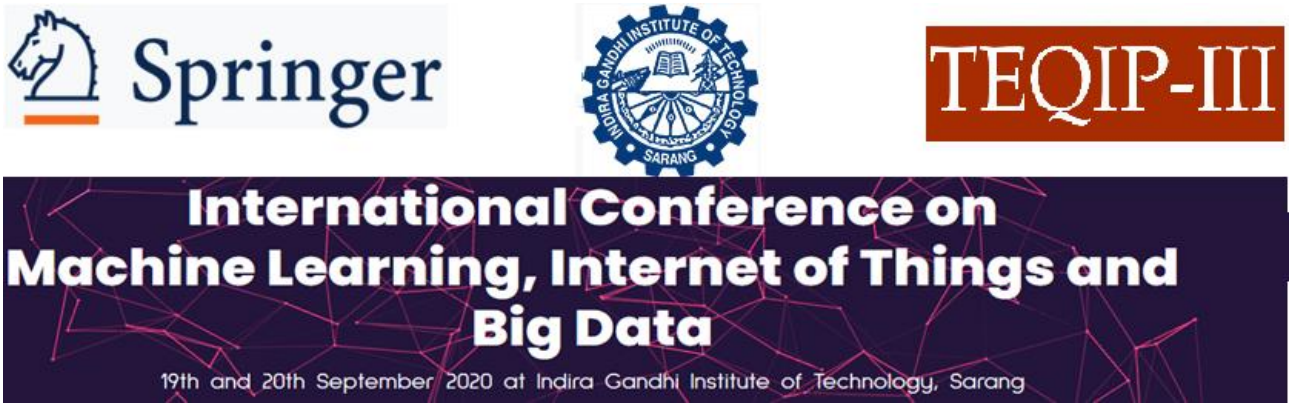
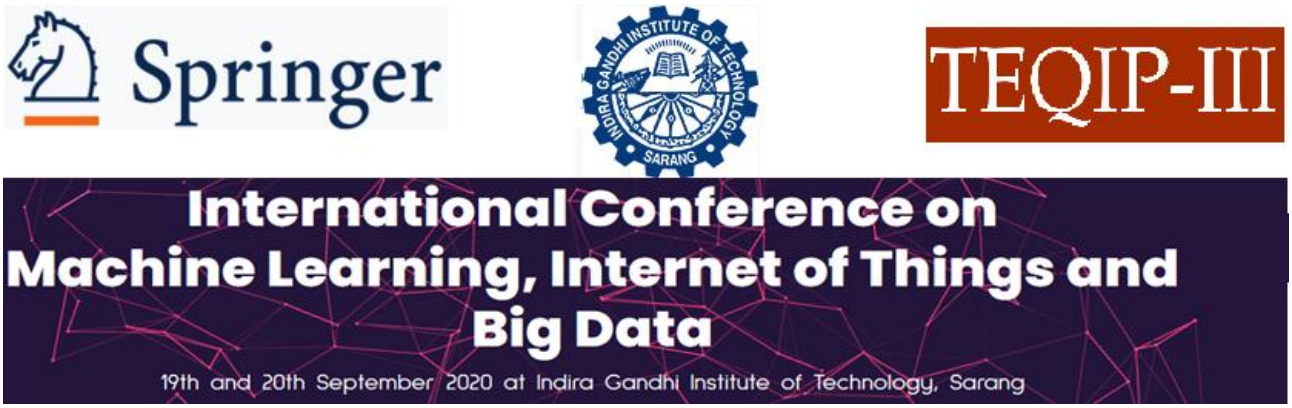


September 19-20, 2020

Edited by

Siba K Udgata, Srinivas Sethi, Satish Srirama



SOUVENIR

of the

International Conference

On

Machine Learning, Internet of Things and Big Data (ICMIB)

September 19-20, 2020

Organized by Department of Computer Science Engineering & Applications

Indira Gandhi Institute of Technology, Sarang, Odisha, India

Message from the Director, IGIT Sarang

It is a matter of pleasure and pride that the Department of Computer Science Engineering & Applications of our Institute is organizing a International Conference on Machine Learning, Internet of Things and Big Data (ICMIB)-2020.

Computing is being transformed to a model consisting of services that are commoditized and delivered in a manner similar to utilities such as water, electricity, gas, telephony, etc. In such a model, users access services based on their requirements without regard to where the services are hosted. Several computing paradigms with the help of Machine Learning, Internet of Things and Big Data have promised to deliver this utility computing vision. These cutting edge research area have emerged as one of the buzzwords in the IT industry and turned the vision of "computing utilities" into a reality.

I hope, the Conference shall provide to the academicians, researchers and engineers from academia and industries an ideal platform for exchange of ideas and views in this fast developing field of knowledge.

On behalf of the host Institute, we are indebted to Prof. L. M. Patnaik, General Chair of the Conference, for his valuable advice. The Program Chair Prof. S K Udgata, and Program Co-Chair Prof. Satish Srirama have done an excellent job during these different activities of the conference. The Organizing Chair Prof. S N Mishra and Organising Chair and Convenor Prof. Srinivas Sethi, and TEQIP Coordinator Prof. Rabindra K Behera, have extended all possible support for the smooth conduct of the Conference. Our sincere thanks to all of them.

I wish the Conference all success.

Prof. Satyabrata Mohanto,
DIRECTOR, IGIT SARANG
IGIT, Sarang.

NATIONAL INSTITUTE OF ADVANCED STUDIES
Indian Institute of Science Campus, Bangalore – 560012, INDIA.

Prof. L M Patnaik, FIEEE,FTWAS,FNA,FASc,FNASc,FNAE,FCSI
INSA Honorary Scientist and Adjunct Professor,NIAS&
Honorary Professor
Department of Electronic Systems Engineering
Indian Institute of Science,Bengaluru
Former Vice Chancellor
Defence Institute of Advanced Technology, Pune&
Former Professor, IISc,Bengaluru

17 September 2020

Message from the General Chair, ICMIB 2020

It is gratifying to note that the Indira Gandhi Institute of Technology(IGIT), Sarang, Odisha, is organizing an International Conference on Machine Learning, Internet of Things and Big Data on 19 and 20 September 2020. Two Pre-Conference Tutorials are also being organized on 18 September covering topics of current interest, Wifi and Fog Computing. The registration for the Tutorials has been beyond our expectation, with 507 registrants as on this date. For the Conference, out of 120 submitted papers, 49 papers have been accepted. Six keynote talks have been organized to be delivered by leading researchers drawn from different countries.

As General Chair of the Conference, it has been my immense pleasure to get involved in this Conference.The management of the Institute, particularly the Director Prof.Satyabrata Mohanta, TEQIP Coordinator Prof.Rabindra K Behera, Organising Chair and Convenor Prof.Srinivas Sethi, and Organizing Chair Prof.S N Mishra have extended all possible support for the smooth conduct of the Conference. My sincere appreciation to all of them.

The Program Chair Prof.S K Udgata, and Program Co-Chair Prof.Satish Srirama have done an excellent job of putting together an interesting technical programme through constant interaction with Organising Chair and Convenor Prof.Srinivas Sethi who has been patiently handling all logistics issues. My profuse thanks to all the three key functionaries of the Conference.

I would like to place on record my thanks to the keynote speakers, tutorial speakers, reviewers, session chairs, authors, technical program committee members, various Chairs to handle finance, accommodation and publicity and above all to several volunteers. Springer's acceptance to publish the Proceedings deserves special mention.

The pandemic conspired against our strong desire to hold the Conference in a physical mode so that we could have enjoyed the pleasant interactions in the lovely campus of IGIT. Hope all the delegates attending the virtual sessions will enjoy the presentations.

Stay safe and healthy. Take care.

Best wishes,

L M Patnaik
General Chair
www.lmpatnaik.in

Message from the Technical Program Chairs, ICMIB 2020

It is really a pleasure to pen down a message on the eve of the International Conference on Machine learning, Internet of Things and Big data (ICMIB) 2020 being organized by the prestigious Indira Gandhi Institute of Technology, Sarang, Odisha, India, during 19th and 20th September 2020. This conference was originally planned to be held during 11th to 13th July 2020 but unfortunate pandemic forced us to postpone it. The pandemic threw a lot of challenges at us and no words of appreciation is enough for the organizing committee who could still pull it off successfully.

The conference draws some excellent technical keynote talks and papers. Two tutorial talks by Prof. D. Manjunath, IIT, Bombay and Prof. Nitin Auluck, IIT, Ropar are planned on 18th September 2020. The overwhelming response for the tutorial talks is worth mentioning. We all are looking forward to these talks. Apart from the tutorial sessions, six keynote talks by Prof. Raj Kumar Buyya (University of Melbourne, Australia), Prof. Md. Atiqur Rahman Ahad (University of Osaka, Japan), Prof. Yu-dong Zhang (University of Leicester, UK), Prof. Soodkhet Pojpapai (Suranaree University of Technology, Thailand), Prof. Siba K Udgata (University of Hyderabad, India), and Mr. Aninda Bose (Springer Nature Publishing house) are planned. We are grateful to all the speakers for accepting our invitation and sparing their time to deliver the talks. We all are looking forward to these talks.

For the Conference, in spite of the adverse situation and lockdown throughout the world, we received 120 full paper submissions and we accepted only 49 papers. The contributing authors are from different parts of the globe that includes United Kingdom, South Africa, China, Bangladesh, Pakistan and India. All the papers are reviewed by at least three independent reviewers and in some cases by as many as six reviewers. All the papers are also checked for plagiarism and similarity score. It was really a tough job for us to select the best papers out of so many good papers for presentation in the conference. We had to do this unpleasant task, keeping the Springer guidelines and approval conditions in view. We take this opportunity to thank all the authors for their excellent work and contributions and also the reviewers who have done an excellent job.

On behalf of the technical committee, we are indebted to Prof. L. M. Patnaik, General Chair of the Conference, for his timely and valuable advice. We cannot imagine the conference without his active support at all the crossroads of decision-making process. The management of the host institute, particularly the Director Prof. Satyabrata Mohanta, TEQIP Coordinator Prof. Rabindra K Behera, Organising Chair and Convenor Prof. Srinivas Sethi, and Organizing Chair Prof. S N Mishra have extended all possible support for the smooth conduct of the Conference. Our sincere thanks to all of them.

