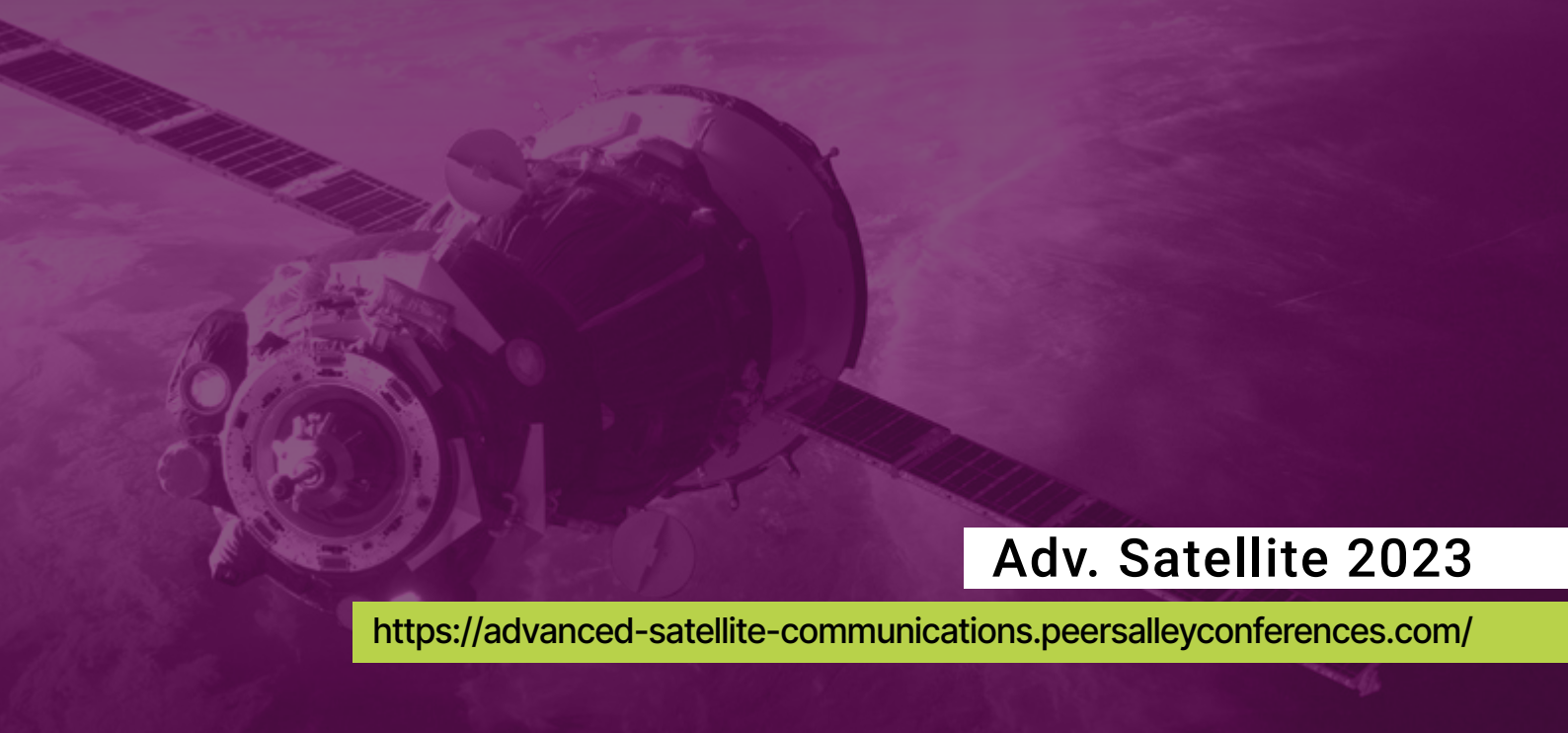**Virtual Event**

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07:45-08:00	Opening Ceremony

Distinguished Speaker Talks

Sessions: Satellite Networking | Satellite and Its Applications | Remote Sensing Satellites and GIS | Weather Satellites | Wireless Satellite and Broadcasting | Artificial Intelligence and Machine Learning | Aerospace and Mechanical Engineering | Space Missions | Mobile Satellite Communication Networks | Satellite Communications in Climate Change and Weather Forecasting | Earth Stations, Antennas and User Devices | Cloud Computing, Networking and Storage

08:00-08:20	**Title: Generating High-Accuracy Urban Distribution Maps from SAR Satellite Imageries Utilizing CNN for Short-Term Change Analysis** **Shota Iino,** *Japan Manned Space Systems Corporation, Japan*
08:20-08:40	**Title: Free-Space Optical Communications for Supporting Satellite Networks as The High-Speed Internet Platform from The Space** **Ucuk Darusalam,** *Universitas Nasional, Universitas Siber Asia, Indonesia*
08:40-09:00	**Title: Synthesis of a Three - Degree of Freedom Spatial Parallel Manipulator** **Srinivasa Rao Pundru,** *Mahatma Gandhi Institute of Technology, India*
09:00-09:20	**Title: Enhanced Antioxidant Compounds of *Ocimum Basilicum* Seedlings Under Various Acceleration Induced By 2-D Clinostat** **Halimeh Hassanpour,** *Aerospace Research Institute, Ministry of Science and Technology, Iran*
09:20-09:40	**Title: Epidemic Forecasting Based on Mobility Patterns. Lessons Learned from COVID-19 Spreading** **Eugenio Cesario,** *University of Calabria, Italy*
09:40-10:00	**Title: Wave propagation in non local fractional order thermoelasticity** **Sangeeta Kumari,** *Chandigarh University, India*
10:00-10:20	**Title: Investigating the Capability of a Novel Method to Deflect Asteroid Didymos by Incorporated Spacecraft Tractor** **Iman Shafieenejad,** *Ministry of Science Research & Technology, Iran*

10:20-10:40	**Title: Effects of Climate Change and Land-Use on Aquifer in The Future Period Using Groundwater Modeling (Case Study: Hashtgerd Plain)** **Abolfazl Hanifehlou,** *Islamic Azad University, Iran*

Refreshment Break 10:40-11:00

11:00-11:20	**Title: Modernization of Developing Countries Within the Global Information Society** **Vladimir Cherny,** *Independent researcher, Russia*
11:20-11:40	**Title: About the Moment System of Equations and Macroscopic Boundary Conditions to Define the Speed and Surface Temperature of the Aircraft** **Auzhan Sakabekov,** *Satbayev University, Kazakhstan*
11:40-12:00	**Title: SDN-based DDoS Attacks Detection and Mitigation using NECOMAtter** **Shahid Naseem,** *University of Education, Pakistan*
12:00-12:20	**Title: Satellite Missions and Fractal Properties of Some Space Objects** **Boyko Ranguelov,** *Mining and Geology University, Bulgaria*
12:20-12:40	**Title: Spatial-Temporal Variability of the Calculated Characteristics of the Ocean in the Arctic Zone of Russia by Using the NEMO Model with Altimetry Data Assimilation** **Konstantin Belyaev,** *Russian Academy of Sciences, Russia*
12:40-13:00	**Title: New Cure Rate Survival Models Generated by Poisson Distribution and Different Regression Structures with Applications to Cancer Data Set** **Mahdy Esmailian,** *University of Mohaghegh Ardabili, Iran*

Lunch Break 13:00-13:40

13:40-14:00	**Title: Free Space and Deep Space Optical Communication Scenarios** **Shun-Ping Chen,** *Darmstadt University of Applied Sciences, Germany*
14:00-14:20	**Title: Quantum Enhanced Time Synchronisation for Communication Network** **Swaraj Shekhar Nande,** *Technische Universität Dresden, Germany*
14:20-14:40	**Title: New Studies in Random Matrix Theory for GPS Jamming Confronting** **Omid Sharifi-Tehrani,** *Imam Hossein University, Iran*

14:40-15:00	**Title: Activating Supply Chain Business Models' Value Potentials Through Systems Engineering** **Jochen Nuerk,** *SAP SE, Walldorf, Germany*
15:00-15:20	**Title: Comparative Analysis of SVM and Decision Tree Algorithms for Heart Attack Prediction: A Dataset Study** **Asadi Srinivasulu,** *BlueCrest University, Liberia*

Refreshment Break 15:20-15:40

15:40-16:00	**Title: Maximum Leaf Greenness is More Associated with Global Vegetation Productivity Than Growing Season Length** **Xiaojie Gao,** *North Carolina State University, USA*
16:00-16:20	**Title: Strategies for Enhancing the Benefits of Satellites in Meeting Society's Need for Water Security** **Richard George Lawford,** *Morgan State University, USA*
16:20-16:40	**Title: Effectiveness of Automated Chatbots for Operational Support and Self-Service Based on Fuzzy Classifier for Autism Spectrum Disorder (ASD)** **Naga Simhadri Apparao Polireddi,** *IKON Tech Services / Arizona State University, USA*
16:40-17:00	**Title: Improving Permanent Magnet Hall Thruster Design with Thermal Modelling** **Marconi Campos Ferreira Porto,** *University of Brasilia, Brazil*
17:00-17:20	**Title: A Report on the Study for Rational and Reliable Pattern Mining** **Tongyuan Wang,** *TechEngine Plus Com, Canada*

Closing Remarks

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SCIENTIFIC ABSTRACTS

DAY 1

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Advanced Satellite Communications 2023

November 16, 2023

ADV. SATELLITE 2023

Generating High-Accuracy Urban Distribution Maps from SAR Satellite Imageries Utilizing CNN for Short-Term Change Analysis

I. Shota

Japan Manned Space Systems Corporation, Japan

Urban areas are experiencing rapid growth in several areas all over the world. Monitoring short-term changes are very important for urban change analysis and planning. Synthetic aperture radar (SAR) satellite imagery is suitable for such purposes because it is not affected by weather or daylight conditions. However, analyzing SAR satellite imagery needs higher skills and more time compared to analyzing optical imagery.

To overcome those problems, we propose a method to generate high-accuracy urban distribution maps for urban change detection automatically using a convolutional neural network (CNN). We optimized SAR polarization combinations and dataset constructions to improve accuracy. In addition, digital surface model (DSM) data was added for distinguishing between urban areas and other areas accurately.

We verified and validated our proposed method with SAR satellite imageries of southeast Asian nations (ASEAN) cities such as Jakarta, Indonesia. Change analysis with timeseries satellite imageries revealed the locations of short-term urban change. Comparing the results with manual change analysis using optical satellite imageries validated the results. The experimental results demonstrated that our proposed method was effective for generating high-accuracy urban distribution maps for short-term change monitoring.

Biography

Shota Iino received his Ph.D. from University of Tsukuba. He has been researching on machine-learning based data analysis at Japan Manned Space Systems (JAMSS) and Center for Cybernics Research at University of Tsukuba. He received Best Paper in Track Award at IEEE Aerospace conference 2022.

Free-Space Optical Communications for Supporting Satellite Networks as The High-Speed Internet Platform from The Space

Ucuk Darusalam[1,2]

[1]*Faculty of Information and Communications Technology, Universitas Nasional, Indonesia*
[2]*Department of Informatics, Universitas Siber Asia, Indonesia*

The demand of internet users has recently become more complex since Artificial Intelligence (AI) has been developed intensively. One of the keys to success in AI is the learning process algorithm which is implemented in AI systems. The learning process demands big data stored in the cloud networks in order AI can analyze more deeply to cultivate new knowledge. In order to support the development of AI, global internet access without limit is the key solution as well. The idea of an internet broadcast from space that was initiated by Elon Musk is a very ingenious solution. The internet from the space that is supported by inter-satellite networks to cover the earth surface demands thousands of satellites to deliver data connections in the scale of Gbps to Tbps. Regarding those aforementioned backgrounds, the internet from space can be supported by free-space optical (FSO) communications technology as the main network infrastructures implemented in inter-satellite connections. The FSO is the only available solution to produce connection in space in providing high data rates and reliable spacing grid between deployed satellites in space. In this paper, the FSO technology is outlined briefly about how it supports the connection between satellite as the inter-satellite networks and satellite to earth station or last-mile user as the down-link connection. The outline covers method of light transmission, method of signal reception, method of signal amplifications, method of filtering and method of signal transmission or time diversity.

Biography

Ucuk Darusalam has completed bachelor engineering at Institut Teknologi Sepuluh Nopember majoring in Photonics Engineering in 2002. He also has completed master and doctoral program at Universitas Indonesia in the Study Program of Opto-Electrotechnique and Laser Application under Department of Electrical Engineering, Faculty of Engineering in 2008 and 2015, respectively. During master program he studied the implementation of laser for algae concentration measurement while also studied optical communications in the field of optical amplifier (Raman and EDFA). During doctoral program, he studied free-space optical communications (FSO) and also got the chance for sandwich-research at Chiba University in 2013. In 2018 and 2019, he also pursued post-doctoral at Universitas Indonesia to conduct research in the development of FSO for supporting Palapa Ring Network in Indonesia.

Ucuk Darusalam is Associate Professor of Informatics Department, Faculty of Information and Communications Technology, Universitas Nasional since 2006. He is right now appointed as the vice rector of academic and research at Universitas Siber Asia since 2020. In 2018 and 2019 He was appointed as vice chair of IEEE Indonesia Section. His current research is in the field of FSO development and optical communications as well. He has published some papers in the international journal, conference and a chapter book. He also frequently invited as a reviewer of reputable journal. Since 2010 until now He has received research grant from Ministry of Education Republic of Indonesia, Directorate of Higher Education in the scheme research of Strategic Research (2010 – 2012), Applied Research (2013 – 2014), Sandwich-Like Research (2013), Doctoral Research (2014), Post-Doctoral Research (2018 – 2019), Advance Applied Research (2020 – 2022), Applied Research (2023 – 2025). His major research is in the optical fiber communications, free-space optical communications, wireless communications, Li-Fi access networks and visible light communications VLC.

Synthesis of a Three - Degree of Freedom Spatial Parallel Manipulator

Srinivasa Rao Pundru

Department of Mechanical Engineering,
Mahatma Gandhi Institute of Technology, India

A problem on synthesis of a spatial 3-PRS parallel manipulator is identified. The main aim of the work is to carryout the synthesis of a spatial 3-degree of freedom (3-dof) parallel manipulator. The kinematic synthesis of parallel manipulators involves the determination of architectural parameters of the manipulator. The dimensional synthesis of 3-PRS manipulator is based on physical constraints of the revolute and spherical joints. The synthesis of the manipulator involves determination of dimensional parameters of manipulator so as to determine the directions and location of revolute joints and location of spherical joints by considering the physical constraints such that a point on the mobile platform passes through a prescribed set of positions in space. The dimensions of the manipulator are determined by considering physical constraints of the manipulator and are carried out using optimized exact method. A spatial 3-PRS parallel manipulator structure has chosen which consists of a base platform connected to a moving platform through three kinematic branches of identical configuration. Each branch consists of actuated prismatic-revolute-spherical joints; the actuated prismatic joints are attached to inclined base platform. Each prismatic joint is connected to a moving limb by a revolute joint and the moving limb is connected to a mobile platform by a spherical joint. The application of 3-PRS manipulator has high stiffness since actuators are close to base and it has more control and stability. The synthesized 3-PRS manipulator is suitable in surgical and space applications, alignment for air craft simulation and robot manipulators where tip, tilt and position motions are significant. The procedures for the position analysis and synthesis of a 3-PRS manipulator are demonstrated through numerical examples.

1. Introduction: The spatial parallel manipulators perform the task of controlling the mobile platform. The kinematic synthesis [1] of 3-RPS parallel manipulators was discussed. The forward and inverse kinematic analysis [2] carried out by changing limb lengths of the 3-RPS manipulator. Forward kinematics of a 3-PRS manipulator [3] is carried out by vector loop technique. Inverse kinematics of a 3-PRS manipulator [4] is carried out by closed loop technique. Synthesis of a 3-PRS manipulator [5] is carried out by exact method. Synthesis of multi-positions in 3-PRS manipulator [6] is carried out by approximate method. Synthesis of 3-PRS manipulator [7] carried out based on range of rotational motion of spherical joints. The synthesized manipulator [8] is calibrated to minimize the positional errors by least square approach. In synthesized manipulator [9] the parasitic motions are eliminated. In this work synthesis is carried out by considering the side and
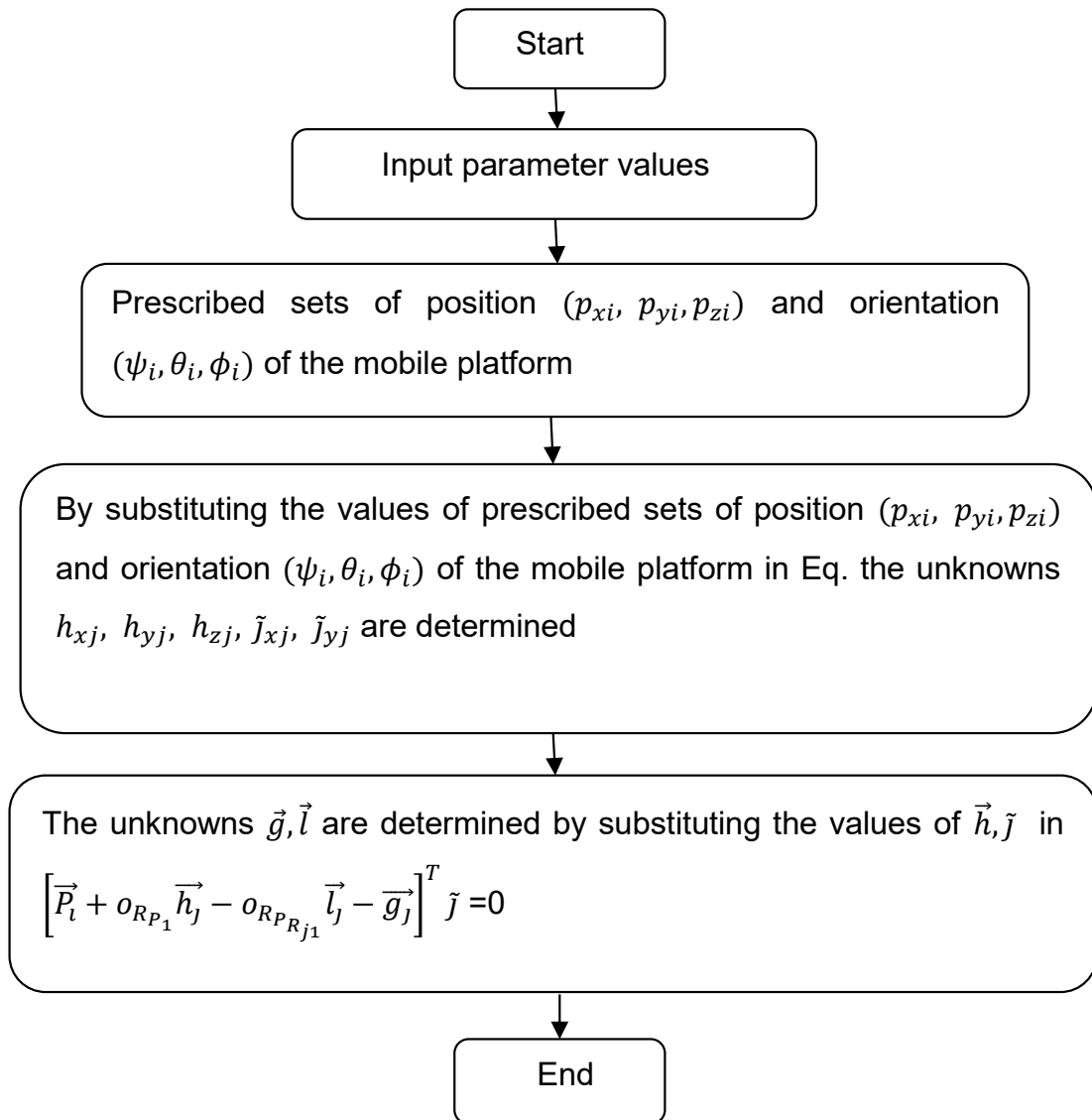
behaviour constraints of a 3-dof spatial parallel manipulator.

