

VIRTUAL EVENT

GLOBAL CONCLAVE ON

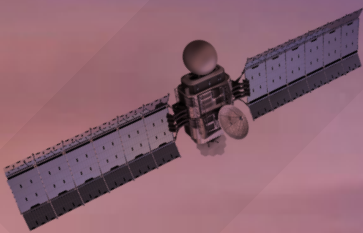
ROBOTICS & AUTOMATION



ADVANCED SATELLITE COMMUNICATIONS

—○

OCTOBER 18
2024





PROGRAM-AT-A-GLANCE >>

**YOUR FIRST CHOICE
FOR RESEARCH
INGENUITY**

AUTOROBO 2024 & ADV. SATELLITE 2024

2024

OCTOBER 18 | FRIDAY

Scientific Program

BST (British Summer Time)

07:45-08:00 Opening Ceremony

Topics: Robotics | Artificial Intelligence Integration in Robotics | Space Robotics | Automation | Medical and Surgical Robotics | Satellite and Education | Space Missions | Mobile Satellite Communication Networks | Satellite Engineering | Wireless Satellite and Broadcasting

Distinguished Speaker Talks

08:00-08:20

Title: Toward the development of Intelligent Interactive Robots

Kaoru Sumi, *Future University Hakodate, Japan*

08:20-08:40

Title: Extended MB logic and its automatic deduction

Sen Xu, *Shenyang University of Chemical Technology, China*

08:40-09:00

Title: Interior structural change detection using a 3D model and LiDAR segmentation

Hang Zhao, *The University of Melbourne, Australia*

09:00-09:20

Title: Strategy for the economic development of the digital society with Intellectual revolution and gravitational effects

Vladimir Cherny, *Independent Researcher, Russia*

09:20-09:40

Title: Need of adaptive equalization in satellite communication

Shital Ganorkar, *SRPCE Nagpur, India*

09:40-10:00

Title: Recurrent neural network based model predictive control for multiagent system using switching topologies

Piyush Chaubey, *Pandit Deendayal Energy University, India*

Refreshment Break 10:00-10:15

10:15-10:35

Title: A hybrid approach for solving a two level location allocation and a static dial-a-ride problem

Kirti Sharma, *K.R. Mangalam University, India*

10:35-10:55	<p>Title: Worldview-3 satellite imagery for mineral mapping in sparsely vegetated South Purulia Shear Zone</p> <p>Pankajini Mahanta, <i>Fakir Mohan University, India</i></p>
10:55- 11:15	<p>Title: The effect of mixing components on mechanical properties of eco-friendly Strain Hardening Cementitious Composites</p> <p>Shirin Maleki, <i>Isfahan University of Technology (IUT), Iran</i></p>
11:15-11:35	<p>Title: Educational robotic for a sustainable future</p> <p>Um Albaneen Yusuf Jamali, <i>Hajer Primary Girls School, The Kingdom of Bahrain</i></p>
11:35-11:55	<p>Title: Alphabet sign Language recognition for Arabic and American language</p> <p>Fatma Zohra CHELALI, <i>University of Science and technology Houari Boumediene (USTHB), Algeria</i></p>
11:55-12:15	<p>Title: The role of AI in transforming modern Robotics: Challenges and opportunities</p> <p>Naga Siva Jyothi Kompalli, <i>Sreenidhi Institute of Science and Technology, India</i></p>
Lunch Break 12:15-12:40	
12:40-13:00	<p>Title: An extensive analysis of satellite imagery for Deepfake detection</p> <p>Preeti Sharma, <i>DIT University, India</i></p>
13:00-13:20	<p>Title: A Methodology for Transformation Between Geodetic Datums Used in Syria</p> <p>Shaza Al-Kasem, <i>Aleppo University, Syria</i></p>
13:20-13:40 (Video Presentation)	<p>Title: High-throughput organo-on-pillar (high-TOP) array system for three-dimensional ex vivo drug testing</p> <p>Jin-Ku Lee, <i>Medical Research Center Seoul National University College of Medicine, South Korea</i></p>
13:40-14:00	<p>Title: Problems and peculiarities of correction of satellite water level measurements based on the results of in-situ observations (lakes and reservoirs of Russia as a case study)</p> <p>Valery Vuglinsky, <i>Russian Federation, Russia</i></p>
14:00-14:20 (Video Presentation)	<p>Title: A Privacy-preserving federated learning framework with lightweight and fair in IoT</p> <p>Yuan Ping, <i>Xuchang University, China</i></p>
Refreshment Break 14:20-14:35	
14:35-14:55	<p>Title:CFx_MnO₂ hybrid cathode for lithium primary batteries used in landers</p> <p>Katia Guérin, <i>Université Clermont Auvergne, CNRS, France</i></p>

<p>14:55-15:15 (Video Presentation)</p>	<p>Title: Calculation of thermal-hydraulic efficiency of porous direct-flow steam generators with Freon-12 coolant in the turbulent area of motion at the channel input and under boundary conditions of the third kind Anatoly P. Lukisha, <i>M.S. Poliakov Institute of Geotechnical Mechanics of the National Academy of Sciences of Ukraine, Ukraine</i></p>
<p>15:15-15:35</p>	<p>Title: Considering caring as a safeguard in Artificial Intelligence Russell Suereth, <i>Salve Regina University, USA</i></p>
<p>15:35-15:55</p>	<p>Title: Robotics in education: Engaging young students in Robotics, Coding & AI Lori Towle, <i>Code & Circuit, Inc. Full Circle Classrooms, USA</i></p>
<p>15:55-16:15</p>	<p>Title: Securing the Autonomous future: Navigating data privacy and Security in Robotics Taha Sajid, <i>Xecurity Pulse, USA</i></p>
<p>16:15-16:35</p>	<p>Title: Early Identification of conflicts in the Chilean Fisheries and Aquaculture sector via text mining and machine learning techniques Mauricio Figueroa Colarte, <i>Fundación Instituto Profesional Duoc UC, Chile</i></p>
<p>16:35-16:55</p>	<p>Title: Bioelectric signal acquisition and classification system to generate intelligent prostheses David Tinoco Varela, <i>Facultad de Estudios Cuautitlán (FESC-UNAM), México</i></p>
<p>16:55-17:15</p>	<p>Title: A report on the study for rational and reliable pattern mining Tongyuan Wang, <i>TechEngine Plus Com, Montreal, Canada</i></p>
<p>17:15-17:35</p>	<p>Title: Zero Trust security for 5G Service-Based Architectures: A cloud-native approach Milind Gunjan, <i>Amazon, USA</i></p>
<p>17:35-17:55</p>	<p>Title: Artificial Intelligence and Machine Learning in cybersecurity Anvesh Gunuganti, <i>Change Healthcare, USA</i></p>
<p>17:55-18:15</p>	<p>Title: Machine Learning and AI in Endpoint Security: Advancements in threat detection and prediction Srikanth Mandru, <i>Cisco Systems, USA</i></p>

Panel Discussion

Closing Remarks



**BOOKMARK
YOUR DATES**

2nd Global Conclave on

Robotics & Automation



3rd Global Congress on

**Advanced Satellite
Communications**

**October 2025
Berlin, Germany**



DISTINGUISHED SPEAKER TALKS

Virtual Event

**ROBOTICS &
AUTOMATION
&
ADVANCED
SATELLITE
COMMUNICATIONS**

OCTOBER 18, 2024

**AUTOROBO 2024
ADV. SATELLITE 2024**

Advanced Satellite Communications

OCTOBER 18, 2024



Toward the development of Intelligent Interactive Robots

Kaoru Sumi

Future University Hakodate, Japan

Intelligent interactions using Artificial Intelligence and remote interactions in which humans act as artifacts, such as avatars, in virtual spaces are becoming more familiar to the public. I believe that it is important to use emotions for intelligent interaction so that I will discuss the possibility of human-agent interaction and human-robot interaction using emotions by introducing several research cases. I will also discuss persuasive technology that systems can utilize to influence human behavior, along with impressions and applications of facial expressions and gestures [1]. Then the possibility of interaction between a four-legged robot and a human will be presented as an example of interaction with a robot [2]. Finally, I will discuss the potential of virtual agents and robots that interact with other users in virtual or real space.

Biography

Kaoru Sumi is a professor in Future University Hakodate, Japan. Prof. Sumi received her Ph.D. in engineering from the University of Tokyo. She is currently working on Human Agent Interaction, Persuasive technology, Artificial Intelligence in Education, Affective Computing, and Interactive Digital storytelling. She previously worked at ATR MI&C Research Laboratories, Communications Research Laboratory, and Osaka University, National Institute of Information and Communications Technology and Hitotsubashi University. She was a visiting professor in British Columbia, Canada. ACM Senior Member, IEEE Senior Member, IEEE Sapporo Section Board of Directors, IEEE Women in Engineering Sapporo Section Chair.



Extended MB logic and its automatic deduction

Sen Xu¹, Shuo Yang¹, Yonghui Qi^{1,2} and Yang Zhao¹

¹Shenyang University of Chemical Technology, China

²Shenyang Institute of Computing Technology, Chinese Academy of Science, China

Formal analysis is usually applied to security protocols in order to ensure its security properties. BAN logic is one of the first formal methods that have ever been proposed, and gained its extraordinary success. However, BAN logic has many flaws that hinder its further applications. MB Logic extended BAN logic, which focused on authentication properties before, to handle secrecy properties. Their extension limits to secret key systems only. We extend MB logic to handle public key systems as well, and apply it to analyze security protocols such as WiMAX Privacy and Key Management (PKM) Protocols, which used public key infrastructure to authenticate principals and to distribute session keys.

The deduction by BAN logic usually requires tremendous workload of mankind. Researchers have been working on its automatic deduction and proposed several useful tools, such as Isabelle and Lean. However, these tools also requires lots of human intervention and should be regarded as only semi automation. As chatGPT has been released, researchers begin to apply Artificial Intelligent to assist automated theorem proving. Their works inspire us to use Large Language Models (LLM) to facilitate BAN logic deduction, especially on the selections of inference rules which could enable faster derivation towards the target (from the assumptions to the authentication goals). Compared to those general automated theorem proving systems, our logic deduction tool is tailored to BAN-like logic, especially to the extended MB logic. Therefore, our LLM based tool can provide better performance on security analysis of protocols using extended MB Logic.

Biography

Sen Xu received his bachelor and master degree in Computer Science and Engineering Department from Harbin Institute of Technology, P.R.China, in 1998 and 2000 respectively. Afterwards, he went to Singapore and USA for further study of computer science, and got his Ph.D. degree from University of South Carolina in 2008. Currently Dr. Xu is a faculty member in College of Computer Science and Technology, Shenyang University of Chemical Technology, P.R.China. Dr. Xu's research interests include information security, secure multicast, wireless networks, and formal analysis and verification of security protocols.



Interior structural change detection using a 3D model and LiDAR segmentation

Hang Zhao, Martin Tomko and Kouros Khoshelham

The University of Melbourne, Australia

Detecting changes of indoor environments with respect to a 3D model is important for building monitoring and management. Existing change detection methods based on LiDAR segmentation and comparison with 3D models are limited to simple environments without temporary changes or moving objects. The aim of this paper is to propose a novel change detection method based on LiDAR segmentation for complex environments. We formulate the problem of detecting differences between the 3D model and the real environment as the detection of differences between real LiDAR scans captured in the environment and synthetic LiDAR scans generated in the 3D model. This allows real-time building change detection and classification using a mobile LiDAR. A two-branch convolutional network is proposed to detect differences between the 3D model and LiDAR scans. Synthetic LiDAR scans are generated in the 3D model using the estimated poses of a set of real LiDAR scans. The network is trained with pairs of synthetic and real LiDAR scans and tested with new real LiDAR scans. Each point of real LiDAR scans is classified into one of four categories: unchanged, structural change, moving objects and temporary change. A comparison is performed between the performance of four backbone architectures to find a suitable backbone architecture for change detection networks. Experimental results show that the proposed approach can achieve 94% overall change classification accuracy with the SqueezeNet-based change detection network and the trained network is transferable to comparable indoor environments. This research enables updating 3D models of complex indoor environments efficiently using a mobile LiDAR scanner.

Biography

Dr. Hang Zhao earned his PhD in the field of Infrastructure Engineering from the University of Melbourne. His research primarily concentrated on LiDAR-based methodologies, encompassing areas such as LiDAR localization, navigation, segmentation, and indoor environment change detection. Currently, Dr. Zhao holds the position of Spatial Data Scientist at VicForests, utilizing LiDAR data and satellite imagery for various aspects of forest management. His responsibilities include employing these technologies for tasks such as bushfire preparation, habitat modeling for rare animals, and monitoring forest regeneration. In addition to his role at VicForests, Dr. Zhao serves as a Research Assistant at the University of Melbourne. In this capacity, he actively contributes to research endeavors focused on smart city development and digital twins.



Strategy for the economic development of the digital society with Intellectual revolution and gravitational effects

Vladimir Cherny¹ and Alexey Lubimov²

¹Independent Researcher, Russia

²Presidium of the Russian Academy of Sciences, Russia

What type of strategy should we choose today for sustainable development? How possible to build economy of innovation with the human capital? Is we ready for Intellectual revolution going in the world today? It has an indicator: globalization of democracy and economics, new financial instrumentations and the use of new forms of social organization of labor. Boosting transformations for development can contribute to long-term economic development strategy by overcoming the gravitational effects of the economy using canons digital economy civilized information society, based on intellectual resources, freedom of enterprise and the use of mechanisms of dark matter of global finance.

Despite the existing differences in the assessment of methods and the role of the market economy in stabilizing and stimulating sustainable development, the global crisis forces us to objectively take stock, evaluate the selected benchmarks, look into tomorrow, and try to understand what is the role of market mechanisms of the economy, taking into account the already established open market in the world community of advanced economies based on the anatomy and functioning of information societies. The global crisis forces an audit of the selected socio-political and economic guidelines for the development of countries representing different civilizations.

It is necessary to understand that a worthy place in the world's civilized development can be achieved only when the methods and mechanisms of developed economies are used in their economic policy, when new legal production and financial intellectual tools are intensively introduced, as well as the social organization of labor is improved on the basis of modern network and logistics methods. Historical experience shows that progress cannot be stopped, and there is no way back. Thus, it is necessary to outline tactical and strategic ways to overcome the crisis in order to improve the socio-economic situation of each country.

Advanced Satellite Communications

OCTOBER 18, 2024

Biography

Vladimir Cherny graduated and has PhD in physics from Rostov-on-Don State University, Russia and received Doctor of Science from the Kotel'nikov Institute of Radio-Engineering and Electronics (KIREE), RAS, Moscow. He graduated from Moscow Public University in economics. He used to work at IRE and General Physics Institute, Volgograd State University, Russia and at the EECS of UC, Berkeley. He has 100 articles, including books. P.A.P. Lyubimov, V.V. Cherny. The evolution of globalism: from computerization to E-democracy and the digital economy of knowledge. <https://link.springer.com/article/10.3103/S0005105521020060>. 2021, 55, 39-45; Cherny, V.V., Savicheva E.M. Understanding modern sovereignty within global tendencies. *Analele Universității din Craiova. Istorie*, Anul XXII, 2017, Nr. 1(31), P.149-155; Cherny, V.V. et al. Russian Civil Society: Business and Security. M., SAIBR, 2006., Kapkov, A.Yu., Cherny, V.V. The evolution of globalism: from the collective unconscious to the collective conscious. M., S. P. Shukshina Publishing House, 2014. 204, etc.



Need of adaptive equalization in satellite communication

Shital Ganorkar

SRPCE Nagpur, India

Satellite channel is one of linear channel having restricted frequency band. Some random changes in channel can cause serious effect on stability of channel. Advance satellite communication can overcome this problem with some new technologies but in advance satellite communication data rate is also increased which results in code interference which also termed as Inter Symbol Interference in this situation adaptive equalizer can play major role which can remove ISI effect with the help of advance adaptive algorithms.

Biography

Shital Ganorkar currently working as an Assistant professor in the department of Electronics and Telecommunication, SRPCE, Nagpur, Maharashtra, India. She received her B.E. and M. TECH degree from RTMNU, Nagpur, Maharashtra. She has done her Ph.D. from SGSITS, Indore, MP, INDIA. Her core research interests are broadly in the area of signal processing, and wireless communication. Her expertise area is also micro-controller and its programming. The current research focuses on the design and implementation of soft computing algorithms. She has publication in SCI journal, IEEE conference and national conferences also. She is also working as reviewer for some international journals and international conferences.



Recurrent neural network based model predictive control for multiagent system using switching topologies

Piyush Chaubey, Anilkumar Markana and Dhaval Vyas

Pandit Deendayal Energy University, India

Multiagent control problem is basically a coordination control problem. Coordination control is inspired from the nature like flock of birds, herd of ships & swarm of bees. The effort and time taken by the single agent to perform a task can be reduced by large amount if it can be supported by other agents.

The control can be centralized or decentralized. Decentralized control is cost effective but requires an effective communication between the agents.

- A fundamental problem of multi-agent control is to achieve consensus, that is, all the agents or robots in a sensor network approach to reach a common state like position or velocity based on an optimization algorithm.
- The main idea of consensus is to develop distributed control policies that enable a group of agents to reach an agreement on certain quantities of interest.
- Multiple Drones can take the advantages of consensus and reach a common position to perform multiple tasks together like surveying, shipping, disaster management, search & rescue, agriculture and farming.

The methodology used in this based on leader- follower strategy with decentralized control based on prediction through MPC and optimization by Recurrent Neural Network for the agents. The decentralized control takes the advantage of graph theory for the switching between different modes of topology.

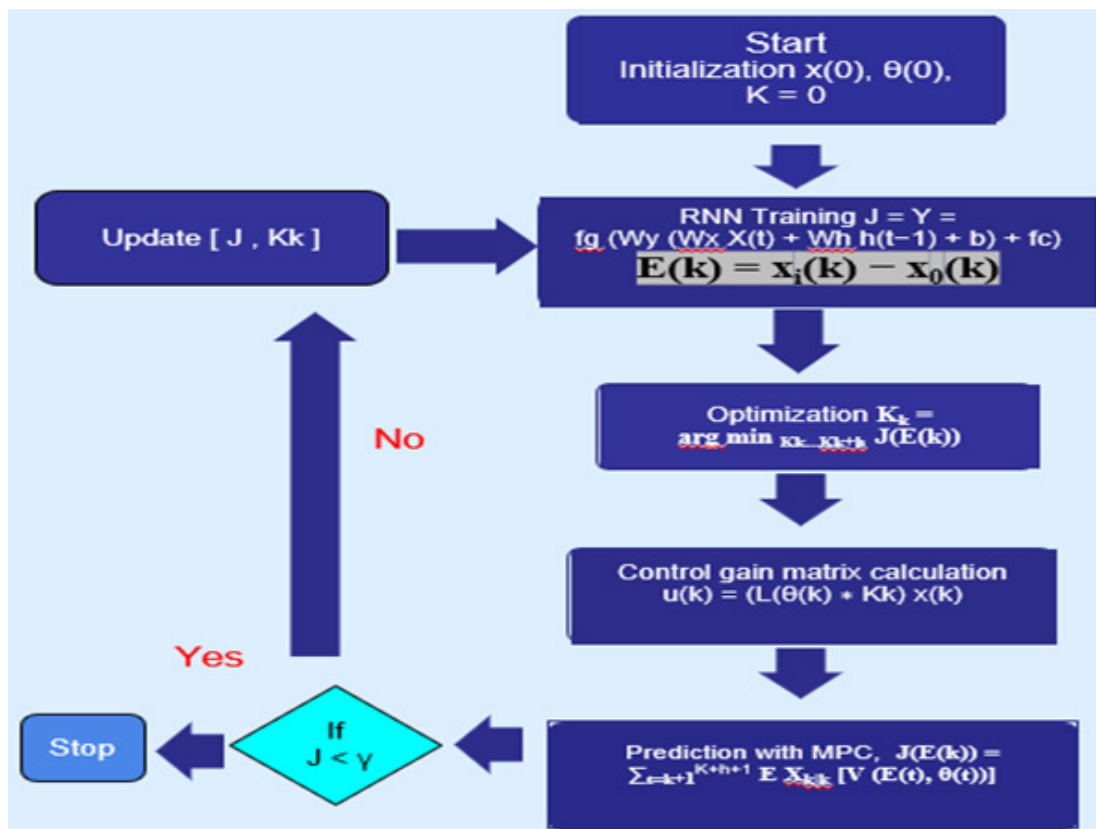
The dynamics of the MAS agents state $x_i(t)$ is $\dot{x}_i(t) = f(x_i(t), u_i(t))$ and the control gain matrix is given by, $u(k) = (L(\theta(k)) \cdot Kk) x(k)$

The discretized form of the above equation for the i_{th} agent is given by:

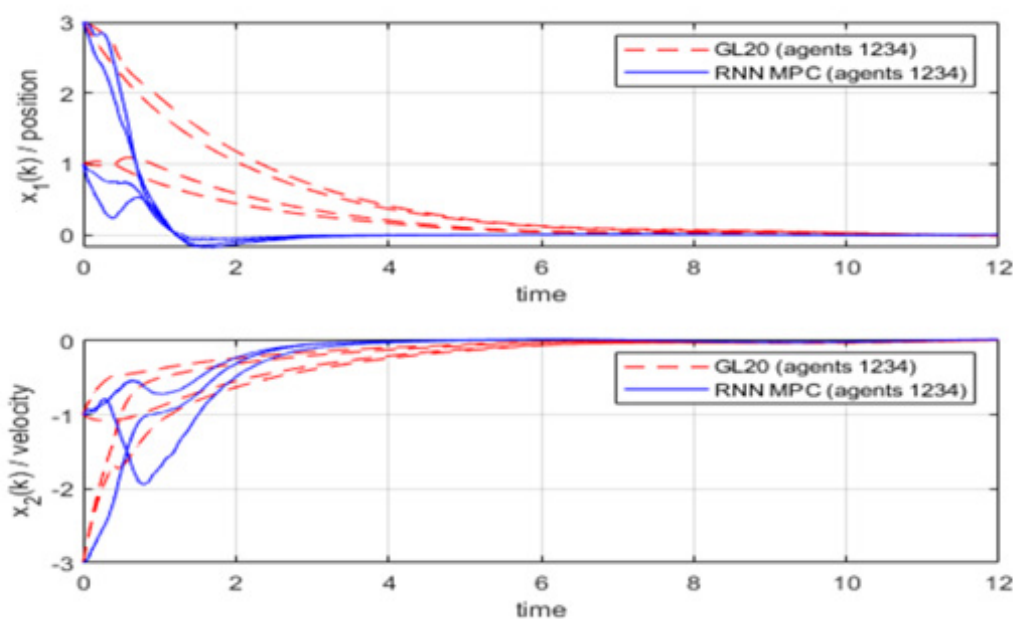
$$x(k+1) = f(x_i(k), u_i(k))$$

Advanced Satellite Communications

OCTOBER 18, 2024



Results shows that the follower agents reach to common position (achieve consensus) following the leader position (state) in minimum time with RNNMPC as compared to the previous research based on Event Triggered strategy suggested by the Gao et al. and NNMPC as provided by the Bruno et al.



Advanced Satellite Communications

OCTOBER 18, 2024

Biography

Piyush Chaubey received the B. Tech degree in Electrical & Electronics Engineering from UP Technical University, Lucknow, (U P) INDIA in 2009 and the M.Tech degree in Control System Engineering from National Institute of Technology, Kurukshetra, (Haryana) INDIA in 2011. He is currently working towards his Ph.D. degree in Electrical Engineering Department from Pandit Deendayal Energy University, Gandhinagar, (Gujarat) India. He is also working as an Assistant Professor in Electrical Engineering Department at Government Engineering College, Bharatpur, (Rajasthan) India. Bharatpur is famous for Keoladeo National Park listed under UNESCO world Heritage center. Previously, he also worked in Electrical Engineering Department at Women Government Engineering College, Ajmer (Rajasthan) India as a TEQIP Faculty under the project - TEQIP III funded jointly by World Bank, Washington DC, USA and Government of INDIA from 2018 to 2021. His research interests include learning based predictive control and their applications to multiagent systems.