We would also like to place on record our thanks to all the keynote speakers, tutorial speakers, reviewers, session chairs, authors, technical program committee members, various Chairs to handle finance, accommodation and publicity and above all to several volunteers.

We are also thankful to Springer Nature publication house for agreeing to publish the accepted papers in their Lecture Notes in Networks and Systems (LNNS) series.

Although we have missed the opportunity to meet and enjoy the conference physically, the organizing committee made all arrangements to make the conference enjoyable and a good learning experience for everybody. Hope all the delegates attending the virtual sessions will enjoy the presentations and also use the opportunity to exchange their ideas.

Please take care of yourself, your loved ones and stay safe.

Best wishes,
Prof. Siba K Udgata and Prof. Satish N Srirama
Technical Committee Chair

Message From The Organizing Chair, ICMIB-2020

Global industry needs a new generation of tools for writing software, backed by innovative programming models. New tools should be natively parallel and allow for optimization of code at run-time across the multiple dimensions of performance, reliability, throughput, latency and energy consumption while presenting the appropriate level of abstraction to developers. Innovative business models may be needed in order to make the development of new generation tools economically viable. High-performance computing meets cyber-physical systems. Applications in automation, aerospace, automotive and manufacturing require computing power which was typical of supercomputers a few years ago, but with constraints on size, power consumption and guaranteed response time which are typical of the embedded applications. This is a market opportunity to build upon the existing strength of Indian industry to develop a family of innovative and scalable technologies, powering computing devices ranging from the embedded micro-server to the large data centre. Internet of Everything is developing fast.

Computing applications merging automation, real-time processing of big data, autonomous behavior and very low power consumption are changing the physical world we live in, and creating new areas of application like e.g. smart cities, smart homes, etc. Data locality is becoming an issue, driving the development of multi-level applications which see processing and data shared between local/mobile devices and cloud-based servers.

In these scenarios Machine learning and IoT have big application in the context era. Indian industry has the know-how and innovation capacity to be a leader in this area, where issues like interoperable interfaces, privacy and data sharing rules will play a very important role in the development of the market.

On behalf of the Organising committee, we are indebted to Prof. L. M. Patnaik, General Chair of the Conference, for his valuable guidance. The Program Chair Prof. S K Udgata, and Program Co-Chair Prof. Satish Srirama have done an excellent job with the Organising Chair and Convenor Prof. Srinivas Sethi, during these different activities of the conference. and TEQIP Coordinator Prof. Rabindra K Behera, have extended all possible support for the smooth conduct of the Conference. Our sincere thanks to all of them.

Prof. S.N.Mishra
Head, Department of Computer Sc, Engg. & Applications,
IGIT,Sarang, and Organising Chair, ICMIB-2020

Message from The Organizing Chair & Convenor ICMIB-2020

On behalf of the Organizing Committee of ICMIB-2020, it gives me pleasure to welcome all the delegates to IGIT, Sarang. The event will be held from 18th to 20th September 2020 at IGIT Sarang. The event is organized by Department of Computer Science Engineering & Applications, IGIT Sarang & technically supported by TEQIP-III. Apart from this sustenance, the Springer Publisher supporting for publication of articles.

Two Pre-Conference Tutorials are also being organized on 18 September 2020, covering topics of recent research interest, Wifi and Fog Computing. Six keynote talks have been organized to be delivered by leading researchers drawn from different countries. The registration for the Tutorials and Conference has been beyond our expectation, with 440 registrants as on this date. We have received 120 papers. Over multiple reviewers worldwide volunteered to evaluate papers of which finally only 49 papers have been selected for presentation and publications in the Springer through the event. Throughout these events, we hope to create an opportunity for researchers to have a get together and more importantly, to welcome new peers in diverse areas of expertise.

The Program Chair Prof. Siba K Udgata, and Program Co-Chair Prof.Satish Srirama have done an excellent job of putting together an interesting technical programme. I would further like to take the opportunity to express my gratitude to all the reviewers who have worked hard to finish reviews on time and hence ensured the success of this event. I would like to thank all authors, Keynote speakers, Tutorial Speaker, session chairpersons, reviewers, technical program committee members, various Chairs to handle finance, accommodation, and publicity and above all to several volunteers delegates for their inordinate support and contribution towards this event. Last but not least are the Organizing Committee, colleagues, friends and our students, who have been working hard to make this conference a grand success. Without their unfailing cooperation, hard work and dedication, this event would simply not be possible The management of the Institute, particularly the Director Prof.Satyabrata Mohanta, Organizing Chair Prof.S N Mishra TEQIP Coordinator Prof. Rabindra K Behera, and have extended all possible support for the smooth conduct of the Conference. My sincere appreciation to all of them.

Hope all the delegates attending the online sessions will enjoy the presentations.

Stay safe and healthy. Take care.

Dr. Srinivas sethi,
General Chair and Convenor, ICMIB-2020, IGIT, Sarang.

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Prof. Rabindra Behera, IGIT Sarang
Prof. Ashima Rout, IGIT Sarang

AGENDA OF ICMIB-2020

9:30 AM to 9:40 AM	Arrival of the Guests Inviting the Guest to the Dias (Few guests will join online) Presentation of Flower bouquet Lamp lighting, Saraswati Vandana Request the President to preside over the meeting
9:40 AM to 9:45 AM	Welcome address by Organising Chair Prof. S. N. Mishra, IGIT Sarang, India
9:45 AM to 9:50 AM	Address by Technical Programme Chair Prof. Siba K. Udgata, University of Hyderabad, India
9:50 AM to 9:55 AM	Address by TEQ IP Coordinator Prof. Rabindra Ku. Behera
9:55 AM to 10:05 AM	Address by General Chair Prof. Lalit Mohan Patnaik, National Institute of Advanced Studies and Indian Institute of Science, Bangalore
10:05 AM to 10:15 AM	Address by Chief Guest
10:15 AM to 10:20 AM	Release of Conference Souvenir
10:20 AM to 10:25 AM	Address by President Prof. Satyabrata Mohanta, DIRECTOR, IGIT SARANG
10:25 AM to 10:30 AM	Vote of Thanks by Organising Chair and Convenor Prof. Srinivas Sethi, IGIT Sarang, India
10:30 AM to 10:45 AM	Tea Break

Keynote Talks	
10:45 AM -11:45 AM	*#Keynote 1* Click here to open the Meeting link YouTube Live link Prof. Rajkumar Buyya Professor and Director of the Cloud Computing and Distributed Systems (CLOUDS) Laboratory at the University of Melbourne, Australia. Title: New Frontiers in Cloud and Edge Computing for Big Data & Internet-of-Things Applications Chairperson: Prof. Lalit Mohan Patnaik, National Institute of Advanced Studies

	and Indian Institute of Science, Bangalore
11:45 AM – 12:00 Noon	Break
12:00 am-1:00 pm	*#Keynote 2* Click here to open the Meeting link YouTube Live link Prof. Md. Atiqur Rahman Ahad Professor of University of Dhaka, Bangladesh and University of Osaka, Japan Title: Activity Recognition: Healthcare Prospective & Others Chairperson: Prof. Siba K. Udgata, University of Hyderabad, India
1:00 pm -2:00 pm	Lunch Break
Technical Paper Presentation: (Session-1,2) Date: 19-09-2020 Time: 2:00 PM to 3:30PM	
Technical Paper Presentation: (Session-3,4) Date: 19-09-2020 Time: 3:45 PM to 5:15 PM	

September 20, 2020 (Day 2)	
Keynote Talks Click here to open the Meeting link Click here to open YouTube Live link	
10:00 AM - 10:45 AM	*#Keynote 3* Prof. Siba K Udgata AI Lab,School of Computer and Information Science University of Hyderabad, India Title: Sensing without Sensors: A Deep Learning Model for Human Activity Recognition using Wireless Signals Chairperson: Prof. (Mrs.) Ashima Rout, IGIT Sarang, INDIA
10:45 AM - 11:30 AM	*#Keynote 4* Dr. Soodkhet Pojprapai School of Ceramic Engineering, Institute of Engineering, Suranaree University of Technology, Thailand Title: Smart Insoles: from Research to Start-up Chairperson: Prof. Sarojananda Mishra, IGIT Sarang, INDIA
11:30 AM -11:45 Noon	Tea break

11:45 AM -12:30 PM	*#Keynote 5* Prof. Yu-Dong Zhang Professor Department of Informatics, University of Leicester, United Kingdom Title: Deep learning and chest CT for COVID-19 detection Chairperson: Prof. Srinivas Sethi, IGIT Sarang, INDIA
12:30 AM-01:15 AM	*#Keynote 6* Mr. Aninda Bose Senior Editor Research Publishing – Books (Interdisciplinary Applied Sciences) Springer Nature, New Delhi, India Title: Elements of Book Publishing Chairperson: Prof. Sunil Kumar Tripathy, IGIT Sarang, INDIA
1:15 PM - 2:00 PM	Lunch Break
Technical Paper Presentation: (Session-5,6) Date: 20-09-2020 Time: 2:00 PM to 3:30PM	
Technical Paper Presentation: (Session-7,8) Date: 20-09-2020 Time: 2:00 PM to 3:30PM	
Valedictory Function Time: 5:00 PM to 5:15 PM Session Link: Meeting link	

Pre-Conference Tutorials-1

Tutorial-1 (Half Day) Time: 10:30 AM

Title: Wifi: Looking back and looking forward

Dr. D. Manjunath
Professor,
Deptt of Electrical Engineering,
Indian Institute of Technology,
Bombay

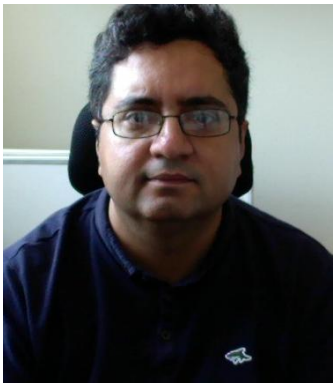
Abstract: The ubiquitous IEEE 802.11 family of protocols has its genesis in the random access protocols of the early days of computer networks. The first protocols allowed for a peak bandwidth of 2Mbps. They have come a long way since then and Gbps rates are on the horizon. In the process, we also have an alphabet soup of variations. In this tutorial, we will trace the history of this protocol and understand the engineering choices that were made in designing them. We will also discuss the state of the art and the emerging standards and also see how they fit into the wireless world of 4G, 5G and beyond.