2. Synthesis of a Three –Degree of Freedom Spatial Parallel Manipulator by using synthesis procedure

Based on motion constraint, the constraint condition for the integrated prismatic and revolute joint axis for ith position is

$$\overrightarrow{B_J P_{R_{Ji}}} \cdot \tilde{j} = 0 \qquad\qquad (1)$$

```
┌─────────────┐
│    Start    │
└─────────────┘
       │
┌───────────────────┐
│ Input parameter   │
│     values        │
└───────────────────┘
```

Prescribed sets of position $(p_{xi},\ p_{yi}, p_{zi})$ and orientation $(\psi_i, \theta_i, \phi_i)$ of the mobile platform

By substituting the values of prescribed sets of position $(p_{xi},\ p_{yi}, p_{zi})$ and orientation $(\psi_i, \theta_i, \phi_i)$ of the mobile platform in Eq. the unknowns $h_{xj},\ h_{yj},\ h_{zj},\ \tilde{j}_{xj},\ \tilde{j}_{yj}$ are determined

The unknowns $\vec{g}, \vec{l}$ are determined by substituting the values of $\vec{h}, \tilde{j}$ in

$$\left[\vec{P_i} + o_{R_{P_1}} \vec{h_J} - o_{R_{P_{R_{j1}}}} \vec{l_J} - \overrightarrow{g_J} \right]^T \tilde{j} = 0$$

End

Flow chart for synthesis of a 3-dof spatial parallel manipulator
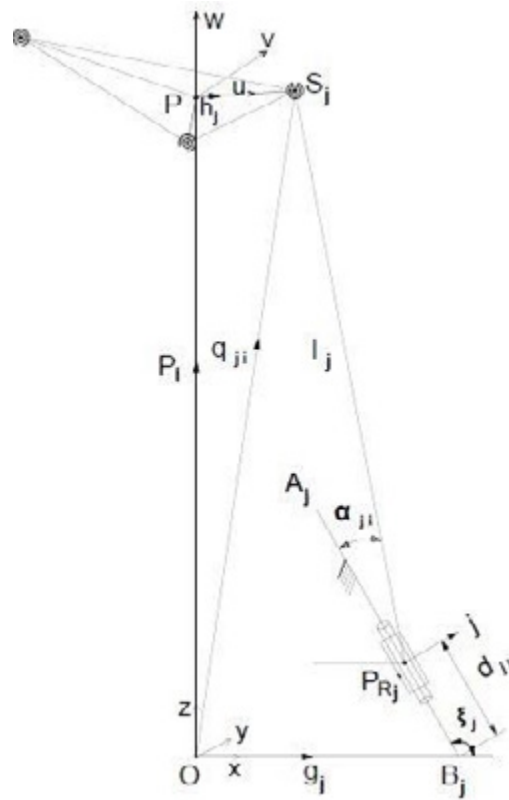
Fig. Three – Degree of Freedom Spatial Parallel Manipulator

3. Numerical Example:

Table 1: Prescribed sets of position and orientation of the moving platform

Set No:	p_{xi}	p_{yi}	p_{zi}	ϕ_i	θ_i	ψ_i
1	0	0	1	0	0	0
2	-0.0000776	-0.0000069	1.0032544	0.0003997	1.7841241	1.471014
3	-0.0002231	-0.0000124	1.0136582	0.0007124	2.5231325	1.853361
4	-0.0003843	-0.0000174	1.0320872	0.0009989	3.0901936	2.121568
5	-0.00055413	-0.0000219	1.0592810	0.0012554	3.5682482	2.335088

p_{xi}, p_{yi}, p_{zi} *are in metres and* ϕ_i, θ_i, ψ_i *are in degrees*

4. Results of 3-dof spatial parallel manipulator parameters:

Table 2: Location of Spherical joint, location and direction of the revolute joint of spatial 3-PRS parallel manipulator

Design variables	Solution 1	Solution 2	Solution 3
$[h_{xj} \quad h_{yj} \quad h_{zj}]^T$	$\begin{bmatrix} 1.0 \\ 6.025E-07 \\ -3.418E-09 \end{bmatrix}$	$\begin{bmatrix} 1.1501 \\ 2.1586 \\ -0.044 \end{bmatrix}$	$\begin{bmatrix} 25.1639 \\ 31.0855 \\ -0.4066 \end{bmatrix}$
$[\tilde{j}_{xj} \quad \tilde{j}_{yj} \quad \tilde{j}_{zj}]^T$	$\begin{bmatrix} 142.354 \\ -1436694238 \\ 1 \end{bmatrix}$	$\begin{bmatrix} 819.8241 \\ 522.1166 \\ 1 \end{bmatrix}$	$\begin{bmatrix} 49.3869 \\ -7.74 \\ 1 \end{bmatrix}$
$[l_{xj} \quad l_{yj} \quad l_{zj}]^T$	$\begin{bmatrix} 0.0 \\ 0.0000012244 \\ 1 \end{bmatrix}$	$\begin{bmatrix} -1.3685 \\ 2.1488 \\ 0.956 \end{bmatrix}$	$\begin{bmatrix} -2.3818 \\ -15.1974 \\ 0.594 \end{bmatrix}$
$[g_{xj} \quad g_{yj} \quad g_{zj}]^T$	$\begin{bmatrix} 1.0 \\ 6.0252837E-07 \\ 0 \end{bmatrix}$	$\begin{bmatrix} 2.5033 \\ 0 \\ 0 \end{bmatrix}$	$\begin{bmatrix} 27.5457 \\ 46.2829 \\ 0 \end{bmatrix}$
Error in the vector of function values	$-1.7949E-12$ $-1.1137E-12$ $-1.3608E-12$ $1.26887E-12$ $6.65389E-13$	$-1.0894E-11$ $-1.3076E-11$ $-1.47097E-11$ $-1.49043E-11$ $-1.5849E-11$	$4.30626E-12$ $5.3971E-12$ $6.0397E-12$ $6.47169E-12$ $6.75235E-12$

5. Conclusion: In this work synthesis of a 3-dof spatial parallel manipulator is carried out by using synthesis procedure of a manipulator with side and behaviour constraints. The physical constraints followed by Euler angle representation are introduced along the plane of spherical joints, actuated prismatic joints and limbs. The synthesis procedure from dimensional point of view involves the main goal to determine the design architectural parameters of the manipulator to satisfy a set of prescribed positions of the end-effectors. The selected manipulator is suitable for alignment applications where only tip, tilt and position motions are significant.

Biography

I (Dr. SRINIVASA RAO PUNDRU) from INDIA affiliated to Mahatma Gandhi Institute of Technology [INDIA]. I was awarded the Doctor of Philosophy in Mechanical Engineering (Robotics) at Jawaharlal Nehru Technological University Kakinada [INDIA]. I Completed Master of Engineering in Machine Design at Andhra University [INDIA]. I have selected as Recognized Researcher and an Academic Expert in "Times Higher Education- QS World University rankings" based on my Record of Research Publications. I have submitted the highly confidential reports to Academic Reputation of Times Higher Education "World University Rankings" in respective Years 2023, 2022.

Enhanced Antioxidant Compounds of *Ocimum Basilicum* Seedlings Under Various Acceleration Induced By 2-D Clinostat

H. Hassanpour

Aerospace Research Institute, Ministry of Science and Technology, Iran

In this study, the impact of microgravity analog induced by clinostat (clinorotation) were investigated on the antioxidant enzyme activities and related compounds, including phenolic, flavonoids, carotenoids, and ascorbic acid of *Ocimum basilicum* at the early growth stage. Clinorotation was applied at 20 rpm speed, clockwise 90º with the centrifugal acceleration of 0.013 and 0.009 g at 2 and 3 cm radiuses and the ground control (1 g). After one week, the seedlings were harvested for some physiological and biochemical analyses. Results showed that clinorotation at lower acceleration (0.009 g) induced higher antioxidant enzyme activities (catalase, superoxide dismutase, and peroxidase) and antioxidant compounds (total phenolic, flavonoids, carotenoids, and ascorbic acid) in comparison to control. The a-amylase activity, starch accumulation, chlorophyll (Chl) content and fluorescence increased significantly under lower acceleration (0.009 g). The findings suggest that microgravity is induced antioxidant compounds through more accumulation of sugars and antioxidant enzyme activities, and the lower g-force can consider as the potential threshold acceleration for the induction of plant antioxidant capacity.

Biography

I am Dr. Halimeh Hassanpour, faculty member of Aerospace Research Institute, Ministry of Science and Technology of Iran. I work about the impact of space conditions on the response mechanisms of growth and antioxidant compounds in plant cell and tissues.

Epidemic Forecasting Based on Mobility Patterns. Lessons Learned from COVID-19 Spreading

Eugenio Cesario

University of Calabria, Italy

During an epidemic, decision-makers in public health need accurate predictions of the future case numbers, in order to control the spread of new cases and allow efficient resource planning for hospital needs and capacities. In particular, considering that infectious diseases are spread through human-human transmissions, the analysis of spatio-temporal mobility data can play a fundamental role to enable epidemic forecasting. In this this talk we present the design and implementation of a predictive approach, based on spatial analysis and regressive models, to discover spatio-temporal predictive epidemic patterns from mobility and infection data. The experimental evaluation, performed on mobility and COVID-19 data collected in the city of Chicago, is aimed to assess the effectiveness of the approach in a real-world scenario.

Biography

Eugenio Cesario is an Associate Professor of Computer Engineering at University of Calabria (Italy). His research interests fall in the broad areas of Data Analytics and Parallel/Distributed Data Mining, and include Urban Computing, Smart Cities, Energy-aware Cloud Computing, Cloud\Grid services architectures, Knowledge Discovery applications. He co-authored over sixty scientific papers in international journals, conference proceedings, and edited volumes. He received two best paper awards and a best paper nomination in three international conferences. He is member of the Editorial Board of several international journals and he served as a chair, organizer, panelist and program committee member of many international conferences. He is member of the Scientific Board of the Ph.D. in ICT of the University of Calabria. Earlier in his career, he was an Associate Professor of Computer Science at Monmouth University (U.S.), and researcher at the Institute of High Performance Computing and Networks (ICAR-CNR) of the National Research Council (CNR) of Italy. During his carrier, he was visiting scholar/professor at Rensselaer Polytechnic Institute, University of Chicago and Rutgers University, working on machine learning, urban data analytics and crime prediction.

Wave propagation in non local fractional order thermoelasticity

Sangeeta Kumari

Chandigarh University, India

The problem of waves propagation in nonlocal fractional-order thermos-elasticity has been studied. We have considered the x-y plane for the governing equation of nonlocal fractional thermos-elasticity and solved these governing equations to calculate the frequency equation for the Plane as well as Rayleigh wave. This frequency shows that three sets of waves exist, in which two are coupled and one is uncoupled. The reflection coefficient of plane waves for classical theory and LS theory has been calculated. The secular equation of the Rayleigh wave is calculated which satisfy the required boundary condition. The effect of phase speeds, specific losses, and attenuation coefficients and reflection coefficient with respect to the frequency and nonlocal parameter for the theories of thermos-elasticity has been studied numerically for all propagating waves, and the same has been plotted graphically and explained thoroughly.

Biography

Having a more than 13 years of experience, Dr Sangeeta Kumari is currently serving as Associate Professor in Department of Mathematics at Chandigarh University, She is working on the wave propagation in thermos-elasticity and published more than 30 research papers in National and International Journals and more than 15 research papers in various Conferences. 3 PhD degrees and 5 M.Sc. Dissertation degree has been awarded under her guidance. And 3 students are doing research work under her guidance. She is member of review Board of Journal of Ocean Engineering and Sciences (Impact factor 4.85, SCI) General Letters in Mathematics and many more Journals. She has been the member of the organizing committee of various conference and other Events in Chandigarh University. She has been the member of BOS, RDC and Women cell, Student grievances cell of UIS. She has chaired the session in many conferences and also derived the expert talk. She has also worked as Academic Coordinator in Department of Mathematics from July 2015 to Feb 2019, working as the NAAC Coordinator of the Department.

Investigating the Capability of a Novel Method to Deflect Asteroid Didymos by Incorporated Spacecraft Tractor

I. Shafieenejad

Assistant Professor, Ministry of Science Research & Technology, Iran

The Didymos asteroid and its moon create a binary asteroid system. These asteroids are not a threat to Earth but they have been selected as future space missions since they will pass near the Earth. Asteroid deflection can take them out from their main belt. Suspended asteroids and asteroid fragments have hit the Earth and other planets in the past and played a key role in changing the history of planetary geology and the history of evolution on Earth. There are different asteroid deflection techniques considering factors such as general performance, cost, failure risk, operation, and technology availability. These deflection or fragmentation methods can be categorized based on their kinetic, gravitational, solar, thermal, or nuclear energy sources. In general, deflection strategies are divided into fragmentation and delay categories. The purpose of this study is to analyze the Didymos asteroid deflection by incorporated spacecraft. The deflection of asteroids with a high potential impact on Earth is widely noteworthy for space experts. This method uses a spacecraft connection to the Didymos asteroid and incorporating the tractor force as a perturbation factor deflects the asteroids from their course. The implemented kinetic energy from the spacecraft to the Didymos asteroid causes the Didymos ΔV velocity change. This paper considers an orbit with the highest velocity to simulate the Didymos asteroid motion equations of a rigid body at the perihelion point. The results show that velocity had the highest effect in the radial direction. These velocity changes have a divergent oscillating behavior. On the other hand, the velocity changes are not simultaneous in the radial and tangential directions and the highest changes were occur after the perihelion point. Also, the asteroid course deflection stability is analyzed because of the non-linear nature of orbital motion equations. Abstract should give clear indication of the objectives, scope, results, methods used, and conclusion of your work. One figure and one table can be included in your results and discussions.

Biography

Iman Shafieenejad received his PhD from K.N.Toosi University of Technology and now is an assistant professor at the Aerospace Research Institute Ministry of Science Research and Technology. He has more than 100 journal and conference papers and 5 books in English and Persian in the field of aerospace engineering and artificial intelligence.

Effects of Climate Change and Land-Use on Aquifer in The Future Period Using Groundwater Modeling (Case Study: Hashtgerd Plain)

A. Hanifehlou[1], S. A. Hosseini[2], S. Javadi[3] and A. Sharafati[4]

[1]Department of Civil Engineering, Islamic Azad University, Iran
[2]Department of Civil Engineering, Islamic Azad University, Iran
[3]Department of Irrigation and Drainage Engineering, College of Abouraihan, University of Tehran, Iran
[4]Department of Civil Engineering, Islamic Azad University, Iran

In this study, the simultaneous effects of climate change and land-use change on groundwater level fluctuations in Hashtgerd plain, Iran, have been studied for the next 30 years (2020-2050). To study the effects of climate change, the output of five models under four emission scenarios, i.e., RCP2.6, RCP4.5, RCP6, and RCP8.5 of the Fifth Report of the Intergovernmental Panel on Climate Change (IPPC) was utilized. The LARS-WG model was also used for the micro-scaling of the climatic data. Land-use mapping was performed using Landsat images in 1990, 2005, and 2020 processed in ENVI 5.3. The Markov chain method in TerrSet software was used to predict land-use changes for 2050. The indexes used to evaluate the model were the overall accuracy of prediction and the kappa coefficient. The overall accuracy of 94.34% and kappa coefficient of 0.92 were in the calibration stage and 86.34 and 0.82 in the validation stage, respectively. Finally, the effect of climate and land-use change on the decrease of groundwater level was simulated using the MODFLOW model for the period 2020-2050. The results showed that with the simultaneous application of climate change and land use, the groundwater level during the period would decrease compared to the scenario of the current situation, so that in the most critical case, the average drop in groundwater level in the study period will be 58 m and the aquifer volume will be reduced by 61%, dropping to 910 MCM. The future land-use change reduced the aquifer reserve by up to 41% and the combined impacts of climate and land-use change in the most critical state reduced the aquifer reserve by 61%. If this trend continues, around 2080, the aquifer will be drained, and the groundwater level will reach the bedrock.

Biography

I am 43 years old and I completed my PhD in Civil Engineering and Water Resources Management at Tehran University of Science and Research in 2023. I have been working in the water and wastewaters company for about 15 years. The titles of some of my articles are as follows:

1-The effects of the application of treated urban wastewater of Ahvaz on soil hydraulic properties. https://civilica.com/doc/1596026

2-Evaluation of rain irrigation systems in Zanjan region. https://civilica.com/doc/38629

3-Evaluation of the quality of the incoming and outgoing wastewaters of West Ahvaz sewage treatment plant for reuse in agriculture. https://civilica.com/doc/5442

4-Prediction of climate and land use changes effects on temporal and spatial fluctuation of groundwater recharge using WetSpass-M distributed model (Case study: Hashtgerd Aquifer, Iran). https://civilica.com/doc/1646329

5- Sustainable exploitation of groundwater resources considering the effects of climate change and land use to provide adaptation solutions (case study of the Hashtgerd plain). https://doi.org/10.1007/s11600-022-00843-2

Modernization of Developing Countries Within the Global Information Society

Vladimir Cherny[1] and **Alexey Lubimov[2]**

[1]Independent researcher, Russia
[2]Presidium of the Russian Academy of Sciences, Russia

The successes of developing countries are directly related to the modernization of their economies, the introduction of market mechanisms and the achievements of the information society, modern financial instruments, science and high technology. The discussion of the modernization of the economy of developing countries on the basis of stimulating innovative development is the main topic of brainstorming in the period of post-crisis development. The existing innovation policy in the conditions of inertial development with signs of mechanisms and tools of the trophy economy hardly corresponds to modern ideas about stimulating state policy.

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.

Biography

Vladimir Cherny graduated and has PhD in radiophysics 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 was graduated from Moscow Public University in economics. He used to work at KIREE and General Physics Institute, Volgograd State University, Russia and at the EECS of UC, Berkeley. He has 100 articles, including books: 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.

About The Moment System of Equations and Macroscopic Boundary Conditions to Define the Speed and Surface Temperature of The Aircraft

A. Sakabekov, S. Madaliyeva and **R. Yergazina**

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The aerodynamic characteristics of aircraft at very high speeds and at high altitudes can be determined by methods of the rarefied gas theory [1,2]. The description of a rarefied gas with the help of the particle distribution function refers to the transitional region. The correct description of the gas flow near the surface should be based on the solution kinetic Boltzmann equation. Calculating aerodynamic characteristics of an aircraft in the high-velocity flow of rarefied gas, it is necessary to supplement Boltzmann equation with the term that depends on the speed of an aircraft, and the condition on moving boundary has to contain parameter depending on the surface temperature of an aircraft.

We present a new one-dimensional non-stationary nonlinear moment system of equations, depending on the flight speed and the surface temperature of the aircraft with macroscopic boundary conditions on mobile boundary. We state the initial and boundary value problem for the system of moment equations in second approximation under the macroscopic boundary conditions and prove the existence and uniqueness of the solution of the above-mentioned problem in the space of functions that are continuous on time and square summable by spatial variable [3]. To determine the speed and surface temperature of the aircraft we solve the inverse problem to the initial and boundary value problem for second approximation of moment system of equations with some additional information about the solution of the direct problem. We will develop an iterative numerical method for solving an inverse problem for a non-stationary nonlinear system of moment equations in the second approximation, reduced to canonical form, software implementation of algorithms and their application for solving inverse problems to determine the speed and surface temperature of an aircraft.

Biography

He was born at Shalkode village in Almaty region of Republic of Kazakhstan in 1947. He was Graduated from Kazakh State University in 1970. He has earned degree of Doctor of physical and mathematical sciences in 1993 at Institute of mathematics and mathematical modeling of Kazakh National Academy of sciences in Almaty, Kazakhstan. His main research fields are Boltzmann equation and its applications, Boltzmann's moment system of equations, remote sensing of the Earth from space. He has more than 230 scientific articles, 2 monographs and 5 tutorials. Currently works as professor in Mathematical department at Kazakh National Technical University by K.I.Satbayev in Almaty. Recent research areas include simulation of oil and gas fields in Petrel and Eclipse program softwares, geostatistics. He is an acting member of Academy of natural sciences and winner of the Academy of Sciences of the USSR, "Best teacher of the year" state grant holder, and awarded medal for "developing Science of Kazakhstan" in 2007.

SDN-based DDoS Attacks Detection and Mitigation using NECOMAtter

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With the advancement of networking, network attacks are increasing day-by-day. Distributed Denial of Service (DDoS) attacks are the most mitigating cyber-attacks in cloud computing. A Distributed Denial of Service attacks are well-known as an effort to create a network or server resources unattainable for the legitimate operators. These attacks are comparatively straightforward to accomplish, hard to protect against, and therefore, the attacker isn't copied back. The main problem for DDoS attacks is that such attacks constrain links on the internet. It is hard to defend the against a DDoS attack on a single network. Attack traffic can potentially be transmitted from anywhere in the world. The purpose of this study is the detection and mitigation of DDoS attacks by means of Software Defined Networks (SDN) for the protection of network security. A blend of the prevailing detection techniques and management of SDN forms a brand innovative method of DDoS mitigation in forthcoming generation networks. In this study, an NECOMAtter is used as a curator to monitor and post information of filtered malicious data packets to mitigate DDoS attack in SDN. The outcomes of the NECOMAtter based SDN for DDoS mitigation filtering malicious traffic and improve resilience against the DDoS attacks. The proposed can be applied to ISPs or Consumer Scale Networks (CSN).

Satellite Missions and Fractal Properties of Some Space Objects

B. Ranguelov

Mining and Geology University, Bulgaria

The research related to the fractals and the fractal analysis of the space bodies of different size and character is a new and perspective topic. Several important issues are considered:

- Fractal nature of the most elements of some bodies of the Solar system obtained by satellite missions. Under investigations and fractal analysis are such elements as digital elevation models of the surface, different natural fields like gravitational, magnetic, thermal, radioactivity, fluid flows, etc.