A hybrid approach for solving a two level location allocation and a static dial-a-ride problem

Kirti Sharma¹, V.P. Singh², Ali Ebrahimnejad³ and Debjani Chakraborty⁴

¹K.R. Mangalam University, India

²Visvesvaraya National Institute of Technology, India

³Qaemshahr Branch, Islamic Azad University, Iran

⁴Indian Institute of Technology, India

The work is concerned with the two-level modelling of the service set-up planning of a logistic service provider company. The problem discussed is a combination of location allocation problem and a static dial-a-ride problem. The objective of the upper level decision maker is to decide the location of customer service centres in a city that maximizes the service coverage. The problem at the lower level comprises of a set of pickup locations and a corresponding set of drop locations for a given set of customers. The objective of the lower level decision maker is to design routes in such a way that satisfies the needs of all the customers in the network (picking them up from pickup locations and dropping them off at their corresponding drop locations) without violating the constraints. The transportation service at second level is carried out by vehicles providing shared service. The problem consists of designing a set of minimum-cost vehicle routes satisfying capacity, precedence and pairing constraints. In this work, a solution methodology based on the combination of K-means algorithm and nearest neighbour approach is proposed to solve the proposed problem. The problem finds its application in door-to-door transportation for elderly and disabled people. The problem can also be used by private sharing cab provider companies to generate efficient routes for a given set of customers.

Biography

Ms. Kirti Sharma is a distinguished researcher in the field of Operations Research within Mathematics. With her master's and doctorate from Visvesvaraya National Institute of Technology, Nagpur, she has emerged as a trailblazer in applying mathematical models to real-world challenges. Sharma's work, featured in esteemed journals such as Expert System with Applications, Soft Computing, Complex and Intelligent Systems, RAIRO-Operations Research and various others, reflects a commitment to advancing optimization methodologies. She is currently working as an Assistant Professor in the School of Basic and Applied Sciences, K.R. Mangalam University.



Worldview-3 satellite imagery for mineral mapping in sparsely vegetated South Purulia Shear Zone

Pankajini Mahanta¹ and Sabyasachi Maiti²

¹Fakir Mohan University, India

²Indian Institute of Technology, India

World view-3 satellite imagery captures the spectral details of material in 16 bands covering the visible to shortwave infrared wavelength region host significant potentiality for mineral mapping. It provides data with 1.24m spatial resolution in 8bands for visible-NIR region covering wavelength from 425nm to 950nm. Additionally, the SWIR bundle provides the data with 7.5m spatial resolution for region covering wavelength from 1210nm to 2330nm. The study area, South Purulia Shear Zone marks the boundary between Chottanagpur Granite Gneissic Complex and North Singhbhum mobile Belt is relatively unexplored promising zone of polymetallic type mineral deposits. It is marked by highly sheared and deformed rock assemblages including mica chlorite sericite schist, granite & gneiss, laterite, hydrothermal & fault breccia, amphibolite, and quartzite. Covering a vast area, SPSZ forms an East-west trending arcuate belt, stretching over 120 km in length and 4 to 5 km in width. Mineralization in this area is intricately tied to the shear zone and locally developed hydrothermal systems. Selective PCA on various band combination is utilized to map the assemblage of hydrothermal alteration minerals. Standard deviation classification proved to be an important method for highlighting the hydrothermal alteration zone of the study area. SAM and SID methods are further employed on World view 3 data for mapping various geological units. SPCA demonstrate efficacy in mapping alterations in vegetated terrains by supressing the effect of vegetation. Alteration proxies derived from SPCA (Al-OH, Fe-OH, Mg-OH, Fe²⁺, and Fe³⁺ anomaly zones), SID and SAM classification combinedly help to map the dominant alteration zones. The most commonly encountered hydrothermal alterations include argillization, ferruginisation, and silicification, with less developed zone of chloritization and sericitization. Image interpretation was validated through field inspections. Spectroscopic analysis and X-ray diffraction studies along with petrographic microscopic study support the remote sensing results by confirming the presence of various alteration mineral phases and their specific assemblages in the study area. SPCA applied with WV-3 data prove particularly useful for targeting small-scale hydrothermal-type mineral resources in the sparsely vegetated regions of the South Purulia Shear Zone. In conclusion, this research aims to contribute valuable insights and findings to the scientific community.

Advanced Satellite Communications

OCTOBER 18, 2024

Biography

Current Position:

Assistant Professor at Fakir Mohan University, Balasore, Odisha, India-756020

Former Affiliation:

Research Fellow at Indian Institute of Technology, Kharagpur

Academic Background:

- PhD (2020) in Remote Sensing and Earth Sciences from IIT Kharagpur

Thesis Title: Integrated field, Remote sensing and GIS-based approach for hydrothermal alteration mapping of South Purulia Shear Zone: Implication for mineral exploration

- M.Sc. Tech (2013) in Applied Geology from Indian School of Mines, Dhanbad

- B.Sc. (2010) in Geology honors from D.D. Autonomous college, Keonjhar (NOU, Odisha)

Research Expertise:

- Remote Sensing
- Mineral Exploration
- Hydrothermal Alteration Mapping
- Reflectance Spectroscopy
- Suspended Sediment Mapping
- Shoreline Change Analysis
- Application of Machine Learning for Geological Problem Solving

Academic Achievements (Awards/Fellowships):

- Assistant Professor at F.M. University (2022 onwards)
- Senior Research Fellow (Jan 2020 to Jan 2022)
- INSTITUTE RESEARCH Scholar (2013-2020)
- Qualified CSIR-UGC NET (Rank-26/306, LS)
- Qualified GATE-2013, 2014.
- Qualified JAM-2010 and ISM entrance

Conference Contributions:

Dr. Mahanta has made significant contributions to the field of Remote Sensing and Earth Sciences, as evidenced by the publication of research papers and presentations at both national and international conferences. Her expertise in integrating fieldwork, Remote sensing, and GIS for hydrothermal alteration mapping has practical implications for mineral exploration.



The effect of mixing components on mechanical properties of eco-friendly Strain Hardening Cementitious Composites

Shirin Maleki and Kiachehr Behfarnia

Department of Civil Engineering, Isfahan University of Technology (IUT), Iran

Many attempts over the past few decades to enhance the performance of fiber-reinforced concrete (FRC) have resulted in the development of a new class of concrete known as strain hardening cementitious composites (SHCCs). The most significant characteristics of these materials are their various cracking tendencies and strain hardening. In this research, the amount of cement used was reduced by employing high-volume slag and limestone, which made SHCC more cost-effective and environmentally benign. The purpose of this study was to investigate the effect of aggregate type and micro-silica on the mechanical properties of SHCC made of PP fibers. Six mixtures were designed and tested for flowability, density of the freshly mixed SHCC, compressive strength, and flexural strength. Three 50 mm cubic specimens and two 30 x 100 x 350 mm prism specimens were made for the compressive strength and four-point bending tests, respectively, from each mixture. The specimens were tested at 14, 28, and 60 days of age. The results demonstrated that adding 15% of the cement's weight to micro-silica improved ductility and compressive strength. The early compressive strength and the ductility of SHCC are enhanced by the use of limestone powder as a filler. SHCC's ductility, absorbed energy, and compressive strength are all negatively impacted by aggregate enlargement.

Biography

Shirin Maleki is a Ph.D. candidate student of civil engineering in the major of earthquake and structural engineering at the Isfahan University of Technology, Iran. Her PhD thesis will be done under the supervision of Prof. Davood Mostofinejad (a professor at the Isfahan University of Technology) and Mohammad Reza Eftekhari (an assistant professor in the Civil Engineering Department). Her master thesis is about "The effect of slab on the conventional coupling beam with/without strengthening under lateral quasi-static load".

She completed her master's degree in the major of earthquake and structural engineering at the Isfahan University of Technology, Iran. Her master thesis was about "The Effect of Mixing Components on Mechanical Properties and Durability Against the Freeze-Thaw Cycling of Engineered Cementitious Composite". The purpose of this research was to make economical concrete with strain hardening behavior by using local materials.



Educational robotic for a sustainable future

Um Albaneen Yusuf Jamali

Hajer Primary Girls School, The Kingdom of Bahrain

Sustainable development as one of the world's greatest challenges is attracting increasing attention from both researchers and educators across the world. The world has limited resources which necessitate either producing creative products or developing creative ways to benefit from these limited resources. As its apparent sustainable development and creativity are closely interlinked, and hence, the imperative need for redesigning educational curricula is felt clearly. The current paper sheds light on attempts to do so by introducing Artificial Intelligence AI and robotics into curriculum. The paper presents a research study exploring the impact of robotics programs on fostering creativity among primary school pupils. The study conducted over four months, and employed a mixed methodology combining pre-post CAP testing and interviews and observational analysis. The study sample comprised 60 female students, aged 10 to 12, from a middle socio-economic background. The participants were randomly divided into control and treatment groups. The students in the treatment group were introduced to LEGO and Arduino robotics program, while the students in the control group did not participate in any robotics program. The results from the pre-post tests indicated that the robotics program, significantly enhanced creativity thinking skills including fluency, flexibility, originality, and elaboration. The paper offers insights for education policymakers while recommends applying Robotics in the Curriculum at schools.

Biography

A specialist in education of gifted and talented students since 2006. An MA graduate in Educational Leadership and Management from the University of Nottingham- England. The kingdom of Bahrain's delegate at the World Council for Gifted and Talented Children WCGTC, a board member of Arabic Council for Gifted and talented. A reviewer of EMAL- SAGE publication (Q1 peer reviewed magazine). An author of several open access books and articles in the field of robotics and creativity. A member of GLOBE International STEM Network (GISN). She has obtained the distinguished teacher regional award in 2020. She has presented in 12 international conferences worldwide.



Alphabet sign Language recognition for Arabic and American language

Fatma Zohra CHELALI and Salah Eddine AGAB

Faculty of Electrical Engineering, Speech communication and Signal processing laboratory, University of Science and technology Houari Boumediene (USTHB), Algeria.

Human machine interfaces HMI and man to man M2M communication systems mediated by machine are multimodal. The speech Modality is a central element and can be combined with other visual or gesture modalities.

Hearing impaired people, Deaf and dumb people face struggle in expressing their feelings to other people, in particular for children who have difficulty communicating in schools. Artificial intelligence aims to create a system capable of recognizing sign or speech in addition to the visual modality.

This work considers different architectures to implement the gesture recognition system, where the first architecture applies individual descriptors such as Discrete Wavelet Transform (DWT), Dual Tree Complex Wavelet Transform (DT-CWT) as well as the Histogram of Oriented Gradients (HOG), to characterize the gestures. Whereas, the second architecture combines two individual descriptors to form a new feature vector, namely DWT + HOG and DT-CWT + HOG. The resulting individual and combined features are fed to five classifiers, MLP, RBNN, PNN, SVM, as well as Random Forest classifiers, to achieve better performance in terms of recognition rate and processing time.

Experimental evaluation is performed on four datasets composed of alphabet signs and dynamic gestures. For the static form, two sign language datasets with simple background were used, the first contains 10 alphabets from the American Sign Language, and the second contains 30 alphabets from the Arabic Sign Language, for the dynamic form, we used two different datasets, the first contains 4 different classes, where each class is defined by 12 video sequences with 55 frames each, the second contains 3 different gestures, each gesture is repeated in 3 different motions, which provides 9 classes recorded with 5 different illumination settings.

The obtained results demonstrate the efficiency of the combined features, for which the achieved recognition rates were comparable to the state-of-the-art. We have demonstrated that the combined features DT-CWT + HOG performed much better in terms of both accuracy rate and execution times

Advanced Satellite Communications

OCTOBER 18, 2024

than the individual descriptors. In addition, we compared results obtained with other recent work in this area.

Biography

Fatma Zohra Chelali received her engineering degree in electronic engineering from university of science and technology Houari Boumedienne of Algiers; ALGERIA (USTHB) in 1994.

She worked as Assistant teacher in the high school of Aeronautical Technicians from 1997 to 2008, She taught courses on Analog and digital telecommunications systems, digital electronics, principal functions in electronics and Microwave systems. She spent a year of post-graduation from 2002 to 2003. Then, she received a “magister” degree and doctorate degree in speech communication from electronic engineering and computing faculty (USTHB) in 2006 and 2012. She graduated Full professor in July 2023. Currently, she is a lecturer in Electrical Engineering Faculty, at University of Science and Technology (USTHB) of Algiers, Algeria.

Her name appears in Who's who in the world since 2012 and in the International Biographical center of Cambridge IBC since 2013. She has also been reviewer for some papers in different IET and Elsevier journal. She has been graduated to IEEE senior She member in September 2017. She served IEEE Algeria section since 2015.



The role of AI in transforming modern Robotics: Challenges and opportunities

Naga Siva Jyothi Kompalli

Sreenidhi Institute of Science and Technology, India

Artificial Intelligence (AI) is revolutionizing the field of robotics, enabling the development of highly autonomous, intelligent, and adaptive robotic systems. This presentation explores the transformative impact of AI on modern robotics, focusing on the latest advancements, practical applications, challenges, and future opportunities. The objective is to provide a comprehensive overview of how AI-driven robotics is reshaping industries, enhancing human-robot interaction, and addressing complex real-world problems.

The scope of this talk includes key AI techniques such as machine learning, deep learning, reinforcement learning, and computer vision, which are instrumental in improving robot perception, decision-making, and manipulation capabilities. We will also delve into the integration of AI in various sectors, including manufacturing, healthcare, logistics, and autonomous vehicles.

Methods discussed involve the use of neural networks for image recognition and object detection, reinforcement learning algorithms for autonomous navigation, and sensor fusion techniques for enhanced environmental perception. Real-world case studies will illustrate the successful implementation of AI in robotics, highlighting both achievements and ongoing challenges.

Our results indicate significant improvements in robotic performance and efficiency, with AI enabling robots to perform complex tasks with greater accuracy and adaptability. For instance, Figure 1 demonstrates the enhanced precision in robotic grasping achieved through deep learning algorithms. Table 1 presents a comparative analysis of traditional vs. AI-powered robotic systems across various performance metrics.

In conclusion, while AI has substantially advanced the capabilities of modern robots, several challenges such as data dependency, computational demands, and ethical concerns remain. Addressing these issues is crucial for the continued growth and safe deployment of AI-driven robotics. This presentation aims to shed light on the current state of AI in robotics and inspire further innovation and collaboration in this dynamic field.

Advanced Satellite Communications

OCTOBER 18, 2024

Biography

Dr. P.N. Siva Jyothi is an Associate Professor in the Department of Information Technology at Sreenidhi Institute of Science and Technology (SNIST), Hyderabad. With a Ph.D. in Combinative Classification Techniques for Efficient Image Texture Analysis, completed in 2021, she brings extensive expertise in AI, machine learning, and image processing. Since joining SNIST in 2013, Dr. P. N. Siva Jyothi has been instrumental in mentoring students, coordinating major projects, and organizing workshops and seminars. Her research interests include Blockchain, IoT, and data science, with numerous publications in reputed journals and conferences. She has also published patents and books on deep learning and medical imaging. Dr. P. N. Siva Jyothi is an active member of several professional organizations and serves on editorial boards and as a reviewer for various journals. Her contributions to research and education have earned her several accolades, including the Research I Award at SNIST for the academic year 2022-2023.



An extensive analysis of satellite imagery for Deepfake detection

Preeti sharma¹, Manoj Kumar^{2,3} and Hitesh Kumar Sharma⁴

¹School of Computing, DIT University, India

²School of Computer Science, FEIS, University of Wollongong in Dubai, UAE

³MEU Research Unit, Middle East University, Jordan

⁴School of Computer Science, University of Petroleum and Energy Studies (UPES), India

Deepfake innovation, at first connected with engineered media like pictures and recordings, has now ventured into additional modern areas, including satellite symbolism. Advanced deep learning methods are used to manipulate or generate synthetic geospatial data in order to create deepfake satellite images that can deceive viewers by presenting altered landscapes or fabricated scenarios. In addition to being used to ridicule individuals or organizations, deepfakes are regarded as a potential threat to nations and their security. Deepfake technology is used to adjust geographic characteristics, remove or add infrastructure, and even create entirely new sceneries. Deepfake satellite imagery has the potential to have far-reaching consequences since the inaccurate data it includes may lead to false narratives in geopolitical situations, disrupt military operations, and mislead decision-makers. The increasing sophistication of these deepfakes complicates detection while also posing a substantial danger to the accuracy of satellite-based evaluations and decisions. As a result, mitigating this issue necessitates continual innovation and strong safeguards to assure the accuracy of satellite images in all applications. The threat of deepfake satellite imagery to national security, environmental monitoring, and urban planning is significant. The difficulties of detecting deepfake satellite images and an in-depth look at the detection methods used to deal with these new threats are the focus of this study. This paper also discusses on the rising dangers posed by deepfake satellite imagery and critically evaluates several detection approaches, emphasizing the importance of ongoing innovation in protecting the integrity of geospatial data.

Advanced Satellite Communications

OCTOBER 18, 2024

Biography

Dr. Preeti Sharma is a faculty member in the School of Computing at DIT Dehradun, where she has been contributing since July 2024. She earned her PhD from UPES Dehradun, with a research focus on deep-fake detection using neural networks, and was also the gold medalist for her M.Tech in Computer Science and Engineering from Uttarakhand Technical University, Dehradun. With over five years of experience, Dr. Sharma's expertise spans Machine Learning, Digital Image Processing, Deep Learning, Digital Forensics, Computer Vision, and particularly generative adversarial networks (GANs). Her research has been widely published in esteemed journals and conferences, and she received the Best Oral Presentation Award at the Research Conclave 2024 organized by UPES. Before joining DIT Dehradun, she served as a Junior Research Fellow at UPES, where she developed a strong foundation in advanced research and innovation. Dr. Sharma is dedicated to advancing the field of neural networks and mentoring the next generation of engineers and researchers. In addition to her academic pursuits, Dr. Sharma is dedicated to mentoring the next generation of engineers and researchers, fostering a collaborative environment that encourages innovation and critical thinking. Her contributions to the field are not only advancing current technologies but also shaping the future of computer science and engineering.



A Methodology for Transformation Between Geodetic Datums Used in Syria

Al-Kasem. Shaza, Ramadan A. Al-Razzak and Jibrini. Hasan

Department of Topographic Engineering, Faculty of Civil Engineering, Aleppo University, Syria

Global Navigation satellite system (GNSS) provides geodetic coordinates referenced to the world ellipsoid WGS84, whereas positions are computed on the local ellipsoid adopted for geodetic computation in various countries. Thus, to take advantage of GNSS in geodetic applications, the need arises to transform coordinates from the global ellipsoid to the local ellipsoid. This is usually carried out by applying geometric transformations models to convert coordinates from The Global Geodetic System WGS84 into the local systems used in each country of the world and into the grid coordinates of local systems. Over the past years, with the increasing of utilization of GNSS in a number of geodetic projects, a numerous of methodologies are available for the solution of transformations issue. These methods can be classified into three categories, the first is based on direct mathematical formulas, the second on iteration approaches and the last category depends on direct transformation from the global system to the local system based on the calculation of transformation parameters (three, seven, nine...). In this study, a methodology has been proposed for direct transformation from global geodetic coordinates to local geodetic coordinates for a limited area in Syria. It's based on the properties of the ratio and proportion between the geometrical elements of points on global and local ellipsoid without calculation of transformation parameters. The results are compared with some studied method (Bursa-wolf, Molodensky abridge and Cassini). The resulting accuracy is about ± 3.5 cm. The main conclusion drawn is that, the proposed method provides a promising alternative in coordinates transformation. Therefore, the capability of the suggested methodology as a powerful method for converting geodetic coordinates from referenced frame to another has been demonstrated in this present study.

Biography

Shaza Al-Kasem recently graduated with a PhD in Topographic Engineering. She was born and raised in Syria and went on to pursue a bachelor's degree in civil engineering, *Department of Topographic Engineering* at the University of Aleppo. Due to the crisis in Syria, her master's study was halted for several years before. She returned to finish her degree and pursue a PhD five years ago. In addition to her work as a TA, she published multiple academic articles in her field and participated in The 8th Smart City Applications International Conference which was held in ESTP, Paris, France, 04-06 October 2023. She currently resides in Jeddah, Saudi Arabia.



High-throughput organo-on-pillar (high-TOP) array system for three-dimensional ex vivo drug testing

Jin-Ku Lee^{2,3}, Hye Ryeong Jun¹, Hyun Ju Kang², Sung Hun Ju¹, Jung Eun Kim¹, Sang Youl Jeon¹, Bosung Ku¹, Jae Jun Lee², Minsung Kim³, Min Jeong Kim⁴, Jung-Joo Choi⁴, Joseph Noh⁴, Hyun-Soo Kim⁵, Jeong-Won Lee⁴ and Dong Woo Lee^{1,6}

¹Institute, Countr a Central R & D Center, Medical & Bio Decision (MBD) Co., Ltd.; South Korea

²Genomic Medicine Institute, Medical Research Center, South Korea

³Department of Biomedical Sciences, Seoul National University College of Medicine, South Korea

⁴Gynecologic Cancer Center, Department of Obstetrics and Gynecology, South Korea

⁵Department of Pathology, Samsung Medical Center, South Korea

⁶Department of Biomedical Engineering, Gachon University, South Korea

Objectives & Scope: The development of organoid culture technologies has triggered industrial interest in ex vivo drug test-guided clinical response prediction for precision cancer therapy. The three-dimensional culture encapsulated with basement membrane (BM) components is extremely important in establishing ex vivo organoids and drug sensitivity tests because the BM components confer essential structures resembling tumor histopathology. Although numerous studies have demonstrated three-dimensional culture-based drug screening methods, establishing a large-scale drug-screening platform with matrix-encapsulated tumor cells is challenging because the arrangement of microspots of a matrix–cell droplet onto each well of a microwell plate is inconsistent and difficult to standardize. In addition, relatively low scales and lack of reproducibility discourage the application of three-dimensional organoid-based drug screening data for precision treatment or drug discovery. To overcome these limitations, we manufactured an automated organospotter-integrated high-throughput organo-on-pillar (high-TOP) drug-screening platform.

Methods & Results: Our system is compatible with various extracellular matrices, including BM extract, Matrigel, collagen, and hydrogel. In addition, it can be readily utilized for high-content analyses by simply exchanging the bottom plates without disrupting the domes. Our system demonstrated

Advanced Satellite Communications

OCTOBER 18, 2024

considerable robustness, consistency, reproducibility, and biological relevancy in three-dimensional drug sensitivity analyses using Matrigel-encapsulated ovarian cancer cell lines. We also demonstrated proof-of-concept cases representing the clinical feasibility of high-TOP-assisted *ex vivo* drug tests linked to clinical chemo-response in ovarian cancer patients.

Conclusion: Our platform provides an automated and standardized method for *ex vivo* drug-sensitivity-guided clinical response prediction, suggesting effective chemotherapy regimens for patients with cancer.

Biography

Jin-Ku Lee is an associate professor at the Department of Biomedical Sciences, Anatomy and Cell Biology, Seoul National University College of Medicine (SNUCM), Seoul, South Korea. He achieved both M.D. (2003) and Ph.D. (2013) at SNU. His research fields of interests were cancer genomics and pharmacogenomic analysis using patient-derived tumor models for precision oncology. In respect to these research areas, he has published numerous SCI(E) articles, including Nature genetics papers (2017, 2018), Genome Biology (2019), and Biomaterials (2023). In particular, his lab is focused on developing cutting-edge technologies in patient tumor organoid cultures and 3D-based drug screening.