Brief Bio:

D.Manjunath received his BE from Mysore University, MS from IIT Madras and PhD from Rensselaer Polytechnic Institute in 1986, 1989 and 1993 respectively. He has been with the Electrical Engineering Department of IIT Bombay since July 1998 where he is now an Institute Chair Professor. He has previously worked in the Corporate R & D Center of General Electric in Scehenectady NY (1990), Computer and Information Sciences Department of the University of Delaware (1992-93), Computer Science Department, University of Toronto (1993-94) and the

Department of Electrical Engineering of IIT Kanpur (1994-98). At IIT Bombay, he was Head of the Computer Centre during 2011-15. His research interests are in the general areas of communication networks and performance analysis. His recent research has concentrated on random networks with applications in wireless and sensor networks, network pricing and queue control. He is a recipient of the best paper award at ACM SIGMETRICS 2010. He is an associate editor of IEEE Transactions on Networking, Queueing Systems: Theory and Applications, and of Sadhana: The Proceedings of the Indian Academy of Sciences. He was TPC chair for COMSNETS 2011 and NCC 2015 and general chair for ACM MobiHoc 2013 and COMSNETS 2015. He is a coauthor of two textbooks, Communication Networking: An Analytical Approach (May 2004) and Wireless Networking (Apr 2008), both of which are published by Morgan-Kaufman Publishers.

Pre-Conference Tutorials-2



Tutorial-2 (Half Day) Time: 2:30 PM
Title: Recent trends in fog computing

Dr. Nitin Auluck
Associate Professor
Department of Computer Science & Engineering
Indian Institute of Technology Ropar

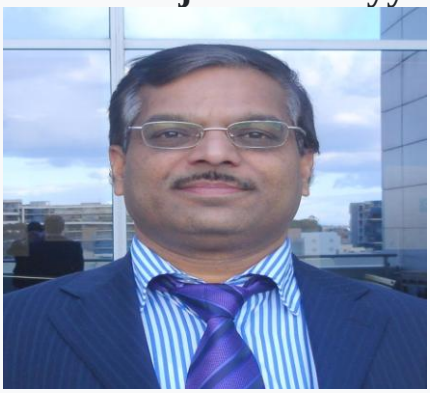
Abstract: Fog computing consists of modest capability fog nodes located close to users/data generation sources. These nodes are ideal for executing small interactive tasks with low latency requirements. Tasks that are larger and more latency tolerant may be executed at the cloud data center. In this talk, we discuss RT-SANE (Real-Time Security Aware scheduling on the Network Edge), a scheduling algorithm for real-time tasks on fog-cloud systems. RT-SANE supports both batch and interactive applications, taking account of their deadline and security constraints. RT-SANE chooses between a micro data center (in proximity to a user) and a cloud data center by taking account of network delay and security tags. We also discuss a fog computing based over-the-air (OTA) update algorithm for smart vehicles. We propose a mobility management algorithm that takes into account the mobility of smart vehicles. In order to reduce the number of handovers, an ILP formulation has also been proposed. Finally, we discuss a framework for repelling wild animals in the agricultural fields using fog computing.

Brief Bio:

Nitin Auluck received the B. E. degree from Gulbarga University in 1998 and PhD degree from the University of Cincinnati, USA in 2004. He was an assistant professor in the Department of Computer Science, Quincy University, Quincy, USA from 2004 to 2010. He has been with the CSE Department at IIT Ropar since 2010, where he is currently an Associate Professor. His research interests include fog computing, real-time systems, and parallel and distributed systems.

Keynote Speaker-1

Prof. Rajkumar Buyya



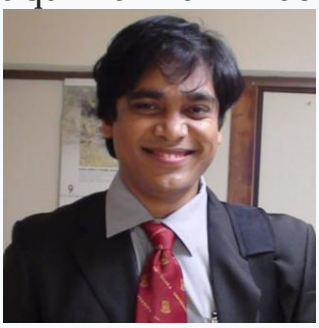
Professor and Director of the Cloud Computing and Distributed Systems (CLOUDS) Laboratory at the University of Melbourne, Australia.

Brief Bio:

Dr. Rajkumar Buyya is a Redmond Barry Distinguished Professor and Director of the Cloud Computing and Distributed Systems (CLOUDS) Laboratory at the University of Melbourne, Australia. He is also serving as the founding CEO of Manjrasoft, a spin-off company of the University, commercializing its innovations in Cloud Computing. He served as a Future Fellow of the Australian Research Council during 2012-2016. He serving/served as Honorary/Visiting Professor for several elite Universities including Imperial College London (UK), University of Birmingham (UK), University of Hyderabad (India), and Tsinghua University (China). He has authored over 725 publications and seven text books including "Mastering Cloud Computing" published by McGraw Hill, China Machine Press, and Morgan Kaufmann for Indian, Chinese and international markets respectively. He also edited several books including "Cloud Computing: Principles and Paradigms" (Wiley Press, USA, Feb 2011). He is one of the highly cited authors in computer science and software engineering worldwide (h-index=137, g-index=304, 99,600+ citations). "A Scientometric Analysis of Cloud Computing Literature" by German scientists ranked Dr. Buyya as the World's Top-Cited (#1) Author and the World's Most-Productive (#1) Author in Cloud Computing. Dr. Buyya is recognized as a "Web of Science Highly Cited Researcher" for four consecutive years since 2016, IEEE Fellow, Scopus Researcher of the Year 2017 with Excellence in Innovative Research Award by Elsevier, and the "Best of the World", in Computing Systems field, by The Australian 2019 Research Review.

Keynote Speaker-2

Prof. Md. Atiqur Rahman Ahad



Professor of University of Dhaka, Bangladesh and
University of Osaka, Japan

Brief Bio

Md Atiqur Rahman Ahad, Senior Member, IEEE, is a Professor of Electrical & Electronic Engineering, University of Dhaka (DU). He is currently working as specially appointed Associate Professor at Osaka University, Japan. He works on computer vision, imaging, IoT, healthcare, etc. He did B.Sc.(honors) [1st class 1st position] & Masters [1st class 2nd position] from the Dept. of Applied Physics & Electronics, DU; Masters from the School of Computer Science & Engineering, University of New South Wales; and PhD from the Faculty of Engineering, Kyushu Institute of Technology [KIT]. He was awarded JSPS Postdoctoral Fellowship, prestigious UGC Award 2016, and a no. of awards/scholarships. He was a Visiting Researcher at KIT. He published 3 books (available in Springer), few Edited books, & a few book chapters. He has published 140+ journals and conference papers. He has received 20+ international awards in various conference/journal/society. Ahad was invited as keynote/invited speakers about 60 times in different conferences/universities. He has established several international MOU/collaborations (e.g., Clemson University, University of Hyogo, RCCIIT, Fukuoka Women University, Kyushu University, etc.).

Keynote Speaker-3

Prof. Yu-Dong Zhang

Professor
Department of Informatics,
University of Leicester,
United Kingdom

Brief Bio:

Prof. Yu-Dong Zhang received his BE in Information Sciences in 2004, and MPhil in Communication and Information Engineering in 2007, from Nanjing University of Aeronautics and Astronautics. He received the PhD degree in Signal and Information Processing from Southeast University in 2010. He worked as a postdoc from 2010 to 2012 with Columbia University, USA; and as an assistant research scientist from 2012 to 2013 with Research Foundation of Mental Hygiene (RFMH), USA. He served as a Full Professor from 2013 to 2017 with Nanjing Normal University, where he was the director and founder of Advanced Medical Image Processing Group in NJNU. Now he serves as Professor with Department of Informatics, University of Leicester, UK. His research interests include deep learning and medical image analysis. Prof. Zhang is the Fellow of IET (FIET), and Senior Members of IEEE and ACM. He was included in “Most Cited Chinese researchers (Computer Science)” by Elsevier from 2014 to 2018. He was the 2019 recipient of “Highly Cited Researcher” by Web of Science. He won “Emerald Citation of Excellence 2017” and “MDPI Top 10 Most Cited Papers 2015”. He was included in "Top Scientist" in Guide2Research. He is the author of over 200 peer-reviewed articles, including 16 “ESI Highly Cited Papers”, and 2 “ESI Hot Papers”. His citation reached 12318 in Google Scholar, and 7270 in Web of Science. He has conducted many successful industrial projects and academic grants from NSFC, NIH, Royal Society, EPSRC, MRC, and British Council.

Keynote Speaker-4

Prof. Soodkhet Pojprapai

School of Ceramic Engineering,
Institute of Engineering,
Suranaree University of Technology, Thailand

Brief Bio:

Dr. Soodkhet is presently working as an Associate Professor at Suranaree University of Technology, Thailand. He is presently head of Data Storage Science and Technology Research Unit and head of Smart Innovative Energy Research Unit, Suranaree University of Technology, Thailand He has done is B.Engg in Industrial Engineering, M.Engg is Nuclear Technology and PhD in Material Science Engineering from University of New South Wales, Australia. He is the recipient of many awards that include Bernd Rode 2017 (Senior Researcher), ASEA-UNINET, Austria, the Graduate Excellence in Materials Science award, and few others. His research interests include wearable sensor applications, Characterization of piezoelectric, and Piezoelectric Energy harvesting He has worked in many funded research projects and a few of them are Thailand MED TECH Excellence Fund, Technology and Innovation-based Enterprise Development Fund, UK Newton Fund: the Royal Academy of Engineering and Office for Higher Education Coordination's Industry Academia Partnership Programme, Thai Research Fund among many others. He has published extensively (around 100) in many reputed international journals and conferences.

Keynote Speaker-5

Prof. Siba K. Udgata

Professor,
School of Computer and Information Sciences,
University of Hyderabad, India

Brif Bio:

Dr. Siba Kumar Udgata is presently serving as a Professor of Computer Science at the AI Lab, School of Computer and information Sciences at University of Hyderabad. He also served as Director at Center for Modeling for Simulation and Design (CMSD), University of Hyderabad. He was a research fellow at International Institute for Software Technology, United Nations University (UNU/IIST), Macau. His main research interests include Wireless communication, IoT and Sensor Networks and Intelligent Algorithms. He has authored more than 100 research papers published in reputed international journals and conferences. He has worked as principal investigator in many Government of India (and other funding agencies) funded research projects mainly for the development of wireless sensor network applications, network security related applications and application of swarm intelligence techniques in the cognitive radio network domain. He has worked as a consultant to Tata Steel Ltd and Scientific Analysis Wing (SAG), DRDO, Govt. of India. He has been awarded with IBM SUR (Shared University Research) Award for research project, "Mobile and Sensor Network based Disaster Management System with emphasis on rescue management" He has around eight edited book volumes published by Springer and also recently coauthored a book entitled "Internet of Things and Sensor Network for COVID-19" published by Springer Nature publication house.