- The fractality and fragmentation of the space bodies seems to be a confirmation of the self-similarity and self-organization related to the Genesis and Development of the Universe.

- All results of the application of the fractal theory to the investigated space bodies in the Solar system show clear fractal properties, easily quantified and giving new and non-expected results.

- In larger or smaller scales the case-studies' results show the fractality and fragmentation as imminent property of many elements of some space bodies in the Solar system – planets, moons, and their physical peculiarities, thus supporting the idea of the universal character of the fractal geometry as a modern tool for research and investigations.

- In some cases unexpected results appear, showing the need of wider approach to the different phenomena (for example the differences in the gravity fields in both sides of the Moon and/or the hemispheres of Mercury).

Our goal is just to present to the scientific community and the public the variability of these new ways of thinking and applying different techniques and practices. It seems rather positive to adapt the presented results to the wider pubic, avoiding the heavy theory and focusing on the simple and understandable way to the everyday society practice. Might be this approach will be our next task.

Biography

Boyko RANGUELOV is professor - University of Mining and Geology, Department of Geophysics, Sofia, Bulgaria. Received B.Sc., M.Sc. and the second M.Sc. in Appl. Math. at Technical University, Sofia. Got the Ph.D in Physics from Bulgarian Academy of Sciences. Head - Department of Seismology and Deputy Director of the IG-BAS. Academician in Academy of Sciences and Arts. Director of Natural Sciences Centre. Two years' work in the Joint Research Centre (JRC) - European Commission, as visiting scientist. Visiting Professor - University of Bologna, Italy. Published 20 books (Key book - "Fractal Universe: Case study of Solar System") and more than 400 research papers of: Geophysics; Nonlinearities; Fractals; Antarctic research; Space Research; Planetary investigations; Early Warning Systems. Teaches courses in Geophysics, Seismology, Natural hazards, Applied Mathematics and Data processing. Member of the Editorial Boards of the Journals "Aerospace Research in Bulgaria", "Research in Geophysics" and "Earth Sciences".

Spatial-Temporal Variability of the Calculated Characteristics of the Ocean in the Arctic Zone of Russia by Using the NEMO Model with Altimetry Data Assimilation

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The spatial-temporal variability of the calculated characteristics of the ocean in the Arctic zone of Russia is studied by using the known hydrodynamic model of the ocean NEMO (Nucleus for European Modelling of the Ocean) [2] with assimilation of observation data on the sea surface height taken from the AVISO (Archiving, Validating and Interpolation Satellite Observation) archive. We use the GKF (Generalized Kalman filter) method [1], developed earlier by the authors of this study in conjunction with the method of decomposition of symmetric matrices into empirical orthogonal functions (EOF, Karhunen-Loeve decomposition). The GKF method essentially generalized the earlier proposed DA schemes [3]. The main investigations mostly are focused on the Northern seas of Russia. The characteristics of the ocean such as the current velocity, sea surface height, and sea surface temperature are calculated simultaneously with data assimilation (DA) and without DA (the control calculation). The calculation results are analyzed and their spatial-temporal variability over a time scale of 28 days is studied. It is shown that the main spatial variability of characteristics after DA is in a good agreement with the localization of currents in the North Atlantic and in the Arctic zone of Russia. The contribution of each of the eigenvectors and eigenvalues of the covariation matrix to the entire spatial-temporal variability of the calculated characteristics is shown by using the EOF analysis.

New Cure Rate Survival Models Generated by Poisson Distribution and Different Regression Structures with Applications to Cancer Data Set

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[2]Universidad de Atacama, Chile
[3]University of Payam Noor, Iran

A new cure rate model is presented by assuming that, conditional on η, the number of competing causes of the event of interest follows the Poisson distribution, where is assumed a random variable with gamma and generalized exponential distributions and competing causes follow the GeTNH distribution. The model is parameterized directly in terms of the cure term, and then different symmetric and asymmetric regression structures are used to assess the effects of covariates, such as logit, probit, log-log, Cauchit, Aranda-Ordaz, skewed probit, and skewed logit. Parameter estimation for the proposed models is derived based on the maximum likelihood estimation method. We achieve a simulation study in order to investigate the performance of these estimators under different scenarios. Finally, the model is illustrated in data sets related to two kinds of cancers (melanoma and colon cancer).

Biography

Dr. Mahdy Esmailian is currently Associated Professor at Department of Statistics and Computer Sciences, University of Mohaghegh Ardabili, Ardabil, Iran. He obtained his PhD in Statistics at University of Mashhad, Mashhad in 2014. He did his B.Sc. degree in Statistics in 1983 at University of Mashhad. He also obtained his M.Sc. degree of Statistics at the Tarbiat Modares University in 1994. His areas of interests are sequential order statistics, statistical inference, distribution theory and reliability theory.

Free Space and Deep Space Optical Communication Scenarios

Shun-Ping Chen

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Typical laser optical communication links are discussed ranging from near-Earth, lunar to interplanetary laser optical communications. The performance is investigated by using simulation models which were successfully verified in previous projects. The simulation models consider typical mission design parameters like transmit power and operation wavelength for the optical laser transmitters, different apertures of the optical telescope, varying distances between the Earth ground station and the satellite or spacecraft terminals. In case of deep space optical communications, because of the extremely large distance, therefore the extremely large attenuation leading to few numbers of the received photons, Geiger-mode avalanche photodiodes (APD) or superconducting nanowire single photon detection (SNSPD) receivers are indispensable. Atmospheric disturbances like scintillation and absorption, background noises for the uplink and downlink are considered. In relatively short distance, higher modulation schemes like m-QAM can be applied and higher bitrates can be achieved, whereas in higher orbits or extremely large distance, appropriate pulse position modulation (PPM) orders will be necessary. Typical design parameters especially for higher orbits or large distance are those of published ESA (European Space Agency) and NASA (National Aeronautics and Space Administration) missions for GEO-orbits and interplanetary orbits. The same method can be also used to investigate the optical Inter-Satellite-Links. The investigations of laser optical communications for various system parameters and different distances between the Earth ground station and the satellite or spacecraft could also help to achieve an overview of free space and deep space optical communications for different orbit constellations for future missions with laser optical communication links.

Biography

Shun-Ping Chen studied Electrical Engineering, High Frequency Engineering and Telecommunications Technologies at the Technical University Braunschweig, Germany, and received his Dr.-Ing. (PhD) Degree with a thesis on Optoelectronic Integration in 1992, before he worked as R&D Engineer and Project Manager at the F.I.T. in Microwave Engineering, Antenna Design, Network Planning projects. In 1995 he became Project Manager, Group Leader and Head of Department at the German Mobile Network Operator E-Plus, meanwhile merged with Telefonica, where he was responsible for Transport Network Planning & Systems. At E-Plus he proposed and conducted the Fiber Optical SDH/DWDM Backbone Network Project. From 2003 until 2008 he was CTO and IT Director of several German companies in the branches like Electronics for Safety/Security Applications, Media, and Transport Logistics. Since 2008 Dr. Chen is Professor of Communication Technologies and Networks. Besides the teaching, he spent also research sabbaticals at T-Labs, TU Hamburg, NOKIA Bell-Labs and ESA/ESOC.

Quantum Enhanced Time Synchronisation for Communication Network

Swaraj Shekhar Nande[1], Marius Paul[1], Stefan Senk[1], Marian Ulbricht[1], Riccardo Bassoli[1], Frank H.P. Fitzek[1], and **Holger Boche[2]**

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[2]Department of Electrical and Computer Engineering, Technische Universität München, Germany

It is essential to establish precise times in future communication networks. Any real-time task's ability to function depends on the system's ability to synchronise time. In the current communication network, time synchronisation is critical and must be maintained to transmit data packets . The functionality of 6G, the Tactile Internet, Time-Sensitive Networking, and ultra-reliable low-latency communications is highly susceptible to time synchronisation. We investigated the idea of employing time synchronisation across different communication network nodes. The current state-of-the-art employs network protocols like Precision-Time Protocol for clock synchronisation across different nodes. These network protocols are not very robust and can generate jitters in data transmission. In this paper, we suggested synchronising the time of the node clocks at three different places using quantum technology. Notably, the oscillation frequencies of each qubit (or oscillator) located at these nodes can be synchronised using quantum synchronisation technique. This set of three oscillators will work as a single clock and will be the master clock of the network . We propose distributing precise time and frequency standards using quantum synchronisation on node clocks. We can synchronise the three qubits (each placed at one node) to oscillate at an identical frequency by applying an external field of a wavelength of 813.32 nm. We analysed our model for different coupling constants and dissipation rates to provide an analysis of the behaviour of the amount of synchronisation in different experimental configurations. The optimal accuracy for our system is 1.6×10^{15} signals per second. Further, we used the Allan deviation to examine the stability of our system for various noise strengths.

Biography

Swaraj Shekhar Nande is a PhD researcher at The Deutsche Telekom Chair of Communication Net- works, TU Dresden. He is currently working on "Quantum Synchronisation Techniques to reduce the synchronisation errors in 6G". His research interest is in the implementation of Quantum Me- chanical Techniques for Quantum Communication and Quantum Internet applications. He completed his Integrated Master's Degree major in Physics at ISERC, Visva-Bharati University in 2021. Then he worked as a Guest Scientist in the field of Theoretical Quantum Optics at Helmholtz Institute Jena, Germany.

New Studies in Random Matrix Theory for GPS Jamming Confronting

Omid Sharifi-Tehrani

Imam Hossein University, Iran

Detection and mitigation of jamming threats are inevitable especially in important applications such as communication and global positioning system (GPS). Different methods utilizing statistical/spectral signal processing, time/frequency transforms and antenna array have been introduced, each of which has its own advantages and disadvantages. In this presentation, new studies by the author, based on random matrix theory is proposed for detection and mitigation of GPS single-tone jamming threat. By using the concept of Wigner, Wishart and Toeplitz matrices and introducing spiked matrix model, the proposed methods distinguish eigen-values. The authentic (cleaned) signal can be reconstructed by projecting received signal on the eigen-functions domain where jamming components can be better removed. The objective is to detect the presence of jamming in the early stage of jamming attack (early warning) and then trying to reduce the jamming effect (mitigation). Different parameters including acquisition metric, position deviation and cross ambiguity function have been evaluated in simulation to provide a good preview. According to the simulation results, the proposed methods have better performance in comparison with some reference algorithms in terms of detection and false alarm probabilities and acquired satellites. The overhead computational complexity could be also reduced compared to conventional covariance matrix estimation-based eigen-decomposition methods.

Biography

Omid Sharifi-Tehrani was born in Isfahan, Iran, in 1984. He received the M.Sc. degree in communication engineering from Islamic Azad University, Isfahan, Iran, in 2010, and the Ph.D. degree in electrical engineering from Imam Hossein Comprehensive University, Tehran, Iran, in 2021. His research interests include statistical/spectral signal processing, detection/estimation/mitigation theory, electronic warfare, and random matrix theory.

Activating Supply Chain Business Models' Value Potentials Through Systems Engineering

J. Nuerk[1] and **F. Darena[2]**

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[2]Mendel University, Czech Republic

New business opportunities, driven by smart digitalization technology and initiatives such as Industry 4.0, significantly change business models and their innovation rate. The complexity of methodologies developed in recent decades for balancing exploration and exploitation activities of digital transformation has risen. Still, the desired integration levels across organizational levels were often not reached. Systems thinking promises to holistically consider interdisciplinary relationships and objectives of various stakeholders across supply chain ecosystems. Systems theory-based concepts can simultaneously improve value identification and aligned transformation among supply networks' organizational and technical domains. Hence, the study proposes synthesizing management science concepts such as strategic alignment with enterprise architecture concepts and artificial intelligence (AI)-driven business process optimization to increase innovation productivity and master the increasing rate of business dynamics at the same time. Based on a critical review, the study explores concepts for innovation, transformation, and alignment in the context of Industry 4.0. The essence has been compiled into a systems engineering-driven framework for agile value generation on operational processes and high-order capability levels. The approach improves visibility for orchestrating sustainable value flows and transformation activities by considering the ambidexterity of exploring and exploiting activities and the viability of supply chain systems and sub-systems. Finally, the study demonstrates the need to harmonize these concepts into a concise methodology and taxonomy for digital supply chain engineering.

Biography

Jochen Nuerk is a Principal Engineer for Supply Chain Management and Enterprise Architecture at Digital Business Services, SAP SE in Walldorf, Germany. In this role, he is responsible for SCM implementations and digital transformation strategies for SAP's global customers for more than 25 years. He held a PhD in Management and Economics from Mendel University in Brno, Czech Republic, an MBA from the University of Ludwigshafen in Germany, and degrees in IT Business Engineering and Mechanical Engineering. Moreover, he is a Chartered Engineer and a Fellow of the British Computer Society. He published articles in European scientific journals and conference proceedings.

Comparative Analysis of SVM And Decision Tree Algorithms for Heart Attack Prediction: A Dataset Study

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[2]Associate Professor, Sohar University, Oman
[3]SVU College of Engineering, Sri Venkateswara University, India

This study presents a comparative analysis of Support Vector Machine (SVM) and Decision Tree algorithms for heart attack prediction based on a dataset analysis. Heart attacks are a leading cause of mortality worldwide, and accurate prediction models can assist in timely intervention and preventive measures. The objective of this research is to assess the performance of SVM and Decision Tree algorithms in predicting heart attacks using a dataset analysis. The study explores the complexities of gene regulatory mechanisms underlying disease progression and cellular reprogramming, emphasizing their significance in cancer research, regenerative medicine, and developmental biology. The review highlights key gene regulatory mechanisms associated with metastasis, mesenchymal stem cells, colorectal cancer, wound healing, and somatic cell nuclear transfer. By integrating insights from these diverse areas, this research aims to enhance the understanding of molecular processes driving disease development, tissue regeneration, and cellular transformation. The proposed SVM and Decision Tree techniques exhibit improved precision, with SVM achieving an accuracy of 72.32% and Decision Tree achieving an accuracy of 79.34%. These results surpass the performance of the current system, indicating notable improvements in accuracy. The findings of this study have implications for enhancing diagnostic approaches, therapeutic interventions, and tissue engineering strategies. By advancing our knowledge of key gene regulatory mechanisms, this research contributes to the development of innovative approaches in disease management and cellular reprogramming research.

Biography

Dr. Asadi Srinivasulu received his B.Tech in Computer Science Engineering (CSE) from Sri Venkateswara University, Tirupati, Andhra Pradesh in 2000. He completed his M.Tech in Intelligent Systems (IS) from the Indian Institute of Information Technology (IIIT), Allahabad, and Uttar Pradesh in 2004. He earned his Ph.D. from J.N.T.U.A, Anantapur, India, under the supervision of Prof. Ch. D. V. Subbarao. Currently, he is pursuing a double Ph.D. in Data Science (IT) at the Indian Institute of Information Technology, Allahabad (IIIT-Allahabad) as a working professional under the supervision of Prof. Anupam Agrawal. Dr. Asadi is the Head-Research & OpenLabs of Information Technology at BlueCrest University, Monrovia, Liberia, and works as a Subject Matter Expert (SME) at Deloitte, Delhi. He has 20 years of teaching and industrial experience and served as the Head of the Department of Information Technology at S.V College of Engineering, Tirupati from 2007-2009. He also holds several professional certifications, including 07 IBM Professional Certifications such as RAD, RFT, DB2, RTC, TDS, LOTUS Domino, and WID, 02 Microsoft Certifications, 03 edX Certifications, 02 TechGig Professional Certifications, 02 Cybrary Micro Certifications, 02 uDemy Certifications

on Python, 02 Solo Learn Certifications on C++, 09 NPTEL Certifications, and 04 Spoken Tutorial Project Certifications from IIT-Bombay. His area of interest includes Data Science, Big Data Analytics, Data Mining, Artificial Intelligence, Robotic Process Automation, Cloud Computing, Pattern Recognition, Machine Learning, and Software Engineering. He is a professional member of several organizations, including IEEE (97608096), SCOPUS ID: 57191070975, Web of Science Researcher ID: B-9382-2018, CSI, ACM, ISTE, IAENG, IACSIT, ICST, SCIEI, VSRDIJ, NASSCOM, ASDF, Meetingfora, and ICA (Indian Congress Association). He serves on the editorial boards of several journals, including i-manager's Journal on Cloud Computing (JCC), SCIERA Journal of Computers, International Journal of Advanced Research in Computer Science and Electronics Engineering (IJARCSEE), Journal of Advances in Management Sciences & Information Systems, and International Journal of Research Innovations in Engineering Education. He is also a professional reviewer for several publishers, including Springer Nature, World Journal of Engineering, IEEE, Springer, Elsevier, Inderscience, Hindawi, CSI, Journal of Advances in Management Sciences & Information Systems (JAMSIS-USA), Data Mining & Knowledge Management, IAENG, and VSRD-CSIT. Throughout his career, he has performed various roles, such as HOD, R&D, NBA, BOS, NAAC, TEQIP-II, IIIC, NPTEL, EDC, TGMC, AICTE-SIP, STP, and IBM CoE Coordinator. He has guided 3 Ph.D. students and 5 students who are pursuing their Ph.D., as well as 14 M.Tech and 62 B.Tech students. He has published over 196 papers, 23 of which are in SCI and 16 in Scopus & WOS, with the remaining UGC listed, in international journals and conferences. He has attended over 195 workshops, symposiums, and seminars and has conducted and acted as a resource person for more than 115 international or national conferences, workshops, symposiums, and seminars. He is an accomplished author with 5 published textbooks, including "Data Science Applications using Python Programming," "Data Science," "Machine Learning Techniques," and "Methodologies for Software Testing." He has a book under review titled "Machine Learning," and he has also contributed to 12 book chapters. Additionally, he has obtained 2 patents. Dr. Asadi has received 2 DST-SERB seminar grants worth RS. 1 Lakh and 9 Lakhs, and his publications are listed in digital libraries such as Springer Nature, IEEE Xplorer, Elsevier Xplorer, Springer Xplorer, SCI Indexed, Scopus, Web of Science, World Journal of Engineering, IGI Global, IJCA, Bookman International Journal (Free), IJAIS, IJCSNS, JACRIJ, DOAJ, PDF DIGITAL LIBRARY, IJCSET, IJCSIT, IJARCET, IJARCSSE, Horizon Publication, Helix, IJEECS, CSI, and COGNIZANCE Journals. Dr. Asadi has received several awards throughout his career, including the "Bharat Vidya Ratan" national award from the International Business Council, Delhi, in 2018, and the "Best IT Teacher of the Year" award for the state ITAP-2020 from ITAP & Tutors Pride, Hyderabad. He also received the "Lifetime Achievement Excellence Award 2022" and the Best International Scientific Researcher award from Research India Foundation (RIF) in 2022, as well as the "Outstanding Teacher Award 2022" for the academic year 2022-23 from RIF. Dr. Asadi has visited many countries, including Malaysia, Thailand, Singapore, Ghana, Kenya, Ethiopia, Dubai, and Liberia. He has received numerous other awards, including Best Mentorship from the IBM-TGMC Challenge Contest and Microsoft in 2011 and 2012, Best SPOC of NPTEL-SWAYAM, Best SPOC of STP-IIT Bombay in 2019, and the Best Mentor Internship Award from Internshala-AICTE, Delhi, in 2019.

Maximum Leaf Greenness is More Associated with Global Vegetation Productivity Than Growing Season Length

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Vegetation green leaf phenology directly impacts gross primary productivity (GPP) of terrestrial ecosystems. Satellite observations of land surface phenology (LSP) provide an important means to monitor the key timing of vegetation green leaf development. However, differences between satellite-derived LSP proxies and in situ measurements of GPP make it difficult to quantify the impact of climate-induced changes in green leaf phenology on annual GPP. Here, we used 1,110 site-years of GPP measurements from eddy-covariance towers in association with time series of satellite LSP observations from 2000 to 2014 to show that while satellite LSP explains a large proportion of variation in annual GPP, changes in green-leaf-based growing season length (GSL, leaf development period from spring to autumn) had less impact on annual GPP by ~30% than GSL changes in GPP-based photosynthetic duration. Further, maximum leaf greenness explained substantially more variance in annual GPP than green leaf GSL, highlighting the role of future vegetation greening trends on large-scale carbon budgets. Site-level variability contributes a substantial proportion of annual GPP variance in the model based on LSP metrics, suggesting the importance of local environmental factors altering regional GPP. We conclude that satellite LSP-based inferences regarding large-scale dynamics in GPP need to consider changes in both green leaf GSL and maximum greenness.

Biography

Xiaojie Gao was born in Sichuan, China. He received a B.S. degree in Geography Information System (GIS) from Chengdu University of Technology, China, and completed an M.E. degree in Natural Resources and Environmental Remote Sensing as a joint graduate student from Chengdu University of Technology and Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences. After graduation, he worked in the GIS and remote sensing industry in China as a Geospatial Engineer for three years. In August 2019, Xiaojie joined the Center for Geospatial Analytics at North Carolina State University to pursue his Ph.D. under the guidance of Dr. Josh Gray. Starting from August 2023, Xiaojie joins Harvard Forest department of Harvard University as a postdoctoral researcher.