Advanced Satellite Communications

OCTOBER 18, 2024



Problems and peculiarities of correction of satellite water level measurements based on the results of *in-situ* observations (lakes and reservoirs of Russia as a case study)

Valery Vuglinsky

State Hydrological Institute, Russian Federation, Russia

Using the example of lakes and reservoirs in Russia, the causes and sources of errors in satellite and *in-situ* water level data, techniques for comparing and analyzing long-term series of these data, methods for adapting satellite observations to improve their accuracy and problems, the solution of which will contribute to improving the reliability of satellite observations. This study uses water level data obtained as a result of processing the altimetric measurements using a software product developed by the French LEGOS Laboratory. The basics of the methodology for correcting satellite data on water level were developed in the LEGOS laboratory and, later, it was developed in the joint work of this laboratory and the Russian State Hydrological Institute.

The first stage of the work on correcting satellite data is the analysis of the available long-term series of satellite observations. Based on its results, the calculation period is determined jointly with the *in-situ* data, the observation posts, the data of which will be used for mutual comparisons, as well as the calculated time interval when comparing long-term series. Each satellite measurement is "linked" to the value of the urgent, daily or mean monthly level obtained from the results of ground measurements on the corresponding date. In order to fill in the remaining gaps in the satellite series, various interpolation methods are used. After filling in the gaps, a "basic" long-term series of satellite values is formed, which is subjected to statistical analysis in order to remove doubtful and erroneous values. The interquartile range between the first and third quartiles is used as a statistical characteristic of the spread of the members of the series. All values that lie outside the one-and-a-half span of this interval are considered as random "outliers" and must be removed from the series.

In order to initially verify the correspondence of the obtained "basic" satellite series to the series of *in-situ* observations, joint chronological graphs of changes in water levels over the period of joint observations are being built. Such graphs clearly show the periods and the extent of deviations between satellite and terrestrial data. If systematic errors are detected in the satellite series, all their values are corrected by introducing appropriate corrections. The resulting "transformed" satellite series are checked for representativeness by comparing their statistical parameters with similar

Advanced Satellite Communications

OCTOBER 18, 2024

parameters of long-term series of terrestrial data. The standard deviation and the coefficient of paired linear correlation are considered as such parameters.

The article presents the results of the application of the above-discussed methodology for correcting satellite data on water levels using the example of 30 lakes and reservoirs of Russia of different sizes. The best results were obtained for large lakes such as Lake Ladoga and Lake Onega. It is shown that the developed technique makes it possible in many cases to obtain representative satellite long-term series of daily and monthly average values of water levels of terrestrial lakes and reservoirs, which correspond to accepted statistical criteria of uniformity and can be used by consumers to solve scientific and applied tasks.

Biography

Vuglinsky Valery Sergeevich born on March 06, 1939 in Moscow.

Education, academic degrees and titles:

- Graduated from Leningrad State University in 1966.
- Since 1972 – PHD of Technical Sciences «hydraulics and engineering hydrology».
- Since 1991 - Doctor of Geographical Sciences «land hydrology, water resources, and hydrochemistry».
- Since 1994 - professor.
- Full member of the International Academy of Informatization since 1996, and a full member of the Russian Academy of Natural Sciences since 2012.
- Honored Meteorologist of the Russian Federation.

Positions held:

Since 1967 - Russian State Hydrological Institute – RSHI (main place of work). From 1982 to 2017 – Deputy Director of the Institute, since 2017 – Chief Researcher.

Since 2009 – Head of the WMO International Dana Center on Hydrology of Lakes and Reservoirs (HYDROLARE), operating as part of the RSHI..

Since 1976 - St. Petersburg State University (part-time job). Faculty of Geography, Department of Land Hydrology. Positions: senior researcher, associate professor; from 1989 to 2012 Head of the department, from 2012 to 2022 – Professor of the department.

Scientific interests:

Land hydrology (water resources and water balance of river catchments, hydrology of lakes and reservoirs, water cadastre, hydroecological problems of inland reservoirs, general issues of land hydrology).

Main publications:

The total number of scientific publications is more than 180.

The main monographs and textbooks:

The water balance of river basins. L., Hydrometeoizdat, 1982 (co-author V.I.Babkin). Guidelines for hydrological calculations in reservoir design. L., Hydrometeoizdat, 1983 (as part of the team of authors).

Water resources of the USSR and their use. L. Hydrometeoizdat, 1987 (as part of the team of authors).

Water resources and water balance of large reservoirs of the USSR L, Hydrometeoizdat, 1991 The doctrine of the hydrosphere. LAMBERT Academic Publishing, 2015 (co-author V.I. Babkin).

International experience:

Since 1972, - participated in international projects through WMO, UNESCO IHP and GCOS. Currently - a member of the international scientific coordination groups for Arctic-HYCOS, GTN-H. Participation in numerous international meetings, seminars, symposiums, conferences with reports and presentations.



A Privacy-preserving federated learning framework with lightweight and fair in IoT

Yuan Ping³, Yange Chen¹, Lei Liu², Mohammed Atiquzzaman⁴, Shahid Mumtaz⁵, Zhili Zhang⁶, Mohsen Guizani⁷ and Zhihong Tian⁸

^{1,3,6}Xuchang University, China

²Xidian University, China

⁴University of Oklahoma, Norman

⁵Silesian University of Technology Akademicka, Poland

⁷Mohamed Bin Zayed University of Artificial Intelligence, UAE

⁸Guangzhou University, China

Federated learning offers a partial safeguard for participants' data privacy. Nevertheless, the current absence of an efficient privacy-preserving federated learning technology tailored for the Internet of Things (IoT) poses a challenge. Numerous privacy-preserving federated learning frameworks have been proposed, primarily relying on homomorphic cryptosystems, yet their suitability for IoT remains limited. Furthermore, the application of federated learning in IoT confronts two significant obstacles: mitigating the substantial communication costs and communication failure rates and effectively discerning and utilizing high-quality data while discarding low-quality data for collaborative modeling purposes. To address these challenges, this paper introduces a privacy-preserving optimal aggregation federated learning framework that relies on the utilization of the multi-key EC-ElGamal cryptosystem (MEEC) and the federated sum optimization algorithm (FSOA), which are characterized by their lightweight nature and fair properties. The proposed MEEC approach aims to tackle the issue of multi-key collaborative computing within the context of federated learning, thereby resulting in reduced communication costs and enhanced communication efficiency. This is achieved through the leverage of the EC-ElGamal cryptosystem, known for its ability to generate short keys and ciphertexts. Furthermore, this paper presents a dynamic federated learning framework incorporating user dynamic quit and join algorithms. The primary objective of this framework is to mitigate the adverse effects of communication failures and enhance power computation on IoT devices. Additionally, an FSOA is devised to ensure the acquisition of optimal training data, thereby preventing the inclusion of low-quality data in the training process. Subsequently, the proposed scheme undergoes rigorous se-

Advanced Satellite Communications

OCTOBER 18, 2024

curity analysis and performance evaluation. The results unequivocally demonstrate that our scheme outperforms existing solutions in terms of security, practicality, and efficiency with lower communication and computational costs.

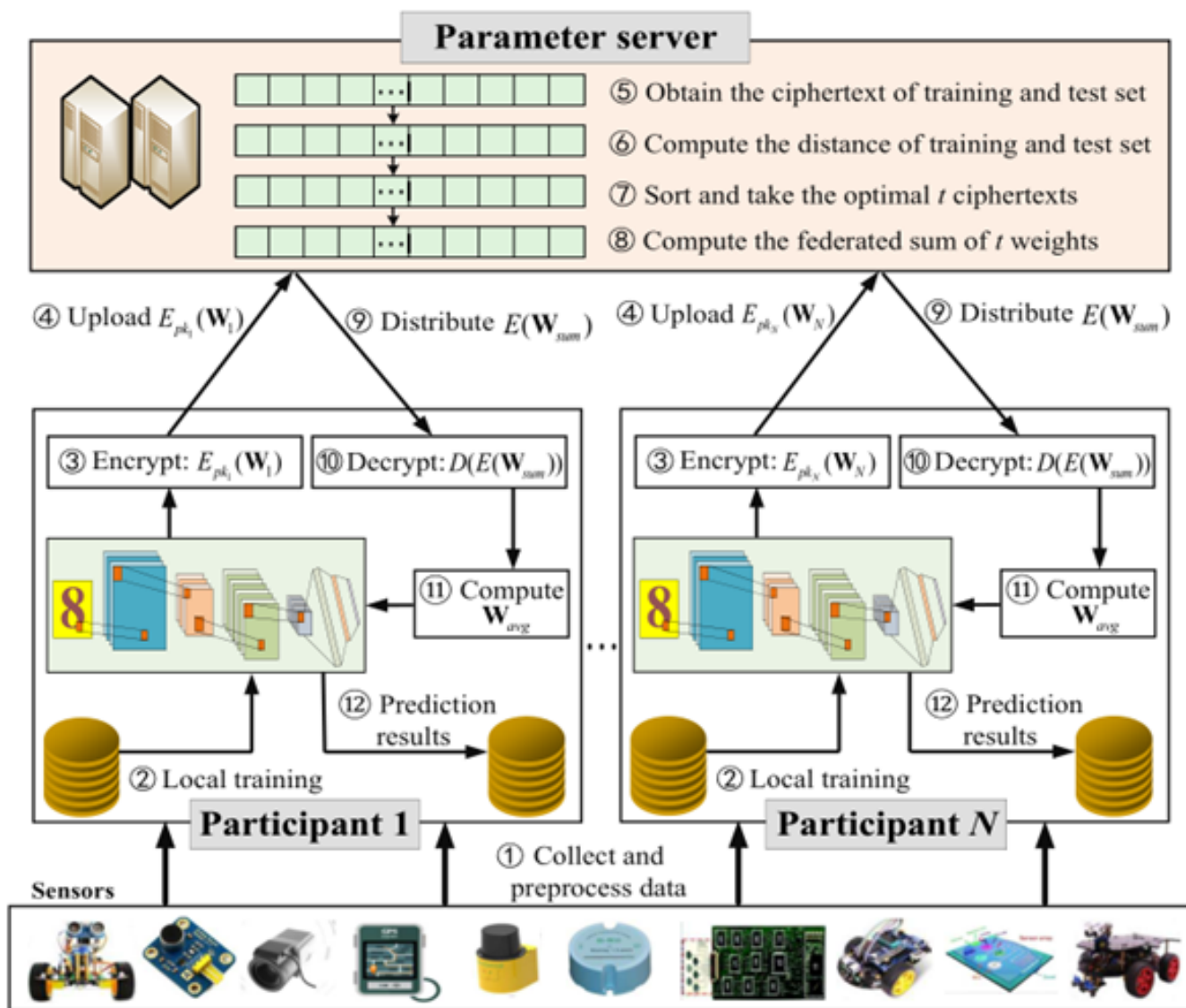


TABLE VI: Computational cost comparison with the weights number variation

scheme	1000	2000	3000	4000	5000	6000	7000	8000
Zhang et al. [23]	5270.03	10540.03	15810.03	21080.03	26350.03	31620.03	36890.03	42160.03
Chen et al. [44]	25277.91	10547.91	15817.91	21087.91	26357.91	31627.91	36897.91	42167.91
Tang et al. [45]	8854.05	17694.05	26534.05	35374.05	44214.05	53054.05	61894.05	70734.05
Ours	3137.31	6272.31	9407.31	12542.31	15677.31	18812.31	21947.31	25082.31

Advanced Satellite Communications

OCTOBER 18, 2024

Biography

Yuan Ping received the B.S. degree in electronics and information engineering from Southwest Normal University, in 2003, the M.S. degree in mathematics from Henan University, in 2008, and the Ph.D. degree in information security from the Beijing University of Posts and Telecommunications, in 2012. He has been a Visiting Professor at Dublin City University, University of Louisiana at Lafayette, and University of Alberta. He is currently a Professor with Xuchang University. He has published more than 85 papers in IEEE Transactions on Network and Service Management, Pattern Recognition, Computers & Security, etc. His research interests include machine learning, data privacy and security, network security, and cloud and edge computing.



CFx_MnO₂ hybrid cathode for lithium primary batteries used in landers

Katia Guérin¹, Louise Dauga¹, Diane Delbègue², Yannick Borthomieu³ and Marc Dubois¹

¹Institut de Chimie de Clermont-Ferrand, Université Clermont Auvergne, CNRS, France

²Centre National des Etudes Spatiales, France

³SAFT, Space and Defense Division, France

CFx_MnO₂ hybrid cathode materials are prepared from a (C₂F)_n-type graphite fluoride (CFx) and industrial MnO₂. Because of its physicochemical (insulating behavior, low content of CF₂ and CF₃ groups, no or a few remaining sp₂ carbon atoms) and electrochemical properties (flat plateau on galvanostatic curve and theoretical capacity of 623 mAh/g, higher than other conventional cathodes for primary lithium battery), graphite fluoride of (C₂F)_n-type is selected to evidence synergetic effects with MnO₂ that occur at the fluoride/oxide and electrolyte/ electrode interfaces. Both materials are mixed by mechanical ball-milling using different sets of parameters. The hybrid material presents very good electrochemical properties with a maximum energy density of about 1600 Wh per kg of active material. Notably, it shows a considerable improvement in voltage plateau and voltage delay compared to CFx. The parameters applied during ball-milling also shape the electrochemical performance of the new hybrid material. Ball milling increases the average discharge voltage plateau, and the power density of the battery, and avoids ohmic drop which may cause a battery to be eliminated as soon as it begins to discharge. More finely, electrochemical impedance spectroscopy shows that pushed grinding leads to more homogeneous but more polarized material-electrolyte interfaces so better diffusion and capacity but lower discharge potential.

Biography

Katia Guérin Araujo da Silva is a full professor of the Clermont Auvergne University.

After getting the title of engineer from ENSCPB school, she received her Ph. D in chemical physics at Bordeaux University in 1999. She worked on lithium-ion insertion mechanism into graphite and hard carbons through solid state NMR and Raman spectroscopies.

Her research activities are now focused on solid-gas fluorine chemistry to discover new materials usable mainly in electrochemical energy storage materials in batteries, fuel cells and supercapacitors.



Calculation of thermal-hydraulic efficiency of porous direct-flow steam generators with Freon-12 coolant in the turbulent area of motion at the channel input and under boundary conditions of the third kind

Anatoly P. Lukisha

M.S. Poliakov Institute of Geotechnical Mechanics of the National Academy of Sciences of Ukraine, Ukraine

The paper presents the results of a numerical calculation of the thermal-hydraulic efficiency of direct-flow porous steam generators in the turbulent zone of coolant movement at the channel inlet, operating on freon-12 coolant and under boundary conditions of the third kind. Cylindrical smooth-walled channels of different diameters were taken as a basis for comparison. In the course of the calculations, it was shown that porous freon steam generators can have higher values of both geometric and energy efficiency coefficients compared to standard smooth-walled channels at the same coolant mass flow rate. Freon-12 was chosen as a model working fluid, since freon coolants, due to the peculiarities of their thermophysical properties, can provide positive values of not only geometric, but also energy efficiency coefficients, which is not possible, for example, for the coolant water. The ratio of the length of a smooth-walled once-through steam generator to the length of a porous once-through steam generator was taken as a geometric efficiency coefficient. The ratio of the pressure drop in a smooth-walled channel to the pressure drop in a porous channel was taken as the energy efficiency coefficient. During the implementation of the computational model, it was shown that the problem is multi-parameter. The values of the efficiency coefficients of porous freon steam generators are influenced by the values of parameters such as porosity, Reynolds number at the channel inlet, channel diameter, the difference between the ambient temperature and the liquid temperature at the channel inlet, as well as the Bio criterion, which characterizes the intensity of heat exchange between the environment and channel wall. During the calculations, the values of the defining parameters changed in the following ranges: Reynolds number at the entrance to the channel $Re_0 = 10 \times 10^3$; 20×10^3 ; 30×10^3 ; 40×10^3 ; 50×10^3 ; Porosity $\theta = 0.9$; 0.85 ; 0.8 ; 0.75 ; 0.7 ; the difference between the ambient temperature and the liquid temperature at the inlet to the steam generator $\Delta t = 1$; 2 ; 3 ; 4 ; 5 °C; channel diameter $d = 3 \cdot 10^{-3}$; $4 \cdot 10^{-3}$; $5 \cdot 10^{-3}$; $6 \cdot 10^{-3}$ m; Bio criterion values: $Bi = 1 \cdot 10^6$; $1 \cdot 10^5$; $1 \cdot 10^4$; $1 \cdot 10^3$; $1 \cdot 10^2$. During the calculations, it was shown that with different ratios of the determining parameters, the geometric efficiency coefficients can reach values of more than 10, and the pressure drop in a porous channel compared to a smooth-walled channel can be several times less, due to the shorter channel length.

Advanced Satellite Communications

OCTOBER 18, 2024

Biography

Dr. Anatoly P. Lukisha. Was born on February 19, 1960 in Dnipropetrovsk, Ukraine. In 1983 I graduated the Dnipropetrovsk State University on a specialty "Aircraft engines". From 1983 to 1986 I studied as the post-graduate student at the professor Prisnyakov V. F., on the same specialty. From 1986 to 1991 I worked as an engineer, and then accepted position of junior researcher at the Dnipropetrovsk State University. From 1991 to 2008 I started working as lecturer, and then took position of senior lecturer on faculty of management of the Dnipropetrovsk State University. Since 2008 to 2024 I worked as the junior researcher, researcher and senior researcher at the M.S. Poliakov Institute of Geotechnical Mechanics of the National Academy of Sciences of Ukraine. I defended a dissertation for receiving of PHD in September 2010 at National Metallurgical Academy of Ukraine. The subject of the dissertation: "Pinch of energy efficiency of porous heat exchangers on the basis of a choice of rational constructive and regime parameters". Subject of my scientific interests are heat transfer, and hydrodynamics in porous materials with high thermal conductivity, thermo-hydraulic efficiency of porous high thermal conductivity heat exchangers and steam generators. In total, 46 scientific research works have been published, of which 5 articles were published in international scientific journals with the Scopus status, 2 articles were published in international periodicals. Took part in the work of 8 international scientific conferences.

Advanced Satellite Communications

OCTOBER 18, 2024



Considering caring as a safeguard in Artificial Intelligence

Russell Suereth

Salve Regina University, USA

The focus of this research is to consider whether a safeguard of caring can be designed into an artificial intelligent system. According to movies, books, and research experts, a superintelligence could harm humans in devastating ways. The purpose of safeguards is to keep such harmful situations from happening. The problem with safeguards in AI is that they are challenging to design. This article considers whether caring can be a safeguard in AI. It examines caring in our human world and how it has been vital to our existence. It also considers what caring could look like in AI and how we could begin to think about designing care in these systems. Additionally, it provides an overview of the LIDA cognitive architecture as a model for designing care in AI systems. The article employs a methodology focusing on a caring frame of mind and a caring environment for our work and research. This article contributes to the current research by creating a greater awareness of care as a safeguard and establishing an initial step toward designing care in AI. It shows that care is an essential aspect of our interactions with the world and how care can be a safeguard in AI.

Biography

Russell Suereth twines the fabric of technology and humanities at Salve Regina University, where he works on his dissertation. He has a master's degree in Critical and Creative Thinking from the University of Massachusetts, Boston, and a bachelor's degree in Philosophy from Boston University. His recent peer-reviewed journal publications include "Considering Caring as a Safeguard in Artificial Intelligence" and "Making and Using Technology: Shifting toward Possibility and Vision." He is the author of the McGraw-Hill book *Developing Natural Language Interfaces: Processing Human Conversations* and has published several articles for the *C Users Journal*. He is a long-time software developer and is the lead inventor of two United States-granted patents for a data integration process.



Robotics in education: Engaging young students in Robotics, Coding & AI

Open-Source Boston Dynamics Robotics Scratch Coding Interface

Lori Towle^{1,2}

¹Code & Circuit, Inc., USA

²Full Circle Classrooms, USA

In a world that is being transformed innovation and robotics, today's youth need opportunities that go beyond core school subjects to prepare to lead us into the high-tech future. This engaging presentation will share cutting edge work being performed by Code & Circuit to educate youth in robotics applications, machine learning, and AI integration. By attending this workshop, you will leave with open-source access to Scratch coding for high-tech robots such as Spot, The Boston Dynamics robotic dog, along with tools for how to engage young students in AI use with robots. What is more, see how robotics can increase engagement with neurodivergent populations of students in schools through results from a pilot study that focused on robotics as a tool to reach nonverbal learners and students on the Autism spectrum.

Biography

Dr. Lori Towle serves as the Executive Director of Code & Circuit, a nonprofit organization in Massachusetts, USA, dedicated to robotics and computer science for youth. She also serves as the founder of Full Circle Classrooms (FCC). FCC provides consulting, facilitation of workshops, and national/international conference presentations from which educators and school leaders gain tools to create effective, learner-centered landscapes using project-based learning as the modality. In conjunction with Code & Circuit, Lori travels to schools as a motivational speaker, actively engaging educators and students in brain-based learning and robotics workshops. With the Boston Dynamics robotic dog, Spot, at her side, students engage in cutting-edge work to code Spot, connect it to AI, and think innovatively about real-world applications. Lori completed her doctoral degree in Educational Leadership, served as a team leader for the XQ Super School initiative, and was a research lab member at MIT's Gabrieli Lab. Outside of work, Lori is the mother of two amazing daughters and is a professional pickleball player.



Securing the Autonomous future: Navigating data privacy and Security in Robotics

Taha Sajid

Founder: Xecurity Pulse, USA

Imagine a world where robots seamlessly navigate our homes, workplaces, and public spaces, collecting vast amounts of data to enhance our lives. While this vision of a fully autonomous future is tantalizing, it raises an unsettling question: Who is protecting the sensitive information that these intelligent machines gather? In this presentation, titled "Securing the Autonomous Future: Navigating Data Privacy and Security in Robotics," we will explore the critical challenges and solutions associated with safeguarding sensitive information in robotic applications.

The objective of this talk is to examine the nature of data collected by autonomous systems, including environmental data, user interactions, and operational metrics, while highlighting the potential risks posed by vulnerabilities in robotic systems, such as unauthorized access, data breaches, and malicious attacks.

We will employ a combination of case studies and industry best practices to analyze the regulatory landscape governing data privacy in robotics, including the General Data Protection Regulation (GDPR) and the California Consumer Privacy Act (CCPA). These frameworks are essential for ensuring compliance and building user trust.

To equip stakeholders with actionable insights, we will provide recommendations for implementing robust security measures, including encryption, access controls, and regular security audits. Additionally, we will explore emerging technologies, such as artificial intelligence and blockchain, that offer innovative approaches to enhancing data security.

By the end of this presentation, attendees will gain a comprehensive understanding of the importance of data privacy and security in the robotics industry, along with practical strategies to secure their autonomous future. Together, we can navigate these challenges and ensure that robotics technology advances while protecting individual and organizational privacy."

Advanced Satellite Communications

OCTOBER 18, 2024

Biography

Taha Sajid is a seasoned lead solution architect and security expert with extensive experience in guiding startups and securing national telecom infrastructures across South Asia, the Middle East, and North America. He specializes in developing innovative tech solutions, achieving regulatory compliance, and enhancing security postures in line with the Zero Trust Framework.

As the author of the best-selling *Ultimate Blockchain Security Handbook*, Taha shares valuable strategies for securing blockchain applications and mitigating crypto scams. He also offers highly rated online courses in cybersecurity tailored for telecom, blockchain, DeFi, and fintech.

As the founder of Xecurity Pulse, Taha empowers organizations to stay informed about the latest technological and cybersecurity advancements. His accolades include recognition in Marquis Who's Who, the Einstein Visa for Extraordinary Ability, and being named a Microsoft MVP and global thought leader in 5G, blockchain, and cybersecurity.



Early Identification of conflicts in the Chilean Fisheries and Aquaculture sector *via* text mining and machine learning techniques

Mauricio Figueroa Colarte

School of Informatics and Telecommunications, Fundación Instituto Profesional Duoc UC, Chile

This project tackles challenges in Chile's fishing and aquaculture sector, vital for both economic and social reasons. Aquaculture entrepreneurs and fishermen, spanning industrial to artisanal, depend on Chile's rich hydrobiological resources. They face issues due to regulatory limits, designed to preserve species and ecosystem balance. The objective is to assess machine-learning algorithms with text mining to create an AI model. This model will help the Undersecretariat of Fisheries and Aquaculture anticipate conflicts *via* early alerts.