Keynote Speaker-6

Mr. Aninda Bose

Senior Editor
Research Publishing – Books (Interdisciplinary Applied Sciences)
Springer Nature, New Delhi, India

Brief Bio:

Mr. Aninda Bose is presently working as a Senior Publishing Editor with Springer Nature. Mr. Bose is part of the Global Acquisition Team at Springer Nature and responsible for acquisition of scientific content across the globe. He is responsible for acquisition of content in Interdisciplinary Applied Sciences. He has more than 25 years of industrial experience in marketing and different fields of publishing. Mr. Bose has completed Masters in Organic Chemistry from Delhi University and Masters in Marketing Research from Symbiosis Institute of Management Studies, Pune. Mr. Bose has delivered more than 135 invited talks on Scientific Writing and Publishing Ethics in reputed Universities, International Conferences and Author Workshops. He has published books for secondary level in Chemistry and is a member of American Chemical Society, USA.

Abstract of The Papers

An approach for Heart Disease Prediction using Machine Learning

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Abstract. The heart is the most vital organ found in the chest pit of people. Sudden blockage of Blood flow to the heart causes a heart attack. Due to the lack of proper diagnosis and early-stage prediction of heart disease many people die every year. In today's era, the modern lifestyle and the polluted atmosphere is the main cause of growth in mortality rate. As per WHO data cardiovascular diseases (CVDs) are the number one reason for death all around, taking an expected 17.9 million lives every year that is approximately 31% deaths around the globe. Irrespective of gender and age group cardiovascular illness is a major issue in India. Hence, it is necessary that early prediction with accuracy can save a million lives. In this paper, different machine learning classification approaches are done for the early prediction of heart disease. After all the conclusion is drawn that the Random Forest classifier produces more accurate predictions than other competitive approaches. It can be helpful for the necessary aid for doctors and chronic patients suffering from heart diseases.

Keywords: Classification,machine learning ,heart disease, support vector machine,k-nearest neighbor ,random forest,x-gboost,decission tree.

A Low Cost Smart Solar DC Nano-grid for Isolated Rural Electrification: Cyber Physical System Design and Implementation

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Abstract— In this paper, a smart controllable distributed solar dc-nano grid is developed for distributed villages in India. Initially the proposed system is modelled individually and its controller structure is investigated. A communication protocol based on cyber physical system is developed for controlling and coordinating different components of the proposed system. Each solar photovoltaic (PV) power plant is rated at 1.5 kW and accomplished by the series connection of a dc–dc converter between the PV array, the load, and the battery storage. The battery is connected with a bidirectional dc-dc converter for bidirectional power flow. The operation of dc-dc converters ensures maximum power point tracking (MPPT) under any environmental condition. The characteristics of the communication network corresponding with the proposed solar energy utilization is remotely monitored, and then the proposed system with the solar interface is studied Simulink. The simulation and experimental results are presented to validate the proposed control system.

Global Path Optimization of Humanoid NAO in Static Environment using Prim's Algorithm

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Abstract. This paper focuses on navigation of a humanoid robot cluttered with obstacles, avoiding collisions in static environment using prim's algorithm. Prim's algorithm is a minimum spanning tree (MST) method with greedy approach which uses the concept of sets. It generates the MST by selecting least weights from the weighted graph and randomly forms disjoint sets with picking one least weight edge from the ones remaining for creating node incident to form the tree. Similar approach repeats for selecting all 'n-1' edges to from the tree which is the path direction to humanoid NAO. The developed algorithm is implemented in both simulation and experimental platforms to obtain the navigational results. The simulation and experimental navigational results confirms the efficiency of the path planning strategy as the percentage of deviations of navigational parameters is below 6%.

Keywords: Humanoid NAO, prim's algorithm, V-REP, simulation, experiment, probability plot.

Weather Prediction Using Hybrid Soft Computing Models

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Abstract. Prediction of weather is a challenging task now a days for the people, the Government and the weather researchers. Climate change and weather prediction is a highly non linear phenomenon which is known called butterfly effect. The soft computing techniques are now capable of replacing the conventional weather prediction methods. The proposed new hybrid soft computing models are designed by exploiting the positive features of the constituent soft computing techniques and suppressing their disadvantages. This research work intends to design the hybrid models by making use of favorable properties of Support Vector Machine, Multi Layer Perceptron and Fuzzy Logic. The new hybrid soft computing models are used to forecast the weather at Delhi by training the model using weather data of Delhi.

Keywords: Support Vector Machine, Multi Layer Perceptron, Fuzzy Rule based Support Vector Machine, Fuzzy Rule based Multi Layer Perceptron.

FindMoviez: A Movie Recommendation System

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ITER, Siksha 'O' Anusandhan (Deemed to be University)

Abstract. Movie Recommendation has become one of the most efficient ways of making the user experience more personalized and connecting the user with the movies that the user might like. In this paper, FindMoviez, a movie recommendation engine has been introduced, which is based on a combination of two recommendation algorithms, implemented in a web application. The three sub data sets(i.e ratings, users, and metadata) of the famous Movielens data set has been used. A combination of item-item collaborative filtering and genre-based using the average weighted rating method has been used. These algorithms have been modified in a way where the user is always recommended movies even if one of the above algorithms fails, the other comes into play making this product more reliable for the user. Thus the user can completely rely on this product for genuine movie recommendations.

Keywords: *Recommendation engine, Collaborative filtering, item-item collaborative filtering, Average weighted rating*

Active Filter with 2-Fuzzy Intelligent Controller: A Solution to Power Quality Problem

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Abstract. This paper presents a controller based on Two-Fuzzy Logic Technique associated with hysteresis band current regulated techniques. The developed controller is implemented in a shunt active filter to enhance the power quality in a system. At first DC voltage component is fed to the First FLC to obtained in phase current component, then AC Voltage is fed to the second FLC to obtain the quadrature component, combination of two component current results the reference current. Reference current and supply current is fed to the PWM controller and accordingly the pulses are generated for the operation of proposed filter and the power quality is achieved. To prove the effectiveness of the controller models with different condition simulated and verified.

Analysis of Covid Confirmed and Death Cases using different ML Algorithms

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Abstract – Machine learning plays a foremost role from precedent years in illustration detection, spam restructuring, normal verbal communication commands, product suggestion and therapeutic analysis. Present machine learning algorithms worn for the analyzing the diseases and finding the relationships between confirmed, deaths. In the present paper, we are finding the root mean square error (RMSE) to analyze the COVID confirmed and Deaths using Linear Regression, Decision trees, Random forests , proving Death rates are less when compared with confirmed cases of Our Country India.

Keywords – Diseases, Linear, Random, Decision, Relationships, Analyze

How good are classi_cation models in handling dynamic intrusion attacks in IoT?

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Abstract. Internet of Things (IoT) is vulnerable to the intrusion that may lead to security threats in the IoT ecosystem. Due to di_erent architecture and protocol stack, the traditional intrusion detection system (IDS) does not work well for generating alarm during possible intrusion in IoT. Machine learning is one of the potential tools for e_ective intrusion detection. However, to apply them in IoT, it may need customization to work with IoT tra_c. The situation becomes adverse when the attack patterns are not known apriori. To mislead IDS, attackers frequently changes the attack patterns. As a result, traditional machine learning methods usually fail to handle such dynamic intrusion e_ectively. In this work, we try to assess seven (07) well-known classi_cation models for their suitability in the IoT network in detecting novel/dynamic attacks. It is more vulnerable and lethal for a system, if a detection system misclassify a novel (unseen) attack as normal tra_c. During our study, we assess such scenario of misclassi_cation by our candidate models. Our result reveals that Random Forest performs better in detecting seen IoT attacks. SVM is superior in keeping a low misclassi_cation rate for dynamic attacks as regular tra_c. Our investigation further concludes that the best IDS system is not always the best detector for handling novel attacks. Keywords: Internet of Things (IoT), Dynamic attacks, Intrusion Detection, Machine Learning, Classification, Clustering, Security, Unseen attacks, Unknown attacks.

Sediment Rating Curve and Sediment Concentration Estimation for Mahanadi River

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Abstract.

The sediment rating curve for Mahanadi River is rare to produce, so the sediment rating curve for three tributaries of size medium to large of the Mahanadi River are estimated. The various curves fitting technique has been applied to estimate the sediment rating curve. It is observed that the data set do not show log-normal distribution due to the biased sampling of data so log-transferred linear fit cannot be applied to this rating curve. The levenberg-Marqardt non-linear and linear algorithm is applied to find out the coefficient of the model and it is found that a non-linear power model includes the Liebenberg-Marquardt algorithm was estimating most appropriate statistical solution of the problem. The long term annual sediment load determined by non-linear power model is found out to be consistent with previously published results.

Keywords*:* Rating curve, Regression analysis, sediment load, Mahanadi River, sediment load.

An Energy Efficient Routing with Particle Swarm Optimization and Aggregate Data for IOT enabled Software Defined Networks

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Abstract. . In the IoT era, the Software-Defined Wireless Sensor Networks play a crucial role. In these networks, many Sensors were placed in hostile areas. Since the ca-pabilities of the sensors has its own limits when it comes to computational and energy efficiency, it is hard to replace them once they run out of battery. So there is an obvious need to develop an energy-efficient and software-defined routing system that enables us to handle wireless sensor networks with ease. This paper recommends the integration of FJAPSO (Fork and Join Adaptive Particle Swarm Optimization) along with data aggregation in the existing Software-Defined Wire-less Sensor Networks. This Enhanced FJAPSO uses dual optimization tech-niques towards the optimal number of control nodes. The simulation results of Enhanced FJAPSO produces a significant improvement compared to FJAPSO in optimizing the size of data to be transmitted which in turn increases the lifetime of sensor network.

Keywords: Sensor Networks, energy optimization, routing, data aggregation, energy effi-ciency.