Strategies for Enhancing the Benefits of Satellites in Meeting Society's Need for Water Security

Richard Lawford

Morgan State University, USA

Although water is abundant in many parts of the Earth's environment, concerns about water security are increasing due to its critical role in human well-being, economic growth, social equity, and biodiversity. The ownership and management of water resources are complex because water is regarded as part of the global commons and managed as a public good. To properly govern and manage water security issues need to be addressed by each level of government using all the tools available to support water-related decisions. Providing the right data to right communities and users at the right time is critical for water security.

This talk reviews the threats to water security and then discusses the information and data services needed to address these threats. Data and data services will be most effective if tailored to user needs by information type, temporal and spatial resolution, domain scale, data latency, and presentation formats. Obstacles in the provision and use of the data are also addressed. Recommendations are given regarding strategies and actions to address these obstacles. A number of these obstacles and recommendations are drawn from the 2014 GEOSS Water Strategy Report. Since then, many of the Strategy's recommendations have been implemented (with varying degrees of success). The talk will explore those recommendations not fully addressed along with emerging opportunities and challenges that need to be considered in renewing this strategy to support water security more strongly under climate change and sustainable development. In addition, the importance of satellite observations for water security will be highlighted.

Biography

Mr. Richard Lawford is a retired Senior Scientist from Morgan State University (MSU) in Baltimore MD. During his time at MSU he worked on applications of satellite remote sensing to water issues, coordinated water activities in the Group on Earth Observations (with support from NASA and JAXA) and studied the Water-Energy-Food Nexus. Previously, he served as the Director of the Global Energy and Water Cycle Experiment (GEWEX) Project Office (supported by NASA), and served as Program Manager for the GEWEX Continental Scale Experiment (NOAA) in the Mississippi River Basin. Prior to moving to the USA, he worked with the Canadian government on climate, water, and technology issues in Environment Canada and the Ministry of State for Science and Technology in various management, advisory, research and operational positions. He has published extensively and has given more than 500 presentations in different contexts. He was educated at the Universities in Manitoba (Brandon), Alberta (Edmonton), and Quebec (McGill).

Effectiveness of Automated Chatbots for Operational Support and Self-Service Based on Fuzzy Classifier for Autism Spectrum Disorder (ASD)

Naga Simhadri Apparao Polireddi and **J Kavitha**

IKON Tech Services / Arizona State University, USA

The impact of technological advancements in construct Autism, often known as autism spectrum disorder (ASD), is a broad category of disorders characterized by challenges with social skills, repetitive activities, speech, and nonverbal communication. There are several different subtypes of ASD, most of which are brought on by a genetic disease as well as environmental factors. The impact of autism varies from person to person owing to many characteristics and challenges brought on by the spectrum condition. According to a number of research conducted on the illness, early detection of autism was associated with a favorable outcome. One in 59 US children have autism. In India, one out of every hundred kids displayed autistic traits. One significant issue in India is that parents are afraid that the public would judge their children, which will worsen the child's health since they will not receive the required care and attention. In order to comprehend and interact with this type of child's behavior, parents also needed particular training. While autistic persons appear normal, their mental conduct is abnormal and requires particular attention. Information technology and machine learning approaches can help to bridge the gap between the patient, the parent, and the physician. On a digital slate with a camera, touch screen, and 3D interaction that is specifically used for this purpose, a kids dashboard is developed and implemented. It also includes a conversational chatbot that may transmit psychosomatic involvement based on sadness and anxiety in order to give behavioral treatment using artificial intelligence. These chatbots are simple to customize, discover emotions, and requirements. It presents individualized replies that are adjusted based on the patient's mood and simply adjusts using a decision tree architecture based on fuzzy classifier. The model is automated, demonstrates empathetic conversational style, and also offers weekly charts outlining mental condition. Having access to the latest up-to-date innovations, such as chatbots, gives a much-needed reprieve to those afflicted with autism or other stigmatized conditions. AI and robots require emotions or feelings, but they are helping people feel more comfortable communicating their true feelings, as they realize that computers will not judge them. The drawback of such AI-based decision-making leads us to believe that conventional methods of caring for people's emotional and psychological wellbeing that involve human interaction are now antiquated.

Biography

Mr. Naga Simhadri Apparao Polireddi has over 20 years of experience in Information Technology industry and Academe is working with IKON Tech Services as a Solution Designer and Technical Manager at Client location in the USA. He earned his Master of Computer Science post-graduation degree from Arizona State University (ASU) in United States. He was accomplished 20 Years of Artificial Intelligence/Machine Learning, Chat Bots implementation experience using Natural Language Processing (NLP) and Web Dev Experience at Fortune 500 companies, clients and Peer work Reviewer, Author of Renowned Publications in Springer Nature and Book Chapters.

He is an extraordinary individual who has not only contributed extensively to the Information Technology Development field but has also earned accolades for his scholarly publications in esteemed journals and books. Mr. Polireddi is a Senior Member of IEEE and Fellow Member of BCS IT. Throughout his illustrious career, Mr. Polireddi, has left an indelible mark on various sectors spanning Finance, Airline, Telecom, and beyond. His ability to adapt and thrive in different environments showcases his versatility and adaptability.

Based on his technical expertise, Mr. Polireddi was invited as a Guest Speaker at various international technical conferences like IEEE and 4th Euro Global Summit on Content Distribution Networks (CDN) and Web Accessibility technologies he implemented for American Express website at the USA. When he was working for TATA, he was invited to review client software projects at Saudi Telecom Company, Riyadh Saudi Arabia and Nokia Networks Portugal, to review their products like Netcracker Telecom Rating and Billing product and Nokia NetAct Operation Support Systems (OSS) product.

Improving Permanent Magnet Hall Thruster Design with Thermal Modelling

M. C. Porto[1,2], S. A. A. Martins[1], S. J. L. Ferreira[1] and S. C. H. Llanos[2]

[1]Plasma Physics Laboratory, University of Brasilia, Brazil
[2]Embedded Systems and Integrated Circuit Applications Laboratory, University of Brasilia, Brazil

This work aims to verify and improve the thermal performance of a Hall thruster making sure the used permanent magnets are operating below their work and Curie temperatures. To acomplish this we performed thermal computer modeling on our current PHALL II-C thruster and identified possible improvements. Based on these results we propose several changes of materials and geometry until best thermal performance is achieved. Experimental tests and power parameters necessary for calculating thermal dissipation in parts of the thruster were collected from previous laboratory works. Modelling was performed using these parameters to obtain current thruster thermal performance, which was greatly improved by using our approach, making sure the operating temperature of the used Sm_2Co_{17} and $SmCo_5$ permanent magnets was well below their working/Curie temperatures.

Biography

Marconi C. Porto completed the undergraduation course in Mechatronics Engineering (also known in Brazil as Control and Automation Engineering) at the University of Brasilia, Brazil, in 2017. In 2021, he completed the Master's Degree course in the field of Hall thrusters for artificial satellites and space probes also at the University of Brasilia. He currently has participation in three published articles.

A Report on the Study for Rational and Reliable Pattern Mining

Tongyuan Wang

TechEngine Plus Com, Canada

On big data science, the classic pattern mining is fundamental to various mining applications. The proper solution for it is thus vitally important. However, after a myriad of research papers on and related to this mining have been published for 30 years, no reliable mining approach has arisen. This report will first present why and how the unreliability problems exist but largely ignored. Followed is on what the study has progressed to solve the issues. These include the appropriate pattern frequentness measure, pattern generation mode, the application of the equilibrium criterion, and the pattern frequency distribution theory. The third part of this report gives briefly what further work to do. The main contributions of the study so far include: (1) The reveal of the fundamental problems and the emphasis of the mining reliability, which is little concerned by previous research, and notice that the first importance of any scientific research is the exploration and identification of the deep problems, then is the solution for them. (2) All the findings in the study are well formed with no exogenous input but rigorous mathematic proofs. Furthermore, these findings are not limited to pattern mining but extended deeply to set theory and combinatorics. These findings thus promise a revolutionary change toward reliable classic pattern mining, and would impact machine learning or data science or even broader.

Biography

Tongyan Wang, Ph.D., M.Sc., M.E., M.A., has studied and worked in multiple fields. He got his first degree in Civil Engineering, then Master in Engineering Management, both at Chongqing University of China in 1980s. He then worked in that university as lecturer. Upon becoming a vice professor, he moved to Canada, where he obtained an M.A in Economics, then he switched to Computer Science from Graduate Diploma to Master and Ph.D. degrees by 2010, all at Concordia University. After graduation, he did not continue teaching career due to a convention here that a new Ph.D. holder would start as an assistant professor without a care of one's previous work experience. He then works for a startup company to date. During the course, he still keeps academic and industrial research. His main research interests include: the classic pattern mining, all-source auto genetic social and economic big dada system, and ecological and smart city.

ACCEPTED ABSTRACTS

GLOBAL CONGRESS ON

Advanced Satellite Communications 2023

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Addressing Cybersecurity and Safety Disconnects in United States Army Aviation: An Exploratory Qualitative Case Study

J. Pearson and **O. Oni**

Capella University, United States

This qualitative case study explores the reasons behind disconnects between United States Army aviation safety and cybersecurity groups' processes. The disconnects were defined as dissimilarities between Army aviation systems and inadvertent overlap of system implementation requirements. The disconnects cause an absence of explicit means to verify systems' resiliency to cybersecurity attacks that increase the risk to flight safety and mission readiness. Literature review revealed the absence of explicit guidance and the increase of cybersecurity issues affecting interconnected aviation systems. This study sought to discover the reasons behind the disconnects and explore how the disconnects could be improved to increase resiliency to cybersecurity attacks and decrease the risk to flight safety and mission readiness. The researcher used the organizational discontinuity theory (ODT) as the framework for determining the reason behind the lack of explicit guidance. Additionally, the researcher conducted interviews with knowledgeable safety and cybersecurity professionals and conducted data source triangulation using the safety and cybersecurity groups' respective process documentation to justify key research findings and accomplish data analysis activities. Data analysis identified three themes: awareness, process critique, and logical and complementary improvement. This study concluded that one primary reason behind the disconnects between safety and cybersecurity groups' processes is that both processes are isolated in terms of execution across the systems' lifecycles. The isolation causes conflicting process requirements and inadvertent overlap where requirements could be improved if cross-functional group coordination occurred. This study also confirmed the necessity for leadership guidance to implement cross-functional group coordination and comprehensive processes to address the disconnects.

Biography

Dr. Justin Pearson has been supporting the aviation industry for over a decade with software airworthiness, cybersecurity accreditation, IV&V, open systems architecture, and digital engineering (e.g. MBSE, Model-Based Software Development, Modeling & Simulation, etc.). Dr. Pearson received his Doctor of Information Technology with a specialization in Cybersecurity and Information Assurance from Capella University and holds both a B.S. and M.S. in Management Information Systems from the University of Alabama in Huntsville as well; Dr. Pearson maintains the CISSP, CEH, and SEC+ certifications. Dr. Pearson emphasizes the application of lessons learned and recommendations from academia to achieve future success.

The AI Driven Ultra Smart Cyberspace

E. Babulak

National Science Foundation, USA

Given the current dynamic developments in the field of Artificial Intelligence (AI) & Robotics, Big Data, Massive Data Storage and Ubiquitous access to high-speed Internet 24/7 for anyone worldwide, the term Ultra Smart Cyberspace is becoming well accepted reality. The level of intelligence of the AI today, by some colleagues could be compared to level of intelligence of a three month old baby. Naturally, a healthy baby is growing, observing, and learning very quickly. For the AI to grow and learn naturally, is very challenging and requires a very complex and massive super computation, which ultimately present lot of subject related challenges such us, uninterrupted 27/7 energy supply, very effective and real-time channel of communication and assimilation of all like Human Senses, that healthy baby has by nature. The most challenging question remains, Will the AI Sensors ever match to Human Senses natural capacities?

In light of currently ongoing developments of Covid-19 crisis, having effective real-time application of Artificial Intelligence & Robotics with the Big Data remotely control via Internet is essential. The utilization of John Hopkins Corona Map, in conjunction with collecting real- time data from the Electronic Health Record (EHR) in the nation and worldwide, as well as collections of antibodies contributes well to community worldwide aspirations to safe human lives and to restart the economies worldwide. These are most dramatic times for mankind worldwide, and yet despite of its most negative impact it does also inspire dynamic innovation, research and developments in the world of health, business, government, industry, plus., while promoting seamless creation of multidisciplinary teams of experts in the nation and worldwide. The authors will discuss the current and future dynamic trends in research, innovation and developments of cutting-edge technologies, AI, Robotics, and smart cyber systems that will contribute effectively to people saving lives, and decision makers in the nation and worldwide.

Biography

Professor Dr. Eduard Babulak is accomplished international scholar, researcher, consultant, educator, professional engineer and polyglot, with more than thirty years of experience. He served as successfully published and his research was cited by scholars all over the world. He serves as Chair of the IEEE Vancouver Ethics, Professional and Conference Committee. He was Invited Speaker at the University of Cambridge, MIT, Purdue Speaker Photo University, Yokohama National University and University of Electro Communications in Tokyo, Japan, Shanghai Jiao Tong University, Sungkyunkwan University in Korea, Penn State in USA, Czech Technical University in Prague, University at West Indies, Graz University of Technology, Austria, and other prestigious academic institutions worldwide. He serves as the Editor, Co-Editor, and Guest-Editor. He communicates in 16 languages. His biography was cited in the Cambridge Blue Book, Cambridge Index of Biographies, Stanford Who's Who, and number of issues of Who's Who in the World and America.

Formulation And Validation of The Best DISTANCE Estimation Algorithm (ELLS) Based on Different Localization Approaches (MLLS, CLLS, and ML) For Indoor Positioning Systems Using UWB Technology

Al-Nussairi Ahmed Kateb Jumaah[1], Wahidah Hashim[2] and **A.k. Alami[3]**

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[3]Al-Manara College for Medical Sciences, Iraq

The Mobile Station (MS) is moved using hybrid technologies to determine the position of an indoor object with the help of Anchor Nodes (AN) as relay nodes utilizing Ultra-Wide Band (UWB) frequency wireless technology. The UWB frequency is the communication channel between the sender (AN) and the receiver (MS), but the UWB signal may suffer a delay in arriving at the receiver when there are obstacles (concrete wall, wooden wall, wooden door, bricks wall) between them so the necessity for a Non-Line-of-Sight (NLOS) detection and mitigation strategy to precisely locate an MS in a harsh indoor environment is thus a significant restriction. The NLOS approach will complicate the positioning approach this delay causes an inaccurate distance from the actual physical measurement between the sender and the receiver, and thus the exact positioning calculation is wrong. The aims of this paper are ; a) To determine the position in accuracy for different types of wall materials when using UWB, b) To formulate the best distance estimation algorithm based on different localization approaches, c) To validate the proposed algorithm with different localization approaches in a real environment. In this paper, we use UWB technologies to build a novel indoor location algorithm called Enhanced Linearized Least Square (ELLS) method without employing an NLOS identification method. In a challenging context, the developed system has an average positioning accuracy of roughly 0.4m^2 of Mean Square Error (MSE). It performs better than the majority of indoor positioning devices on the market with less effort, less money, and higher efficiency.

Biography

Full Name: Al-Nussairi Ahmed Kateb Jumaah

Bachelor degree : Communication Engineering/ Iraq

Master Degree : Communication Engineering / Russia

Ph.D student :Information and Communication Technology/ Malaysia

A Generative Deep Learning-Based Unsupervised Multi-Scale Method for Denoising and Producing Super-Resolution Images

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[3]Associate Professor, School of Computer Science, University of Petroleum and Energy Studies (UPES), India

Blind noise called high-level noise is considered very complex. To produce super-resolution images, it is essential to eliminate these noise elements and give a clear noise-free output. Deep learning has been used to solve the issues of image denoising and super-resolution reconstruction, typically with better outcomes than conventional approaches. However, these techniques do not consider the advantages of multi-scale context in handling high-level noise resulting layer-by-layer more errors in the feature fusion process. In this paper, we propose a novel image denoising and super-resolution reconstruction method, called multiscale ensemble GAN. It is based on multi-scale context by handling high-level noise for regenerating the high-definition images. This denoising approach is found to be very effective in many ways for its accuracy of correct feature extraction capacity. It can easily be integrated as a chosen enhancement tool in the GAN model due to its adversarial training and stochastic gradient descent functionality. It is implemented using a single generator with three discriminator-based GAN architectures. The difference in error between multi-scaling and ground truth images is minimized by an adaptive diverse loss function. The model is developed using the least loss function as deciding factor to choose the best discriminator for a particular epoch. The approach is integrated and implemented through simultaneous generator and discriminator model training aiming to optimize the learning process and accordingly, the output is made best. The model is evaluated using the Structure Similarity Index (SSIM), Inception Score (IS), and Fréchet Inception Distance (FID) parameters. It is found that the proposed approach outperforms the comparison algorithm both qualitatively and quantitatively. It recovers images with various forms of blur and creates high-quality images by maintaining structural integrity. Experimental results using publicly accessible datasets as well as our newly created dataset (Indian celebrity replicas) show that the proposed approach outperforms state-of-the-art techniques.

Biography

Dr. Manoj Kumar completed his Ph.D. from The Northcap University and M.Sc. (Information Security and Digital Forensics) from Technological University Dublin (Formerly ITB Blanchardstown) Ireland in 2013. He received fully-funded scholarship for his M. Tech and M.Sc. program from Irish Government. He has more than 12.6+ years of research, teaching, and corporate experience. He is currently working on the post of Associate Professor-Cyber Security in University of Wollongong in Dubai, UAE. His specialization is Machine Learning, Digital Image Processing, IOT, Digital Forensics, WSN, and Information Security. He has published over 125 articles in International refereed journals and conferences. He is also a member of numerous renowned bodies including IEEE, ACM, IAENG, ISTS and UACEE and many more. He has delivered several guest lectures, seminars and chaired the session at various reputed international conferences. He published two textbooks and six edited books for the most famed publishers like Springer, Bentham Science, Taylor & Francis, and Elsevier, etc. He is an associate editor, Guest editor, and editorial board member of various journals of repute. He is serving as a Reviewer and Editorial Board Member of many reputed Journals including IEEE Transactions and Technical Program Committee member of International Conferences. He has received the Best Researcher Award in 2020, an outstanding Scientist Award in 2021, and a Young Researcher Award in 2021 from recognized bodies. He published 10 patents of which three are granted. He delivered two international research projects.

Orbital Dynamics, Chaotic Orbits and Jacobi Elliptic Functions

Rami Ahmad El-Nabulsi

Research Center for Quantum Technology, Chiang Mai University, Thailand

Bertrand theorem's states that, among central-force potentials with bound orbits, there are only two types of central-force scalar potentials with the property that all bound orbits are also closed orbits: the inverse-square law and Hooke's law. These solutions are considered basic examples in classical mechanics since they help in understanding the regular and predictable motion of bodies and superintegrable dynamical systems. However, there are strong beliefs that other potentials may arise in dynamical systems which are not predicted by Bertrand's theorem. Besides, several dynamical systems such as the solar system are characterized by chaotic and unbounded orbits which are not predicted by Bertrand's theorem. In this work, we prove an extension of Bertrand's theorem by means of non-standard Lagrangians and show the existence of a family of solutions for chaotic unstable periodic orbits.

Biography

Rami Ahmad El-Nabulsi holds a PhD in Particle Physics, Mathematical Physics and Modeling from Provence University (currently Aix-Marseille University), France and a diploma of advanced studies in Plasma Physics and Radiation Astrophysics from the same institution. He worked with different worldwide research departments in UK, South Korea, China, Greece, Thailand, India, etc. and he is currently affiliated to Chiang Mai University, Thailand. He is the author of more than 335 peer-reviewed papers in peer-refereed reputed journals and a reviewer for more than 135 scientific journals. His research ranges from applied mathematics to theoretical physics including nonlinear dynamical systems, space and astrophysics, general relativity, geometrical and algebraic physics, physics and chemistry of solids, plasma MHD, neutronics and nuclear reactors, superconductivity, and magnetic materials among others.