The study employed the CRISP-DM methodology, focusing on a Neural Networks-based model, specifically the Multilayer Perceptron. This research surpassed its initial hypothesis, aiming for 70% accuracy in conflict classification. The model processed natural language from electronic media and Twitter, achieving 81.50% precision in conflict prediction. As a result, managers can now make more informed decisions to preemptively address conflicts with greater confidence.

Biography

Born in 1972, in Valparaíso, Chile. By profession Civil Engineer in Computer Science and Master in Information Technology. Experience of 27 years participating, leading projects and head offices for public and private companies in sectors such as fisheries and aquaculture, port maritime, customs, banking, insurance, among others. In the last 10 years, He have worked in the area of computer science with an emphasis on the digital transformation of the fishing sector, artificial intelligence, information security and improvements in citizen public services. 16 years of teaching and research in the area of Information Technology and its associated disciplines in prestigious universities and Institutes in Chile.



Bioelectric signal acquisition and classification system to generate intelligent prostheses

David Tinoco-Varela, Raúl Dalí Cruz Morales and Fernando Gudiño Peñaloza

1Facultad de Estudios Cuautitlán (FESC-UNAM), Mexico

Nowadays, in a world where artificial intelligence is found in different and very varied industrial and everyday applications, it is important to include it in control processes of devices such as prostheses, and so, such technological tools can improve the quality of life of different population sectors, such as people with different abilities. Starting from this fact, the development of a bioelectric signal acquisition system is presented. These signals are acquired from a user's arm and from which a set of characteristics is extracted. Characteristic are used to train a neural network which will be the one in charge of controlling an intelligent robotic hand. The neural network has been successful to identify 5 hand movements, replicating them in a robotic device.

The hardware for acquisition, filtering, and signal adaptation has been designed, as well as the software that processes the input data. The system extracts temporal and frequency characteristics of the signal in order to obtain input vectors that allow the artificial neural network to classify the data more accurately, achieving 93% effectiveness.

The presented proposal seeks to generate a fast and intelligent way to control different electronic, or robotic, devices through biometric elements, in this case bioelectric signals. With which it is expected to allow all types of people, including those who have lost limbs or who have suffered from an illness that limits their mobility, to interact with this type of technologies and devices in an easy way.

Biography

Professor at the Faculty of Higher Studies Cuautitlán, within the National Autonomous University of Mexico, assigned to the engineering department.

He has completed doctoral studies in computer science, working mainly in the areas of electronics, cryptography and artificial intelligence.

He has participated as leader of various research and development projects in Mexico.

He has been characterized by always seeking the transmission of knowledge, and in this way, he always seeks to encourage young students to enter into the scientific field.



A report on the study for rational and reliable pattern mining

Tongyuan Wang

TechEngine Plus Com, Montreal, Canada

The classic pattern mining is a fundamental topic and has been studied extensively for over 30 years but left with no reliable mining approach yet. This report will first present why the case is, and then what the author's study has found and what progress has made toward the reliable mining. It includes the appropriate pattern frequentness measure, the pattern generation mode, the adaptation and application of the equilibrium condition, and pattern frequency distribution theory. All the findings are well formed with no exogenous input but rigorous mathematic proofs. Furthermore, the findings extend some new conceptions and rethinking deeply on set theory and combinatorics, such that the study is not restricted in pattern mining itself but stretches to data science in general or even broader.

Biography

Tongyuan Wang, Ph. D, M. Sc., M. E., M. A., has studied and worked in multi fields. He got his first degree in civil engineering, then a Master in engineering management, both at Chongqing University of China in 1980s. He then worked in that university as a lecturer. Upon becoming a vice professor, he moved to Canada, where he obtained a M. A. in economics, and then he switched to computer science from Graduate Diploma to Master and Ph. D degrees, all at Concordia University by 2010. After graduation, he did not continue teaching career due to a condition there that a new Ph. D holder may starts as assistant profession without a care of previous work experience, He then works for startup company to date. During the course, he still keeps academic and industrial research. His main research interests include pattern mining and ecological smart city.

Advanced Satellite Communications

OCTOBER 18, 2024



Zero Trust security for 5G Service-Based Architectures: A cloud-native approach

Milind Gunjan

Amazon, USA

The emergence of 5G Service-Based Architectures (SBA) brings forth unique security challenges due to their cloud-native and distributed nature. Traditional security models are insufficient for these dynamic environments, necessitating a shift towards a Zero Trust approach. This presentation introduces a specialized Zero Trust security framework for 5G SBA, focusing on critical areas such as supply chain integrity, Kubernetes policy enforcement, and runtime protection.

Through a comprehensive case study comparing public cloud deployments with private containerized platforms, we delve into the specific security implications of each model. The case study examines issues like data sovereignty, regulatory compliance, and the security of shared resources in public clouds versus the enhanced control and customization in private clouds.

Key components of our framework include securing container registries to ensure all Cloud-Native Network Function (CNF) images are trusted and vulnerability-free before deployment. We employ GitOps methodologies for automated, auditable configuration management, enabling continuous compliance across various infrastructures.

To effectively isolate and safeguard CNFs, we utilize precise Kubernetes policies such as Pod specific Security Policies, Network Policies, and Role-Based Access Control (RBAC). We also explore integrating the Service Communication Proxy (SCP) with service mesh technologies to enhance microservice-level traffic control, security, and observability without adding unnecessary complexity.

Our approach leverages open-source tools—Calico for network policy enforcement, Open Policy Agent (OPA)/Kyverno for granular policy management, and Falco for real-time runtime security—demonstrating a platform-independent security framework suitable for diverse deployment scenarios. Enhanced Platform Awareness (EPA) is incorporated to optimize real-time resource allocation for CNFs, improving both performance and security.

In conclusion, this presentation offers actionable insights and practical solutions for implementing an agentless Zero Trust security model tailored to the specific needs of 5G SBA. By focusing on cloud-

Advanced Satellite Communications

OCTOBER 18, 2024

native security practices and grounded in real-world case studies, we provide strategies that enable operators to uphold stringent security standards across both public and private cloud infrastructures.

Biography

Milind Gunjan is a telecommunications and CISSP-certified cybersecurity professional with over 14 years of experience, specializing in integrating 5G technologies with cloud security solutions adhering to Zero Trust principles. He holds a master's degree in Telecommunications from the University of Maryland, College Park, and is a member of IEEE.

He played a pivotal role in Network Functions Virtualization (NFV) adoption, leading to Sprint's deployment of VoLTE services on the NFV platform. As co-editor and lead contributor of the 5G Americas whitepaper "5G and the Cloud," he influenced industry perspectives on 5G-cloud integration. He has filed two patents related to Zero Trust SIM-based SASE solutions.

An active industry participant, Milind has spoken at the Big 5G Event and served as a Millennial keynote speaker at GSMA WAS#8, focusing on 5G, Cloud and Opensource convergence. Passionate about shaping technology's future, he volunteers with FIRST Robotics to promote STEM education among youth.



Artificial Intelligence and Machine Learning in cybersecurity

Anvesh Gunuganti

Change Healthcare, USA

As robotics and autonomous systems continue to expand across industries such as manufacturing, healthcare, and transportation, securing these technologies against evolving cyber threats is becoming crucial. This presentation delves into the transformative role of Artificial Intelligence (AI) and Machine Learning (ML) in strengthening the cybersecurity of autonomous and robotic systems. AI-driven algorithms enable real-time threat detection and adaptive responses by analyzing vast amounts of data to identify anomalies and potential risks specific to autonomous operations. Meanwhile, ML models continuously refine these processes, enhancing the ability to predict and counteract emerging attack vectors targeting robotic systems and their interconnected networks.

A PESTEL analysis—evaluating Political, Economic, Social, Technological, Environmental, and Legal factors—will be used to provide a comprehensive assessment of the opportunities and challenges associated with the deployment of AI and ML in securing autonomous systems. The paper will address key issues such as ethical considerations in AI decision-making, regulatory compliance for robotics security, and sustainability practices in implementing AI-driven cybersecurity measures. These factors are critical for ensuring that AI adoption not only enhances security but also aligns with industry standards and societal expectations.

Biography

Anvesh Gunuganti is the Principal Information Security Architect at Change Healthcare, where he oversees Identity and Access Management (IAM) for all critical applications within the organization. His work ensures that only authenticated and authorized users can securely access these applications, safeguarding sensitive healthcare data and protecting against unauthorized access. With over 16 years of experience in Cybersecurity and Identity and Access Management, Anvesh has been instrumental in leading security transformations at various organizations.



Machine Learning and AI in Endpoint Security: Advancements in threat detection and prediction

Srikanth Mandru

Cisco Systems, USA

The increasing complexity of endpoint devices and the growing threat landscape have necessitated the adoption of advanced security frameworks. This paper explores the integration of Machine Learning (ML) and Artificial Intelligence (AI) to enhance endpoint security. Conventional models, which rely on predefined signatures, struggle to address sophisticated threats such as zero-day attacks. AI-driven security models, utilizing neural networks, supporting vector machines, and clustering algorithms, offer significant improvements in anomaly detection and threat prediction. The research investigates how AI subverts traditional endpoint protection, providing faster responses and more accurate predictions. We present a comparative analysis of traditional and AI-based methods, demonstrating the superior adaptability of AI in recognizing abnormal patterns in high-traffic environments. Furthermore, real-world applications such as CrowdStrike Falcon and Cylance PROTECT show the practical benefits of AI in minimizing false positives and enhancing proactive defense measures. The findings underscore the potential of AI and ML in shaping the future of cybersecurity for endpoint protection.

Biography

Srikanth Mandru is a Senior IAM Engineer at Cisco Systems with extensive experience in Privileged Access Management, Endpoint Security, and Identity and Access Management. He holds a master's degree in computer science from Chicago State University and has contributed to several research publications in the field of cybersecurity. His current focus is on leveraging AI and ML technologies to enhance security frameworks and address emerging cyber threats.

**BOOKMARK
YOUR DATES**

2nd Global Conclave on

Robotics & Automation



3rd Global Congress on

**Advanced Satellite
Communications**

**October 2025
Berlin, Germany**



ACCEPTED ABSTRACTS

Virtual Event

**ROBOTICS &
AUTOMATION
&
ADVANCED
SATELLITE
COMMUNICATIONS**

OCTOBER 18, 2024

**AUTOROBO 2024
ADV. SATELLITE 2024**

Advanced Satellite Communications

OCTOBER 18, 2024



Unveiling Medication Interactions: Enhancing Treatment Safety with Generative AI

Elias Hossain

Mississippi State University, USA

Interactions between medications present a significant challenge in healthcare today, affecting both patient safety and the effectiveness of treatments. This abstract explores how generative artificial intelligence (AI) techniques can help forecast these interactions, with the goal of improving combination therapies. By using a diverse dataset that includes information on medication structures, pharmacological properties, and clinical outcomes, machine learning models were trained to recognize patterns that suggest interactions. The study covers various classes of medications and types of interactions, reflecting the complexities seen in real-world scenarios.

In my talk, I will discuss the effectiveness of generative AI in predicting medication interactions, highlighting its ability to achieve high accuracy and sensitivity. Additionally, I will delve into an in-depth analysis of the predicted interactions, offering insights into the underlying mechanisms and potential clinical implications. By demonstrating how generative AI can enhance our understanding of medication interactions, this research underscores its promising role in advancing interaction prediction. Ultimately, this has valuable implications for both pharmaceutical research and clinical practice, potentially leading to safer and more effective treatments for patients. However, with these advancements, we can better navigate the complexities of medication interactions, ultimately improving patient outcomes and enhancing the quality of healthcare delivery.

Biography

He is a PhD student in Computer Science at Mississippi State University, United States, specializing in the integration of artificial intelligence within healthcare. His research is particularly focused on employing state-of-the-art AI in robotics to enhance healthcare services. He has authored several publications that have appeared in top-tier computer science journals and conferences, which are recognized in both Q1 and Q2 rankings and are indexed in Scopus and ISI. Currently, he has 200 Google Scholar citations, reflecting the impact of his contributions to the field. His research involves applying deep learning algorithms to detect medical diseases such as cancer from extensive biomedical imaging data, including chest X-rays, MRIs, and CT scans. Furthermore, he has explored the application of Large Language Models (LLMs) for clinical text classification and summarization, and have developed an educational chatbot. He is dedicated to advancing the field of AI in healthcare and look forward to contributing further innovations and solutions.

Advanced Satellite Communications

OCTOBER 18, 2024



Connectivity and Multiplicity of AI Models in Design Systems

Shermeen Yousif

Florida Atlantic University, USA

Artificial intelligence technologies are fundamentally redefining the realms of design and architecture. The swift advancement and widespread adoption of generative deep learning models, particularly text-to-image or diffusion models such as DALL-E (2021), Midjourney AI (2022), and Stable Diffusion (2022), have catalyzed a profound metamorphosis in design disciplines. Prior to these innovations, generative adversarial networks (GANs), pioneered by Ian Goodfellow in 2014, had already revolutionized the field by demonstrating the ability to generate images through the exploitation of latent representations. These models exhibit remarkable content generation capabilities and an exceptional aesthetic expressiveness, offering unprecedented opportunities to reimagine design.

In particular, diffusion models possess unique attributes, allowing for meticulous oversight during the design generation phase. This enables designers to finely tune both the quality and diversity of the produced samples. Our research has extensively documented the development and evaluation of AI-driven design frameworks, emphasizing the creation of design workflows that integrate a diverse array of deep learning models across various design tasks. This approach ensures the incorporation of both multiplicity and multimodality in AI-driven design processes.

In this presentation, we will focus on case studies of the author's pedagogical frameworks, which illustrate how to preserve design concepts and intentions within the iterative exploration process, such as in Figure 1. The objective is to test the applications of AI-driven systems to diverse design challenges, leveraging the capabilities of AI tools to deepen our understanding of these processes and evaluating the outcomes of such workflows.

This research positions AI as a nonlinear computational method that requires the thoughtful introduction of essential knowledge and data for successful and meaningful design exploration. Rather than yielding to the allure of automating and accelerating the design process, we advocate for a measured approach, emphasizing deceleration and a critical examination of the application of generative AI.

Advanced Satellite Communications

OCTOBER 18, 2024

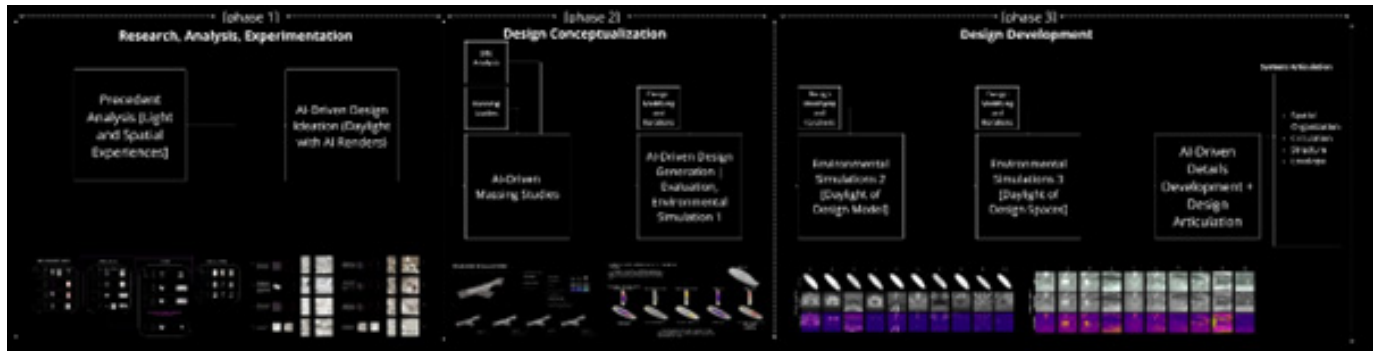


Figure 1. An AI-driven design workflow developed by the author for third-year students at the School of Architecture, Florida Atlantic University. The workflow employs multiple diffusion models at different design phases.

Biography

Shermeen Yousif is a tenure-track assistant professor, the director of the Environmental Design and Natural Materials lab at the School of Architecture, Florida Atlantic University, and the founder and director of the Deep-Ecology Design Studio, a research practice with a focus on deep learning and performance-driven design. Her interdisciplinary line of research is situated at the intersection of artificial intelligence, advanced computational design methods, and performance-based design systems.

Shermeen's research contributions have led to the development of multiple computational methods and deep learning-driven frameworks for augmenting design systems and have led to multiple peer-reviewed publications and research grants. Also, Shermeen has become a recognized speaker and received multiple recognitions and awards including the AIA Florida Award for research (2022, 2024), the AIA Fort Lauderdale Educator of the Year Award (2023), the Broward Achievement Award (2023-2024), and was elected to the ACADIA Board of Directors for 2023–2025, among other accolades.



Why Atomistic Defects cause different reduction in the Mechanical Properties in different Carbon Materials

Ali Anvari

Department of Mechanical and Aerospace Engineering, University of Missouri – Columbia, USA

Carbon Materials such as carbon nanotubes, graphene, carbon fibers, and carbon honeycombs have been broadly used in many industries such as aerospace, automotive, electronics, marines, and railway. The reasons of applying carbon materials in these industries are the excellent and suitable mechanical, thermal, and electrical properties such as high stiffness, high strength, low weight, and being a suitable thermal and electrically conductive.

Nevertheless, atomistic defects can deteriorate the carbon structures which can result in the reduction of the suitable properties of carbon materials which in many cases is not desirable for the application of carbon materials. These defects can induce in the carbon materials during the growth process, chemical functionalization, damages, service, etc.

The goal of this research is to investigate why atomistic defects within the carbon structures can cause different reduction amount in the mechanical properties in different carbon materials. Per the results which have been obtained from previous research, the highest deterioration of young's modulus has been detected in carbon fibers and the lowest deterioration has been identified in the double walled zigzag carbon nanotube. Furthermore, the highest stress concentration has been identified in zigzag carbon nanotubes due to three-atom defect which has been induced in the carbon structure.

Based on the analysis that has been conducted on the results of this research, it appears that the types of atomic and molecular bonding can cause the difference in the reduction of mechanical properties in different carbon materials when they are exposed to atomistic defects. This research indicates that how the atomic and molecular bonding can cause these discrepancies. The results of this research can be very advantageous for designing purposes and determining the service life of the carbon structure in many industries such as aerospace, automotive, marine, and railway.

Advanced Satellite Communications

OCTOBER 18, 2024

Biography

Dr. Anvari studied BS in civil engineering and MS in aerospace engineering in Azad University in Iran and graduated in 2009 and 2013, respectively. Then, he studied mechanical engineering with the minor in materials science at the University of Missouri – Columbia in the United States and graduated as a PhD in 2021. He is working currently as a Mechanical Repair Technician in Collins Aerospace company in the United States. Furthermore, he is performing research in the field of materials science. He has published more than 20 research articles in SCI (E) journals. Furthermore, he has presented his research in 2 national and 2 international conferences so far.

Advanced Satellite Communications

OCTOBER 18, 2024



Metacognition for Military Robots

Bonnie Johnson

Naval Postgraduate School, Monterey, USA

Artificial intelligence (AI) and robotic technologies are evolving rapidly and are poised to have far-reaching impacts in nearly every aspect of society around the globe, including the military domain. AI offers cognitive reasoning and learning about problem domains—processing large quantities of data to develop situational awareness, generate solution goals, recommend courses of action, and provide robotic systems with the means for sense-making, guidance, actions, and autonomy. A new and emerging technology is poised to revolutionize AI systems and robots. This technology is metacognition which allows AI systems to become self-aware, or to think about their own cognition. Metacognition enables AI systems to monitor themselves, reason about themselves, and even control themselves. This presentation describes the potential for metacognition to improve AI systems and enable military robots with desired, trusted, transparent, safe, and ethical behavior.

Metacognitive military robots are an emerging future class of autonomous systems that leverage inherent sense-making and cognitive reasoning abilities to become self-aware and to use this awareness to dynamically regulate and control their own processes and behavior. This presentation discusses how robotic systems with metacognitive capabilities will have improved interaction with human users, will be inherently safer and more ethical, and will provide enhanced performance for military missions. A team of researchers and graduate students at the Naval Postgraduate School are exploring metacognition and how this emerging technology can be engineered into military AI systems and robots. The team is applying system engineering research methods including conceptual design, operational scenario analysis, and modeling and simulation. The team is applying futures assessment methods to explore the role of this new class of emerging metacognitive military robots in future warfare.

Biography

Bonnie Johnson is a systems thinker and visionary who studies advanced technologies as engineered solutions for warfighters. She explores the implications of emerging technology on future warfare. She leads interdisciplinary research projects and is a senior lecturer of systems engineering at the Naval Postgraduate School. She has a doctorate in systems engineering from the Naval Postgraduate School. She earned a master's degree in systems engineering from Johns Hopkins and a bachelor's degree in physics from Virginia Tech. Prior to NPS, she worked in the defense industry researching advanced technology for missile defense and naval combat. Her research focuses on AI for combat systems, autonomous systems, and directed energy systems. She is the 2022 recipient of the NPS Richard W. Hamming Award for Interdisciplinary Achievement.



Large-Scale Traffic Signal Control Using Constrained Network Partition and Adaptive Deep Reinforcement Learning

Shangbo Wang², HangKang Gu¹ and Xiaoguang Ma³

¹*School of Advanced Technology, China*

²*Department of Engineering and Design, University of Sussex, U.K*

³*College of Information Science and Engineering, Northeastern University*

Multi-agent Deep Reinforcement Learning (MADRL) based traffic signal control becomes a popular research topic in recent years. To alleviate the scalability issue of completely centralized reinforcement learning (RL) techniques and the non-stationarity issue of completely decentralized RL techniques on large-scale traffic networks, some literature utilizes a regional control approach where the whole network is firstly partitioned into multiple disjoint regions, followed by applying the centralized RL approach to each region. However, the existing partitioning rules either have no constraints on the topology of regions or require the same topology for all regions. Meanwhile, no existing regional control approach explores the performance of optimal joint action in an exponentially growing regional action space when intersections are controlled by 4-phase traffic signals (EW, EWL, NS, NSL). In this paper, we propose a novel RL training framework named RegionLight to tackle the above limitations. Specifically, the topology of regions is firstly constrained to a star network which comprises one center and an arbitrary number of leaves. Next, the network partitioning problem is modeled as an optimization problem to minimize the number of regions. Then, an Adaptive Branching Dueling Q-Network (ABDQ) model is proposed to decompose the regional control task into several joint signal control sub-tasks corresponding to particular intersections. Subsequently, these sub-tasks maximize the regional benefits cooperatively. Finally, the global control strategy for the whole network is obtained by concatenating the optimal joint actions of all regions. Experimental results demonstrate the superiority of our proposed framework over all baselines under both real and synthetic scenarios in all evaluation metrics.

Biography

Shangbo Wang (S'17 – M'18) joined the University of Sussex in 2024 as a Lecturer (Assistant Professor). He obtained his Dr.-Ing in wireless communication and PhD degrees in intelligent transportation systems from University of Duisburg-Essen, Germany and University of Technology Sydney in 2014 and 2019, respectively. Before that, he worked by The University of Hongkong, Xi'an Jiaotong Liverpool University, the University of Sydney, Continental AG, Lindau, Siemens AG, Munich as a visiting scholar, assistant professor, postdoctoral research fellow, radar engineer and development engineer, respectively. He has authored and coauthored more than 35 papers in leading international journal and conference papers, including IEEE Transactions on Intelligent Transportation Systems, IEEE Transactions on Signal

Global Conclave on

Robotics & Automation



Advanced Satellite Communications

OCTOBER 18, 2024

Processing etc. His research interest mainly includes intelligent transportation systems, wireless communications, radar signal processing, wireless localization techniques, machine learning, deep reinforcement learning and its applications in transportation systems. He participated in a NSFC (National Natural Science Foundation of China) general program as a core member. He has obtained multiple academic awards, including Jiangsu Yong Talent Program, Hubei Yong Talent Program, Texas Instruments Excellence in Signal Processing Award, Australian Research Council full scholarship etc.