Design of IoT based Real-Time Vıdeo Surveıllance System using Raspberry Pi and Sensor Network

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Abstract. The video surveillance system of any secured places using security guards at every moment is not possible. Also, closed-circuit Television (CCTV) is extensively used CCTV in most of the security places like multi-storage buildings, banks, cinema halls, commercial buildings like shopping malls, and more. But real-time thief handling is very important to prevent theft and vandalism. This project employs an IoT based real-time video surveillance system with a password locking technique using raspberry pi. The system requires a USB webcam, Raspberry-pi 3B, 4*4 Keypad, and PIR sensor. When any motion is detected pi activate the webcam for capturing the image if anyone enters a wrong password or tries to enter a random password, at that time processor sends an E-mail or SMS alert to register id or mobile number. When motion detected using PIR(passive infrared sensor) the raspberry pi store the image in the cloud using the SMTP mail server and send them to register Email.

Keywords: IoT, SMTP, Raspberry Pi, E-mail, Motion Detection, Video surveillance

Multiagent System of Autonomous Underwater Vehicles in Octagon Formation

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Abstract. In this paper a formation control problem of eight Autonomous underwater vehicles (AUVs) is addressed using multiagent system (MAS) concept. The proposed MAS of AUVs constitute of a virtual leader and eight follower AUVs. Each follower AUV represents an agent connected by a communication network and assumes full communication without delay. The formation control of multi-AUV system deals with controlling positions and heading angles of AUVs using Jacobian theory and methods of geometric reduction to achieve an octagonal shape. The underwater environment is modelled as a two-dimensional grid. The AUV motion dynamics are modelled assuming 3 degree-of-freedom neglecting heave and sway motions. The surge and yaw inputs are used as control inputs for the controller. The proposed controller maintains the octagonal geometry while approaching the target. This research can be helpful in solving formation control problem for applications such as oceanographic survey.

Keywords: Autonomous underwater vehicle (AUV), Follower, Formation, Jacobi theory, Leader, Multiagent system (MAS), Octagon.

Fuzzy Q-Reinforcement Learning Based Energy Optimization In IoT Network

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Abstract- Motivated by the growing environmental concerned (effect of greenhouse gases) coupled with increasing cost of energy, green computing emerges as promising solution to energy-limited IoT network. As IoT network consist of limited low-battery power smart sensors having ability to connect over wireless network for transmission of data. Energy harvested from the environment by the sensor node reduces carbon emission and also recharging its battery continuously and this harvested energy is used by sensors for its working operation that enhances the lifetime of the IoT network. In this paper, a Fuzzy Q-reinforcement learning (FQRL) scheme using Fuzzy logic and model free Q-learning to optimize the energy consumption in perpetual operations of IoT nodes is presented. The optimization of energy consumption is subject to adaptive duty cycle exercised to smart sensors. The learning agent of FQRL updates If-Then rules of fuzzy controllers according to reward received by learning agent through interacting with environment. The learning agent rewards for good action (increasing the firing strength of rule) and punishes (decrease the firing strength of rule) for bad action subject to maintain the energy neutrality condition. Finally, simulation results show the proposed FQRL outperforms in terms of duty cycle and residual energy after perpetual operation. It means, presented algorithm FQRL provides smart sensors to achieve better charging status of their battery and suitable for energy harvested IoT networks.

Keywords: Fuzzy Energy harvesting, fuzzy Inference system, Q-learning, Duty Cycle, power optimization, Energy neutrality condition.

A Circumstantial Methodological Analysis of Recent Studies on NLP-driven Test Automation Approaches

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Abstract. From manual testing to test automation, Test generation is advancing. With the emergence of new challenges – and legacy challenges already persisting- there is a great need of turning test creation activity into a way that is more responsive and effortless. Natural Language Processing, with its applicability in different domains, is swiftly adopted by researchers in software testing discipline to perform automation of such activities. Attempts like this, will bring in prominent paradigm shifts in the conventional and mundane non-automated frameworks of test cases creation (software development activity) from requirement specifications. To explore, as how Natural Language Processing could be employed to assist software testing, this paper presents a detailed article with methodological investigation of some recent research studies. The detailed knowledge will help the practitioners to get insights of how Natural Language Processing (NLP) is being carried out in testing domain and what specific role does each term associated with it will play.

Keywords: NLP, test automation, Natural Language Processing, test cases, test case generation.

Plant Disease Recognition from Leaf Images Using Convolutional Neural Network

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Abstract. Automated plant disease recognition from leaf images of a plant is important in the field of agriculture. To achieve this, a Convolutional neural network (ConvNet) based classifier is proposed in this paper. The existing methods used the general CNN architectures such as AlexNet and VGGNet for the disease recognition by retraining it whereas the proposed CNN architecture contains a few convolution layers against the existing CNN models. The number of learnable parameters in the existing networks are 30 times higher compared to the proposed model. The proposed ConvNet is trained on a subset of the publically available dataset that contains 24,249 images of diseased and healthy plant leaves of the crops cultivated in India. The image samples in the dataset are modified by thresholding the original images to remove the background. Rectified Linear unit (ReLu) activation function is used across all layers. The sparse categorical cross entropy loss function is considered with Adam optimization algorithm to fine tune the network parameters by minimizing the loss function. The proposed model achieved a training accuracy of 96.39%, validation accuracy of 90.97% and testing accuracy of 90.59%.The performance of the proposed model is comparable to the existing methods, however, with reduced number of parameters. Due to the reduction in model parameters to a larger extent, the proposed model could be deployed in a resource constrained edge computing devices for a real time processing.

Keywords: Plant disease classification, convolutional neural networks; AI in agriculture.

Optimum Design Of Profile Modified Spur Gear Using PSO

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In this article a profile modification approach is adopted to design a spur gear set for minimization of contact stress and optimization of weight. An altering tooth sum method is used to reduce the hertizian contact stress along the path of contact. Three case studies are performed for a spur gear set with specific centre dist ance and tooth sum of 90 (+5). A Multi-objective optimization problem is formulated with contact stresses along path of contact and weight of gear set as design objectives. This nonlinear constrained optimization problem has been addressed by mean of the Particle Swarm Optimization algorithm. Six design variables related to gear geometry and material property are used in this optimization and all the constraints are sat isfied at the optimal solution. Gear and pinion surface temperatures are below flash temperature, indicating protection against scoring wear. A higher value of AGMA scoring index is achieved in this optimum design approach. Specifically, a lighter gear with les s contact stress and adequate scoring resistance is reported in this study. Promising results in terms of objective function values and computational time (CPU time) are observed .Furthermore, a CAD model is developed by means of optimized design parameters so as to check the geometric interference and practical feasibility of the design.

Keywords:- Spur gears; Contact ratio; Profile shift; Contact stress; Scoring .

Benchmark of Unsupervised Machine Learning Algorithms for condition monitoring

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Abstract. Predictive maintenance and condition-based monitoring technique used to monitor the health of bearings, pumps, turbine rotors, gearboxes etc. It uses the idea of data mining, statistical analysis, and Machine Learning technique to accurately predict early fault of mechanical components and calculate the remaining useful life. The paper is about condition-based health monitoring of heavy engineering equipment and their predictive maintenance. Data is gathered from the bearing of our experimental setup using unsupervised learning on Type of failure and remaining useful life should be determined to predict the maintenance of a Machine. In this paper, we consider a data collected from the bearing and fit different unsupervised learning algorithm, Gaussian mixture model and clustering technique to check its performance, accuracy, and sturdiness. In conclusion, we have proposed a methodology to benchmark different algorithm techniques and select the best one.

Keywords: Predictive Maintenance, Machine Learning, Deep Learning, Unsupervised Learning, Fuzzy C-means (FCM) clustering, Gaussian mixture model

Investigation of the Efficiency for Fuzzy Logic based MPPT

Algorithm dedicated for standalone Low cost PV systems

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Abstract. This paper motivates the study of various Maximum Power Point tracking (MPPT) algorithm and analyzes the efficiency for the standalone solar systems. To increase the efficiency of the algorithms for the tracking maximum power, MPPT shows a major role. The various MPPT algorithms are like perturb and observe, incremental conductance, particle swarm optimization techniques have been implemented to enhance the performance of standalone solar system. But all this conventional methods have perturbations under dynamic environmental conditions. Therefore this paper explicates fuzzy logic control technique for extraction of extreme power from photovoltaic cell using boost converter during the dynamic environmental conditions. The fuzzy-MPPT technique has been implemented for the standalone photovoltaic system. The system has been developed in Simulink environment and the results are analyzed. The obtained simulation results validates the efficiency over other conventional algorithms.

Keywords: Fuzzy logic control (FLC), Fuzzy Inference System (FIS), Photovoltaic (PV), Maximum power point (MPP), DC-DC boost converter, Perturb and Observe(P&O), Incremental Conductance(INC).

Distributed Channel Assignment in Cognitive-Radio Enabled Internet of Vehicles

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Abstract. Internet of Vehicles (IoV) is an evolving and appealing technology which enables vehicles to communicate with each other, to road-side infrastructures, and to pedestrian handheld devices. The communication between these agents helps to develop and execute on-road safety applications, traciency applications, and infotainment applications. However, spectrum allocated according to current vehicular communication standard IEEE 802.11p is not enough to provide growing demands of the increasing vehicle users. To this direction, cognitive radio technology and cooperative spectrum sensing have been proposed as possible solutions for overcoming these challenges. They enable vehicular users to efficiently use the licensed spectrum while ensuring promised Quality of Service (QoS) for licensed users. However, it is necessary to have an efficient channel assignment strategy in order to avoid collision between transmissions. In this work, we propose a distributed channel assignment algorithm to ensure efficient utilization of channels and improve the network throughput. We perform simulations which show that our proposed algorithm gives better throughput, packet delivery ratio and channel utilization.

Load Reduction using Temporal Modeling and Prediction in Periodic Sensor Networks

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Abstract. Wireless Sensor Networks (WSNs) operate in an energy constrained environment, and judicious use of limited battery of sensor nodes is a priority. Load reduction aids in prudent usage of battery by reducing the amount of data transmitted across the network without loss in underlying information, thereby increasing the network lifetime. Thispaper showcases a load reduction technique where we understand patterns in temporal data and create an adaptive prediction model based on M5P algorithm in the WEKA toolkit. The model predicts measurements, and only when sensor measurements do not agree the predictions, sensor nodes send data to the sink. This brings down the amount of data transmitted, leading to reduced communication and energy consumption. Preliminary results indicate 70 % reduction in data transmission across the network, proving the efficacy of the temporal modeling in reducing amount of data sent, consequently saving energy, and improving the network lifetime.