Alteration Mineral Mapping in The Antarctic Environment Using Aster Multispectral Remote Sensing Imagery

Amin Beiranvand Pour

Institute of Oceanography and Environment (INOS), Universiti Malaysia Terengganu (UMT), Malaysia

Spectral discrimination of altered minerals helps to analyze alteration processes and identification of parent lithologies. In Antarctica, spectral mapping of altered minerals is very challenging due to the remoteness and inaccessibility of poorly exposed outcrops. This investigation evaluates the capability of Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) satellite remote sensing imagery for mapping and discrimination of alteration mineral groups in the Antarctic environment of northern Victoria Land. The Mixture Tuned Matched Filtering (MTMF) and Constrained Energy Minimization (CEM) algorithms were used to detect the sub-pixel abundance of Al-rich, Fe^{3+}-rich, Fe^{2+}-rich and Mg-rich alteration minerals using the visible and near-infrared (VNIR), shortwave infrared (SWIR) and thermal infrared (TIR) bands of ASTER. The reference spectra directly extracted from the image using the Automated Spectral Hourglass (ASH) technique are used to accomplish the MTMF and the reference spectra of phyllosilicate minerals selected from the USGS spectral library are used for executing the CEM. The relative absorption and emissivity intensities of the end-member spectra are analyzed and compared to reference spectra from the USGS spectral library. Results indicate that Al-rich phyllosilicates are strongly detected in the exposed outcrops of the Granite Harbour granitoids, Wilson Metamorphic Complex and the Beacon Supergroup. The presence of the smectite mineral group derived from the Jurassic basaltic rocks (Ferrar Dolerite and Kirkpatrick Basalts) by weathering and decomposition processes implicates Fe^{3+}-rich and Fe^{2+}-rich phyllosilicates. Biotite (Fe^{2+}-rich phyllosilicate) is detected associated with the Granite Harbour granitoids, Wilson Metamorphic Complex and Melbourne Volcanics. Mg-rich phyllosilicates are mostly mapped in the scree, glacial drift, moraine and crevasse fields derived from weathering and decomposition of the Kirkpatrick Basalt and Ferrar Dolerite. Chlorite (Mg-rich phyllosilicate) was generally mapped in the exposures of Granite Harbour granodiorite and granite and partially identified in the Ferrar Dolerite, the Kirkpatrick Basalt, the Priestley Formation and Priestley Schist and the scree, glacial drift and moraine. As a result, the spatial distribution of Al-rich, Fe^{3+}-rich, Fe^{2+}-rich and Mg-rich phyllosilicates is mapped. Statistical results obtained from the confusion matrix and Kappa Coefficient indicate that Al-rich phyllosilicates class pixels are strongly discriminated, while the pixels attributed to Fe^{3+}-rich class, Fe^{2+}-rich and Mg-rich phyllosilicates classes contain some spectral mixing due to their subtle spectral differences in the VNIR+SWIR bands of ASTER. Results derived from TIR bands of ASTER show that a high level of confusion is associated with mafic phyllosilicates pixels (Fe^{3+}-rich, Fe^{2+}-rich and Mg-rich classes), whereas felsic phyllosilicates (Al-rich class) pixels are well mapped.

Biography

He is a well-experienced and internationally established researcher in the field of geological and environmental remote sensing. He was listed among the World's Top 2% Scientists by Stanford University for the years 2020 and 2021. He has a full academic background in applied geology, environmental geology and remote sensing. He was project Leader of numerous remote sensing research projects using multispectral and hyperspectral sensors in arid and semi-arid terrains, Antarctic, Arctic and tropical environments. His experience ranges widely, from environmental issues to geological mapping such as geo-hazard, environmental monitoring and modelling, structural mapping, mineral exploration, geothermal mapping and geomorphic and coastal geology investigations. He has published more than 180 research papers in the field of geological and environmental remote sensing.

Developing Methods for Vibration Damage Estimation Under Combined Random and Deterministic Loading Using Monte Carlo and Finite Element Methods

M. Ptak[1], M. Cis[2] and **J. Czmochowski[3]**
[1]*Wroclaw University of Science and Technology, Poland,*
[2]*Collins Aerospace an RTX Business, Poland,*
[3]*Wroclaw University of Science and Technology, Poland*

This article focus on developing novel method for vibration damage estimation under combined deterministic and stochastic vibration loading for military application. As the base use Monte Carlo method and Inverse Fast Fourier Transformation (IFFT) for creation times series from the Power Spectra Density (PSD) Response function – which is derived using highly efficient FEA (Finite Element Analysis) linear dynamic, frequency domain-based algorithm. Research result presented in this paper is a continuation of the research introduced for white noise signal – research extended to wide band and narrow band signals.

This publication introduce legacy method used in commercial software – pure frequency domain damage estimation in oppose to proposed novel method – combined frequency and time domains damage estimation. Research results shows that using combined domain consideration allows for precise damage estimation using Rainflow Cycle Counting algorithm in time domain (including derivation mean value and distribution of damage see Fig.1) in oppose to legacy method, which allow only for mean damage value estimation. Additionally, the mean value evaluated by legacy method is high conservative compared to the mean value evaluated with using novel method. Unknow of the damage distribution might implies undertesting of the unit – this paper introduce recommendation how test need to be performed to avoid undertesting based on derived damage distribution and the impact of IFFT block size on damage variability.
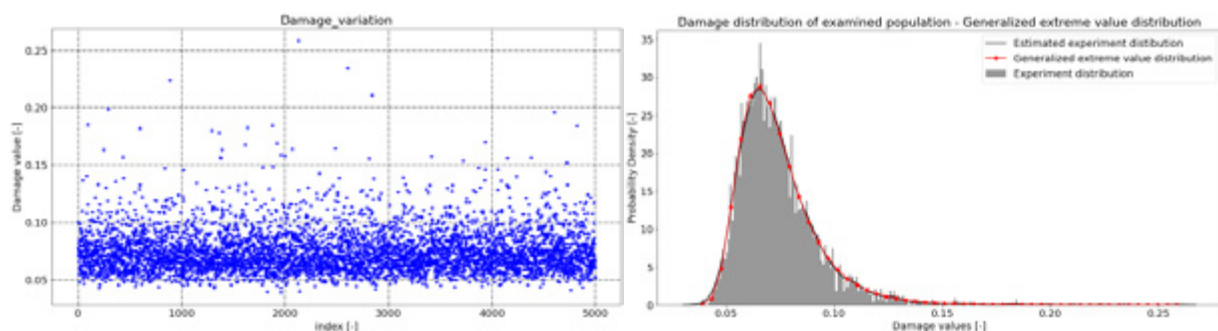
Fig. 1 Damage distribution for wide band signal clipped at 5 standard deviations, block size ln(N) = 16

This paper introduces damage estimation results using exemplary aircraft unit with using the novel method and legacy method for comparison and to shows the benefit of using proposed method. Additionally introduced how the novel method can be used for replication real test conditions (what is not allowed for legacy method) – e.g., considering block size in IFFT and signal clipping at considered standard deviation level impact on damage variability.

Biography

I am working at Wroclaw University of Technology, and simultaneously at the Collins Aerospace an RTX Business (as the Senior Structural Engineer), Wroclaw, Poland. In both initiatives I am dealing with structural dynamic, impact of stochastic and deterministic loading on structural integrity. My main research discovers are related to Rainflow Cycles Counting (RCC) methods in frequency domain and combined time and frequency domains vibration damage estimation.

In terms of RCC method in frequency domain in my publications I proposed many modifications of legacy knowledge which helps to match frequency domain signal statistic parameters with its counterparts in time domain. I have extended Dirlik method, which helps to derived distribution of damage not only mean value of the damage. I proposed modified formulation for Lalanne and Narrow Band Bendat's methods and reduced integration of spectral moments – it help to obtain matching the damage with using these methods to the Dirlik method with much less empirical complexity.

Additionally, I'm the author of the novel method for vibration damage estimation under simultaneous stochastic and deterministic loading using combined time and frequency domain consideration with using IFFT and Monte Carlo method. The novel method helps to estimate the vibration damage much more accurate than the legacy method, which based on pure frequency domain consideration.

Deformations of Finitely Generated Modules Over a Repetitive Algebra

Adriana Fonce-Camacho[1], Hernán Giraldo[1], Pedro Rizzo[1] and **José A. Vélez-Marulanda[2]**

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[2]*Valdosta Stated University, USA*

Let Λ be a basic finite dimensional algebra over an algebraically closed field k, and let be the repetitive algebra of Λ (in the sense of H. Giraldo, Irreducible Morphisms Between Modules over a Repetitive Algebras. (2018) and D. Happel, Triangulated categories in the representation theory of _nite dimensional algebras. (1988)). In this talk, we introduce a recently develop theory about deformations of finitely generated modules over a repetitive algebra. More precisely, we prove that, if $\hat{V}$ is a left $\hat{\Lambda}$-module with finite dimensión over k, then $\hat{V}$ has well-defined versal deformation ring $R(\hat{\Lambda}, \hat{V})$, which is a local complete Noetherian commutative k-algebra with residual field k. We also prove that in this situation $R(\hat{\Lambda}, \hat{V})$, is invariant under syzygy operator and projective summands as long as $\text{End}\,\hat{\Lambda} = k$. These results have a close relation with several deformation theories of fiite dimensional self-injective k-algebras (more details in F. M., Bleher. and J. A. Velez-Marulanda. Universal deformation rings of modules over Frobenius algebras. (2012), F. M. Bleher and D. J. Wackwitz, Universal deformation rings and self-injective Nakayama algebras. (2019) and J. A. Vélez-Marulanda, Universal deformation rings of strings modules over a certain symmetric special biserial algebra. (2015)), whose ideas are in influented by deformation theory of Galois representation develop by B. Mazur (1997).

Investigating The Associations Between Solar Flares and Magnetic Complexity of Active Regions

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[2]*Department of Physics, Science and Technology, Nigeria*
[3]*Department of Physics and Astronomy, King Saud University, Saudi Arabia*

To learn more about how solar flares are produced in relation to solar magnetic configurations, we examined a total of 37,741 soft-X ray solar flare events observed by a series of GOES satellites. The flare and sunspot data catalogued by NOAA were obtained from 1996 July through 2018 December, covering solar cycles 23 and 24. The investigated flares database consists of 38.26% B-, 55.52% C-, 5.78%M- and 0.44% X-class. In accordance with the Hale magnetic complexity categorisation system, a total of 33,562 sunspot groups comprised of 30.65% α-, 57.7% β-, 8.69% $\beta\gamma$-, and 2.96% -$\beta\gamma\delta$-type active regions were counted based on their daily appearances, from the same source and period. The Multi-Taper and cross-correlations analyses were adopted in carrying out the investigation using their daily numbers. Our findings reveal that B-flares are negatively correlated with all the sunspot groups, in contrast to other flare classes that are positively correlated and synchronous. The β-sunspot and C-flares are found to exhibit the typical 11-year solar cycle, including the double-peaks feature during solar maximum. Correspondingly, the measured daily occurrence rates of β-sunspot and C-flares were the highest during the studied two solar cycles. Meanwhile, a total of 22,121 flare events were observed to be occurring concurrently with sunspot groups, out of which 10,019 flare events were found associated with β-sunspot, from which 5,378 happened to be C-class, the highest number obtained, followed by 4,164 with B-class. The X-flares recorded 2 events with α- sunspot group, the least recorded in the studied period. We also confirm that the $\beta\gamma\delta$-group is more likely to produce any class of flare. However, constrained by their formation rates, resulting in the β-group producing the most flares by number. Periodicities of 9.9, 10.67, and 9.9 years were obtained for α-, β-, and complex ($\beta\gamma$-and-$\beta\gamma\delta$) respectively while 4.1-6.5, 10.67, 11.2 and 10.64 years were obtained for B-, C-, M-and-X flares.

Biography

I am an early-career scientist with a PhD degree in Astrophysics from Yunnan Observatories of the Chinese Academy of Sciences, supported by the CAS-TWAS President's Fellowship. I am a postdoctoral research fellow at the Institute of Astroparticle Physics of Southwest Jiaotong University in Chengdu. Previously, I served as a lecturer in the Department of Physics at Bamidele Olumilua University of Education, Science and Technology in Ikere-Ekiti, Nigeria.

My main area of research is centered around solar active regions, coronal mass ejections, and solar flares. I am keenly interested in exploring fresh periodicities, associations, and dependencies among solar activity features and

other attributes. I use a variety of techniques to achieve this goal. I aim to create more precise prediction techniques and statistical documentation for various solar events and activities. These include flares, sunspot groups, solar wind speed, and various solar parameters.

In the long term, my research interests and goals involve addressing problems related to space weather and the upper atmosphere by incorporating Machine Learning into astrophysical data analysis. This includes utilizing data from solar flares, solar wind, and other relevant sources to enhance our understanding of these phenomena.

Global And China's Carbon Sources and Sinks Monitoring Satellites

MENG Guang

Chair Professor and Vice Chairman The University Council Shanghai Jiao Tong University, China

With the development of industrialization, the anthropogenic greenhouse gas emissions have increased significantly. In order to meet the needs of carbon stocktaking and support the monitoring and supervision of carbon sources and sinks, it is recommended to make full use of the foundation of the existing satellites, improve the detection technical specifications of carbon sources and sinks monitoring measures, and build a multi-means comprehensive, LEO-GEO orbit carbon monitoring satellite system to achieve higher precision, higher resolution and multi-dimensional carbon monitoring. On this basis, it is recommended to strengthen international cooperation, improve data sharing, actively participate in the international carbon retrieval algorithm standards, establish an independent and controllable global carbon monitoring and evaluation system, and contribute china's strength to the global realization of carbon peaking and carbon neutrality.

The Role of Climate Change and Its Sensitivity on Long-Term Standardized Precipitation Evapotranspiration Index, Vegetation and Drought Changing Trends Over East Asia

Shahzad Ali[1,2], Abdul Basit[3], Muhammad Umair[1], Tyan Alice Makanda[1] and **Jian Ni[1]**

[1]College of Life Sciences, Zhejiang Normal University, China
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[3]Department of Computer Science, University of Peshawar, Pakistan

Droughts have become more severe and frequent due to global warming. In this context, it is widely accepted that for drought assessments both water supply (rainfall) and demand (standardized rainfall evapotranspiration index, SPEI) should be considered. Using SPEI, we explored the spatial-temporal patterns of dry and wet annual and seasonal changes in five sub-regions of East Asia during 1902-2018. Our results show that the SPEI significantly improved extreme drought and mostly affected the SPEI-06 and SPEI-12 growing seasons in East Asia during 1981-2018. The dry and wet annual SPEI trends mostly affecting the five sub-regions of East Asia, the annual SPEI has two extremely dry spell during 1936 to 1947 and 1978 to 2018. Japan, South Korea and North Korea are wet in summer compared to other regions of East Asia, with drought frequency occurring at 51.4%, respectively. The mean drought frequencies in China and Mongolia are 57.4% and 54.6%. China and Mongolia are the driest regions in East Asia due to high drought frequency and duration. The spatial seasonal analysis of SR, WVP, WS, VCI, TCI and VHI are confirmed that East Asia region suffered from maximum drought events. The seasonally variation of SPEI shows no clear drying trends during summer and autumn seasons. While during winter and spring seasons showed a dry trend in East Asia region. During 1902-1990, a seasonal SPEI presented diverse characteristics, with clear wet trends in Japan, Mongolia and North Korea in four different growing seasons, while dry tends in China and South Korea. During 1991-2018, seasonal SPEI presented clear dry trends in Japan, Mongolia and North Korea in different growing seasons, while, China and South Korea show a wet trend during spring, autumn and winter seasons. Understandings of long-term vegetation trends and the effects of rainfall and SPEI on drought severity are important for water resource management and climate change adaptation.

Biography

Dr. Shahzad Ali, male, was born in April 1988, in Peshawar City, KP Province, Pakistan. He completed a B.Sc. (Hons) & M.Sc. (Hons) in Agronomy with a Silver and Browns Medal Award. He completed his Ph.D. in China (Northwest A&F University). He completed his Postdoctoral at Qingdao University (Remote sensing, climate change, and big data analysis) and worked at Lanzhou University as Young Talent Researcher (2020). Dr. Shahzad Ali is working as a Lecturer at Hazara University Mansehra. Dr. Shahzad Ali is currently working as a Postdoctoral at Zhejiang Normal University since 2022.

The Use of Machine Learning and Satellite Imagery to Detect Roman Fortified Sites: The Case Study of Blad Talh (Tunisia Section)

Nabil Bachagha

College of Computer Science and Electronic Engineering, Hunan University, China

This study focuses on an ad hoc machine-learning method for locating archaeological sites in arid environments. Pleiades (P1B) were uploaded to the cloud asset of the Google Earth Engine (GEE) environment because they are not yet available on the platform. The average of the SAR data was combined with the P1B image in the selected study area called Blad Talh at Gafsa, which is located in southern Tunisia. This pre-desert region has long been investigated as an important area of Roman civilization (106 BCE). The results show an accurate probability map with an overall accuracy and Kappa coefficient of 0.93 and 0.91, respectively, when validated with field survey data. The results of this research demonstrate, from the perspective of archaeologists, the capability of satellite data and machine learning to discover buried archaeological sites. This work shows that the area presents more archaeological sites, which has major implications for understanding the archaeological significance of the region. Remote sensing combined with machine learning algorithms provides an effective way to augment archaeological surveys and detect new cultural deposits.

Biography

Nabil Bachagha has more than 5 years of experience in the field Earth Observation from satellite/airborne/ground based on passive (optical, multi-hyperspectral data) and active (radar, LIDAR) sensors. His main research interests are focused on modeling, data processing, integration, and interpretation of big Earth Observation for landscape analysis and environmental degradation, paleo-environmental investigations and archaeological studies. He authored or co-authored of more than 12 peer-reviewed papers (JRC journals, book etc.), guest editor for several international journals Remote Sensing, Journal of arid land, regional Sustainability and Reviewer Remote Sensing, Applied sciences, Sensor, African Journal of Ecology, IERPH, Sustainability Hydrology, Geoscience Water. Currently His is Member of the reviewer team at BAR Publishing (The British Archaeological Reports Series, Oxford OX2 7BP, UK) He has been the scientific investigator of several research projects at international level (2 projects, funded by the National Natural Science Foundation, of China.

About the Moment System of Equations and Macroscopic Boundary Conditions to Define the Speed and Surface Temperature of the Aircraft

A. Sakabekov, S.Madaliyeva and R. Yergazina

Satbayev University, Kazakhstan

The aerodynamic characteristics of aircraft at very high speeds and at high altitudes can be determined by methods of the rarefied gas theory [1,2]. The description of a rarefied gas with the help of the particle distribution function refers to the transitional region. The correct description of the gas flow near the surface should be based on the solution kinetic Boltzmann equation. Calculating aerodynamic characteristics of an aircraft in the high-velocity flow of rarefied gas, it is necessary to supplement Boltzmann equation with the term that depends on the speed of an aircraft, and the condition on moving boundary has to contain parameter depending on the surface temperature of an aircraft.

We present a new one-dimensional non-stationary nonlinear moment system of equations, depending on the flight speed and the surface temperature of the aircraft with macroscopic boundary conditions on mobile boundary. We state the initial and boundary value problem for the system of moment equations in second approximation under the macroscopic boundary conditions and prove the existence and uniqueness of the solution of the above mentioned problem in the space of functions that are continuous on time and square summable by spatial variable [3]. To determine the speed and surface temperature of the aircraft we solve the inverse problem to the initial and boundary value problem for second approximation of moment system of equations with some additional information about the solution of the direct problem. We will develop an iterative numerical method for solving an inverse problem for a non-stationary nonlinear system of moment equations in the second approximation, reduced to canonical form, software implementation of algorithms and their application for solving inverse problems to determine the speed and surface temperature of an aircraft.

Biography

He was born at Shalkode village in Almaty region of Republic of Kazakhstan in 1947. He was Graduated from Kazakh State University in 1970. He has earned degree of Doctor of physical and mathematical sciences in 1993 at Institute of mathematics and mathematical modeling of Kazakh National Academy of sciences in Almaty, Kazakhstan. His main research fields are Boltzmann equation and its applications, Boltzmann's moment system of

equations, remote sensing of the Earth from space. He has more than 230 scientific articles, 2 monographs and 5 tutorials. Currently works as professor in Mathematical department at Kazakh National Technical University by K.I.Satbayev in Almaty. Recent research areas include simulation of oil and gas fields in Petrel and Eclipse program softwares, geostatistics. He is an acting member of Academy of natural sciences and winner of the Academy of Sciences of the USSR, "Best teacher of the year" state grant holder, and awarded medal for "developing Science of Kazakhstan" in 2007.

Advanced Satellite Communications 2023

On The Concept of Cp Parameter and Its Application in The Analysis of Scattering Phase Functions of Single Ice Crystal

Guanglang Xu, Martin Schnaiter, Shawn Wagner and **Emma Järvinen**

Karlsruhe Institute of Technology, Germany

Real physical world is complex. Improving our understanding of the real physical world can only be achieved through joint efforts of measurement and modeling. Measurement obtains direct input data from the real physical world, and modeling produces output based on our conceptual understanding of the physical world. In this talk, I will introduce a new mathematical concept called Cp parameter using simple Legendre polynomial expansion. I will explain why this concept is important and how it can be used in connecting the measurement and modeling. To illustrate the effectiveness of this parameter in analyzing measurement and modeling data, particularly, I will discuss the so-called Cp-analysis on the scattering phase function of single ice crystal. I will discuss how valuable information about the morphologies of the ice crystal can be retrieved through the relation between the Cp parameter and the asymmetry parameter g under the framework of successive order of scattering.