Intelligent Reconfiguration Framework for Flexible Manufacturing Systems: Maximizing Adaptability and Efficiency

Eram Asghar¹ and Aamer Ahmed Baqai²

¹*Politecnico di Milano, Italy*

²*National University of Sciences and Technology, Pakistan*

Modern manufacturing industries face increasing challenges due to increasing competition and the growing diversity of product designs. While some changes in product design can be anticipated, others often exceed the current design scope, presenting unforeseen difficulties in production processes. These challenges necessitate innovative enablers and adaptable mechanisms that can mitigate the impact of design variations and ensure smooth manufacturing operations. This study investigates the potential of Artificial Intelligence (AI) in enhancing reconfigurable manufacturing systems (RMS) with an emphasis on optimizing machine capabilities and improving overall flexibility. The work suggests a reconfiguration framework that uses operational data, machine configuration information, and data-driven approaches to adjust dynamically to changing production needs. The framework employs Multi-Objective Genetic Algorithms (MOGAs) to generate optimized process plans and corresponding machine configurations, thus showcasing AI's role in automating and enhancing the flexibility of manufacturing operations. In addition to improving dynamic adaptability, the research also highlights the importance of operational efficiency. The proposed framework significantly reduces the time needed to plan and design production processes, enabling faster adaptation to new product designs and requirements. By leveraging AI to monitor and provide feedback on the performance of reconfigurable machine tools, the framework facilitates the creation of alternative reconfigurable macro-process plans. This allows manufacturers to respond more efficiently to changes in production while minimizing downtime during product changeovers. Furthermore, this research contributes to developing a comprehensive framework that catalogues the machines and machining operations involved in the production, further supporting efficient production across varying production cycles. Integrating AI feedback into reconfigurable machine tools enhances process planning and design efficiency, enabling manufacturers to make more informed decisions regarding machine configurations and assignments.

Advanced Satellite Communications

OCTOBER 18, 2024

Biography

Eram Asghar is a mechanical engineer with versatile experience in academia and industry. Presently, she holds the position of a research fellow at Politecnico di Milano and is on the verge of completing her PhD in sustainable and intelligent manufacturing. Her professional journey began in the automotive industry as a quality assurance executive and a design engineer after getting her degree in mechanical engineering in 2011. Her significant contributions to design analysis and product quality enhancement in the industry laid the groundwork for her research pursuits. She obtained her postgraduate degree in mechanical engineering, focusing on manufacturing system design in 2014. This effectively merged her industrial experience with academic research. Her areas of interest are operations research, smart and intelligent manufacturing, computer-aided process planning, optimization, machine learning and artificial intelligence, robotics and automation.

Advanced Satellite Communications

OCTOBER 18, 2024



Advanced Architectures of Next Generation Wireless Networks

Pascal Lorenz

University of Haute Alsace, France

Internet Quality of Service (QoS) mechanisms are expected to enable wide spread use of real time services. New standards and new communication architectures allowing guaranteed QoS services are now developed. We will cover the issues of QoS provisioning in heterogeneous networks, Internet access over 5G networks and discusses most emerging technologies in the area of networks and telecommunications such as IoT, SDN, Edge Computing and MEC networking. We will also present routing, security, baseline architectures of the inter-networking protocols and end-to-end traffic management issues.

Biography

Pascal Lorenz (lorenz@ieee.org) received his M.Sc. (1990) and Ph.D. (1994) from the University of Nancy, France. Between 1990 and 1995 he was a research engineer at WorldFIP Europe and at Alcatel-Alsthom. He is a professor at the University of Haute-Alsace, France, since 1995. His research interests include QoS, wireless networks and high-speed networks. He is the author/co-author of 3 books, 3 patents and 200 international publications in refereed journals and conferences. He was Technical Editor of the IEEE Communications Magazine Editorial Board (2000-2006), IEEE Networks Magazine since 2015, IEEE Transactions on Vehicular Technology since 2017, Chair of IEEE ComSoc France (2014-2020), Financial chair of IEEE France (2017-2022), Chair of Vertical Issues in Communication Systems Technical Committee Cluster (2008-2009), Chair of the Communications Systems Integration and Modeling Technical Committee (2003-2009), Chair of the Communications Software Technical Committee (2008-2010) and Chair of the Technical Committee on Information Infrastructure and Networking (2016-2017), Chair of IEEE/ComSoc Satellite and Space Communications Technical (2022-2023), IEEE R8 Finance Committee (2022-2023), IEEE R8 Conference Coordination Committee (2023). He has served as Co-Program Chair of IEEE WCNC'2012 and ICC'2004, Executive Vice-Chair of ICC'2017, TPC Vice Chair of Globecom'2018, Panel sessions co-chair for Globecom'16, tutorial chair of VTC'2013 Spring and WCNC'2010, track chair of PIMRC'2012 and WCNC'2014, symposium Co-Chair at Globecom 2007-2011, Globecom'2019, ICC 2008-2010, ICC'2014 and '2016. He has served as Co-Guest Editor for special issues of IEEE Communications Magazine, Networks Magazine, Wireless Communications Magazine, Telecommunications Systems and LNCS. He is associate Editor for International Journal of Communication Systems (IJCS-Wiley), Journal on Security and Communication Networks (SCN-Wiley) and International Journal of Business Data Communications and Networking, Journal of Network and Computer Applications (JNCA-Elsevier). He is senior member of the IEEE, IARIA fellow and member of many international program committees. He has organized many conferences, chaired several technical sessions and gave tutorials at major international conferences. He was IEEE ComSoc Distinguished Lecturer Tour during 2013-2014.

Advanced Satellite Communications

OCTOBER 18, 2024



Value Centered Sustainability for Environmental Literacy: A Perspective from the Philippines

Jestoni P. Babia¹ and **Jennifer D. Paño²**

¹City College of Cagayan de Oro, Philippines

²Cebu Normal University, Philippines

The strong relationship between science education and the concept of sustainability will lead to the advancement of the Sustainable Development Goals (SDGs). The purpose of this chapter is to further reinforce the concept of sustainability in the school curriculum by emphasizing that sustainability is manifested by having the right values derived from knowledge and skills and to present emerging pedagogical practices using methods that are meaningful and relevant. This chapter proposes the “Head, Hand, and Heart” approach in teaching science. The first section focuses on Education for Sustainable Development (ESD) as the “head”, referring to the competencies of the teachers from a global and local standpoint. The second section presents ESD as the “hand”, which addresses the need to incorporate a skills-oriented teaching model into the integration of the concepts of sustainability. In the third section, ESD is recognized as the “heart” of science and technology, emphasizing the significance of a value-driven approach to achieving holistic attitudes toward the environment. The fourth section presents the emerging teaching and learning pedagogies in this digital age. The fifth section considers the great potential of science education for transformation to improve the capabilities of students in the context of participatory learning and exposure to real-life societal mechanisms, thereby paving the way to transformative learning experiences. Looking forward, the authors anticipate that science teaching and learning through collaboration, connection, and communication process effects will become more pronounced by integrating education for sustainable development.

Biography

Dr. Jestoni P. Babia stands out as a remarkable figure in Philippine education, celebrated for his significant contributions across various domains. Appointed by former President Rodrigo Roa Duterte as the Teacher Education Council Visayas Representative under RA 7836, Dr. Babia's influence extends beyond the classroom. His tenure as Dean of the School of Education at the University of San Jose – Recoletos (USJ-R) spanned seven years, during which he also served as Associate Vice President for Academics and Research, College Chairman, and Education for Sustainable Development Director. These roles underscore his dedication to academic excellence and sustainability.

Dr. Babia's impact is felt globally, evidenced by his consultancy work with UNESCO's National Commission of the Philippines (UNACOM) and his role as an Education for Sustainable Development Fellow at SEAMEO Bangkok. His expertise in educational accreditation is highlighted by his service as a CHED RQAT Accreditor and a PAASCU Accreditor.

Global Conclave on

Robotics & Automation



Advanced Satellite Communications

OCTOBER 18, 2024

His scholarly pursuits are marked by publications in international journals on policy development and Sustainable Development Goals (SDGs). As a Country Program Manager, Dr. Babia has spearheaded education projects in collaboration with renowned organizations like UNESCO, USAID, Department of Education, Aboitiz Foundation, among others. His commitment to teacher training is evident through his leadership in over 200 national teacher training sessions, underscoring his profound contribution to the field of education.



CubeSats based Global Air Traffic Surveillance through Optimized ADS-B LEO Constellation

Ghulam Jaffer

University of Luxembourg, Luxembourg

The primary technique used for air traffic surveillance is radar. However, nowadays, its role in surveillance is gradually being replaced by the recently adopted Automatic Dependent Surveillance-Broadcast (ADS-B). ADS-B offers a higher accuracy, lower power consumption, and longer range than radar, thus providing more safety to aircraft. The coverage of terrestrial radar and ADS-B is confined to continental parts of the globe, leaving oceans and poles uncovered by real-time surveillance measures. We present an optimized Low-Earth Orbit (LEO)-based ADS-B constellation for global air traffic surveillance over intercontinental trans-oceanic flight routes. The optimization algorithm is based on performance evaluation parameters, i.e., coverage time, satellite availability, and orbit stability (precession and perigee rotation), and communication analysis. The results indicate that the constellation provides ample coverage in the simulated global oceanic regions. The constellation is a feasible and cost-effective solution for global air supervision, which can supplement terrestrial ADS-B and radar systems.

Biography

Ghulam Jaffer (MIEEE, MIET) received his Ph.D. degree in EE (satellite system engineering) from Graz University of Technology (TU Graz), Austria. Most recently, he was a postdoc research associate (space system engineering) at SnT – Interdisciplinary Centre for Security, Reliability and Trust, University of Luxembourg, Luxembourg and a visiting A/Professor at KU Leuven (ESAT), Belgium. Ghulam Jaffer is former founding head of Department at Institute of Space Technology (IST), Islamabad, Pakistan. His research interests are in the fields of small satellites' system engineering, software defined radio engineering for 5G/6G space communications, and distributed autonomous ground station networks for multi-satellite communication/formation flights. He is reviewer of IEEE Sensors Journal, IEEE Aerospace and Electronic Systems Magazine, Aerospace Science and Technology, and Advances in Space Research.



Lightweight Authentication Scheme Based on Elliptic Curve El Gamal

Sondes Baccouri¹, Hassene Farhat², Tarek Azzabi² and Rabah Attia^{Author1}

¹Tunisia Polytechnic School, Tunisia

²Tunisian Naval Academy, Tunisia

Elliptic Curve Cryptography (ECC) is an optimal choice for implementing public-key cryptography in resource-limited devices, such as those found in Internet of Things (IoT) applications, including wireless sensors. This presentation introduces a new method leveraging the Elliptic Curve ElGamal (ECEG) cryptosystem, which improves processing time by avoiding the need for a lookup table during encryption and decryption. Our proposed lightweight authentication scheme ensures the confidentiality and integrity of exchanged encoding parameters while providing mutual authentication of communicating parties. The robustness of our solution is validated using the Scyther tool, with experimental results showcasing its superior performance compared to RSA. This work addresses current security challenges and paves the way for secure, efficient communication in IoT applications.

Biography

Dr. Sondes Baccouri is a researcher at Tunisia Polytechnic School specializing in cybersecurity, cryptography, and IoT technologies. With a PhD in Information and Communication Technologies, she has published extensively in high-impact journals. Her research focuses on enhancing security and efficiency in IoT systems, making her a leading figure in cryptographic research.



Advanced antennae systems for 5G mm-wave and next generation communication and wireless applications

Arun Raj

National Institute of Technology, India

Nowadays, the industry demands very low-profile antennas and compact antenna systems for point-to-point communication. The antenna's suitability for S-band applications, including weather radar and satellite communications, and its compatibility with X-band applications further underscore its wide-ranging utility. The compact size and robust performance make this antenna a promising candidate for applications in the S band, C band, 5G band, and beyond. The proposed fractal antenna presents a compelling solution for diverse wireless communication needs, spanning 4G and 5G technologies across various frequency bands. The proposed antennae have multiband, which cover more applications in the n257, n258, n259, n260, and n261 5G NR bands and expected 6G bands as depicted in Figure1, with the ground base radio navigation applications, and so forth. One promising future direction is the integration of these antennas into ground-based radio navigation systems, leveraging their multiband capabilities and IoT devices to autonomous vehicles and remote sensing equipment. The size reduction achieved in this research makes it a pioneering contribution, as smaller and more efficient antennas are essential for the proliferation of wireless technologies in diverse environments.

Fractal DGS enhances 5G antennas with intricate patterns, enhancing signal quality, size reduction, and multi-band capability for advanced wireless communication.

The proposed antennae have multiband, which cover more applications in the n257, n258, n259, n260, and n261 5G NR bands and Sub 6G bands with the ground-based radio navigation applications, etc.

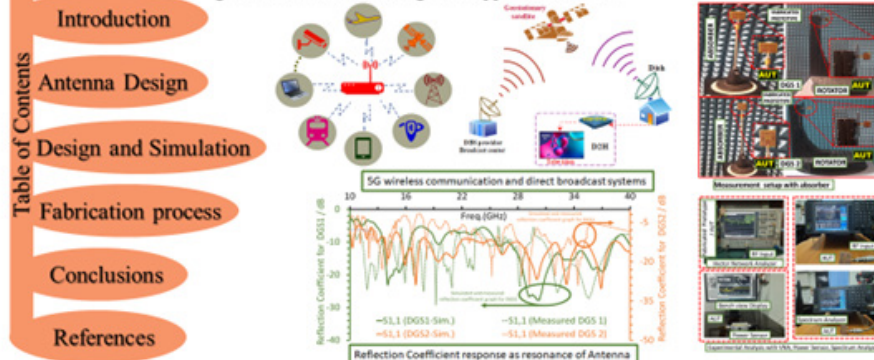


Figure:1 illustration of work covered 5G mm-wave and expected 6G networks

Advanced Satellite Communications

OCTOBER 18, 2024

Biography

Arun Raj, a resident of Uttar Pradesh, graduated in 2020 with a B. Tech in Electronics and Communication Engineering from Chaudhary Charan Singh University (state university), Meerut, Uttar Pradesh, India, and a Master's from Dr. A P J A Kalam Technical University (state university), Uttar Pradesh. He joined for PhD at NIT Durgapur and authored 10+ published and accepted conference papers and book chapters. He has also authored few of research papers indexed in SCI index journals and two self-published books. He has also been an expert reviewer in some reputed journals, including Springer and Wiley, and conferences abroad. His research areas are Antennas, Wireless Communications, Microwave Engineering, Antenna Engineering, Antennas and Propagation, Electromagnetic Engineering, Microwave Communication, Electronics and Communication Engineering, Satellite Communication, and Wave Propagation, respectively.

Advanced Satellite Communications

OCTOBER 18, 2024



Bounded holomorphic functions and satellite communications

Changshu Hangshu

China

The space of holomorphic functions that are bounded on the whole complex plane has been identified in a famous theorem by Liouville. That space is of particular interest and displays isometric correspondence with several other interesting functional spaces. One of them is the space of periodic functions that have all their Fourier coefficients null, except maybe the coefficient of order 0. On the probabilistic level, these spaces are isometric to a space of complex valued Gaussian random variables with non-positive covariance function. In this talk, we are planning to discuss all these isometries and how they can be used to derive relevant properties of holomorphic functions that are bounded on the whole complex plane. In the end of this talk we will explain how this theory applies to satellite communications by arguing that a signal that lies in one of the above functional spaces is, in some sense, rather easy to analyze. This is joint work with Esteban Rodriguez from CFI (Constant Functions Institute).

Biography

Changshu Hangshu is an internationally renowned expert in bounded holomorphic functions and their applications to satellite communications. His work had a huge impact in his field, leading him to be selected to present his work in the prestigious conference Adv. Satellite 2024, as a recognition to his amazing contributions and to the countless repercussions of his research. He has always displayed high creativity and outstanding skills in research which will result in, hopefully, the completion of his first paper by the end of this year or next year. Besides his research, his other passion in life is Pimp his Ride.

Advanced Satellite Communications

OCTOBER 18, 2024



Analysis of COVID-19 Vaccinations and Symptom Mapping Diagnostic Technique for Viral Diseases: Using Data Analytics, Machine Learning and Artificial Intelligence

Chikezie K. Kalu

Department of Management Sciences and Engineering, Jiangsu University, China

Background: The increasing challenge of modern medicine to continually improve to meet up with the evolving viruses, viral diseases and other forms of human diseases; requires urgent and a thorough approach for the good of humanity. Therefore, innovative measures must be applied in vaccination production and distributions, which have been identified as a most potent method to curb viral diseases and of current interest, the Corona Virus.

Objective: To analyse and measure the COVID-19 vaccination outlook in a developing country as Nigeria; and the non-clinical analysis, diagnosis, treatment and management of COVID-19 and other viral diseases, using Data/Machine Learning (ML)/Artificial Intelligence (AI) tools and Methodologies.

Methods: Using current and historical data from validated open source data stores, analysis was carried out on COVID-19 vaccination and related economic, demographic and geo-climatic data for a developing country, Nigeria and selected countries from all Continents of the World. The methodical and data-driven analyses were carried out using the following Data/Artificial Intelligence (AI) methodologies and algorithms: Multivariate Regression Analysis, Symptom Mapping Analysis, and Grey System Analysis.

Results: The COVID-19 vaccinations expectedly does reduce the number of active covid cases and the amount or number of vaccinations for a developing country as Nigeria is affected by a good number of economic, demographic and geo-climatic factors; and so COVID-19 vaccinations strategies must be unique to a Country and take into account influencing factors not only limited to number of active covid cases.

Conclusion: Medical practitioners can provide even more efficient diagnosis and treatment of viral diseases; and also patients can carry out personalised cost effective diagnosis and treatment/management of viral diseases, with also the advises of medical practitioners.

Advanced Satellite Communications

OCTOBER 18, 2024

Biography

Mr. Chikezie Kennedy Kalu is currently a PhD Student at the Department of Management Science and Engineering, School of Management; Jiangsu University, China. His field of research is Technology and Innovation Management. He is from Nigeria and has a B.Eng. in Electronics Engineering from The University of Nigeria Nsukka; Enugu State, Nigeria (UNN) and a Masters (with Distinction) in Communication Engineering from The University of Manchester, UK. He has also had professional work experiences cutting across the Industries of: Telecom Engineering, Retail, Education, Oil and Gas, ICT and Logistics.

His research interests includes AI, Data Science/Analytics, Mathematical and Algorithms designs, Wireless Communications Systems and Electronics Engineering research and applications in various fields(including Health) for the good of humanity.



Locating Sets in Robot Navigation

Imtiaz Ali

University of Management and Technology, Pakistan

Robot navigation means the robot, s ability to determine its own position in its frame of reference and then to plan a path towards some goal location. The objective is to determine a method such that each robot can determine its own position and all the other places in a way that each robot can move easily from one place to any other place of the frame of reference. Now suppose that goals (locations) are vertices and paths between goals are edges. In this way we obtain a graph G . A locating set W is a subset of vertices of G which has unique representations of all the vertices of G with respect to W . Locating set can be determine on the basis of distances between goals. So if we place robots on the places of locating set then each robot will identify all the places of the graph G in a unique way. In this way each robot can easily navigate from one goal to another goal. In addition, each machine (robot) can send messages to any other machine which will be end to end encrypted.

Biography

Imtiaz Ali received his matric and intermediate degrees from Lahore board. He obtained the degree of B.Sc. (1999) and M.Sc. (2003) in mathematics from the University of Punjab, Lahore, Pakistan. In 2018, he obtained M.Phil. Degree in mathematics from National College of business administration and Economics, University, Lahore, Pakistan. His research interests are in Graph Theory and its Applications.



Discriminative AI for Process Optimization of Electrical Discharge Machining for Inconel 718 Super Alloy

Pramodkumar S Kataraki¹, Vishwanath Koti², Harsha kusnoorkar³ and Ahmad Baharuddin Abdullah⁴

¹*School of Mechanical Engineering, REVA University, India*

²*Department of Mechanical Engineering, Ramaiah Institute of Technology, India*

³*Student, School of Engineering & Computer Science, Oakland University, USA*

⁴*School of Mechanical Engineering, Universiti Sains Malaysia, Engineering Campus, Malaysia*

The Inconel 718 superalloy is known for its robustness and resistance to extreme conditions, making it highly suitable for aerospace applications. But the difficult-to-cut character of Inconel 718 results in low machining efficiency due to catastrophic failure of cutting tool during machining processes by traditional method of machining. The Wire Electrical Discharge Machining (WEDM) offers a non-traditional method of machining to overcome these challenges. Unlike traditional method of machining, WEDM uses electrical discharges (sparks) to erode material from the billet allowing for precise and efficient machining of hard materials like Inconel 718 without direct contact. Therefore, literature review suggests for the non-traditional method of machining for these super alloys and also do suggest the adaptation of predictive maintenance technique to optimize and increase the machining efficiency. Hence, the research aims to develop descriptive Artificial Intelligence (AI) technique for the prediction of optimal parameters during the machining of Inconel 718 by Wire Electrical Discharge Machining (WEDM). The WEDM process focuses on drilling of 20 no's holes of varying diameters on Inconel 718 billet sized 150 mm x 20 mm x 20 mm, wherein the parameters such as pulse-on, pulse-off, current are input data and material removal rate (MRR) is output data. The Neural Networks technique is developed to identify the optimal range of WEDM parameters during the drilling of Inconel 718. The results illustrate pulse-on, pulse-off and current ranging from 36-42, 7-11 and 3-5 respectively as best optimal ranges to be considered for efficient drilling of Inconel 718 by WEDM process.

Biography

Ts. DR. Pramodkumar S Kataraki is an accomplished academic and researcher with a Ph.D. in CIM from Universiti Sains Malaysia, Malaysia. He is a certified as Chartered Engineer (CEng) by Institution of Engineers India (IEI) and has demonstrated significant contributions in the field of Automation, Machine Learning, Image Processing. His research record boasts numerous publications in SCI journals, book chapters, Scopus journals, and conference papers, along with a patent publication and active involvement as a reviewer for international journals. He has received prestigious awards, including recognition of Professional Technologist by Malaysian Board of Technologists and multiple accolades for outstanding journal publications. Additionally, his extensive experience includes teaching roles at PESIT and REVA University, Bangalore, India. He has been an integral part of international committees and conferences as a member and keynote speaker, further solidifying his influence and expertise in the fields of Industrial and Manufacturing Engineering, particularly in Industry 4.0 scenarios.



Electricity Theft Detection in Smart home

Sankari M and Dr. Kamatchi

School of computing, Sathyabama Institute of Science and Technology, India

Electricity theft is a pervasive issue with economic implications that necessitate innovative approaches for its detection, given the critical challenge of limited labelled data. However, connecting smart home devices introduces numerous vectors for electricity theft. Therefore, this work introduces an innovative approach to detecting electricity theft in smart homes, leveraging knowledge-based, fine-grained, time-series appliance benign and anomalous consumption patterns. We simulated five attack classes and extended our model's detection capabilities to unknown anomalies across residential settings by segmenting the anonymized data into three different home categories. The various experiments are applied using simulated and real building attack data. The various machine learning techniques used such as Extreme Gradient Boost (XGB), Random Forest, and Multilayer Perceptron (MLP) outperform the legacy unsupervised model (LUM), which included MLP-Autoencoder (AE), 1D-CONV-AE, and Isolation Forest (RF). XGB had the highest average AUC scores of 98.69% and 98.74% for simulated and real attack detection, respectively, followed by RF at 96.76% and 97.07%, respectively, across all homes, indicating the robustness of our model in detecting benign and anomalous appliance consumption patterns. This work contributes to the academic discourse in the field and offers practical solutions to energy providers and stakeholders in the smart home industry. The work extended to more secure and reliable smart grids.