Keywords: Sensor networks, Load reduction, Data reduction, Efficientinformation

transfer, Temporal modeling, Machine learning

Direct Torque Control of Mathematically Modeled Induction Motor Drive using PI-Type-I Fuzzy Logic Controller and Sliding Mode Controller

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Abstract. This research introduces a Type-I Fuzzy Logic control technique in associated with conventional PI controller using sliding mode control strategy for direct torque control in induction motor drive. This technique controls the rapid variation in motor speed to the optimum reference parameter for smooth operations. Here Fuzzy Logic Controller is used for the tuning of PI control gains to get faster response towards steady state. Sliding mode controller is used to remove uncertainties due to sudden variations in motor speed which regulated in associated with the PI. This complex controller helps in getting the full control on torque with switching converters and gets accurate outputs with respect to the reference parameters. The model is designed in MATLAB. Results indicate that the conventional PI controller gives fast steady state at normal operating conditions but the proposed technique of PI- FLC-SMC more effective and faster in variance and stability. ITAE from the different operating conditions are demonstrated in this paper and the results are compared according to the simulink results.

Keywords: IM drive, DTC, PI Controller, FLC, SMC, ITAE.

Measuring the Performance of a Model Semantic Knowledge-base for Automation of Commonsense Reasoning

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Abstract. Commonsense Reasoning is the simulation of human ability to make decisions during the situations that we encounter every day. It has been several decades since the introduction of this subfield of Arti- ficial Intelligence but there has been a very little progress. The modern computing aids also have remained impotent in this regard due to the absence of a strong methodology towards commonsense reasoning devel- opment. Semantic networks can be used to conceptualize and implement a part of commonsense reasoning. A well-defined computer-assisted in- struction set in the form of a knowledge-base is very much essential. This paper presents a study on performance measurement and analysis of one such model semantic network used to build commonsense knowledge- base. Various categories of performance measures have been presented to analyze the practicality of such models for automation of common- sense reasoning. Overall, the analysis is intended to present a practical feasibility study of a model semantic network by considering character- istics of a commonsense knowledge-base.

Keywords: Commonsense reasoning, artificial intelligence, knowledge- base, semantic networks, inference

COVID-19 Detection and Prediction using Chest X-Ray Images

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Abstract. COVID-19 (Coronavirus Disease 2019) is an infectious disease caused by severe acute respiratory syndrome coronavirus 2(SARS-CoV-2). Widespread testing is hampered by lack of test kits and their questionable accuracies. Applying deep learning algorithms on chest x-ray images is a better, more accurate and faster method of testing. People using conventional testing methods take a few hours to get back their test results, which sometimes increase depending on the backlog of the site as well as location. This paper introduces a novel deep learning algorithm which can predict the presence of the virus to very high degrees of accuracy. This paper gives an accuracy of about 98% on the test set. This results in quick detection of the infection and saves a lot of time between testing and diagnosis. This can be highly instrumental in saving the life of a person who displayed no signs of the virus, as well as preventing further spread of the virus.

Keywords: COVID-19, Deep Learning, Chest X-ray, Convolution Neural Network

Automated Precision Irrigation System using Machine Learning and IoT

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Abstract. Water is considered to be the most precious natural resource for agriculture in this 21st century. To avoid the scarcity of water we must have to use it precisely. For this task a smart irrigation recommendation system is the need of the hour. In this era of automation we may use technologies like machine learning and IoT to build a smart irrigation recommendation system for efficient water usage with nominal human intervention. Here, we propose an IoT based irrigation framework with machine intelligence. The intelligence is incorporated with various ma- chine learning based regression and classification models. To make our proposed system even robust we have integrated the forecasted weather data using their available APIs. We use our own collected sensor data along with the NIT Raipur dataset to validate the effectiveness of this system. From all the experimentation, it is found that the proposed sup- port vector regression (SVR) along with the KNN classifier trained sys- tem is very much effective for this challenging task.

Keywords: Smart irrigation, IoT, Machine intelligence, SVR, KNN clas- sifier, Weather forecasting

UHWSF:Univariate Holt Winters Based Store Sales Forecasting

Abstract. As sale is the life line of any retailer company, hence fore- casting of sales play an important role for a retailer company and ev- ery retailer companies want to estimate their sales before actual sale so that their business will run successfully. Traditional method like Auto- regressive Integrated Moving Average (ARIMA) is commonly used tech- nique for forecasting sales and this forecasting information is used to make a good business for retailer company. In this article I proposed Holt-Winter's (HW) techniques to predict weekly sales for any retailers. In this work I have used real word dataset (publicly available) Walmart sales dataset. Lastly a comparison is made between baseline and pur- posed model and found that the purposed method is more accurate and efficient to predict sales than the traditional method, also maintain a good accuracy.

Keywords: ARIMA, Holt-Winters, Sales Forecasting, Statistic, Accu- racy

A Nature Inspired based Multi-Objective Service Placement in Fog Computing Environment

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Bibhudatta Sahoo · Prasenjit Maiti

Abstract In recent years, the Internet of things(IoT) has been one of the pop- ular technologies that facilitates new interactions between things and humans to enhance the quality of life. With the rapid development of IoT application, connected devices are generating an unprecedented volume and variety of data that to be processed at the centralized cloud data center.The ever-increasing demand for computation resources in the centralized cloud data center system inevitably affects service quality(QoS).The concept of fog computing is based on moving the computational load into the edge of network, since processing the data at the edge can reduce the response time and bandwidth cost while fulfilling the Quality of services(QoS). The fog computing environment offers promising solution to provision the available resources for IoT based appli- cation. In order to fully utilize the capabilities of distributed fog computing architecture, a large scale (IoT) application can be decomposed into dependent and independent services and to deploy those services in a orderly way into the available virtualized fog node while satisfying the constraints and Service Level Agreement(SLA) may increase the efficiency and performance of the pro- posed model. In this work, we study the application placement problem which is a well known NP complete problem in fog computing environment. We in-

Advanced Binary-Matrix based Frequent Pattern Mining Algorithm

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Abstract. Frequent Pattern Mining (FPM) is one of the most important areas in the field of data mining. Several FPM algorithms have been proposed in the literature by many re- searchers. In most of the approaches, dataset is scanned repeatedly in almost every steps of the algorithm, that leads to high time complexity. That is why, processing huge amount of data using those algorithms may not be a suitable option. Hence, in this paper, we have proposed a novel FPM algorithm that improves efficiency by decreasing the time complexity as compared to classical frequent pattern mining algorithm. The proposed FPM algorithm converts the real world dataset into a binary matrix in a single scan then join operation is performed on frequent itemset to obtain the candidate itemsets. Further, AND operation is performed on the candidates to obtain frequent itemsets. Further more, using our proposed algorithm interesting association rules can be derived.

Keywords: Binary Matrix, Data Mining, FPM, Itemset

Sentiment Analysis using Semi Supervised Machine Learning Technique

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Abstract. The sentiments of the users are expressed in the form of views or comments, in favor or against of any item, a product or a movie, etc. These reviews may be labeled or unlabeled. Labeled reviews are easier to process in compare to that of unlabeled once. Using Semi supervised machine-learning technique; the unlabeled reviews can be labeled. In this approach, with the help of small amount of labeled reviews, a large volume of unlabeled review can be labeled. In this paper, a step-by-step approach is adopted to label the unlabeled dataset. In order to perform this task, Support Vector Machine (SVM) technique is used. Different performance evaluation parameters such as precision, recall, f-measure, and accuracy are considered to access the results in each steps and thus, overall process can move forward.

Keywords: Semi supervised machine learning technique, labeled re- view, unlabeled reviews, Support vector machine

Unconstrained Optimization Technique in Wireless Sensor Network for Energy Efficient Clustering

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Abstract-Emerging Technology now a day's used large scale wireless communication network, having tiny sensor node with minimal power and multifunctional process. The sensor node having limited energy cannot stand for a long years. It cannot recharge as most of the time the sensor nodes scattered in remote environment and harsh condition like dense forest, battle field, desert etc. Many energy efficient technologies are emerging. The node energy remain a scare supply at the time of designing a wireless sensor network and transmission distance of packet linking node and base station . Energy enhancement is one of the key challenges in sensor network. Many of the people working in this field these days are trying to solve this energy efficiency by implementing clustering approach .Most of the approaches have not mathematically proven. To fill this balance, a system and methods with mathematical proof usually take the help of unconstrained optimization technique of multivariable calculus. This approach helps us to reduce energy consumption and routing issues in sensor networks. Here the assumption is that the nodes are distributed in nature in multidimensional.

Keywords- Cluster, sensor, gateways, eigenvalue, symmetric matrix, hessian.

A Smartphone App based model for classification of Users and Reviews (A case study for tourism application)

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Abstract

Classification of reviews provided by the users plays a vital role in many real world applications. Many industries in the current era depend on the reviews of the customers/ users for planning their business and providing better customer care services. It deals with the classification of reviews to validate the objectives of the organization. The evaluations and follow up goals can be determined as positive or negative types of reviews. This paper tried to propose a model that performs the classification of users or customer reviews using ratings provided by users or reviewers. In the proposed model, users can give feedback on the location through the Android App, which will be stored in a cloud platform. This real time dataset can be used for tourism applications in the proposed work. The algorithm is used to classify a review as either an honest review or a fake review. It also tries to classify the users as honest, suspicious, and malicious. Feedbacks classified as honest and given by honest users only will be considered authentic information by the other users during the search operation.

Keywords Classification, Feedback, Reviews, Rating, Tourism, Smartphone App

Classification of Arrhythmia beats using Optimized K-Nearest Neighbor Classifier

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Abstract. Artificial intelligence related technologies are outperforming present day screening methods in medical field. The classification of ECG beats to detect cardiac arrhythmia is of great significance in medical field. K- Nearest Neighbor (KNN) algorithm is a supervised instance-based learning algorithm. It is most popular non-parametric algorithm in data mining and statistics because of its simplicity and substantial classification performance. However, classification using KNN algorithm becomes complicated when the sample size and the feature attributes are large. This may reduce the performance of KNN classifier. For classifying arrhythmia beats, MIT-BIH arrhythmia database is considered. An Optimized K-Nearest Neighbor Classifier (O-KNN) is proposed in this paper and Simulation results are compared with the traditional KNN algorithm. A traditional KNN algorithm gives an accuracy of 96.98%. Optimizing hyper parameters, the accuracy of the optimized K-Nearest Neighbor (O-KNN) Classifier reaches 99.03%. The experimental results show that the proposed algorithm improves the classification accuracy of KNN classifier in processing large data sets.