Biography

Dr. Guanglang Xu has been a postdoctoral researcher at Karlsruhe Institute of Technology since the year of 2021. He obtained his Ph.D degree in atmospheric sciences at Texas A&M University in December of 2017. From February of 2018, he was postdoc researcher at the department of physics, University of Helsinki, Finland. Dr. Xu's research focuses on light scattering by non-spherical particles using both numerical and measurement approaches.

Simulating Land Surface Temperature Using Biophysical Variables Related to Building Density And Height in Dar Es Salaam, Tanzania

Olipa Simon[1], Nestory Yamungu[2] and **James Lyimo[1]**
[1]*Institute of Resources Assessment, University of Dar es Salaam, Tanzania*
[2]*Department of Geography, University of Dar es Salaam, Tanzania*

Land use and land cover dynamics are pivotal to communicating land surface temperature (LST) scenarios. This Land use and land cover dynamics are pivotal to communicating land surface temperature (LST) scenarios. The current study characterises the influence of biophysical variables on LSTs in the Dar es Salaam Metropolitan City (DMC). Landsat images were analysed using geographically weighted regression (GWR) and Ordinary least square (OLS) models to determine biophysical variables (Soil Adjusted Vegetation Index (SAVI), Normalized Difference Built-up Index (NDBI), and Normalized difference bareness index (NDBaI)) and LST relationships. The GWR analysis results revealed that LST had a weak to strong negative correlation with the Soil Adjusted Vegetation Index, a moderate positive correlation with Normalized Difference Built-up Index, and a low positive correlation with the Normalized difference bareness index. GWR produces better predictive capacity than OLS, with coefficient of determination -R2 values of 55%, 80%, and 62% for 1995, 2009, and 2017, respectively. Also, higher model residuals values were observed in high building density compared to low building density areas. This study provides a broad understanding of the biophysical variables' impact on LST in DMC. And thereby extending site-specific urban land-use planning, design and conservation strategies for LST mitigation.

Biography

Ms. Olipa Simon, a highly accomplished professional in geomatics and natural resources management, holds a Master's degree in Computer Science and a Bachelor's degree in Land Surveying from the University of Dar es Salaam and a PhD student in natural resources assessment and management at the University of Dar es Salaam. With 20 years of experience as the Principal GIS Laboratory Scientist at the Institute of Resource Assessment, she conducts training, designs customized courses, and provides consultancy services in GIS and Remote Sensing. Ms. Simon's expertise extends to notable projects, related to GIS and remote sensing application for natural resources management. She has received specialized training in the Netherlands and Belgium to enhance her skills in Geographic Information Systems and Remote Sensing. Her contributions have been recognized at both national and international levels, earning her a strong reputation in her field.

Satellite-Based Rainfall Estimates to Simulate Daily Streamflow Using a Hydrological Model Over Gambia Watershed

Bakary Faty[1], Geert Sterk[2], Abdou Ali[3], Souleymane Sy[4], Honoré Dacosta[5], Salif Diop[5] and **Luc Descroix[6]**

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[2]Department of Physical Geography, Faculty of Geosciences, Utrecht University, the Netherlands
[3]Centre Régional AGRHYMET, Niger
[4]Institute of Geography, University of Augsburg, Germany
[5]Département de Géographie de l'University Cheikh Anta Diop de Dakar, Sénégal
[6]IRD, UMR PALOC MNHN/IRD/Sorbonne Université 75231 Paris, France

Satellite rainfall products (SRPs) have the potential to overcome the limitations of ground-based rainfall observations and provide an alternative for inadequately or ungauged watersheds. However, due to the relatively poor accuracy and associated uncertainties to SRPs, it is necessary to evaluate their quality and applicability for each investigated watershed. This paper evaluates the usefulness of SRPs as forcing data for hydrological modelling under different scenarios and assesses their applicability for the Kedougou, Mako and Simenti sub-basins of the Gambia River. To achieve this, the "Génie Rural à 4 paramètres Journalier model" (GR4J) hydrological model was employed to simulate the streamflow considering four different scenarios: i) non-calibrated GR4J model run with uncorrected SRPs (Scenario 1); ii) non-calibrated model run with corrected SRPs (Scenario 2); GR4J model was calibrated and validated using uncorrected SRPs and then they were utilized to drive the model (Scenario 3); GR4J model was calibrated and validated and then run using forcing inputs from corrected SRPs (Scenario 4). Results revealed that under Scenario 1 the SRPs performed poorly over the three sub-basins, while under scenario 2, the simulated daily streamflow show relative improvement when run using corrected SRPs with 6 or 10 rainfall stations. Under the scenarios 3 and 4, the calibrated model provides significant improvement of the simulated streamflow with both the corrected and non-corrected SRPs. Finally, the SRPs demonstrate potential for use in watersheds where there are no rain gauges. The performance loss from scenario 4 (considered as the reference) to scenario 3 does not exceed 20%. Similarly, the performance loss from scenario 4 to scenario 2 does not exceed 50% when the SRPs are corrected using 3 and 6 rainfall stations (e.g., in the Kedougou sub-basin). Thus, they can be considered acceptable for hydrological simulations when the hydrological model is calibrated with measured streamflow.

Deep And Reinforcement Learning Technologies on Internet of Vehicle (Iov) Applications: Current Issues and Future Trends

F. Author[1], S. Author[2], Lina Elmoiz Alatabani[1], Elmustafa Sayed Ali[2], Rania A. Mokhtar[3], Rashid A. Saeed[3], Hesham Alhumyani[3] and Mohammad Kamrul Hasan[4]

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[2]Department of Electrical and Electronics Engineering, Faculty of Engineering, Red Sea University, Sudan
[3]Department of Computer Engineering, College of Computers and Information Technology, Taif University, Saudi Arabia
[4]Center for Cyber Security, Faculty of Information Science and Technology, Universiti Kebangsaan Malaysia (UKM), Malaysia

Recently, artificial intelligence (AI) technology has great attention in transportation systems, which led to the emergence of a new concept known as Internet of Vehicles (IoV). The IoV has been associated with the IoT revolution and has become an active field of research due to the great need, in addition to the increase in the various applications of vehicle communication. AI provides unique solutions to enhance the quality of services (QoS) and performance of IoV systems as well. In this paper, some concepts related to deep learning networks will be discussed as one of the uses of machine learning in IoV systems, in addition to studying the effect of neural networks (NNs) and their types, as well as deep learning mechanisms that help in processing large amounts of unclassified data. Moreover, this paper briefly discusses the classification and clustering approaches in predicative analysis and reviews their abilities to enhance the performance of IoV application systems.

Biography

Lina E. Alatabani Received Her M.Sc. In Data Communications and Network Engineering from The Future University – Sudan in 2015 and B.Sc. In Information Technology from the same university in 2005, she is also a prospect PhD student. Currently working as a Business Development Manager at Safat Aviation Group which a group of complexes with R&D facilities. She also executed majority of projects in the ICT field. Working as a private researcher, she published articles and book chapter in the Artificial Intelligence field. Her area of research includes Machine Learning, Deep Learning, Machine Learning Applications in Secure Network Communications, VSAT, Applications of Artificial Intelligence (AI) Techniques in wireless networks, and Unnamed Aerial Vehicle (UAV) Secure Network Communications, and Internet of Vehicles.

On the Channel Coding in 5G and Beyond Technology for Future Satellite Telecommunication

Ambar Bajpai

Chulalonkorn University, Thailand

Despite being decades old, satellite communication networks have typically relied on specialized hardware and proprietary software. Satellite communications remained out of reach for scenarios involving widespread use due to the limited size and pricey offerings that resulted from this. The ability of smartphones to fully utilise satellite communications is a key component of 5G. This talk underwent a shift in telecommunication as we focused on smartphones, which presented the greatest possibility but also the greatest technical challenge because their compact design precluded the use of MIMO. The R&D of satellite communications capabilities is still driving satellite communications technology in 5G Advanced for both end-user devices and IoT, as seen in 3GPP's most recent 5G Release 17.

In 5G satellite communications, also referred to as "non-terrestrial networks" or NTNs, are made available on smartphones and IoT platforms, true mobile broadband o ver satellites will be possible by going beyond SMS emergency texting capabilities, like the newly announced Snapdragon Satellite. This 5G expansion has the potential to link rural and remote regions, support networks of remote IoT devices, and act as a backup in case of significant terrestrial outages like those caused by natural catastrophes. We cover channel coding requirements in satellite communication for commercial future application in addition with future research leads for forward error correcting codes in application involved for NTN.

Biography

Dr. Ambar Bajpai, SM'IEEE, F'IETE, L'ISTE, is currently working as a research associate professor at Atria Institute of Technology in Bangalore, India. His alma mater are Chulalongkorn University, Thailand (Ph.D. 2016) and Birla Institute of Techn ology and Science, Pilani, India (M. Eng., 2008). Dr. Ambar has more than 15 years of teaching and research experience in various institutions in India and abroad.

Dr. Bajpai also received various scholarships mainly prestigious graduate school scholarships, 90th-year Research Scholarship, GATE, and Overseas academic presentation scholarship during his Ph.D. and M.Eng. His areas of interest are iterative channel coding in 5G and beyond and visible light communication. He has published more than 42 papers in peer-reviewed journals and international conferences including invited talks in India and abroad related to the broad domain of Wireless Communication. He has been volunteering in IEEE Bangalore section as a Branch Counsellor, Founder Secretary in the Information Theory Society Chapter, Treasurer and Exe Com role of various technical society chapters.

Satellite Image Analysis Using Partial Differential Equations
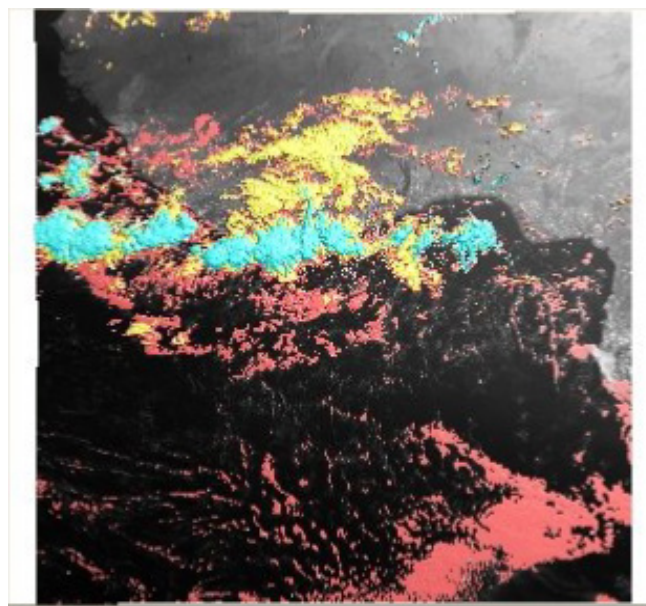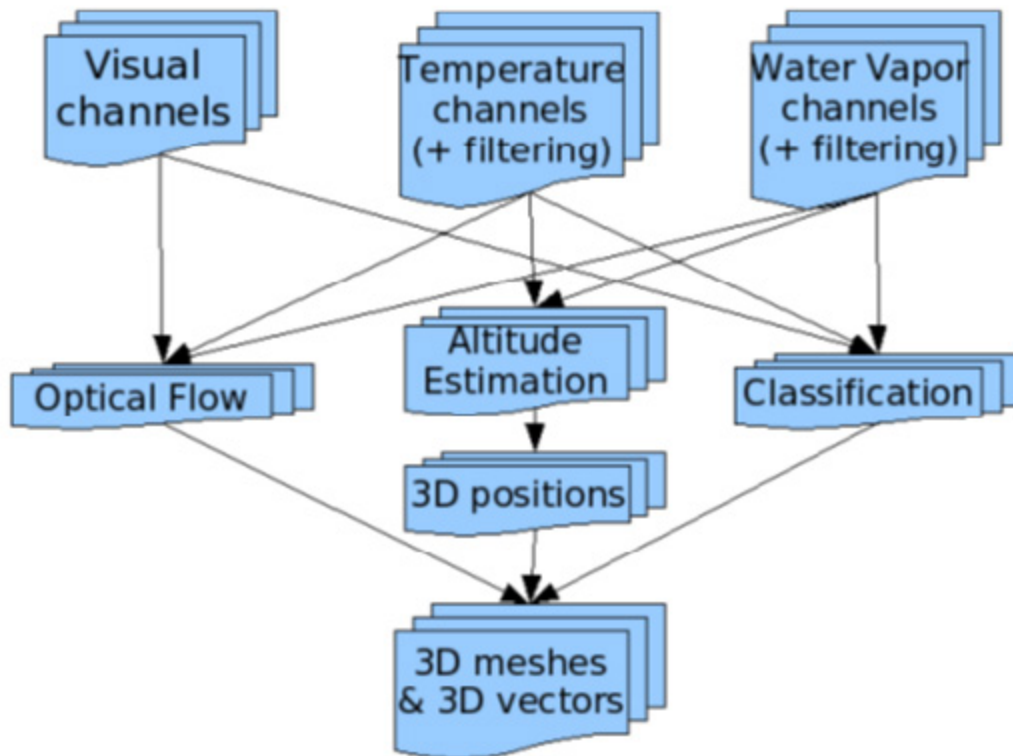
BADR OULGIHT

Mohammed V University, Morocco

EUMETSAT, the European organization, offers satellite image sequences with various channels, such as visible, temperature, and water vapor channels. These channels are utilized together for several essential tasks:

1. 2D Flow Computation: The combination of different channels allows us to calculate the movement and flow patterns of atmospheric elements, such as clouds and winds.

2. Altitude Estimation and Noise Reduction: By analyzing the data from multiple channels, we can estimate the altitude of cloud formations and reduce unwanted interference or noise in the satellite imagery.

3. 3D Position Computation: Leveraging the information from various channels, we can determine the three-dimensional positions of clouds and other atmospheric phenomena. 3D Visualization of Clouds and Vector Flow: The collected data is processed and used to generate three-dimensional visualizations of clouds and vector flows, providing valuable insights into the dynamic behavior of the atmosphere. By utilizing these multichannel satellite image sequences, EUMETSAT enables advanced meteorological analysis and visualization, contributing to a better understanding of weather patterns and atmospheric conditions.

The 2D flow is computed using a partial differential equation in particular fractional Orlicz operator with variable order. It consists in minimizing an energy functional defined as sum of two factors. The data factor assume that the images have similarities at corresponding points, while the regularization factor assume smoothness in the fluid flow, following Nagel and Enkelmann's approach.

The next table illustrates the different tasks and their inputs and the second Figure we have the 3D layer decomposition derived from the EUMETSAT original data. On the right side, you can see the results after applying our noise-reducing filters to both the classification image and the temperature channel. Additionally, we present the estimated flow for highest class of clouds.

3D cloud structure reconstruction

Biography

BADR OULGIHT is a Moroccan mathematician and physicist working primarily on calculus of variations and partial differential equations and their applications in satellite and space.

OUILGIHT received his master's degree from the University of Fez in 2017, and earned his doctorate in 2022 from

the University Mohammed V.

OULGIHT has worked in the theory of fractional elliptic problems, with particular emphasis on the variational theory of singular elliptic equations. In addition, he has given several contributions to the functional analysis theory. Recently, his field of research has become limited between the analysis of satellite image using partial differential equations and minimizing of energy functional (Earth observation imagery).

Fuzzy Correlation Based Algorithm for UAV Image Mosaic Construction

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[2]Centre du Développement des Technologies Avancées (CDTA), Algérie
[3]Université de Sciences et Technologies de Houari Boumedian (USTHB), Laboratoire de Robotique, Parallélisme et Systèmes Embarqués (LRPSE). Algérie

In this article, we propose an efficient method for aerial image mosaicing algorithm. The developed technique is based on including fuzzy logic theory with classical correlation approaches in order to provide sufficient and precise set of matched features that are necessary for finding parameters of the projective transformation model. After testing several image mosaicing algorithm such as SIFT/SURF based algorithm, LBP based algorithm and correlation based algorithm; we have found that the main problem associated with those algorithms is the occurrence of many false associations, for that; different techniques were proposed for selecting the correct matches, as using Random Sample Consensus (RANSAC) approach, but it cannot generally provide efficient results. Therefore; in our work; a robust fuzzy correlation based method was suggested for features matching purpose. We have tested the proposed algorithm on different scenes and we have found that the results maps for famous benchmark, and they are satisfactory in terms of quality and execution time. Effective numerical and visual comparisons; with previous related works showed the efficiency of our proposed technique.

Biography

LATI Abdelhai: received his magister degree in automation from Military Polytechnics School (EMP, ex ENITA), Algiers (Algeria), in 2015, then his doctorate degree in electronics from University of Sciences and Technologies – Houari Boumedian (USTHB),

Algiers (Algeria) in 2019. Since 2019, he is a professor university of Ouargla (Algeria). His research interests include digital image processing and embedded systems.

Cancelable Biometric Security System Based on Advanced Chaotic Maps

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In recent years, the protection of human biometrics has witnessed an exponential growth. Fingerprint recognition has been utilized for cell phone authentication, biometric passports, and airport security. To improve the fingerprint recognition process, different approaches have been proposed. To keep biometrics away from hacking attempts, non-invertible transformations or encryption algorithms have been proposed to provide cancelable biometric templates for biometric protection. This paper presents a scheme that depends on chaos-based image encryption with different chaotic maps. These chaotic maps are used instead of the simple random number generator to overcome the loss of randomness in the case of a large number of images. To preserve the authentication performance, we should convolve the training images with random kernels to build the encrypted biometric templates. We can obtain different templates from the same biometrics by varying the chaotic map used to generate the convolution kernels. A comparative study is introduced between the used chaotic maps to determine the one, which gives the best performance. The simulation experiments reveal that the enhanced Quadratic map 3 achieves the lowest error probability of 3.861% in the cancelable fingerprint recognition system. The cancelable fingerprint recognition system based on this chaotic map achieves the largest probability of detection of 96.139%, with an Equal Error Rate (EER) of 0.593

Biography

Noha Ramadan received a B.Sc. (Honors) in Electronic Engineering in May 2000 (Faculty of Electronic Engineering, Menoufia University, Egypt). In 2007, she received her M.Sc. degree in "Multimedia Implementation over General Packet Radio Service". She is now an assistant professor at the Faculty of Engineering (Ahram Canadian University, Egypt). Her research interests are multimedia over mobile networks, security over wireless networks, and image processing.

Arabic Speech Conversion with Sequence-ToSequence Modeling Based on Electro Larynx Device

Zinah Jaffar Mohammed Ameen[1] and **Abdulkareem Abdulrahman Kadhim[2]**

[1,2]*College of Information Engineering, Al-Nahrain University, Iraq*
[1]*Computer Engineering, University of Technology, Iraq*

Electro Larynx (EL) provides a kind of an acceptable intelligible speech, unfortunately its quality is still a long way from being equivalent to genuine speech. A speech conversion system that is based on sequence-tosequence modelling is proposed in this paper. The system consists of three stages: voice feature extraction from both the source and the target, model training, The final step is to collect the transformed feature sequences into a waveform. Text to speech (TTS) pretraining based transformer model was trained using standard Arabic voice dataset with voice conversion model trained by the prepared Arabic dataset. Parallel WaveGAN (PWG) neural vocoder is used to create a voice waveform from spectral and prosodic information. Test results, covered both subjective and objective tests, revealed that the proposed model worked well in a non-parallel Arabic speech conversion based on EL device.

Biography

Zinah Jaffar Mohammed Ameen received the B.Sc. degree in 2005 in Software Engineering from University of Technology/Baghdad and received her M.Sc. degree in Information Engineering from Al Nahrain University, Baghdad, Iraq in 2011. She has just received her Ph.D. degree in Information and Communication Engineering department, College of Information Eng., Al-Nahrain University. She is a lecturer in Computer Engineering department, University of Technology, Baghdad, Iraq. Her research interests include computer networks, information technology, data mining, and speech processing.