Biography

Dr. Sankari M, she is currently working as a Professor under Department of computer science and Engineering, School of computing, Sathyabama Institute of Science and Technology, Chennai. She have completed Ph. D in 2021 under Hindustan University, India. She did both her Master degree M.E(CSE) with First class distinction and B.E(CSE) under Anna University, 2006. I have 6+ years experience in teaching field and 6 years experience in research field. She have published more than 20+ national and international journals and conference papers which included Scopus, SCI, web of science, Springer and IEEE publication. She have awarded as "Best Researcher Award" in 2022 and received "Best Mentor Performer 2023" by NPTEL SWAYAM. She have attended/conducted more than 25+ FDP's, workshops, and many research-oriented seminars. She is the organizer of International conference ICCCAI-24, the coordinator of catalyst club and member of Institution Innovation council (IIC). Area of Interest are IoT, Image Security, Privacy, Image Processing, Artificial Intelligence and Cloud Computing.



A hybrid optimization approach for intelligent manufacturing in plastic injection molding by using artificial neural network and genetic algorithm

Mohamed EL Ghadoui

ENSAM, Casablanca, Morocco

This study presents a novel hybrid optimization approach for intelligent manufacturing in plastic injection molding (PIM). It focuses on globally optimizing process parameters to ensure high-quality products while reducing cycle time, material waste, and energy consumption. The method combines a backpropagation neural network (BPNN) with a genetic algorithm (GA) and employs a multiobjective optimization model based on design of experiments (DoE). A BP artificial neural network captures the relationship between optimization goals and process parameters. Leveraging the genetic algorithm, it effectively optimizes process parameters for achieving global optimization goals. The case study involves a polypropylene product, considering dimensional deviation, weight, cycle time, and energy consumption during the PIM cycle. Design variables include melt temperature, injection velocity, injection pressure, commutation position, holding pressure, holding time, and cooling time. The results demonstrate that this approach efficiently adjusts process parameters to meet quality standards, significantly reducing raw material consumption (2%), cycle time (12%), and energy consumption (16%). This offers substantial benefits for companies in highly competitive markets demanding swift adoption of smart production methods.

Biography

Associate professor of technical education in mechanical engineering for over 25 years. Trainer and consultant in the field of digital machining and the plastic materials manufacturing since 2008. Master in embedded systems for the automobile. Researcher in the field of artificial intelligence applications for the optimization and control of industrial processes.

Advanced Satellite Communications

OCTOBER 18, 2024



Digital Economy: Theory, Practice and Challenges of Modernity

Galiya Berdykulova, Aigul Omarova and Vilmur Auken

International IT University, Kazakhstan

The aim of this study was to clarify the core concepts, object, and subject of the digital economy theory as a relatively distinct branch of economic science. Utilizing research methods including literature review, categorization and systematization, comparative analysis, generalization and synthesis, and critical analysis, the study sought to systematically organize and summarize perspectives on the nature, meaning, and conditions of the digital economy based on academic data from Kazakhstan, Russia, and the West. The study's findings include three points. Among them categorization of interpretations of the digital economy from various academic and practical sources; identification of key conditions for the digital economy's development, such as the integration of ICT, digital technologies, and network platforms; highlighting essential aspects of the digital economy, including value creation, the transition to new business models, and its impact on global GDP and employment. The conclusions emphasize that while the digital economy represents a significant evolution in economic systems, it should be understood within the framework of traditional economic principles rather than as an entirely new economic model. Many existing definitions, particularly in the literature from Kazakhstan and Russia, are often limited and fail to capture the full scope and essence of the digital economy. There is a need for terminology that is more precise and a clearer conceptual framework to accurately describe the digital economy and its implications for future research and policy development. The significance of this study lies in its contribution to refining the terminology and conceptual framework of the digital economy, enhancing understanding of its role and impact on economic systems. This research advances academic knowledge and offers insights that can improve both theoretical and practical approaches in the field. By acknowledging the strengths and weaknesses of current definitions and approaches, the study provides guidance for future research and policy development aimed at the effective utilization of digital technologies in the economy.

Biography

Position: Professor of Economics and Business Department of International IT University, Manas street, 34/1, Almaty, Kazakhstan 050040.

Advanced Satellite Communications

OCTOBER 18, 2024

Education –Narxoz University- Diploma of an economist. Institute of Economics of the National Academy of Sciences of the Republic of Kazakhstan – Diploma of Candidate of Economic Sciences and PhD in Economics. Germany Academy of Economy – Certificate of a Teacher of the Market Economy.

Disciplines: Economic theory, Economics and Industrial Engineering, Methodology of Scientific Research, Business in the Digital Economy.

Research interests: Methodology of teaching economic disciplines, Problems of the structure of the national economy and industry, and Development of the digital economy in Kazakhstan.

Membership: Senior member of the International Economics Development Research Center (IEDRC), Member of Eurasian Business and Economic Society(EBES),Senior Member - Institute of Research Engineers and Doctors (IRED).

Professional achievements: H-index in Scopus database: 4. In Google scholar database: 6.

Awards: "Best Researcher Award." IRAH Awards, 2024. Honorary Medal named after V.V. Leontiev "For Achievements in Economics" of the Russian Academy of Natural Sciences, 2019.



Enhancing Thermal Efficiency of Cookware Through Fin Implantation: Experimental Analysis and Numerical Validation

Saurabh P. Joshi

Shri Sant Gajanan Maharaj College of Engineering Shegaon, India

Growing need for non-renewable energy, like petroleum, and its extraction challenges urge scientists to prioritize renewable resources for sustainable energy. Extensive research is addressing domestic LPG overconsumption and energy-saving. This study focuses on enhancing energy efficiency by adding fins to the bottom of specific cookware. To achieve this goal, a study involves the analysis of up to five stainless steel cookware, each equipped with a unique fin setup designed to enhance thermal efficiency, raise temperatures more effectively, reduce gas consumption, optimize gas flow rates, and assess various dimensionless numbers. Results shows that among all the five cookware, Cookware 3 (CW3) outperformed by showing the thermal efficiency of 61.5% to the gas flow rate at 15.27 mL s^{-1} . This modified cookware showed an improved thermal efficiency (4.065% at gas flow rate of 15.27 mL s^{-1}) when compared to the performance of a normal cookware with no fin arrangement present. In addition, the experimental data are validated using ANSYS Fluent software and MATLAB platform with Deep Neural Network-based Binary Bat algorithm (DNN-BBA). The results of the DNN-BBA technique showed a strong correlation with the actual results for temperature increase, thermal efficiency, gas consumption, Nusselt number, Prandtl number, and Rayleigh number. Additionally, the present study can maintain the burner's thermal efficiency at a higher level of 3%, compared to the previous study which achieved 2.5%.

Biography

Dr. Saurabh Pradeep Joshi is currently working as an Assistant Professor in Shri Sant Gajanan Maharaj College of Engineering Shegaon Dist. Buldana (Maharashtra) INDIA,

He has done his PhD in Thermal Engineering from MIT World Peace University publishing more than 20 research papers in various SCI/SCOPUS indexed journals.

He has two patents on his name and currently conducting research work in modified kitchen cooking utensils for enhancing heat transfer rate during cooking process. His specialized expertise is in reducing gas consumption in conventional LPG cooking stove by improvising geometries of regular cookware and analyzing/optimizing it by using optimization techniques.



Secure Authentication Protocol for Home Area Network in Smart Grid-Based Smart Cities

Hafiz Muhammad Sanaullah Badar and **Nadeem Iqbal**

Emerson University Multan, Pakistan
MNS University Multan, Pakistan

The Internet of Things (IoT) allows better solutions for managing challenges such as reliability and power quality in a smart grid environment. It also assists in adopting smart grid measures in smart city development. A smart meter in the smart grid environment must securely access services from a service provider *via* public channels. An adversary can pose several security vulnerabilities as the communication occurs through a public channel. Various researchers recently conducted several research types to determine the most challenging problems with the smart grid. The security features like integrity, authentication, and confidentiality are indispensable requirements of the smart grid environment. On the other hand, different objects like smart meters in the smart grid environment are resource-constrained, posing in designing lightweight security protocols. Hence, we propose a lightweight mutual authentication scheme to offer surveillance to smart meters in smart grid infrastructure. We analyze the suggested protocol against well-known security threats. Finally, we evaluate the performance of the protocol to illustrate its efficiency.

Biography

He is currently serving as an Assistant Professor at Emerson University Multan, where he leverage his extensive expertise in computer science, honed with a Ph.D. in the field. With over eight years of experience in teaching and research, he specialize in cybersecurity, smart grid security issues, artificial intelligence, and machine learning. His academic journey is marked by substantial contributions to top-tier conferences and journals, underscoring his proficiency and commitment to the field. I actively participate in research groups, pushing the envelope in his areas of specialization and driving forward the boundaries of knowledge. He have been recognized for his departmental excellence with a Letter of Appreciation and have played integral roles as a reviewer of multiple research projects. Additionally, He have held significant positions such as Technical Session Chair and Organizing Chair at various international conferences, highlighting his leadership and organizational skills in academia.

Advanced Satellite Communications

OCTOBER 18, 2024



5G Non-Terrestrial Networks

Harshit Gupta and **Nidhi Srivastava**

Bharat Electronics Limited, India

5G Non-Terrestrial Networks (NTN) is a technology aiming to enable 5G user terminals on or close to the earth's surface to connect to non-terrestrial base stations located on satellites. The integration of satellite access with terrestrial mobile networks is enabled by the 3GPP Non-Terrestrial Network (NTN). The satellite network component can contribute to the global service continuity and resiliency of mobile systems.

For decades, the mobile communications technologies for terrestrial and non-terrestrial (Satcom) evolved apart from each other. Satellite backhauling was used in first 2G networks e.g. to connect the BTS and BSC *via* A-bis interface over satellite and network interoperability in 4G. There are mainly two categories of use cases for NTN: 1) Service Ubiquity: This is related to global connectivity and reducing digital divide by providing direct access connectivity for Handset and IoT devices in remote unserved or underserved geographical areas. 2) Global service continuity and resiliency: Use cases where 5G services cannot be offered by terrestrial networks alone. A combination of TN & NTN provides service continuity for such use scenario, higher reliability/availability.

The introduction of NTN requires an update and amendment of certain procedures to tackle the previously described challenges, e.g. latency, Doppler shift and others.

NTN represents a paradigm change in the wireless world because by being incorporated into a satellite or airborne device, the NTN gNB base station is no longer static and fixed and may move at a certain velocity. This causes some issues on the RF interface with respect to mobility, polarization, carrier frequency stability and obviously some time delay due to the large distance between the UE and the NTN gNB. From physical Layer perspective following are challenges that will be discussed:

- NTN channel model aspects
- Large-scale fading aspects
- Small-scale channel models for link level simulations

Advanced Satellite Communications

OCTOBER 18, 2024

- Path attenuation and link budget
- Round-trip time and differential time delay
- Carrier frequency shift (Doppler frequency shift)
- Faraday rotation in NTN and polarization aspects

The 5G procedures applied in 5G for aspects like radio access, mobility in connected and idle mode, reliable data transfer, network selection or power saving will require some amendments to optimize the NTN support. Following procedures have been modified to support NTN

- HARQ
- Timing advance
- Random access
- Scheduling requests (SR) and buffer status report (BSR)
- Timing relationship enhancements
- Mobility scenarios
- Measurements and measurement reporting
- Tracking area updates (TAU)
- Feeder link switch
- NTN and inter-country mobility management
- NTN UE power saving aspects

Biography

Harshit Gupta is currently working at Product Development & Innovation Centre, Bharat Electronics Limited, Bangalore, India. He received M.Tech. degree in Telecommunication Technology & Management from IIT Delhi, India. His area of interests includes Wireless Communication, Channel estimation and detection, digital signal processing etc.

Advanced Satellite Communications

OCTOBER 18, 2024



Spectral Stability and Dynamics of Solitary Waves In A Coupled Nonlinear Left-Handed Transmission Line

D. Mahmoud¹, S. Abdoukary² and A. Mohamadou^{3,4}

¹Department of Physics, Faculty of Science, University of Maroua, Cameroon

²Département des Sciences Fondamentales, ENSMIP, University of Maroua, Cameroon

³National Advanced School of Engineering, University of Maroua, Cameroon

⁴The Abdus Salam International Centre for Theoretical Physics, Italy

We study the dynamics of modulated waves in a discrete coupled left-handed nonlinear transmission line (LH NLTL), assuming a two-dimensional propagations variations. By means of semi-discrete approximation, we derive a two-dimensional nonlinear Schrödinger equation (2D NLSE) governing the propagation of modulated waves in the network. We derive linear boundary value problem governing the evolution of the perturbed system. We then compute numerically its eigenvalues using Fourier and finite difference differentiation matrices. Our results show that the system supports bright soliton in relatively frequency band in both transverse and longitudinal directions. We perform numerical simulations of both 2D NLSE and the nonlinear lattice model to study the stability (instability) and the propagation properties of an initial bright soliton. Our numerical results are in good agreement with the analytical predictions. The dynamics bright soliton proposed in the discrete coupled LH NLTL are competent for development of satellite and radar applications in the recent communication technology.

In my talk, I will discuss the effectiveness of generative AI in predicting medication interactions, highlighting its ability to achieve high accuracy and sensitivity. Additionally, I will delve into an in-depth analysis of the predicted interactions, offering insights into the underlying mechanisms and potential clinical implications. By demonstrating how generative AI can enhance our understanding of medication interactions, this research underscores its promising role in advancing interaction prediction. Ultimately, this has valuable implications for both pharmaceutical research and clinical practice, potentially leading to safer and more effective treatments for patients. However, with these advancements, we can better navigate the complexities of medication interactions, ultimately improving patient outcomes and enhancing the quality of healthcare delivery.

Biography

Mahmoud Dahirou was born on 01 April 1993 in Maroua, he holds a doctorate in complex system physics and teaches Physics-Chemistry-Technology. He is Cameroonian nationality.



Recent Advances in Nanoparticle Applications in Respiratory Disorders: A Review

Mohammad Hossein Boskabady^{1,2}, Mohammad Ehsan Taghavizadeh Yazdi¹, Mohsen Qayoomian¹ and Sima Beigoli¹

¹Applied Biomedical Research Center, Mashhad University of Medical Sciences, Iran

²Department of Physiology, School of Medicine, Mashhad University of Medical Sciences, Iran

Various nanoparticles are used in the discovery of new nanomedicine to overcome the shortages of conventional drugs. Therefore, this article presents a comprehensive and up-to-date review of the effects of nanoparticle-based drugs in the treatment of respiratory disorders, including both basic and clinical studies. Databases including PubMed, Web of Knowledge, and Scopus were searched until the end of August 2022 regarding the effect of nanoparticles on respiratory diseases. Nanomedicine as a new tool provided promising applications on treating of pulmonary diseases. The basic composition and intrinsic characteristics of nanomaterials showed their effectiveness in treating pulmonary diseases. The efficiency of different nanomedicines has been demonstrated in experimental animal models of asthma, chronic obstructive pulmonary disease (COPD), pulmonary fibrosis, lung cancer, lung infection and other lung disorders, confirming their function in the improvement of respiratory disorders. Various types of nanomaterials, such as carbon nanotubes, dendrimers, polymeric nanomaterials, liposomes, quantum dots, metal and metal oxide nanoparticles, have demonstrated therapeutic effects on respiratory disorders, which may lead to new possible remedies for various respiratory illness that could increase drug efficacy and decrease side effects.

Biography

MHB was Born in 1958, graduated as MD in 1981 and has done his PhD in 1991 from the Department of Medicine, Charing Cross and Westminster Medical School, University of London, London, UK. Working as Professor in the Department of Physiology, School of Medicine, Mashhad University of Medical Sciences, Mashhad, IR Iran. Published 325 full papers in International Journals in English language and 10 in Faesi with H-Index of 43 (Scopus). His research interests are; 1) Respiratory and immuno-pharmacology of medicinal plants 2) Airway therapeutic and regulation, 3) Smoking and environmental, occupational and toxin induced respiratory diseases, 4) Pulmonary Function tests in health and lung diseases and 5) Prevalence of respiratory diseases in the region. He has got several national and international research award. MHB is head of Applied Biomedical Research Center as well as Editorial member of reputed Journals and Editor In Chief of Avicenna Journal of Phytomedicine.

Advanced Satellite Communications

OCTOBER 18, 2024



AI And Anti-Drone Systems: Shaping the Future of Aerial Defense

Ami Pandat

Bhabha Atomic Research Center, India

As drone technology continues to advance and become more accessible, the need for robust anti-drone systems has never been more critical. This talk explores how Artificial Intelligence (AI) is revolutionizing the field of aerial defense by enhancing the capabilities of anti-drone systems. AI-driven innovations are transforming our ability to detect, track, and neutralize unauthorized or malicious drones, providing a significant leap forward in securing our skies.

We will delve into the latest advancements in AI-powered detection systems that leverage machine learning algorithms to improve the accuracy and reliability of identifying drone threats. The role of real-time surveillance technologies, including computer vision and sensor fusion, will be highlighted in continuously monitoring drone activities. Additionally, we will examine AI-based neutralization tactics that ensure the safe and effective interception of rogue drones, minimizing collateral damage and enhancing public safety.

Real-world case studies will be presented to demonstrate the successful implementation of AI-powered anti-drone systems across various sectors, such as defense, public safety, and critical infrastructure protection. These examples will illustrate AI's practical applications and effectiveness in real-world scenarios.

Finally, we will discuss the emerging trends in AI and their potential impact on the future of anti-drone technology. Attendees will gain a comprehensive understanding of how AI is shaping the next generation of aerial defense mechanisms, making this session ideal for professionals, researchers, and policymakers dedicated to advancing drone security through innovative AI solutions.

Key Points:

- **AI-Powered Detection:** Leveraging machine learning for accurate and reliable drone threat identification.
- **Real-Time Surveillance:** Utilizing computer vision and sensor fusion for continuous drone activity monitoring.

Advanced Satellite Communications

OCTOBER 18, 2024

- **Neutralization Tactics:** Implementing AI-based methods for safe and effective rogue drone interception.
- **Case Studies:** Real-world applications of AI-powered anti-drone systems in various sectors.
- **Emerging Trends:** Future directions of AI in enhancing anti-drone technology and aerial defense.

Biography

Ami Pandat is a dedicated researcher and a Ph.D. candidate in Computer Science at the Bhabha Atomic Research Centre (BARC), Mumbai, with coursework completed at the Indian Institute of Technology (IIT) Bombay. With a strong academic background, including an M.Tech in Information and Communication Technology from Dhirubhai Ambani Institute of Information and Communication Technology (DAIICT) and a B.E. in Computer Engineering from Ahmedabad Institute of Technology, Ami has developed a deep expertise in machine learning, deep learning, and computer vision.

Her research primarily focuses on the application of AI in enhancing anti-drone systems, a critical area in modern security. Ami has contributed to several notable projects, including the classification of birds and drones using convolutional neural networks (CNNs) and semantic-aware graph partitioning. She has published multiple papers on topics such as AI in drone detection and graph analytics.



From Pixels to Pathology: Employing Computer Vision to Decode Chest Diseases in Medical Images

Muhammad Arslan¹ and **Ali Haider²**

¹Royal Infirmary of Edinburgh, UK

²University of Lahore, Pakistan

Radiology has been a pioneer in the healthcare industry's digital transformation, incorporating digital imaging systems like picture archiving and communication system (PACS) and teleradiology over the past thirty years. This shift has reshaped radiology services, positioning the field at a crucial junction for potential evolution into an integrated diagnostic service through artificial intelligence and machine learning. These technologies offer advanced tools for radiology's transformation. The radiology community has advanced computer-aided diagnosis (CAD) tools using machine learning techniques, notably deep learning convolutional neural networks (CNNs), for medical image pattern recognition. However, the integration of CAD tools into clinical practice has been hindered by challenges in workflow integration, unclear business models, and limited clinical benefits, despite development dating back to the 1990s. This comprehensive review focuses on detecting chest-related diseases through techniques like chest X-rays (CXRs), magnetic resonance imaging (MRI), nuclear medicine, and computed tomography (CT) scans. It examines the utilization of computer-aided programs by researchers for disease detection, addressing key areas: the role of computer-aided programs in disease detection advancement, recent developments in MRI, CXR, radioactive tracers, and CT scans for chest disease identification, research gaps for more effective development, and the incorporation of machine learning programs into diagnostic tools.

Biography

Dr. Muhammad Arslan is a medical professional who earned his degree from Nawaz Sharif Medical College, University of Health Sciences. Presently, he holds the position of Senior Clinical Fellow at the esteemed Royal Infirmary of Edinburgh. This role indicates his expertise and experience in the medical field. His principal interest lies in the realm of artificial intelligence (AI) and its integration into radiology. Radiology, a branch of medicine involving medical imaging, has witnessed transformative advancements through AI applications, promising enhanced diagnostic precision and overall patient care. Dr. Arslan's focus on AI suggests an active engagement in harnessing technology to improve radiological practices, potentially involving the development of AI algorithms for image interpretation or utilizing machine learning for data analysis. His work at the intersection of medicine and technology exemplifies a commitment to advancing healthcare through innovative approaches and leveraging cutting-edge technologies.

Cureus

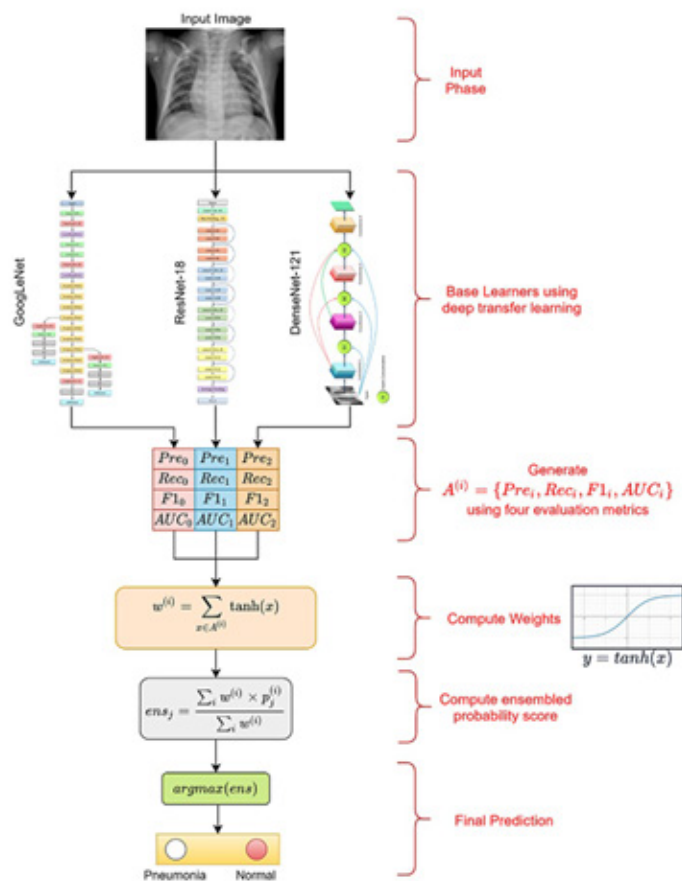


FIGURE 3: Proposed mechanism of the pneumonia detection framework.

Reproduce under the terms of the Creative Commons Attribution License from Reference [22]. Copyright 2021 PLoS ONE.

In the pursuit of classifying images as either normal or indicating pneumonia, researchers leveraged binary classification techniques on a dataset of 5,856 chest X-ray (CXR) images sourced from the pediatric-CXR dataset [23]. Data augmentation techniques were employed as a means of expanding the dataset. Through these efforts, a custom convolutional neural network (CNN) was trained using the accumulated data to accurately detect instances of pneumonia, achieving an accuracy rate of 83.38%. Further advancements in research have aimed to distinguish between viral and non-viral pneumonia through confidence-aware anomaly detection [24]. This investigation heavily relied on the X-viral and X-COVID-19 CXR databases. The former contained 5,977 images showcasing viral pneumonia cases, while the latter encompassed 57,395 images illustrating non-viral pneumonia cases. Additionally, the second dataset comprised 107 images that were not infected with COVID-19 and 106 images that were infected. IF Healthcare's telemedicine software was deployed across 390 hospitals for both datasets. The proposed confidence-aware anomaly detection (CAAD) model exhibited robust performance, boasting a high area under the curve (AUC) value of 87.57%. This AUC value signifies the model's efficacy in identifying instances of viral pneumonia. The utilization of an 18-layer deep convolutional neural network (CNN) method facilitated the categorization of CXR images into pneumonia or normal categories [17]. This task was executed using the pediatric-CXR dataset. The resultant model achieved an impressive sensitivity (SEN) of 99.50%, accuracy (ACC) of 94.39%, and specificity (SPE) of 86.00%.