Keywords: Arrhythmia Classification, K-Nearest Neighbor (KNN), Optimized K-Nearest Neighbor (O-KNN).

A comparative analysis of fuzzy logic-based DTC and ST-DTC using 3-level inverter for torque ripple reduction

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Abstract. In this paper, fuzzy logic is implemented for DTC of a three-phase induction motor using two and three-level inverter and a comparative study is done with conventional switching table-based DTC(ST-DTC). Here, d-q model in stationary reference frame equations are consider for simulation of 3-phase induction motor, to which power supply is given by a three-level inverter controlled with fuzzy logic. In three-phase three-level (3P-3L) inverter number of switching states are 27 which is only 8 in 3- phase 2-level inverter. With increase in switching vectors, it is able to define a greater number of sectors and different sets of switching states depending on type of loading. By selecting proper input and output membership functions and rules, a fuzzy interference system is generated to trigger the switches of the inverter. The result shows that settling and rise times are comparable with conventional DTC, however a remarkable reduction of torque ripples (5.2583% in 3-level and 4.7577% in 2-level inverter) are observed. The current ripples also reduced by 4.006% in 3-level and 3.734% in 2-level in case of fuzzy logic-based DTC (Fuzzy-DTC).

Keywords: Multi-level inverter, induction motor, fuzzy logic, DTC, switching table, torque ripple, current ripple.

An Inference Engine Integrated with Health Parameters for Medical Web Platform

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Abstract. Technology is advancing at an unprecedented rate with developments in almost every gadget, particularly smartphones. This project aims at using smartphones to measure some of the most important vitals of the human body – heart rate, breathing rate, blood pressure, oxygen level in blood and heart rate variability. In this approach, a person places his or her right and left finger tips on the smartphone camera lens to record 10-seconds video signals, which are then analyzed to measure the parameters. Thus, no external equipment like sensors and electrodes are required. The performance has been evaluated on 50 subjects with different age groups. Experimental results show that the heart rate and blood pressure can be estimated effectively using this approach with an average error rate of 2.5% and 2.3% respectively.

Keywords: Photoplethysmography, video, heart rate, breathing rate, heart rate variability, oxygen level in blood, blood pressure.

Diabetes Prediction Using Machine Learning ?

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Abstract. Diabetes is probably the deadliest disease on the planet. It is not only a sickness but also a contributor to umpteenth types of illnesses like visual impairment, kidney failure, coronary episode. The most chal- lenging task for a doctor is the early prediction of diabetes in a patient whether the patient is diabetic or not. Moreover anticipating the ailment early prompts treating the patients before it progresses and gets serious. The objective of this paper was to propose an expert system which can foresee whether the patient has diabetes or not with high accuracy. Data mining can separate concealed information from the humongous sea of diabetes-related information available on account of which,it provides a huge help in diabetes examination. The point of this venture was to build up a framework which can anticipate the diabetic hazard level of a patient with higher precision utilizing strategic relapse.The model developed using artificial neural network consist of total of six dense layers. Each of these layers are responsible for the efficient working of the model.The model makes the prediction with an accuracy of 77%, which is fairly good and reliable.

Keywords: Diabetes Prediction · Machine Learning · Cross-validation.

Analysis of Security Vulnerabilities of Internet of Things and it's Solutions

Abstract:
At present, the Internet of Things (IoT) plays very important role in communication system by facilitating services in the form of smart city, smart home, smart transportation, etc . These wide range of applications are collected, computed and provided by thousands of IoT devices placed in open spaces. Everyday these highly interconnected heterogeneous IoT devices face new attacks. Common security platforms are not suitable to manage these complex platforms because communication stacks and protocols of each type of devices are different from other types. Therefore, it seems important to study about security issues relating to several attacks and vulnerabilities. In this paper, IoT security issues and challenges are discussed in a systematic way to protect the devices from vulnerabilities and to strengthen the idea of the researchers in this direction.

Keywords: Authentication, Encryption, RFID, Wireless Sensor Network, Blockchain, Machine Learning

Cognitive Function of Human Memory using Machine Learning

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Cognitive function essentially has a vital role in human life. Predominantly, cognitive function with memory is an important feature to characterize the life of a human being. In this context, human brain being an important part of its body can be used for short term memory and volatile memory at an attainable age and foundation for whole brain simulation. In this paper, it has been tried to analyze a large number of student details for the accuracy of result and for human brain development process. This work is based on human intelligence, which may be characterized to different attributes like sharpness, alertness, cleverness, reasoning capability, critical thinking, problem solving and judgment etc. Machine learning is a classification of AI (artificial intelligence) and builds mathematical model for the sample data. A data of approximately 200 students have been taken into consideration for manual calculation and simulation using Weka software towards result and analysis. This paper summarizes to focus on how to increase the learning capability. If the past learning is good, then given sufficient time for studies where interest is at an outstanding level of a person, eventually student's learning capability is good. This work is also based on linear regression equation. The accuracy of results could be performed by analyzing three different classification processes of BayesNet, NaïveBayes and ZeroR.

Keywords: Cognitive Function, Human Memory, Machine Learning

TB-EDA: A Trust Based Event Detection Algorithm to Detect False Events in Software Defined Vehicular Network

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Abstract. False event propagation is one of the main reasons of disruption of a network. So, false events need to be detected early to protect the network from collapsing. In this paper, a trust based event detection algorithm (TB-EDA) is proposed for a software defined vehicular network (SDVN). In the proposed al- gorithm, an evaluator node first checks the trust values of its neighbor vehicles before receiving information from them. If this condition satisfies, then the evaluator node again checks the correctness of the received information using the similarity method. After satisfying the conditions, then only the evaluator node accepts the information received from its surroundings and act based upon it. If any of the two conditions is not satisfied, then the evaluator node discards the message and stops spreading of such false event messages in the network. Due to the centralized structure and open flow nature, we select the SDVN based network model. Our work is implemented using Veins hybrid simulator, where OMNeT++ act as the network simulator and simulation of urban mobili- ty (SUMO) as a road traffic simulator. We check the performance of our work by considering various parameters, such as detection accuracy, detection time, and energy consumption.

Keywords: TB-EDA, False Events, SDVN, Evaluator Node, Trust

A Multi-objective Sensor Node Deployment Method for Connected probabilistic Target Coverage problem in Wireless Sensor Network

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Abstract. The objective of terrestrial sensor nodes deployment in Wireless Sen- sor Network (WSN) is to choose a minimum number of sensor nodes intelli- gently placed in terrain to monitor a predefined set of targets. The optimal senor deployment positions of the sensors determine the network performances such as the degree of coverage, connectivity, fault-tolerant against coverage, and connectivity. The mentioned network performances highly influence the Quali- ty of Service (QoS) of the sensor network. In this paper, we proposed a method that can analyze the trade-off among the conflicting deployment objectives cov- erage, connectivity, and fault-tolerant of the network against choosing deployed numbers of sensors with defined sensing and communication range. We have considered ε -coverage, m-connectivity, k-coverage for deployment objectives quality of coverage, m-way end-to-end connectivity, and coverage fault-tolerant, respectively, for the experiment. The optimization problem for de- ployment classified as an NP-hard computing problem in the literature. We have used an efficient meta-heuristic multi-objective optimization (MOO) algo- rithm NSGA-II for the simulation.

Keywords: Deployment of Sensors, Wireless Sensor Networks, Probabilistic Target Coverage, connectivity, Network QoS, Multi-Objective Optimization, NSGA-II.

An Empirical Study of Green Supply Chain Management by Using an Optimisation Tool: An Eastern India Perspective

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Abstract. Green Supply Chain Management (GSCM) has become one of most promising tool in reducing environmental hazards of many industries. Selection of indicators and its implementation needs good decision making. The expanded consideration given to the subject of GSCM warrants the composition of this paper. The idea of GSCM is to incorporate ecological speculation into the gracefully chain the board. This study encompasses the survey of factors affecting GSCM and their priority in productive approach. From literature 12 key factors are identifies and these include inbound, outbound, cleaner production and reverse logistics. In this paper, we essentially centre around how much the enterprises are inclined towards the greening of their flexibly chain. So as to know the green status of those ventures, a poll has been created to catch these conspicuous variables on a five-point likert scale. This poll has been circulated in different Eastern Indian enterprises and filled by the accomplished employees of diverse division. Information has been gathered and investigated utilizing a fair Examination of Fluctuation (ANOVA) strategy. To evaluate the dependability of reactions, Cronbach alpha coefficient has been determined.

Key words: Green Supply Chains, GSCM, Environmentally responsible supply chains, green manufacturing, cleaner production, Reverse logistics, ANOVA

A Fuzzy AHP Approach to Evaluate the Strategic Design Criteria of a Smart Robotic Powered Wheelchair Prototype

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Abstract. In the product development process of a prototype, the most noteworthy task is to select important engineering characteristics (ECs) to avoid early-stage failures such as design manufacturing, assembly, and operating errors. Hence, it is very essential to identify and reveal the conflicting design criteria with the various labels of importance associated with it. In this work, an investigation on the prototype design of a smart robotic powered wheelchair (SRPW) is proposed to select and rank the design criteria based on multi-criteria decision-making (MCDM) methods. We have introduced two new additional design criteria namely functional performance of wheelchair (FPW) and user immediate environment (UIE) to the existing attributes. Then, we apply analytical hierarchy process (AHP) to analyze the importance of various criteria. Furthermore, a Fuzzy Analytic Hierarchy Process (FAHP) is used to validate the results of AHP as the various conflicting criteria's rating provided by expert's acumen on the presence of these engineering characteristics could be personalized, unclear, and uncertain. In the present analysis, FPW design criteria turns out to be an important criterion for designing a SRPW, as it comes in second position in the priority level following the manufacturing cost criterion out of seven nos. of design criteria that are identified, selected, analyzed for the proposed wheelchair. Whereas UIE placed fifth rank in this analysis and manufacturing cost as a criterion has the highest weight of 0.3657 corresponding to other ECs. It was found that both AHP and FAHP give similar result regarding the importance of calculated weights assigned to the attributes. So, this study will assist the decision maker in a better way while evaluating different factors required for the early-stage design of the product as it analyses a more number of important criterions.