Performance Analysis Of 5G Spectrum Wireless Fixed Links in Arid Regions Considering Dust and Sand Storms

Asma Ali Budalal

College of Electrical and Electronics Technology (CEET), Libya

Millimetre-wave is one of the essential enabling technologies of many outdoor applications that require a high bandwidth transmission channel in 5G networks and beyond. However, atmospheric conditions like dust and sand storms can significantly affect their performance and reduce link reliability. The attenuation caused by dust and sand is one of the significant problems in using terrestrial and space wireless communication. One misconnection can cause considerable damage to outdoor applications such as Vehicle-to-Vehicle applications. However, the accuracy and efficiency of each model are limited to characterize path loss for an environment that is different in terms of weather conditions and geographical arrangement from that for which they have been designed. This paper aims to investigate of the effect of dust and sand storms on the performance of mm-wave links in arid climate regions, such as Libya, where such storms are common. Results show that the attenuation caused by dust and sand depends on the visibility, the particle size of sand, the frequency of the propagating wave, and different humidity levels (0%, 60%, and 100%) on mm-wave links, which have been investigated. The worst weather condition is considered to calculate the attenuation factor in dB/km when the visibility is low, and the particle size of dust and sand is large. The performance (link-level simulation) in spectral efficiency and throughput under dust and sand storm conditions has been evaluated. Additionally, the impact of these storms on the link level has been analysed. Received signal level, path loss, fade margin spectral efficiency, and link throughput have been examined. Finally, a new model of link fade margin is proposed to estimate the effect of dust and sand on (28 GHz) and 5G (60 GHz) Path loss models for the outdoor environment. The results show that dust and sand storms can cause significant signal attenuation, especially at high frequencies, resulting in a higher bit error rate and outage probability. The study concludes that the performance of millimeter-wave links in regions affected by dust and sand storms can be optimized by considering the impact of these storms in the design and operation of the links. It's recommended that utilizing Adaptive modulation and adaptive channel space (AMAC) is a technology that automatically adjusts the working mode based on channel quality to mitigate the impact of dust and sand.

Biography

Dr. Asma Ali Budalal received a B.Sc degree in electrical and electronics engineering from the Faculty of Engineering, University of Benghazi, Libya, in 1999. An M.Sc. degree in Electrical and Computer Engineering (telecommunications) from International Islamic University Malaysia, and completed a Ph.D. in communication Engineering - Doctor of Philosophy, in the field of communication & Computer Engineering, specifically in Wireless Communication Systems, from the Department of, Electronic, Computer Engineering, Faculty of Engineering from the International Islamic

University Malaysia IIUM. She works as a head of telecommunications and technology at the College of Electrical & Electronics Technology – Benghazi. Libya, she has published several scientific research Journals and conference papers. She is a very active reviewer in Q1 Journals on antenna and wireless propagation. Her research interests include RF propagation, Millimetre-wave propagation for 5G and beyond, wireless channel conditions and modeling, radio link design, RF propagation measurement, and the link level and system-level key performance indicators.)

Fairness And Applications'Transport Protocol Aware Frame Aggregation Using Programmable Wlans

Anil Kumar Rangisetti[1], Rishabh Dwivedi[2] and Sudhakar Modem[3]

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[3]Department of Electrical Engineering, Indian Institute of Technology Jammu, India

Internet of Things (IoT) is emerging as a prominent technology, and a broad range of IoT applications are deployed using advanced Wi-Fi technologies like 802.11n, ac, and ax. Wi-Fi technologies with the support of frame aggregation techniques are highly useful for throughput hungry applications such as e-education, and e-conference to improve wireless channel utilization, and throughput of Wi-Fi stations (STAs). In existing works by considering mobility, and channel conditions, various frame aggregation schemes were investigated at STA level for finding optimal aggregation size. But, the local frame aggregation schemes could lead to unfairness issues among STAs with poor signal strength. Moreover, IoT applications such as e-education, e-conferences can be implemented using either Transmission Control Protocol (TCP) or User Datagram Protocol (UDP).

Hence, enabling frame aggregation in Wi-Fi networks can lead to poor throughput, and fairness issues for TCP STAs from UDP STAs transmitting at higher rates due to lack of flow control and congestion control. Having enterprise Wireless Local Area Networks (WLANs) with programmable Access Points (Pro-APs), it is possible to control fairness issues using global knowledge of connected STAs, and their channel, and traffic details. In this work, we investigate major reasons for fairness issues, and propose a Fairness and Applications' transport protocol aware Frame Aggregation (FAFA) scheme using Pro-APs. In our work, we design and implement the FAFA scheme at Pro-AP to solve fairness issues among STAs connected to it. The FAFA scheme is evaluated against existing schemes using extensive simulations with the Network Simulator-3 (NS-3). In various test scenarios, the results corroborate that the proposed FAFA is able to maintain Jain's Fairness Index (JFI) around 0.9 for STAs in the network, whereas existing works are able to maintain JFI 0.3 to 0.7 only in terms of throughput, delay, and jitter.

Biography

Dr Anil Kumar Rangisetti received his PhD in the field of computer science and engineering from IIT Hyderabad. He has nearly 10 years of teaching and research experience in computer science and engineering. Currently he is working as Assistant Professor in the Department of CSE, IIITDM Kurnool. During his career, he worked at prestigious Indian institutions such as IIIT Dharwad, SRM-AP, and GMR, and worked at MNC such as ARICENT, IRL-Delhi.

Broadly his research interests include Wi-Fi, 4G, 5G, SDN, NFV, and edge computing. He published a number of novel research publications with IEEE, Springer, Elsevier, Wiley in the field of a variety of networking technologies such as LTE, SDN and NFV, Wi-Fi technologies. He authored a book titled "Advanced Network Simulations Simplified" with Packt publishers.

Besides research activities, he is interested in writing and reviewing books on Advanced Networking Technologies, Cloud computing, Network Simulations, and Programming languages.

Adaptive Analytical Fault Estimation and Fault Tolerant Control of Quadrotor in The Presence of Uncertainty and Disturbance

Arman Mohammadi[1] and **Amin Ramezani[2]**

[1]*Tarbiat Modares University, Iran*

Nowadays, with the advancement of technology and the increasing use of the machine for daily tasks, the optimal use of these devices is of paramount importance. One of the main issues in control and navigation of quadrotors is handling the affected faults by fault tolerant control (FTC) methods. In this paper an adaptive analytical method is proposed in order to estimate the actuator fault of quadrotor in the presence of model uncertainties and external disturbances. In fact, the adaptive analytical redundancy relations (AARR) is employed to detect, estimate and tolerate the faults affected the quadrotor system by updating the control inputs using appropriate adaptation law. In addition, it will be shown that the proposed control strategy has robustness against the uncertainties and external disturbances. By using this analytical method, there is no need to use observer in order to fault diagnosis. Simulation results prove that the proposed FTC methods can maintain the system in a good trajectory tracking situation in faulty conditions.

Biography

Arman Mohammadi received his MSc and BSc degrees in Control engineering in 2017 and 2013 from Tarbiat Modares University, Tehran, Iran and University of Tabriz, Tabriz, Iran respectively. His main research interests include Navigation and Control of Unmanned Aerial Vehicles, Fault Detection and Tolerant Control, Model Predictive Control, Learning Based Control Systems, Adaptive and Robust Control, Optimization and System Identification. He has published numerous papers in these fields especially about the control strategies for designing a fault tolerant control of quadrotors. Also, he has useful experiences in working at industrial sites in the field of power grids, SCADA systems and water-supply networks.

The Importance of Natural Indigo Dye and Its Revitalization and Ethiopian Potential for Indigo Growing

Abera Kechi Kabish[1], Molla Tadesse Abate[1], Zelalem Adane Alemar[1] and **Solomon Girmay[2]**

[1]Ethiopian Institute of Textile and Fashion Technology, Bahir Dar University, Ethiopia
[2]College Agriculture and Environmental Science, Bahir Dar University, Ethiopia

The current rise in environmental sustainability and health risks awareness is the driving force behind the search for alternative environmentally friendly materials and production methods. As a result, manufacturing processes that are environmentally friendly and safe for human health are a global concern. The overuse of part of harmful synthetic dyes in the production of textiles and clothing causes environmental pollution and health risks in the areas where they are used. As a result, in recent years, academics and development catalysts have begun to explore alternatives to part of toxic synthetic dyes that are harmful to the environment. Due to its inherited dyeing characteristic, natural indigo dye from the indigo plant is chosen as well as synthetic indigo dye in this context. Natural indigo dye allows for environmentally responsible dyeing without the use of mordants while yet achieving fastness qualities that are appropriate for use in commerce. The global demand for blue jeans, particularly those that are naturally indigo blue, has increased the use of indigo dye. Additionally, natural indigo dye is in demand right now for several applications, including functional textile finishing, cosmetics and food coloring, UV protection and deodorizing agents, and others. Natural indigo has generally become a significant cash crop due to its rising demand and variety of uses, and it is sold on the international market from 35 to 40 USD per kilogram based on its purity level. As a result, indigo dye has gained more uses than it did before synthetic colorants were developed. A possibility with interwoven economic and social advantages is presented by the resurgence of indigo for developing countries. Ethiopia, a growing nation in tropical Africa, stands to gain from the rebirth of indigo due to its favorable climate, young labor force, large land resources, and flourishing textile and garment industries.

Biography

Associate Professor of Textile Chemistry at Bahir Dar University at Ethiopia's Ethiopian Institute of Textile Fashion Technology. Working in University as a teacher and researcher, as well as one of the founder of and the president of the Ethiopian Textile and Apparel Professional Association.

Achieved with more than 30 publications of scientific research papers at highly regarded international journals. Furthermore, two academic books have been published. Keynote addresses at numerous nearby institutions. Having held the posts of dean, associate vice president, and scientific director for more than 10 years, with extensive expertise in university leadership. The primary interests are in research and academic pursuits, and I continuing lifelong learning. Married and the parent of two daughters and two sons. Highly excited about projects that generate jobs and use green manufacturing processes and continually working in this regard.

Production Practice, Microbial Quality and Consumer Acceptability Test of Traditionally Produced Butter in North Shoa Zone, Oromia Regional State, Ethiopia

Asrat Diriba[1], Mitiku Eshetu[2] and **Yonas Hailu[2]**
[1]Department of Animal Sciences, College of Agriculture and Natural Resource, Dilla University, Ethiopia
[2]School of Animal and Range Sciences, Haramaya University, Ethiopia

The study evaluate the production practices and microbial quality of traditionally produced butter. The result of the study revealed that the educational status of households in the study area was 53.3% illiterate, 33.9% in elementary school, and 12.8% in high school. Butter was taken to market by packing with plant leaves (30.6%), plastic sheet (11.1%), or plant and plastic sheet alternatively (58.3%). About 12.2% of the farmers do not treat the water. The practise of treating underground water with chlorine accounts for 82.9%. A total of 180 respondents were randomly selected for the survey from six purposefully selected kebeles in the Wachale district. A total of 34 butter samples (thirty from three open markets, equally ten from each, two butter samples from cooperatives, and two laboratory made butter samples) were collected and analyzed. The aerobic mesophilic bacteria count was significantly ($P < 0.05$) higher (6.48 log cfu/g) in butter samples from Muke Turi than Wabari (6.36 log cfu/g). The coliform count was significantly ($P < 0.05$) lower in laboratory made butter (2.96 log cfu/g) than others. The Escherichia coli count was significantly ($P < 0.05$) higher in butter sample collected from Muke Turi (3.46 log cfu/g) than Wabari (3.29 log cfu/g). Staphylococcus aureus was significantly ($P < 0.05$) higher in Gimbichu butter (5.46 log cfu/g) samples. Listeria monocytogenes was significantly ($P < 0.05$) higher in Gimbichu butter, whereas no count of this colony was found in the cooperative and prototype butter samples. The color and aroma of butter made in laboratory have a significantly ($P < 0.05$) higher score than butter collected from open market. The microbial qualities of butter from three open markets except Gimbichu were substandard. The butter sample from the prototype was relatively compliant with the microbial quality standard, an indication of possibilities for improvement.

One figure and one table can be included in your results and discussions.
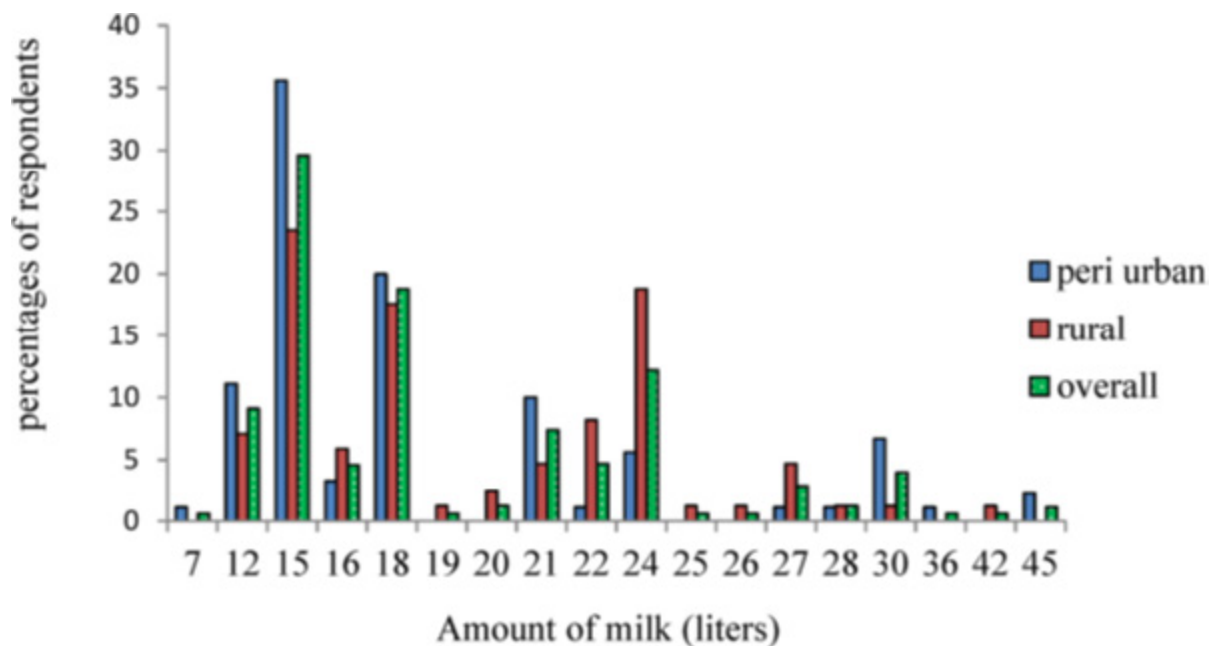
Fig. Amount of milk required for producing one Kg of butter.

Table. Consumer acceptability of butter made under different condition

Sample Source	Parameter			
	Color	Smell/Aroma	Texture	Overall Acceptability
Muke Turi	5.25 ± 0.17^c	5.38 ± 0.13^c	4.93 ± 0.09^b	5.01 ± 0.16^c
Wabari	5.34 ± 0.184^c	5.35 ± 0.140^c	4.89 ± 0.16^b	5.04 ± 0.14^{bc}
Gimbichu	5.44 ± 0.15^{bc}	5.44 ± 0.10^c	4.98 ± 0.16^b	5.03 ± 0.14^{bc}
Cooperative	5.75 ± 0.35^{ab}	5.70 ± 0.28^b	5.50 ± 0.35^a	5.40 ± 0.57^a
Control	6.05 ± 0.50^a	6.00 ± 0.28^a	5.65 ± 0.35^a	5.35 ± 0.28^{ab}
CV (%)	3.94	2.74	3.5	4.14

Values in the table are mean ± standard deviation (STDV) of acceptability score for each attribute (N=34). Means in each column bearing similar superscripts are not significantly different (P>0.05).

Biography

I was born on March 20, 1980, in North Shoa Zone, Oromia National Regional State, from my father, Diriba Asfaw, and my mother, Atseda Gemeda. As I reached the age of education, I attended primary School at Adare Gordoma, secondary and preparatory school at Muke Turi, and preparatory School at Muke Turi Regasa Woyesa preparatory school in 2007. Then, I joined Arba Minch University in 2008 and received my BSc degree in Animal Sciences in July 2010. Soon after my graduation, I was recruited by Wachale Karl TVET Institute as an instructor of Dairy Cattle Occupation (from 2011–2014) and then by Dilla University to serve as an assistant lecturer from 2014 until I joined the Postgraduate Programme of Haramaya University in September 2016 to pursue my M.Sc. study in Animal Production. After my graduation from Haramaya University, I am currently working as a lecturer and researcher at Dilla University.

Towards Ethno-Political Advocacy: Ethiopian Journalists' Professional Role Perceptions in Post- EPRDF Interregnum

Behailu Atinafu Dessie

Department of Journalism and Communication, Debre Tabor University, Ethiopia

The study aims at investigating the interplay between the ethnic identity politics and journalists' role perceptions in contemporary Ethiopian media landscape. Professional roles are a key topic in journalism research along with the fundamental elements in defining journalism as a profession because they suggest and provide insights about the environment surrounding the journalists. Based on the analytical model of journalism culture and social identity theory (SIT), the article draws on qualitative interviews of journalists from the perspective of six media channels along with media and communication scholars to argue that the country's ethno-political context shapes the media environment, which in turn influences how journalists perceive their roles. Accordingly, promoting ethno-centric identity and culture, becoming guardians and advocates for ethnic communities, mainstreaming the regional politics and hegemony, and considering themselves as struggle activators and change agents were found to be the most remarkable institutional role perceptions of journalism in the current Ethiopian media system.

Biography

Behailu Atinafu was born in Bahir Dar, Ethiopia in 1984. He completed all his pre-college classes in different schools in Bahir Dar before joining Bahir Dar University to study English language and literature at the undergraduate level. After completing his undergraduate studies, Behailu pursued a Master's degree in Teaching English as a Foreign Language (TEFL). He later went on to earn a Ph.D. degree in Media and Communication.

Behailu has been teaching at various higher education institutions for many years and is currently an assistant professor at Debre Tabor University. He has also served as the dean of the College of Social Science and Humanities at the same university.

Behailu has published five research articles in reputable journals, showcasing his expertise in academic and research writing. His area of interest lies in media and politics, political communication, media literacy, media and society, and the political economy of media.

Behailu's desired career path is focused on research and development, public relations, and the media industry. His expertise in academic writing and research makes him an instrumental figure in his field.

PEERS ALLEY
M E D I A

Study On Feasibility of Rainwater Harvesting Using MAR Model in Drought-Prone Barind Tract, Bangladesh Using RS-GIS Approach

C. S. Jahan[1], M. A. Hossain[1], R. Holader[1], Q. H. Mazumder[1] and **M. F. Rahaman[2]**

[1]*Department of Geology & Mining, University of Rajshahi, Bangladesh*
[2]*Institute of Environmental Science, University of Rajshahi, Bangladesh*

The Barind Tract, northwest Bangladesh is facing challenges from scarcity of rainfall, topographic barrier for conservation of rain/runoff water, low groundwater recharge due to thick top clay soil layer of low infiltration capacity, constrain in groundwater development etc. The drainage pattern indicates scope of loss of major amount of runoff water with less natural infiltration capacity of surface soil to recharge suggesting constrain in availability of groundwater. The recharged groundwater eventually discharged into surrounding rivers basins from the Tract in generally in both dry and monsoon seasons. Moreover, the unsustainable water management practice consequences the rapid declination of groundwater tables in last few decades making the system is close to unbalance condition. Unfortunately, no proper assessment of the sustainable groundwater resource have yet made. Here water balance study is definitely a challenging task, and the rainwater harvesting with artificial recharge of groundwater resources using Managed Aquifer Recharge (MAR) model - a viable solution has considered to revert the ongoing depletion of resources and to restore water balance. In this context, potentiality for MAR model has studied using integrated approach of RS and GIS tool to have time saving and cost-effective results. The Tract has MAR model application potentiality of 20% area with 'high suitability'; and 66% of 'moderate suitability'. Here, groundwater resource used for irrigation equals to 24% of the annual precipitation, but only 8.5% of the precipitation infiltrated to recharge groundwater naturally, and rest 68% of rain/runoff water has scope to infiltration/injection naturally/artificially to revert balanced condition. Here, cost of recharging is about US$ 0.18/m3, and is solution for communities especially economically marginalized and unprivileged peoples facing hardship for drinking and agricultural water. Finally, the present study provides a guideline to water managers and decision makers to ascertain availability of water resource.

Biography

Professor Dr. Chowdhury Sarwar Jahan started his career as lecturer in the Department of Geology and Mining, University of Rajshahi in 1984. Obtained PhD in Hydrogeology from the Moscow State Geological Prospecting University, Russia. Professor Dr. Chowdhury Sarwar Jahan was the Pro-Vice Chancellor, (2013-2017) and Dean, Faculty of Life and Earth Science (2012-2013) of University of Rajshahi.

Prof. Jahan has made significant contribution as Chair/Members/Expert in various, policy, strategic plan, technical committee etc. of Govt. of Bangladesh and international organizations. Prof. Jahan is being engaged with many social organizations like Bangladesh Red Crescent/Cross Society, Rotary Club of Rotary International etc.

Prof. Jahan has more than 70 research papers/books in international arenas; delivered invited lectures/ key notes on climate change, water resource management and water governance etc.; attended international conferences and visited USA, UK, India, Iran, Italy, Spain, Nepal, Turkey, Thailand, Pakistan, Sri Lanka, Japan, United Arab Emirates (UAE), Oman, Russia, Brazil in connection of symposium and conferences.