Advanced Satellite Communications

OCTOBER 18, 2024

**RPRA: Reputation-Based Prioritization and Resource Allocation Leveraging Predictive Analytics and Vehicular Fog Computing****Muhammad Ilyas Khattak** and **Yua Hui***Shandong University, China*

Predictive analytics and vehicle fog computing (VFC) have emerged as important methodologies for enabling seamless and instantaneous access to storage and information in real-time and facilitating the execution of resource-hungry smart applications. VFC-enabled IoT devices that use predictive analytics efficiently can process data in a timely manner. However, besides time sensitivity, better security and privacy solutions for several such smart systems, such as smart healthcare systems, are essential but have rarely been developed so far. With the nature of healthcare information being personal-specific and trust being of paramount significance, our research aims to fill a gap by proposing reputation-based prioritization and resource allocation (RPRA). It is a VFC-enabled framework for time-sensitive, computationally resource-deficient smart healthcare IoT devices that uses latency and energy as key constraints. RPRA is a subjective logic-based heuristic approach that uses context-dependent, indirect, and perceived reputation-based trust. Our method minimizes trust bias and trust-based assaults and uses static weight allocation and a specialized algorithm that guarantees utility maximization. We employed three distinct key metrics, i.e., individual perception, real-time perception, and marginal perception, to identify rogue nodes with hostile intent and remove them from active participation. In a dynamic VFC-enabled healthcare system, our approach outperforms in terms of utility-based reputation values with the highest range on the scale of [0,70] and the least algorithmic complexity.

Biography

Muhammad Ilyas Khattak earned a Bachelor's in Computer System Engineering from Pakistan's National University of Science and Technology (N.U.S.T.), Islamabad, and a Master's in Electrical Engineering (major in electronics and communication) by research from U.E.T., Peshawar (Peshawar campus) in October 2015. Ilyas was a telecommunications engineer at Mobilink and an electrical engineering instructor at a chartered private-sector engineering university in his hometown. Ilyas is currently pursuing a Ph.D. at the School of control science and Engineering program, Shandong University's Qianfoquan campus in Jinan, Shandong province, P.R. China.

Advanced Satellite Communications

OCTOBER 18, 2024



Perforated H- Guide Based Solutions for Realization of Sub-THz Integrated Circuits and Systems

Nagendra Prasad Pathak

Department of ECE, Indian Institute of Technology Roorkee, India

The demand for wireless data rates are increasing exponentially and thus multi-Gigabit-per-second links are expected to become a reality within the next five-six years. Large unused bandwidth at Sub-THz frequency bands motivates researchers and scientists to explore it for wireless communications and it is supposed to satisfy the hunger for much higher wireless data rates due to the large available bandwidth. The communication range at Sub-THz/THz frequencies is very short which may be further reduced if safety margin with real-world effects such as Rayleigh fading, Fresnel diffraction, atmospheric attenuation, and the day-to-day weather are included in the design. However, it supports short range high data rate communication, which can be used for fulfilling the future demand and will be used for secure indoor communication system. Along with this, chip-to-chip wireless communications are benefitted with the development of the low-loss and high speed interconnection at sub-THz frequency range that enables the data transfer rate of tens and hundreds of Gb/s or more.

To fulfill the demand, present and next-generation wireless communication systems need highly-versatile components having low-loss, and energy-efficient architecture with easy fabrication, low-cost technology, and having immunity to interference and noise that are typically present in the progressively-congested electromagnetic environments. For their implementation, advanced front-end integrated circuits with increased levels of transfer-function adaptively and enhanced electrical performance need to be developed. Among all the available technologies, dielectric integrated guides are more attractive due to their inherently low loss nature along with possibility of low cost realization. We successfully developed and tested Perforated H-guide based integration technology and some components which finds application in realizing 6G and beyond wireless systems. Fig. 1 shows the concept of Perforated H-Guide based integrated circuits and systems for Sub-THz/THz applications.

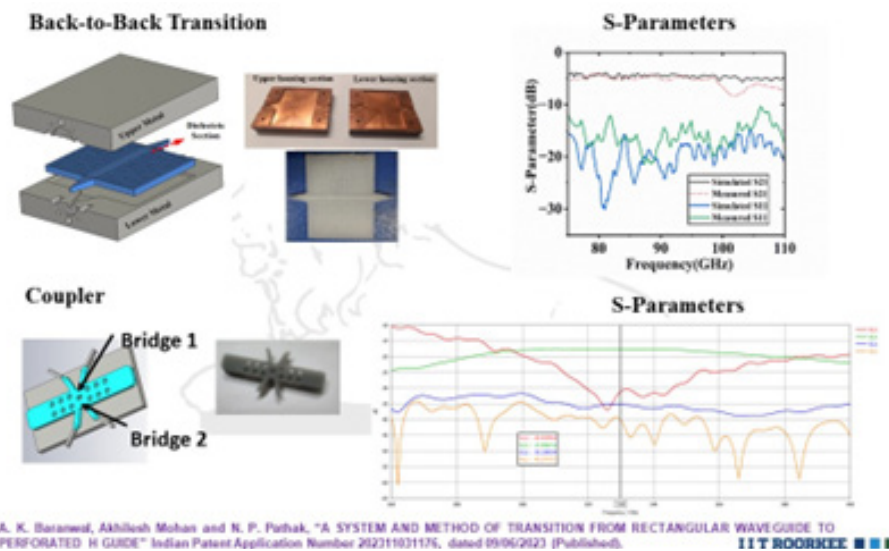


Fig.1 Perforated h-guide based wireless systems for sub-thz/thz applications

Biography

Nagendra Prasad Pathak is currently working as Professor and head of Electronics & Communication Engineering department, Indian Institute of Technology Roorkee, Uttarakhand, India. Prof Pathak has served as member of 6G Task Force, DOT, Govt. of India, IEEE MTT-S technical committee on "THz Technology and Applications" (TC, MTT-21) and Research Advisor of Nanyang Academy of Sciences, Singapore. He is an Associate Editor to IEEE Access and Editor of IETE Journal of Research. He has served as TPC Chairman of IEEE MAPCON 2023, IEEE IMaRC 2021 and Chairman of IEEE Microwave Theory and Techniques Society MTT-S Uttar Pradesh Chapter (2021-23), He is recipient of DST Fast Track Research Grant for Young Scientists (2007), IETE India National Research Fellowship in the area of 'Microwave and Radar Engineering' (2004, 2005). Prof Pathak's current research interests are: Integrated circuits for microwave/millimetre wave/ Sub-millimetre wave/ THz wireless communications; Non-invasive sensors.



Challenges And Opportunities in Design and Performance of Robots for Disaster and Risk Management

Omkar Singh Kushwaha

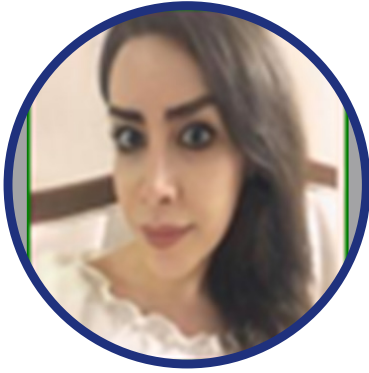
Centre(s) of Excellence in CCUS, Energy and Sustainability, Chemical Engineering Department, IIT-Madras, India

Modern emergency response techniques depend on disaster management robots. Robots are used in disaster preparedness, response, recovery, and reconstruction because of their unique qualities. Data collection by robots is crucial in disaster-prone areas, especially during preparation. Drones' high-resolution cameras and sensors enable fast airborne reconnaissance. Accurately scanning difficult environments to discover structural flaws, environmental risks, and people in need. This data aids authorities in resource allocation and evacuation planning. Robots are used in emergency response to reduce hazards and find and rescue people in difficult conditions. Ground robots like ROVs and UGVs include cameras, sensors, and manipulator arms. These robots can search wreckage, fallen buildings, and hazardous materials for survival or structure stability. Such robots can navigate tight places and fragile structures, protecting rescuers and lowering casualties.

A robot with thermal imaging cameras or gas sensors can detect life, monitor the surroundings, and detect gas leaks or fires. Subaquatic search and rescue activities during floods use AUVs and ROVs. Robots also help to rebuild after any severe disaster. They remove debris, assess infrastructure damage, and restore communication networks and utilities. Modern sensing and mapping robots ease damage assessment and urban regeneration methods by documenting impacted regions. The disaster management robots improve emergency response efficiency, productivity, and security, saving lives and protecting communities. Robotic systems can improve disaster resilience and response as technology advances by integrating with the software's such as Disaster Management Information Systems (DMIS), Incident Command System (ICS) Software, and WebEOC Resource Management Module, etc.

Advanced Satellite Communications

OCTOBER 18, 2024

**A surrogate model for predicting dam displacement under seismic load for different orthotropic states of concrete****Rezvan. Saeed** and **Amir Javad Moradloo***University of Zanjan, Iran*

In this study, the seismic performance of a concrete dam was evaluated by incorporating lift joints through nonlinear finite element analysis and a surrogate model for prediction. Lift joints, which can weaken the dam structure at specific locations and directions, were accounted for by assuming orthotropic behavior for the concrete. Various orthotropic states arising from the lift joints were investigated. Subsequently, to predict the nonlinear response of the concrete dam, a FORTRAN program was developed. The proposed method draws upon evolutionary algorithms inspired by Darwinian biology, which are increasingly utilized as surrogate models for various analyses. The Morrow Point dam was modeled and analyzed under the Taft earthquake loading. The purpose of developing the program was to reduce the time required for analyzes so that by analyzing the initial seconds of seismic loading, by importing training inputs to the program, a proper prediction of the response process for the rest of the loading time could be obtained. In addition, by training the program for the isotropic and orthotropic modes, time history diagrams could be extracted for other orthotropic modes in different anisotropy ratios. According to the obtained results, the program is acceptably able to predict the graphs in a very short time. In addition, an equation for predicting the displacements in the orthotropic mode is presented. The results reveal that time history plots derived from the implemented program closely resemble those from finite element analyses. The output results are remarkable, given the significantly reduced time required for predictions generated by the implemented program.

Biography

Rezvan has a M.Sc. and Ph.D. in hydraulic structures, and has extensive experience in both academic and industrial. She has more than 10 years of experience in research and education. So far, she has published more than 20 papers in prestigious journals and conferences. Also, she has a published book.

Advanced Satellite Communications

OCTOBER 18, 2024



Satellite And Education: Implementing The Failed Strategy Of 'Putting the Cart Before the Horse' As A Panacea to Bridging the Lacuna in Education Through Satellite Solutions

Sebastiane Ebatamehi

Nigeria

Sub-Saharan Africa accounts for the highest rates of education exclusion. According to United Nations reports [2022], one out of five children in the region between 5 and 11 years are out of school. In the same year, an independent Education Commission Committee headed by Rebecca Winthrop, on February 8, 2022, testified before the U.S. House Foreign Affairs Committee that sub-Saharan Africa needs a minimum of \$175 billion per year until 2050 to support education.

Numerous factors prevent children in sub-Saharan Africa from accessing education, but tops on the list are accessibility and location – both of which can be effectively addressed by satellite connectivity. Satellites provide unique solutions that can bridge the lacuna in education, where other terrestrial options may seem inadequate or more so – unrealistic.

Satellite solutions can break the geographical barrier between the rich and the poor. However, there is a big problem which stakeholders and advocates for the use of satellite in education have failed to identify.

For example, the United Nations through the Sustainable Development Goals, has projected a world with quality, inclusive and equitable education for all (including children in sub-Saharan Africa) by 2030. In this vein, billions of dollars are spent yearly in designing and improving the intelligence of satellites to help actualize this goal. But there is a problem – we are putting the cart before the horse!

Are we addressing the pain points when designing satellites as a panacea for educational solutions? Are we providing solutions to problems we have not ascertained? Are we designing satellite systems to empower the already empowered? In this paper, we will critically analyse the status quo, and together – birth a road map to an effective and sustainable satellite in education solution.

Advanced Satellite Communications

OCTOBER 18, 2024

Biography

Sebastiane Ebatamehi is a renowned writer, researcher and educationist. He is an Associate Partner and Senior Lecturer at a leading African Training Academy. He has extensive knowledge and expertise in research, writing/editing, and lecturing spanning two decades.

In addition, he proudly serves as a UN Youth Ambassador with the International Youth Federation, actively contributing to global youth initiatives. His research and papers expose a dynamic expertise spanning 17 countries across three continents - attracting global critics and accolades.

His commitment to research and innovation is evident in the global attraction his papers and lectures have attracted over time.

Advanced Satellite Communications

OCTOBER 18, 2024

**Artificial General Intelligence Based Rational Behavior Detection Using Cognitive Correlates for Tracking Online Harms****Shahid Naseem***Dept. of Information Sciences, Division of Science and Technology, University of Education, Pakistan*

Expert systems possess human-like expertise for data analyzing as well as for decision-making. These systems are suitable in a situation, where a high level of uncertainty exists. In expert systems, for protecting sensitive information, various encryption techniques such as classical encryption and quantum encryption are used. In these systems, Artificial Intelligence (AI) is used to analyze the data at runtime and to detect unauthorized users in the early stage especially for tracking online harms. These systems are not completely secured, because the encryption techniques have some loopholes such as the algorithm's short life expectancy and less computation power. An unauthorized user destroys the precious data, as well as the system, might access these loopholes. As the confidentiality and integrity of expert systems are threatened by intrusions and real-time attacks related to privacy and cyber-security, there is a need for proposing novel methodologies to predict future attacks and identify new threat patterns. To analyze the behavior of the intruder and overcome the encryption weaknesses, this paper presents an Artificial General Intelligence based Rational Behavior Detection Agent (AGI-RBDA). The proposed system possesses human-like rationality for protecting the information like a human mind. It is exposed that the human mind does not apply any kind of encryption technique; instead, it used various cognitive correlates such as intention, perception, motivation, emotions, and implicit and explicit knowledge for the secrecy of sensitive information. In the end, the behavior of different cognitive correlates is exposed and stimulated.

Advanced Satellite Communications

OCTOBER 18, 2024



A Survey Of 6G And Geoai Technology for Analysis & Control of DTs

Sharmila Sengupta

Vivekanand Education Society's Institute of Technology, India

Objectives: GeoAI and sixth generation (6G) communication systems can elevate the intelligence behind how we perceive, understand and make decisions regarding geographical phenomena by deploying Digital twins (DTs) for urban areas and earth sciences.

Scope: The proposed general architecture is to design and optimize the performance of DT control centre; for applications to mitigate climate change; organic practices for yield improvement in agriculture and innovative and affordable healthcare etc..

Results: A general survey of debris data gathered for India shows considerable deposit of ocean plastics around the coastline and allows intelligent management and control of plastics moving to the sea.



Advanced Satellite Communications

OCTOBER 18, 2024

Methods: Though GIS data was unavailable, data collected from various sources are applied to various AI prediction models and the best results are shown in the heat map. Use of DT will allow live monitoring of this data.

Conclusion: The forthcoming 6G communication network is envisioned as a sixth-sense next-gen system and AI and IIOT will augment Quality of Experiences and Quality of Life by using Edge Computing, eliminating the need for server, software, or hardware installations for clients, only necessitating a fast internet connection with robust security measures and regulations.

Biography

Dr. Sharmila Sengupta, Associate Professor (Computer engineering department, VESIT)

Education

Ph.D., Mumbai University

M.E.(EXTC), Mumbai university, (68.5%)

B.E.(Electronics), Shivaji university, (68.6%,1st class, distinction)

HSC (1st class distinction), West Bengal Board of Higher Secondary Education

Key Skills

Subjects taught at various departments in UG and PG level

Guided several ME candidates

Encouraging Research and Projects

Attended and conducted several research, technical, educational events and faculty development programs and STTPs organized by ISTE, CSI, MHRD, ATAL etc.

Life member of ISTE

- Received AI for Earth Microsoft Azure Compute Grant of \$15000 USD for "AI based statistical analysis of pollution due to land and ocean plastic waste in India" in 2021-2022
- Received a Minor Research Grant under University of Mumbai of Rs. 30000 for a project titled "Sahara: A stanchion for the blind" in 2019-2020
- Winner at eYantraSymposium (eYS2018), IIT Bombay, for the project, "e-Classroom" in 2017-2018
- Winner at eYantraSymposium (eYS2016), IIT Bombay, for the project, "Pothole Management System Using Image Processing and Geotagging" in 2015-2016
- Winner of technical events, best teacher and paper awards



Histo-Anatomical Mutilations of Developing Chick Brain Induced by In-ovo Fluoride and Bifenthrin Exposure

Syeda Nadia Ahmad¹, Khawaja Raees Ahmad² and Syeda Ayesha Ahmed³

¹Department of Zoology, University of Chakwal, Pakistan

²Ex-Professor, Department of Zoology, University of Sargodha, Pakistan

³Department of Zoology, University of Sargodha, Pakistan

Comparative developing brain histo-anatomical pathologies of Fluoride ions and Bifenthrin in-ovo exposures were explored in the golden black variety of domestic chick. Three exposure groups were –the Vehicle control group (Vg); Fluoride (F) group and the Bifenthrin (Bn) group each with forty fertilized eggs and received their respective group treatment at zero day of incubation. Embryos were extracted, dissected from head region and the embryonic whole brains were recovered after 14 days of incubation. The embryonic brains were preserved in bouin fixative for 24 h for further studies. The morphological results show the atrophied and hypertrophied embryonic brain in F and Bn groups respectively as compared to Vg group. The toxicological signs of encephalic anatomy and histology of F and Bn exposure were the enlarged third ventricles, optocoeles and arachnoid mater, encephalic spongiosis and decreased neuroglial density. The morphometric data showed significant decrease ($p \leq 0.05$) in mean weight and density of whole brain in F and Bn groups compared Vg. The mean length and width of whole brain in F were significantly lower than that of the Bn and Vg. whereas, the mean breadth of third ventricle in Bn remained significantly lower than F and Vg groups. On the other hand, the mean breadth of optocoele and fourth ventricle in F and Bn groups remained significantly higher than Vg. Conversely the mean optic lobe wall thickness in F remained significantly lower than Bn and Vg. Additionally, the mean neuronal density in diencephalon, optic lobe and cerebellum in F group and Bn group remained significantly ($p \leq 0.05$) lower than Vg. Results show that low dose in-ovo fluoride or bifenthrin exposure may cause neurodevelopmental abnormalities in the developing chick embryos indicating that the Fluoride-ions and Bifenthrin harbor strong developmental neurotoxic capacity.

Advanced Satellite Communications

OCTOBER 18, 2024

Biography

Dr. Syeda Nadia Ahmad is currently working as a “Assistant Prof. of Zoology” in Department of Zoology, University of Chakwal, Pakistan. She is also the focal person of “ BOS, QEC, ORIC and curriculum development committee” & working as convener of “migration rules committee” in University of Chakwal, Pakistan. Dr. Nadia is the active member of “National Youth Assembly”, Pakistan. She remained a part of “Higher Education Department” as a Lecturer Biology and Vice Principal in Govt. Associate College for Women Bhera, Pakistan since March 2018. She produced 12 research publications in well reputed journals from thesis and projects. Regarding teaching carrier, Dr. Nadia remained as Master trainer of Science for Primary and Elementary Educator from 2012 to 2021. She has participated and published 11 abstract publications, 6 oral presentations and designed posters in various national conferences. She is also working as reviewer in many journals. Currently, she is reviewing the articles for “International Journal of Reproductive Biomedicine”, Iran. Currently, Dr. Syeda Nadia Ahmad with her research group is working on different fluoridated insecticides, teratological aspects of pyrethroids, bovine semen cryopreservation, endocrine and vital organs regeneration and Bio-active ethno-medicinal ingredients as fertility preservers and patho-histological ameliorators.

Advanced Satellite Communications

OCTOBER 18, 2024



SpiNet-QSM: Model-based Deep Learning with Schatten p-norm Regularization for Improved Quantitative Susceptibility Mapping

Vaddadi Venkatesh¹, Raji Susan Mathew² and Phaneendra K. Yalavarthy³

¹Indian Institute of Science, India

²Indian Institute of Science Education and Research, India

³Indian Institute of Science, India

Objective: Quantitative susceptibility mapping (QSM) provides an estimate of the magnetic susceptibility of tissue using magnetic resonance (MR) phase measurements. The tissue magnetic susceptibility (source) from the measured magnetic field distribution/local tissue field (effect) inherent in the MR phase images is estimated by numerically solving the inverse source-effect problem. This study aims to develop an effective model-based deep-learning framework to solve the inverse problem of QSM.

Materials and methods: This work proposes a Schatten p-norm-driven model-based deep learning framework for QSM with a learnable norm parameter p to adapt to the data. In contrast to other model-based architectures that enforce the l_2 -norm or l_1 -norm for the denoiser, the proposed approach can enforce any p -norm ($0 < p \leq 2$) on a trainable regulariser.

Results: The proposed method was compared with deep learning-based approaches, such as QSMnet, and model-based deep learning approaches, such as learned proximal convolutional neural network (LPCNN). Reconstructions performed using 77 imaging volumes with different acquisition protocols and clinical conditions, such as hemorrhage and multiple sclerosis, showed that the proposed approach outperformed existing state-of-the-art methods by a significant margin in terms of quantitative merits.

Conclusion: The proposed SpiNet-QSM showed a consistent improvement of at least 5% in terms of the high-frequency error norm (HFEN) and normalized root mean squared error (NRMSE) over other QSM reconstruction methods with limited training data.

Biography

He is a Ph.D. student in the Medical Imaging Group (MIG) headed by Dr. Phaneendra K Yalavarthy, Prof., Computational and Data Sciences (CDS), Indian Institute of Science (IISc) Bangalore. Before joining IISc Bangalore, He did M Tech in Computer Science, from the School of Computer and Information Sciences (SCIS), University of Hyderabad (UoH), under the supervision of Dr. V Ch Venkaiah Prof., CS, UoH. He is currently working on developing deep learning models and model-based deep learning models for medical image analysis.

Advanced Satellite Communications

OCTOBER 18, 2024



Seamless Integration of Satellite, Gateway, and Ground Networks for Next-Generation Connectivity

Waleed Algriree¹, Bayan Mahdi Sabbar² and Mokhalad Alghairi³

¹Putra University Malaysia, Malaysia

⁴Al-Mustaqbal University, Iraq

³Imam Al Kadhum College, Iraq

The Space–Air–Ground Integrated Network (SAGIN) is a critical component of the emerging sixth-generation (6G) mobile communication system. This integration aims to provide seamless, high-speed, and ubiquitous connectivity by leveraging the complementary characteristics of space-based, aerial, and terrestrial communication networks. Hybrid satellite-terrestrial communication systems enhance coverage and efficiency but face challenges like shadowing and obstructions that hinder performance. This study addresses these issues by introducing a novel Hybrid Detection Sharing (HDS) technique for MIMO 5G waveforms, aimed at improving spectrum utilization and system efficiency. Traditional satellite communication systems struggle with spectrum enrichment, whereas our proposed method excels. Through extensive simulations, we demonstrate the HDS technique's enhanced sensing and sharing capabilities, leading to an increase in the number of Secondary Users (SUs), a reduction in Signal-to-Noise Ratio (SNR) requirements, and maintenance of manageable computational complexity and regulatory frameworks such as Licensed Shared Access (LSA) or General Authorized Access (GAA) allow multiple users to share the same spectrum bands. These frameworks can facilitate spectrum access in areas where exclusive licenses are not feasible, ensuring better coverage. Optimal performance was achieved with 64 gateway antennas (95% detection at 18 dB SNR) and two base station antennas (92% detection at 6 dB SNR). Additionally, we explore the trade-off between false alarm probability and detection performance. Our approach significantly outperforms existing methods, especially in low SNR scenarios and complex computational environments, showcasing its potential to enhance spectrum sharing efficiency in future satellite-terrestrial communication systems.

