equipment to keep the wild animals away from the agricultural fields. It was found that by installing only one acoustic equipment in crop land, a financial benefit of INR 42,700 per annum can be obtained.

Keywords: Wild life, crop damage, renewable energy

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PIλ-PDμ Controller for Suppression of Limit Cycle in Fractional-Order Time Delay System with Nonlinearities

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Abstract – This paper examines the presence of a limit cycle in a fractional-order time delay plant with separable static and dynamic nonlinearities. A comparison study is performed between 2-DOF integer and fractional-order PI-PD controllers for suppression in amplitude and frequency of this limit cycle oscillations. Due to computational complexity, constrained optimization techniques such as Particle Swarm Optimization (PSO), Ant Lion Optimization (ALO), and Teaching Learning Based Optimization (TLBO) are used to estimate the parametric values of the PI-PD controllers. The parameters of the PI-PD controllers obtained from the applied computational algorithms are compared based upon the Integral Square Error (ISE) minimization.

Keywords: Fractional-order nonlinear system, time-delay system, PI-PD controller, limit cycle, optimization technique.

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Thermally evaporated GaSb thinfilm grown from TVDS method

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Abstract - In this work, a new crystal growth technique has been used i.e. Thermo Vertical Direction Solidification (TVDS) which is designed and developed in our laboratory to grow undoped GaSb ingot from high purity Ga and Sb host materials. The grown ingot was then put inside thermal evaporation unit to deposit a film of GaSb on quartz substrate. The structural study of the grown GaSb thin film from the XRD characterization revealed that grown film was polycrystalline in nature. The electrical properties like carrier concentration, Hall-coefficient, mobility, resistivity etc of the film were studied by performing Hall-Effect measurements by Van Der Pauw method. Hall effect study revealed that lesser the source to substrate distance (d), higher the Thickness (T), proportionally higher the majority charge carrier concentration (np)and the resistivity (), whereas proportionally lower the mobility (p), proportionally and the tendency of shifting the type of material (i.e. from P type to N type) i.e.the Hall-coefficient (RH).

Keywords: Thermo vertical directional solidification, Thermal evaporation, GaSb, Thin film, Hall Effect.

CatBoost Ensemble Approach for Diabetes Risk Prediction at Early Stages

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Abstract - Diabetes prediction at the early stage is an important issue in the healthcare field and helps an individual to avoid dangerous situations by initiating treatment. For the prediction of diabetes at the early stages, many techniques in the area of machine learning and ensemble learning have been used. In this paper, we propose an ensemble technique CatBoost which is a Gradient Boosting Decision Tree (GBDT) for diabetes prediction at early stages. The experiment is conducted by comparing the performance of CatBoost with other machine learning methods such as K-Nearest neighbor, Multilayer perceptron, Logistic regression, Gaussian Naive Bayes, and Stochastic gradient descent and the result is evaluated using accuracy, precision, recall, f1-score, and AUC-ROC curve. Experimentation is conducted using the dataset available in the UCI machine learning repository named "Early stage diabetes risk prediction". The results prove that CatBoost outperforms compared to the other machine learning methods.

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Assessment of ambient air quality in an industrial cluster as a tool for environmental health

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Abstract – The seriousness of air pollution has a great threat to the environment as well as to the human health. The rapid industrialization &urbanizations cause's different kinds of negative impacts to the environment which needs to be addressed with top priority. To reduce the negative impacts, it is very much necessary to measure the concentrations of air pollutants in a timely and scientific manner. An analysis has been undertaken for different air pollutants like PM10, PM2.5, SO2 and NO2 for a period of three years with respect to various seasons starting from Mar'2013 to Feb'2016. From the study it has been revealed that the levels of air pollution is worsening year by year. It is happened due to massive transportation of raw materials and finished products from industries and mining activities near to the study area. During the study period 2015-16, the maximum concentrations of PM10 observed in winter season at ML-5, ML-3 i.e. 216.5 μ g/m3, 212.3 μ g/m3 and PM2.5 at ML-3, ML-2 i.e. 111.8 μ g/m3, 100.4 μ g/m3followed by summer season which exceeding the standard norms. It is also observed from the study that during all three seasons and years the concentrations of SO2 & NO2 were not exceeding the prescribed limit and found well within the norms. This finding can provide a theoretical basis and basic status of air quality to control over the future air pollution and making policy as control measures.

Keywords: Ambient air quality; Air pollutants; PM10; PM2.5; SO2; NO2.