Keywords: Smart Robotic Wheelchair, Fuzzy AHP, Design criteria ranking, Soft Computing.

An Earthquake Prediction System for Bangladesh using Deep Long Short-term Memory Architecture

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Abstract. Earthquake is a natural catastrophe, which is one of the most significant causes of structural and financial damage, along with the death of many humans. Prediction of the earthquake at least a month ahead of the event may diminish the death toll and financial loss. Bangladesh is in an active seismic region, where many earthquakes with small and medium magnitude occur almost every year. Several sci- entists have predicted that there is a good chance of an earthquake with startling energy shortly in this region. In this work, we have proposed a long short-term memory-based architecture for earthquake prediction in Bangladesh in the following month. After tuning hyperparameters, an architecture of 2 LSTM layers with 200 and 100 neurons, respec- tively, along with L1 and L2 regularization, was found to be the most efficient. The activation functions of the LSTM layers were tanh in the proposed architecture. The proposed LSTM architecture achieved a re- markable 70.67% accuracy with 64.78% sensitivity, 75.94% specificity in earthquake prediction for this region.

Keywords: Earthquake · Prediction · Optimization · LSTM.

Off-line Odia Handwritten Characters Recognition using WEKA Environment

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Abstract. Optical Character Recognition (OCR) is an image analysis technique in the document where digital images (scanned) that contain handwritten script or machine printed script used as input into a system to convert it to editable machine readable text format. In the current era OCRs development for regional script is an active field of cutting-edge as research , such as Odia , Telgu , Bangali etc. Particularly, in Odia language it is a great challenge to an OCR inventor due to the various category of character in the alphabet. Further it is also required to combine the different letter in Odia and many character are roundish similar in loop. In this paper WEKA software has been used to build classification model for offline character recognition. Hence this research work has been attempted towards development of a novel algorithm for classification of Offline Handwritten Odia Character recognition using Naive Bayes and Decision Table in WEKA environment.

Keywords: OCR,classification, naive bayes, decision table, machine learning.

Neural Network Based Receiver in MIMO-OFDM system for Multiuser detection in UWA communication

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Abstract. High quality of service and high transmission rate is the demand for future Underwater Acoustic (UWA) communication which is achieved through the implementation of Multiple-Input Multiple-Output Orthogonal Frequency Division Multiplexing (MIMO-OFDM) system in the UWA communication. However, the quality of the MIMO-OFDM system has faced Multi Access Interference (MAI) at the receiver due to the interference from co-channel users. Therefore, Multi User Detection (MUD) technique is needed at the receiver of the MIMO-OFDM system to suppress the effect of MAI. The novelty in this research is that MUD is achieved using Multilayer Perceptron (MLP) based Neural Network (NN) detector at the receiver of the MIMO-OFDM system in the UWA communication. The MLPNN detector achieved the MUD at the receiver of the MIMO-OFDM system through the adaptation of NN weights and bias weights in the Back Propagation (BP) algorithm. The transceiver model of the MIMO-OFDM system in underwater is implemented using BELLHOP simulation system. The Bit Error Rate (BER) performance of the MLPNN detector towards MUD is analyzed and is compared with that of existing detectors (Matched Filter (MF) detector, Decorrelating Detector (DD), Minimum Mean Square Error (MMSE) detector, and multistage conventional Parallel Interference Cancellation (PIC) detector) in the UWA network. Proposed MLPNN detector outperforms in BER analysis over existing detectors in the UWA network.

Keywords: Underwater Acoustic (UWA), Multiple-Input Multiple-Output (MIMO), Orthogonal Frequency Division Multiplexing (OFDM), Multiuser Detection (MUD), Multi-Access Interference (MAI), Multilayer Perceptron Neural Network (MLPNN).

Employing Deep Neural Network for Early Prediction of Students' Performance

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Abstract. Educational institutions aim to deliver quality education and motivate students to perform better in academic examinations. The early prediction of students' performance helps to identify the low-performing students who may fail in exams. Thus, allowing institutions to help such students for performing better. Traditional machine learning methods utilize the academic attributes of students to predict their academic performance. Accuracy in the prediction of students' performance is very crucial. This article employs Deep Neural Network (DNN), a contemporary technique of deep learning, to predict students' academic performance. The dataset utilized for prediction is prepared with the academic attributes of students. Comparison has been made with prominent machine learning methods, viz. Support Vector Machine (SVM), Naïve Bayes (NB), k-Nearest Neighbors (kNN), Decision Trees (DT), Random Forest (RF), and Artificial Neural Networks (ANN). The results show that the proposed model obtains 98% accuracy, which is better than the accuracy of the other compared methods.

Keywords: Machine Learning · Deep Neural Network (DNN) · Educational Data Mining (EDM)

* This work was done as a part of M. Tech. Thesis [1] during his stay at MNNIT Allahabad as a Master's student

Minimizing Energy & Cost through VM Placement using Meta-Heuristic Algorithm in Cloud Data Center

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Abstract. Now a days cloud computing is an essential commodity for the computational world which offers a large number of server capabilities through virtualized services. The datacenters which promises their clients to deliver services contains a large number of computational nodes which are responsible for consuming a large amount of energy. Virtual Machine (VM) in somehow solve this problem. Through VM consolidation the number of physical machines (PM) in the datacenters are minimized and so the energy consumption. Optimized VM placement is the medium for VM consolidation. In this paper, we proposed a mathematical model to reduce the power consumption as well as active VMs and then used meta-heuristic algorithm which uses GA for generating an optimized solution. The proposed model is compared with First Fit, First Fit Decreasing and permutation pack algorithms and found our meta-heuristic algorithm is performing well compared to others.

Keywords: VM placement, cost, Energy, Meta Heuristic Algorithm, GA.

Mobile Cloud Computing: A Green Perspective

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Abstract. Green computing is a technology that focuses mostly on finding alternative solutions (recycling) to protect the natural resources on earth like energy etc. In this matter, it can be observed that mobile computing technologies like mist, edge, cloud, and fog computing can support this technology by providing services that help in efficient utilization of resources and reducing energy consumption. In fact, fog computing is an extended version of cloud computing, where data moves from the mist and edge devices to the cloud, passing through the fog layer, which helps in improving some cloud computing features, adding privacy, reduce latency, and location awareness, since it is closer to the end user. As a result, cloud computing can significantly reduce the utilization of resources, which helps in making the overall computing process better and green. This paper aims to highlight the areas and the extent to which the mist, edge, fog, and cloud computing technologies can support the green technology and ways to increase this support.

Keywords: Green computing, Fog, Edge, Mist, Cloud Computing, Energy

Fault Detection In Differential Based STATCOM Compensated Double Circuit Line.

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Abstract

This paper presents Discrete Wavelet Transform (DWT) algorithm applied for fault detection in double circuit line, in which Static Syn- chronous compensator (STATCOM) is integrated in the middle part of circuit-1 and the circuit-2 remains uncompensated. As the fault detection in case of double circuit line is an important concern now a days. Further the parameter change in the STATCOM integrated line needs special attention to study the fault involved in the line. The process starts with extracting the phase current signals of both the circuit from both end of the substation bus synchronously and the current signal is processed through DWT to find spectral content ener- gy (SCE). The differential spectral content energy (DSCE) signal of each circuit is assessed by computing the difference of spectral con- tent energy at sending end line (SCE at SE) current signal and the spectral content energy at receiving end line (SCE at RE) current sig- nal. This DSCE based algorithm is the most competent method for analyzing the fault compared to the conventional method as mis-fault case is not detected and detection time remains within cycle period of time. In addition to this it explains the different fault classification study of different shunt fault occurs at any part of the line (circuit-1 and circuit-2). The critical fault study includes different parameter alteration in the transmission line such as fault angle, fault-resistance, impedance at the source and reversing the power flow. In all such condition the algorithm suitably address the fault detection and register the different types of fault pattern.

Keywords: *Double Circuit transmission line; Differential Spectral Content Energy(DSCE); Spectral Content Energy (SCE); Static Synchronous Compen- sator (STATCOM); Fault Angle (FA);Fault-Resistance (Fr); Impedance at the Source(SI)*

OPTIMIZING THE VALID TRANSACTION USING REINFORCEMENT LEARNING BASED BLOCKCHAIN ECOSYSTEM IN WSN

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In virtual transactions, Blockchain technology is a new effective transmission technology that integrates decentralized and distributed database. Then Blockchain is lucidity, which dictates easy validated transactions however it allows us supportable transparency in each mechanism. The main mechanism is immutable which restrict to displeasure the data because once the data has been changed it will work up the whole chain of data. The immutable is actually used for security purpose in blockchain technology. The blockchain stores all the transactions into a ledger over four building blocks. However, to the best of our knowledge, there are no techniques available to optimize the transactions occurring between the source and destination of blockchain ecosystem. Here, the transactions are transmitted and received through a self-generated address or digital identities that serve an anonymous user. In this paper, an optimal distribution of blockchain transactions in Wireless Sensor Networks (WSNs) using Reinforcement Learning (RIL). The RIL helps in transacting the value of transactions from source to destination address and helps in recording the public transaction history. The RIL helps in verifying carefully the transactions since it is unaltered or rejected after verification. Further the experimental results validate the blockchain transactions based on its transmission rate, packet delivery ratio, etc.

Keywords. Blockchain, Reinforcement Learning, Wireless Sensor Network

Wi-Fi Fingerprint Localization based on Multi-Output Least Square-Support Vector Regression

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Abstract. Estimating the location of a movable object is highly necessary for providing context-aware services in an indoor environment. As Global Positioning System (GPS) is not appropriate for indoor positioning, Wireless Local Area Network (WLAN) seems to be a gifted choice due to its ubiquitous nature. The localization task based on wireless signals involves several challenges. This paper proposes a cost-effective Wi-Fi based location estimation and navigation architecture which employs the existing IEEE 802.11 infrastructure for facilitating indoor positioning, providing business solutions, monitoring health care and guiding navigation. A statistical regression model is built on the recorded Received Signal Strength (RSS) dataset using Multi-Output Least Square Support Vector Machine (M-LS-SVM) regression which infers the locality of a mobile device. The information from the radio map helps in improving the performance. The proposed M-LS-SVM technique is compared with various regression models for different kernels.

Keywords. Fingerprint localization, Indoor Positioning, Support Vector Machine Regression, Global Positioning System