Biography

Waleed Algriree received his B.Sc. in Electrical Engineering/Communications Engineering from the University of Technology, Baghdad, Iraq, in 2005, and his M.Sc. in Communication Systems Engineering from the University of Portsmouth, UK, in 2009. He earned his Ph.D. in Wireless Communication Systems Engineering from Putra University, Malaysia, in 2023. Since 2010, he has lectured at various universities in Iraq. Algriree is an author/co-author of three books and 40 international publications. He has chaired technical sessions and given tutorials at major international conferences, served as a Co-Guest Editor, and reviewed over 40 articles for impact factor journals. His research interests encompass radio wave propagation, RFID antenna design, mobile and satellite systems, CRN, and digital communications. Additionally, he is on the editorial boards of the American Journal of Science, Engineering and Technology, the Artificial Intelligence and Robotics conference, and Innovation Discovery.



Monitoring Of Ambient Air Quality Pattern and Assessment of Air Pollutants Correlation, Its Effects on Ambient Air Quality Of Lahore, Pakistan

Waqas Ahmed Khan^{1,2}, Faiza Sharif¹, Muhammad Fahim Khokhar², Laila shahzad^{1,3} and Nusrat Ehsan⁴

¹*Sustainable Development Study Center, Government College University Lahore, Pakistan*

²*National University of Science and Technology, (NUST) Islamabad, Pakistan*

³*Institute of Risk and Disaster Reduction, University College London, UK*

⁴*Department of Environmental Management, National College of Business Administration and Economics, Pakistan*

Industrialization, population explosion, anthropogenic activities and vehicular exhaust play a vital role in deteriorating ambient air quality over the world. Current study aim to assess the impacts on ambient air quality patterns and their co-relations in one of the world's most polluted city: Lahore, Pakistan for a time period of 28 months (March 2020- June 2022). Purpose of this study is to monitor and analyze relationship between criteria Air pollutants (SO₂, PM₁₀, PM_{2.5}, CO, O₃ and NO₂) through Haz-scanner 6000 and Mobile van (Ambient air quality monitoring station) over nine towns of Lahore. The Results showed an unprecedented increase in the concentration of air pollutants. Post COVID-19 period illustrate significant increase in the concentrations of SO₂, PM₁₀, PM_{2.5}, CO, O₃ and NO₂ in range of 100%, 270%, 500%, 300%, 70% and 115% respectively. Findings shows major peaks (pollution concentration) for PM₁₀, PM_{2.5}, NO₂ and SO₂ were found during the winter season. Multi linear regression model shows significant Co-relation was found among Particulates matter with NO₂ and SO₂. The ratio of increase in the Particulate matter concentration with increasing NO₂ concentration is nearly 2.5 times more than that with SO₂. Negative to positive Co-relation was found between Ozone and PM as air quality improved. A slight difference in mobile van and Haz-scanner was observed while noteworthy correlations R² (0.43, 0.44 & 0.59) were found between ground base observation and satellite data respectively (SO₂, NO₂ and CO). During the strict COVID-19 lockdowns reduction in vehicular and industrial exhaust, significantly increase air quality in nine towns of Lahore and reported within Punjab ambient air quality standards (PEQs). Metrological data was analyzed through different software's (Sigma Plot, MATLAB) for the study time period which have the significant effect on air quality parameters (PM). This research sets the ground for further research on the quantification of total emissions and the impacts of vehicular/industrial emissions on human health.

Advanced Satellite Communications

OCTOBER 18, 2024

Biography

Dr. Waqas Ahmed Khan is a dedicated environmental scientist with a diverse academic background and over 8 years of professional experience. Born on May 20, 1991, in Lahore, Pakistan, he holds a PhD in Environmental Sciences from Government College University Lahore, specializing in Climate Change. His commitment to environmental research is evident through major international publications, including studies on air quality patterns in Lahore and the human health risk assessment of arsenic in groundwater.

Dr. Khan has served as the Chief Executive Officer of Entertech Group of Companies and as the Director of IES Environmental Solutions. His expertise extends to Satellite data analysis validations, Environmental monitoring reports, energy audits, and research in various capacities. He also contributed as a lecturer at The University of Lahore, teaching courses on climate change, environmental impact assessment, research methods, and sustainable development.

As a seasoned professional, Dr. Khan has been involved in significant projects, including the development of industry-specific environmental quality standards funded by the World Bank. He has actively contributed to environmental stewardship, energy audits, carbon footprint assessments, and wastewater treatment initiatives across industries.

Dr. Khan holds certifications in Green Productivity, E-waste Recycling, Carbon Credit, and Management, showcasing his commitment to staying updated in his field. Apart from his professional endeavors, Dr. Khan has actively participated in conferences, workshops, and symposiums, emphasizing his commitment to environmental awareness and education.

Advanced Satellite Communications

OCTOBER 18, 2024



Advancing Disaster Response: The Integration of Robotics in Emergency Management

Zainab Khalid Mohammed and **Zarkoosh**

Ministry of Water Resources, Directorate of Planning and Strategic Follow-up, Iraq

Disasters strike with devastating force, leaving a desperate need for swift and effective response. Disaster Response Robotics (DRR) is no longer science fiction, but a revolutionary force transforming emergency management. This presentation explores the cutting-edge capabilities of DRR, showcasing a diverse arsenal of robots – from nimble search-and-rescue drones navigating collapsed buildings to powerful machines clearing debris. Real-world applications will be brought to light, highlighting DRR's potential to save lives trapped in the wreckage, improve response efficiency by providing crucial situational awareness, and minimize the risks faced by human responders.

We'll delve into the exciting advancements propelling DRR forward, including the integration of artificial intelligence for faster decision-making, autonomous navigation for traversing treacherous terrain, and seamless human-robot collaboration for maximizing rescue efforts. The discussion will also touch upon the ethical considerations surrounding the use of robots in disaster zones, ensuring responsible and effective integration of this life-saving technology.

Biography

Zainab Khalid Mohammad is currently pursuing a doctorate in Information and Communication Technology at UNITEN, Malaysia. She earned a master's degree in Computer Engineering from JNTU, India, in 2014. Additionally, she completed a diploma in Total Quality Management (TQM) in 2015 and ISO 9001:2015 certification in 2016 from the Smart Business Academy in Sweden. Zainab works at the Iraqi Ministry of Water Resources, specializing in the installation, maintenance, and security of network servers. She is skilled in cloud computing, website design, software development, and smart device applications.

Zainab's interests include AI, IoT in natural disasters, Smart Cities, Intelligent Transportation, Circular Economy, and Cyber Security. She has been nominated for leadership roles in Saudi Arabia and Geneva as Director of Science and Technology and is an active member of the Al-Nahrain Association of Iraqi Scientists in the USA. In her research, Zainab focuses on decision-making strategies, network security, and data analytics techniques.



Why did the French Satellite Microscope fail to prove the violation of the principle of equivalence?

Abdelouahed Tounsi^{1, 2}

¹Material and Hydrology Laboratory, University of Sidi Bel Abbes, Faculty of Technology, Department of Civil Engineering, Algeria

²Department of Civil and Environmental Engineering, King Fahd University of Petroleum & Minerals, 31261 Dhahran, Eastern Province, Saudi Arabia

Recently, the final results of the Microscope mission [1, 2] have just been published where record accuracy is shown. Indeed, the principle of equivalence has been proved with an unequalled precision of 10^{-15} . These results demonstrate that bodies fall in a vacuum with the same acceleration regardless of their composition or their mass; the principle of equivalence therefore remains unshakable even today, nothing less than a new victory for General Relativity proposed by Albert Einstein more than a century ago.

In this presentation, we will show why the French satellite microscope did not succeed in proving the violation of the principle of equivalence.

The main cause of the failure of the satellite microscope to prove the violation of the principle of weak equivalence is due to the dimensions of the bodies tested which are at the macroscopic scale. At the macroscopic scale, all bodies fall with the same speed and the same acceleration as shown theoretically and mathematically recently by Tounsi [3]. This is due to the fact that at this scale, the strain gradient length scale parameter which varies with the nature of the material and its composition does not intervene in the physical and mechanical laws. In my opinion, even the next generation of proposed experiments such as MICROSCOPE 2 which should reach a level of precision of $\eta \leq 10^{-17}$ will fail to prove the violation of this founding principle of Einstein's theory of General relativity if macro-bodies will be considered.

To prove the violation of this principle, it is necessary to carry out experiments on nano-bodies as is shown theoretically and mathematically recently by Tounsi [4, 5].

Advanced Satellite Communications

OCTOBER 18, 2024

**Influence of Fiber Orientation on the Water and Ions Transportation of Engineered Cementitious Composite****Abdullah M. Tawfek***School of Qilu Transportation | Shandong University, China*

An engineered cementitious composite (ECC) belongs to a type of high-performance fiberreinforced materials. Fiber alignment causes the anisotropy of such materials. Herein, the influence of the fiber orientation on water and ion penetration into an ECC was studied. Fiber alignment was achieved using an extrusion approach. Water absorption, sorptivity, chloride penetration resistance, sulfate attack resistance, and freezing–thawing resistance of specimens with fiber aligned horizontally (AH), vertically (AV), and randomly (R), corresponding to the direction of the exposure surface that was studied. The results showed that fibers oriented perpendicular to the water path delayed water migration into the ECC matrix. The sorptivity was significantly affected by the fiber direction. The sorptivity of the AH specimens was 35% and 13% lower than that of the AV and R specimens, respectively. After 180 days of exposure, the chloride penetration depth of the AH specimens was 5.7 mm, which is 13.6% and 20.8% lower than that of the AV and R specimens, respectively. The sulfate ingress profile indicates that the fiber–matrix interface oriented perpendicular to the penetration path can effectively delay sulfate migration. The fiber orientation also influences the compressive strength gain under immersion conditions (Na_2SO_4 solution, $\text{Na}_2\text{SO}_4 + \text{NaCl}$ solution, and water). Compared with the AH and R specimens, the AV specimens are more sensitive to the immersion condition. In contrast, the fiber orientation has no significant effect on ECC specimens under freeze–thaw cycles. These findings indicate that controlling the fiber alignment and orientation in an ECC can improve its durability under certain exposure conditions.

Biography

Abdullah Tawfek, a Ph.D. candidate in Tunnel and Bridge Engineering at Shandong University (SDU) who graduated in December 2023. His journey in academia began with a Bachelor's degree in Civil Engineering from Sana'a University in 2012. Following his graduation, he embarked on a career as an engineering consultant, where he served as a supervisor and designer for various projects. Additionally, he had the privilege of teaching as a lecturer at Ibb University from 2012 to 2014. In September 2016, he was awarded a scholarship that allowed him to pursue a Master's degree in Construction Engineering and Management at KIIT University, India. He successfully completed his Master's degree with a remarkable grade of 9/10, accompanied by significant achievements in scientific research. During this academic journey, he had the honor of publishing two research papers. Subsequently, in September 2018, he received a fully-funded scholarship to undertake a Doctoral degree program at Shandong University, China, focusing on Tunnel and Bridge Engineering. During this academic journey, he has published 6 research papers during his research journey.

Advanced Satellite Communications

OCTOBER 18, 2024



Beyond Borders: Navigating the Satellite Frontier for Educational Empowerment

Ali Hashemi

In an era marked by rapid technological advancements, this study delves into the intersection of satellite technology and education, aiming to comprehensively analyze the multifaceted implications and transformative potential of satellite-based initiatives in the educational landscape. Leveraging a combination of quantitative and qualitative research methodologies, the research investigates the role of satellites in expanding educational access, enhancing teaching methodologies, and fostering global collaboration.

The study begins by providing a contextual overview of the current state of education globally, highlighting challenges such as limited access to quality education in remote areas, disparate learning opportunities, and the need for innovative solutions. Building upon this foundation, the research scrutinizes how satellite technology acts as a catalyst for overcoming these challenges. It explores the deployment of satellites for delivering educational content to remote regions, facilitating real-time connectivity, and supporting distance learning initiatives.

Furthermore, the study critically examines the impact of satellite technology on educational pedagogy, investigating the integration of satellite imagery, data, and communication tools in curricula to enhance experiential learning and cultivate critical thinking skills. The research also assesses the role of satellite-based resources in promoting STEM (science, technology, engineering, and mathematics) education and fostering interdisciplinary learning environments.

Additionally, the study investigates the socio-economic implications of satellite-driven educational interventions, considering factors such as economic empowerment, job market preparedness, and community development. Special attention is given to case studies and success stories that exemplify the positive outcomes of satellite-enabled education in diverse geographical and socio-economic contexts.

In conclusion, this research contributes to the academic discourse by shedding light on the transformative potential of satellite technology in the realm of education. By presenting a nuanced understanding of the challenges and opportunities associated with this intersection, the study offers insights that can inform policymakers, educators, and technology developers in harnessing satellite technology to create a more inclusive, accessible, and technologically enriched educational landscape.



Interplay of psychological reactance, burnout, and spiritual intelligence: A case of Iranian EFL teachers

Reza Pishghadam¹, Nouroddin Yousofi², Asieh Amini³ and Maryam Sadat Tabatabaeyyan⁴

^{1,4}*Ferdowsi University of Mashhad, Iran*

²*Razi University, Iran*

³*Neyshabur University of Medical Sciences, Neyshabur*

Despite the fact that teaching has been construed as a profoundly emotional activity, scant information is revealed regarding the adverse emotional demands encountered by teachers or how these affect teachers' well-being. The present study aimed to examine the relationship among teacher burnout, psychological reactance, and the mediating role of spiritual intelligence in a sample of 270 English as a Foreign Language (EFL) teachers. Three scales were employed to measure the aforementioned constructs. It was revealed that there was a positive association at the individual level between burnout and reactance, and negative associations between spiritual intelligence with burnout and reactance. Further, results of bootstrapping resampling procedure revealed that spiritual intelligence mediated the relationship between burnout and reactance. It seems that paying attention to the areas of spirituality is of particular significance; perchance, there is a sense of requirement for teachers to enhance spiritual intelligence for abstaining burnout. Findings accentuate need for teacher training courses to raise awareness of emotional demands and implement strategies to promote emotion regulation skills in both experienced and recently qualified teachers.

Biography

Asieh Amini has got her Ph.D. degree in English Language Teaching (ELT) from Razi University, Kermanshah, Iran. She is a university lecturer at Neyshabur University of Medical Sciences (NUMS), Neyshabur University (NU), and non-public universities. She has published several scientific articles in peer reviewed international (JCR, ISI, and Scopus) and national journals and presented five papers in international conferences. She has compiled a research methodology book and a medical translation book. She has cooperation with Hamta Business Corporation located at Canada as a researcher. She is one of the reviewer members in high tier journals (Interactive Learning Environments, International Journal of Qualitative Studies in Education, International Journal of Mental health promotion, Journal of Applied Research in Higher Education, and the Fifth International Conference on Social Science, Public Health and Education (SSPHE)). Her research interests are in several fields of sociology, language and technology, medical sciences, Sleep quality/quantity and mental health, identity, and psycholinguistics.



Planar dipole antenna design for industry 4.0

Asiya E. Asiya¹, Sunday A. Ojomu², Costly M. Erim³, Anthony C. Aloamaka⁴ and Paul E. Okayim⁵

¹Department of Electronics and Computer Technology, University of Calabar, Nigeria

²Department of Electrical and Electronic Engineering, Cross River State University of Technology, Nigeria

³Department of Continuing Education and Development Studies, University of Calabar, Nigeria

⁴Department of Electrical/Electronic Engineering, Faculty of Engineering, Delta State University, Abraka, Nigeria

⁵Department of Electronics and Computer Technology, University of Calabar, Nigeria

In smart industries where robots and automation are applied, antenna plays a major role in accomplishing the control and automation of real-time processes *via* wireless communication such as those in wireless sensor network. The antenna generally occupies one-third of the total circuit advancement in the Industrial Internet of Things (IIoTs) and it comes in different shapes. Planar dipole antenna is the most suitable and attractive design for the IoTs application which can enhance industrial revolution due to its smaller in size and its thin profile. These characteristics make it suitable for mounting on mobile robots and portable industrial equipment. In this article, advance design system software was used to designed two antennae, meandered and wideband planar antennae on a PCB size of 18.8 mm × 43.2 mm and 0.8 mm thickness having a 4.6 dielectric constant. The transmission line of these antennae has a width of 1.25 mm resulting in a typical line impedance of 50 Ω. The comparative analysis of the simulated and measured results from a feed port, 1 of the meandered PIFA antenna shows a better performance of 95.43% efficiency with a gain of 2.54391dBi and a return loss of - 24.49 dB at 2.4 GHz resonant frequency than that from a feed port, 2 whose efficiency was only 73.99%. Whereas, the wideband planar antenna depicts an average bandwidth of 93.91% from 1.3 to 2.4 GHz frequency band. This range covers the GPS applications, the 2.4 GHz ISM band, the general WCDMA and the LTE 3GPP bands useable for smart industrial devices and IoT applications. The proposed antenna provides low power operation, extended range, compactness, cost-effective designs to support industrial control and automation in industries.

Biography

Asiya E. Asiya is a Lecturer at Electronics & Computer Technology Unit, University of Calabar, Nigeria. He bagged a Ph.D., M.Sc. degree in Engineering Physics and B.Sc. in Electronics & Computer Technology from the University of Calabar, Nigeria in 2021, 2014 and 2008 respectively.

Asiya is a pioneer principal instructor and a collaborative researcher at the Directorate of Science, Engineering &

Global Conclave on

Robotics & Automation



Advanced Satellite Communications

OCTOBER 18, 2024

Technology Project (SET-P), University of Calabar where he provides mentorship to young researchers/students on innovative research in STEM. As an Engineer, he was instrumental to the implementation of the Cross River State Smart City and Enterprise Network and saw their growth among other contributions at the CRS Ministry of ICT.

Asiya is a young man with passion for innovative research in STEM, who has carried out researches in the areas of antenna design, wireless security sensor network, IoT, optical communication, etc. with findings published in reputable peer-reviewed academic journals.



TOPSIS Approach for MCGDM based on Intuitionistic Fuzzy Rough Dombi Aggregation Operations

Azmat Hussain¹, Tahir Mahmood², Florentin Smarandache³ and Shahzaib Ashraf⁴

¹Department of Mathematics and Statistics, Faculty of Basic and Applied Sciences, International Islamic University Islamabad, Pakistan

²Islamic Girls School and College Parachinar, Pakistan

³Department of Mathematics, University of New Mexico, USA

⁴Institute of Mathematics Khwaja Fareed University of Engineering and Information Technology, Pakistan

Atanassov presented the dominant notion of intuitionistic fuzzy sets which brought revolution in different fields of science since their inception. The operations of t-norm and t-conorm introduced by Dombi was known as Dombi operations and Dombi operational parameter possess natural flexibility with the resilience of variability. The advantage of Dombi operational parameter is very important to express the experts' attitude in decision making. This study aims to propose intuitionistic fuzzy rough TOPSIS method based on Dombi operations. For this, first we propose some new operational laws based on Dombi operations to aggregate averaging and geometric aggregation operators under the hybrid study of intuitionistic fuzzy sets and rough sets. On the proposed concept, we present intuitionistic fuzzy rough Dombi weighted averaging, intuitionistic fuzzy rough Dombi ordered weighted averaging and intuitionistic fuzzy rough Dombi hybrid averaging operators. Moreover, on the developed concept we present intuitionistic fuzzy rough Dombi weighted geometric, intuitionistic fuzzy rough Dombi ordered weighted geometric and intuitionistic fuzzy rough Dombi hybrid geometric operators. The basic related properties of the developed operators are presented in detailed. Then the algorithm for MCGDM based on TOPSIS method for intuitionistic fuzzy rough Dombi averaging and geometric operators is presented. By applying accumulated geometric operator, the intuitionistic fuzzy rough numbers are converted into the intuitionistic fuzzy numbers. The massive outbreak of the pandemic COVID-19 promoted the challenging scenario for the world organizations including scientists, laboratories and researchers to conduct special clinical treatment strategies to prevent the people from COVID-19 pandemic. Additionally, an illustrative example is proposed to solve MCGDM problem to diagnose the most severe patient of COVID-19 by applying TOPSIS. Finally, a comparative analysis of the developed model is presented with some existing methods which show the applicability and superiority of the developed model.

Advanced Satellite Communications

OCTOBER 18, 2024

Biography

AZMAT HUSSAIN was born in Para Chinar, Pakistan, in 1987. He received the M.Sc. degree in mathematics from Hazara University Mansehra, and the M.Phil./M.S. and Ph.D. degrees in mathematics from International Islamic University, Islamabad, Pakistan, in 2016 and 2020, respectively. Recently, he is Assistant professor in department of mathematics Islamic Public School and College Parachinar. He has published 23 research articles with 60 plus impact factors in well reputed international journals. His research interests include fuzzy algebraic structures, decision making, rough set theory, soft set theory, and aggregation operators.

About us

A confluence of Erudite and Knowledge-Seeker

Peers Alley Media

A global consortium of the scientific fraternity, scholars, educationists, industry leaders and entrepreneurs to collaborate, share ideas and knowledge to resolve challenges across medicine, science, technology and business

Our Vision

"We aim to bring the research and innovations happening across the parts of the globe to facilitate interaction, knowledge sharing and exchange. We also aim to inspire university professors, students, researchers, clinicians and entrepreneurs from across the disciplines including but not limited to clinical, medical, business, technology, healthcare and pharmaceutical fields. Our dream is to bring advancements in the Science and Technology to the mankind through our scientific gatherings and deliberations. We believe in introducing novel methods and innovative techniques in science, business and technology to provide understanding on the developments".

Our Mission

How do we serve our target groups in the scientific & business community?

- We bring the untold research accessible for many.
- Our events meet the research needs of the target groups across the academia, industry, corporates, the government, non-government agencies and public bodies.
- We Engage. Enlighten. Empower people deprived of information.
- We connect the international giants towards finding simple solutions to the complex medical and healthcare challenges of the globe.
- We unveil the unlimited research opportunities to the sections of population that is away from the developments in science and technology.
- We encourage Young and emerging researchers and scholars.
- We extend continuous education credits to boost the career and academic progress.
- We encourage start-ups in science, technology and business for the social and economic empowerment of the enthusiastic entrepreneurs.



Peers Alley Media

1126 59 Ave East, V5X 1Y9, Vancouver BC, Canada

Ph : +1 (506) 909-0537 | Contact us: contact@peersalley.com

INDEX

Name	Pg. No
Al-Kasem. Shaza	28
Anatoly P. Lukisha	37
Anvesh Gunuganti	48
David Tinoco-Varela	44
Fatma Zohra CHELALI	22
Hang Zhao	10
Jin-Ku Lee	29
Kaoru Sumi	8
Katia Guérin	36
Kirti Sharma	17
Lori Towle	40
Mauricio Figueroa Colarte	43
Milind Gunjan	46
Naga Siva Jyothi Kompalli	24
Pankajini Mahanta	18

Name	Pg. No
Piyush Chaubey	14
Preeti sharma	26
Russell Suereth	39
Sen Xu	9
Shirin Maleki	20
Shital Ganorkar	13
Srikanth Mandru	49
Taha Sajid	41
Tongyuan Wang	45
Um Albaneen Yusuf Jamali	21
Valery Vuglinsky	31
Vladimir Cherny	11
Yuan Ping	33

**BOOKMARK
YOUR DATES**

2nd Global Conclave on

Robotics & Automation



3rd Global Congress on

**Advanced Satellite
Communications**

**October 2025
Berlin, Germany**