Turbo and LDPC codes for satellite communication

Deepak Mishra

Demand for transmission using short block length messages has been increased recently in applications including satellite communication, mobile communication, wireless sensor networks, and machine type communications. Unacceptable performance degradation associated with the short block length Turbo codes restricted its use for applications requiring communication with short block length codewords. A novel performance improved reliability-based decoding algorithm for short block length Turbo codes has been formulated and proposed by the authors. The proposed algorithm has a coding gain of 2.45 dB at a BER of $10{-}3$ over AWGN channel with BPSK modulation for a code rate of ¼. The algorithm has a channel adaptive complexity and has shown nearly 82%reduction in the decoding time complexity for the rate ¼ Turbo code at 3 dB SNR. As an extension of this earlier work, a detailed performance analysis of the algorithm on different Turbo codes has been carried out. A four-state Turbo encoder has been used to bring out the key aspects of the level-based algorithm which is driven by reliability as the key parameter. The formulated algorithm has been applied to different Turbo encoder structures namely 3GPP LTE and CCSDS Turbo codes and a detailed analysis has been carried out in this paper. Simulation results show a significant improvement in the error correction performance of short block length Turbo codes. The algorithm also leads to a marked improvement in time complexity at high SNRs. The algorithm is an attractive solution for applications requiring communication with short block lengths.
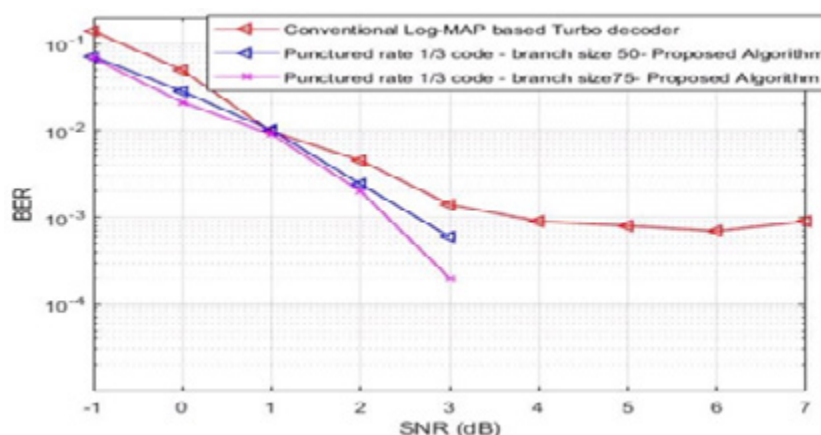
Figure 1: Performance of the conventional Log-MAP-based turbo decoder and the proposed turbo decoding algorithm for a rate 1/3punctured code with retained branch size of 50 and 75

Low-density parity-check (LDPC) codes [1] are a class of modern channel coding, because of the advantages of approaching the Shannon capacity and the iterative decoding algorithms with lower complexity. LDPC codes have been attracting great interests even in the field of satellite navigation systems. In GPS modernization, LDPC code is used in L1C signal to enhance the receivers' performance in weak signal environments. India is also planning to transmit civilian signal in L1 Band. There are various design approaches of LDPC codes being considered. Quasi-Cyclic LDPC code is found to be an ideal candidate for smaller frame length signal structure in satellite navigation system [2]. Recently Quasi-cyclic (QC) LDPC codes is also adapted in 5G communications, it is chosen as the standard codes for 5G enhanced mobile broadband (eMBB) data channel [3].

This paper proposes a constructing algorithm for Quasi-Cyclic LDPC code which is suitable for proposed NavIC L1 Band signal, it avoids the existence of short cycle with the length of 4 in the Tanner graph from the beginning, by limiting the cross-correlation values of sparse sequences. Since the parity- check matrix of a QC-LDPC code consists of circulant permutation matrices or the zero matrix, the required memory for storing it can be significantly reduced, as compared with randomly constructed LDPC codes [4]. Using dual-diagonal structure, the parity-check matrix can be directly used to encode hence there is no need to calculate generator matrix.

We have simulated the bit error ratio (BER) performance of LDPC code used by GPS L1C signal frame structure2 (600 bits) and signal frame structure3 (274 bits) [5], the channel is assumed to be AWGN and LMS. QPSK

modulation is used as modulator and demodulator, where QPSK demodulator provides 3 bits soft LLR (log- likelihood ratio) output. The maximum iteration times is set to 50 for each decoding process. The LDPC Decoder block uses the belief propagation algorithm to decode the data. The input to the decoder block is the soft- decision output (log-likelihood ratio of received bits) from demodulation. The block decodes generic binary LDPC codes where no patterns in the parity-check matrix are assumed. In order to evaluate the performance and power of LDPC codes, ½ convolutional code used in GALLIEO L1 band and uncoded performance of QPSK modulation is also simulated. A comparative simulation is performed with respect to GPS LDPC polynomial in the identical simulation environment. Figure 2 and Figure 3 shows the comparative performance results of new proposed Quasi cyclic LDPC code with respect to GPS L1C LDPC codec for subframe 2 &3 respectively. Using 802.11n protocol as a reference, parity-check part is double diagonal, which makes the encoding process possible directly with parity-check matrix. Simulation results shows that Quasi-cyclic (QC) LDPC code performs slightly better than what GPS L1C LDPC codes, lower encoding and decoding complexity makes it more suitable for NavIC L1 Band signal.
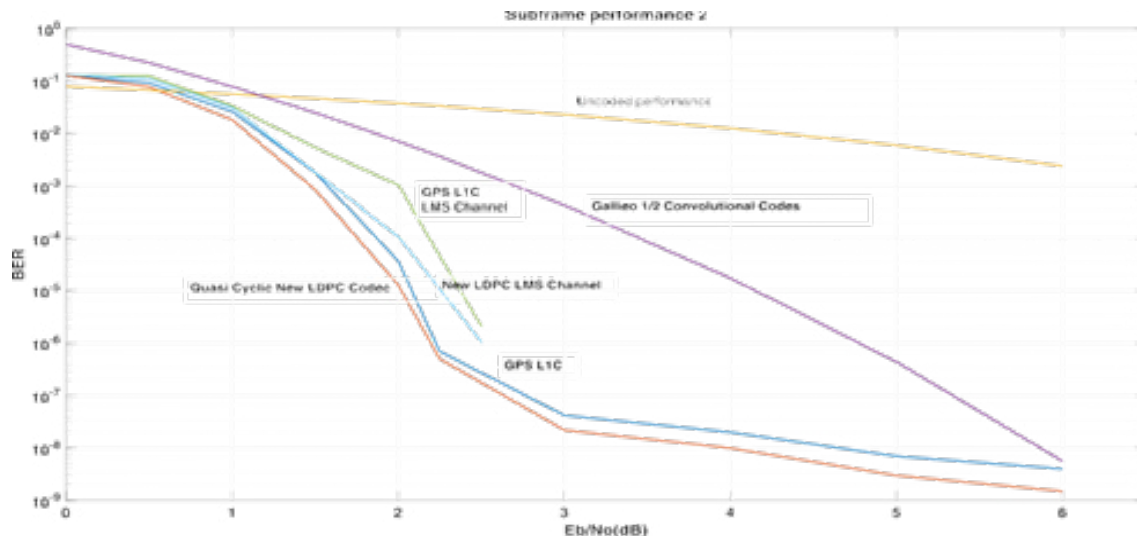
Fig. 2: BER performance comparison of proposed QC-LDPC codes, GPS L1C LDPC codes, Gallieo ½ convolutional codes for subframe 2 (600 Bits)
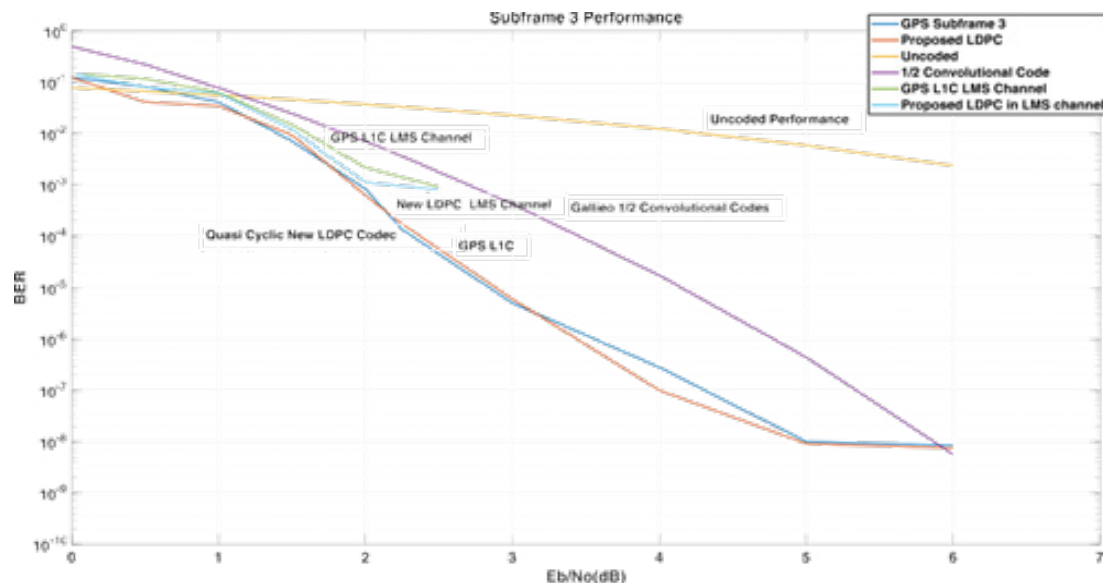
Fig. 3: BER performance comparison of proposed QC-LDPC codes, GPS L1C LDPC codes, Gallieo ½ convolutional codes for subframe 3 (274 Bits)

Biography

Dr. Deepak Mishra is Scientist/Engineer-SG and Head of Navigation Payload Electronics Division at Space Applications Centre (SAC), Indian Space Research Organization (ISRO), Ahmedabad, India. He has received Ph.D. degree from Indian Institute of Technology (IIT), Banaras Hindu University (BHU) on the topic "Joint Source Channel Coding for Deep Space Application", in the year 2012. He received his M.Tech degree in Communications Systems Engineering from Department of Electronics Engineering, IIT, B.H.U. in 2003 and B.E degree in Electronics and Communication from the Govt. G.B.Pant. Engineering College, Uttarakhand, India in 2001. He is associated with SAC, ISRO since the year 2003. During this tenure, He has been involved in various subsystems development of various ISRO projects. Currently, he is involved in design and development of payload for navigation systems, Technology demonstration payload (TDS-01) and communication module for Gaganyaan project.

He has more than 45 papers in various international journals and conferences. He has also delivered invited talk in International Conference at Tokyo University, Japan in 2016. He has 4 patents and two copyright and one technology transfer to his credit. He is the focal person for signal processing module of post graduate course of United Nation Satcom course and faculty member in the navigation systems course. He is approved PhD co-guide at Nirma University, Ahmedabad. The brief academic profile is mention below.

Design Constrains in three Configurations of UCAs for Distortion Free Orbital Angular Momentum Modes Generation

Deepak Yadav[1], Madhur Deo Upadhayay[2] and **Jitendra Prajapati[3]**

Shiv Nadar [Institution of Eminence Deemed to be University], India

In this article, three different configurations of the uniform circular array (UCA), i.e., unidirectional element array, radial array and tangential array of 4.5GHz half-wave dipole antennas at different array radii and for the different number of elements are demonstrated as shown in Fig. 1. The minimum radius of UCA for three configurations is presented first time from the aspect of practical design.
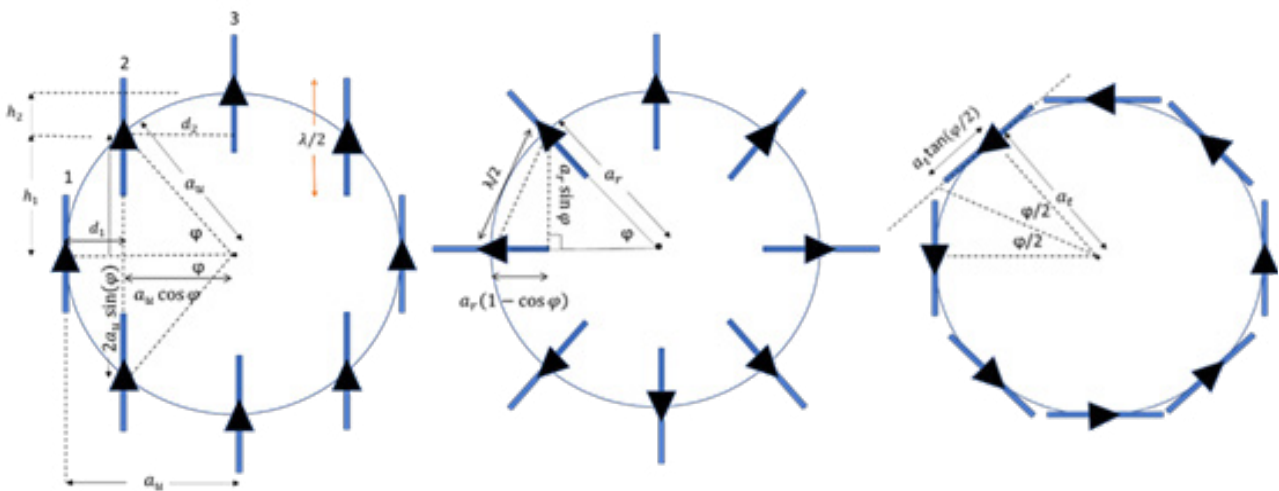

Fig. 1. UCA configuration in x-y plane (a) unidirectional (b) radial (c) tangential

An extensive analysis on the generation of different OAM modes using three configurations is presented. This results as major findings: first, generation of the higher order OAM modes (3,4,5...) with small radius of UCA is not possible even if the number of elements are higher (8,12…) and second, the generation of the lower order OAM modes (1,2) with large radius of UCA is not possible even the number of elements are lesser (3,4,6) as shown in Table 1. Also, the minimum radius required and an optimal range of controlling factor (a/l) for the generation of distortion free OAM modes using three configurations of UCA is presented.

Table 1. *OAM modes generation status for N=12 elements in three UCA configurations*

Configuration	Mode No. (l)	λ/4	2λ/4	3λ/4	4λ/4	5λ/4	6λ/4	7λ/4	8λ/4
Unidirectional element array	1	A.N.P	G	G	G(D)	N.G	N.G	N.G	N.G
	2	A.N.P	G	G	G	G	G(D)	G(D).	N.G
	3	A.N.P	N.G	G(D)	G	G	G(D)	G(D)	G(D)
	4	A.N.P	N.G	N.G	G(D)	G	G	G	G
	5	A.N.P	N.G	N.G	G(D)	G	G	G	G
	6	A.N.P	N.G	N.G	N.G	N.G	G(D)	G(D)	G(D)
Radial Array	1	A.N.P	G	G	G(D)	N.G	N.G	N.G	N.G
	2	A.N.P	G	G	G	G	G(D)	N.G	N.G
	3	A.N.P	G	G	G	G	G	G	G(D)
	4	A.N.P	G(D)	G	G	G	G	G	G
	5	A.N.P	N.G	G(D)	G(D)	G	G(D)	G	G
	6	A.N.P	N.G	N.G	N.G	N.G	N.G	N.G	N.G
Tangential Array	1	A.N.P	A.N.P	A.N.P	G(D)	N.G	N.G	N.G	N.G
	2	A.N.P	A.N.P	A.N.P	G(D)	G	G(D)	N.G	N.G
	3	A.N.P	A.N.P	A.N.P	G	G	G	G	G
	4	A.N.P	A.N.P	A.N.P	G	G	G	G	G
	5	A.N.P	A.N.P	A.N.P	G(D)	G	G	G	G
	6	A.N.P	A.N.P	A.N.P	N.G	G(D)	G(D)	G(D)	N.G

* N.G stand for Not Generated
* G stand for Generated
*G(D) stand for Generated with distortion
* A.N.P stand for Array Not Possible

Biography

Deepak Yadav was born in Bareilly, Uttar Pradesh, India in 1986. He is Ph.D. scholar at Electrical Engineering Department, Shiv Nadar University, India. He received Bachelor of Technology degree in electronics & communication engineering from Uttar Pradesh Technical University, Lucknow, Uttar Pradesh, India, in 2008 and Master of Technology degree in digital communication from Uttarakhand Technical University, Dehradun, Uttarakhand, India, in 2014.

He has worked as Assistant Professor at SRMS Engineering College, Bareilly, India from 2014 to 2020. He has published 5 papers in IEEE conferences and one article in AEU - International Journal of Electronics and Communications. His current research interests include Orbital Angular Momentum (OAM) antennas, OAM mode generation, Terahertz antenna, Phased networks and Power Dividers.

Recent Advancements in Machine Learning -Distributed Learning and Federated Learning

Vijayakumar Ponnusamy
ECE Department, SRM IST, India

Massive data training, secrecy and data privacy management are the most significant issues in machine learning/deep learning application development. Various distributed and federated learning (FL) approaches/algorithms with recent advancements and use cases are presented to address this issue.

Outline of the Presentation

- Overview of AI
- Centralized Training
- Distributed Learning and use cases
- Federated Learning and use cases

Biography

Dr Vijayakumar Ponnusamy has completed his PhD from SRM IST (2018) in applied machine learning in wireless communication(cognitive radio), Master's in Applied Electronic from the College of Engineering, Guindy(2006), and B.E(ECE) from Madras University (2000). He is a Certified "IoT specialist" and "Data scientist. ". He received the NI India Academic Award for excellence in research (2015). His current research interests are Machine and Deep learning, IoT-based intelligent system design, Blockchain technology, and cognitive radio networks. He is a senior member of IEEE. He works as Professor in the ECE Department, SRM IST, Chennai, Tamil Nadu, and India.

Bioinspired Optimization and Its Need in Satellite Image Analysis

Anju Asokan

Assistant Professor, Department of Computer and Communication Engineering, Sri Eshwar College of Engineering, India

Satellite image acquisition and analysis is improving on a daily basis. The amount of spatial content in the image is excessive and capturing this extensive detail is difficult and time consuming.It is necessary to work on a large volume of satellite data to clearly analyze the spatial information in the image. The parametric values in each image keeps changing from image to image and manually assigning these values to each satellite image is difficult and time consuming. This facilitates the need for optimization algorithm to automatically tune the parameters in the image. The main advantage of utilizing nature inspired algorithms for optimization is its possibility to arrive at the best solution within less time and less number of iterations. The limited performance of the traditional filter and increased complexity of images have led to the need to develop certain advanced techniques to boost the effects of the traditional filter. This has paved way for the need to combine the concepts of traditional filter with optimization algorithms. The main focus was on adaptive step size calculation to ensure that the entire space is covered in lesser number of steps consuming lesser amount of time. The aim was to chose an optimization algorithm such that a faster convergence to the optimum solution is reached with minimum effort. The adaptable nature of the step size calculation makes it easier to cover the entire search space within a minimum amount of time thereby enabling faster convergence of the algorithm. Manta ray foraging optimization is adopted for modifying the control parameters in the filter to account for the inadequacy of the algorithm in balancing the local and global search. A self adaptable Manta ray optimization is proposed, which is shown to outperform the traditional enhancement techniques such as Bilateral filter and Gabor filter optimized with traditional algorithms

Biography

Dr.Anju Asokan, PhD currently working as the Assistant Professor in the Department of Electronics and Communication Engineering at Sri Eshwar College of Engineering , Coimbatore, Tamilnadu, India. She received her doctoral degree from Karunya Institute of Technology and Sciences, Tamil Nadu. She completed her Masters in Electronics and Communication Engineering from Amrita School of Engineering, Coimbatore. Her research interests include VLSI design, Image and signal processing with application in satellite image analysis. She has published papers in renowned journals ,conferences and book chapters and authored various books. She is also editor and reviewer of various journals and programme committee member in various conferences. She also has more than 10 patents to her credit. She received the "Best Young Researcher award 2021" awarded by IJMTST registered under MSME and outstanding paper award awarded by Novel Research Academy.

Investigating The Role of Different Magnetic Parameters of Barkhausen Noise on Hardness Measurement Using Artificial Intelligence Technique

A. Srivastava

Presidency University, India

The present investigation focuses on the prediction of the hardness of the cold rolled low carbon steel (IS2062) subjected to reduction ratios between 10 to 50 %. Microstructural characterization was performed for each cold-rolled sample using optical microscopy and hardness is measured using a microhardness tester. Different machine learning models such as support vector regression, Random Forest, Xtreme gradient boosting and Gaussian process regression is used to develop the regression model. The different magnetic parameter such as root mean square value and peak value of Barkhausen noise and coercivity, remanence and average permeability derived from the hysteresis loop is used as the input parameters in the prediction modelling of hardness. Further, the relative importance of different magnetic parameters towards hardness measurement is determined. Also, the performance of the model is evaluated in terms of root mean square error and correlation coefficient. It was observed that among others random forest and Xtreme gradient boosting models predict the hardness with better accuracy. Average permeability and Remanence is found to be a more important magnetic parameter in the hardness measurement. The present work can help in further improving the capability of Barkhausen noise in the hardness measurement of material.

Biography

Ashish Srivastava received his PhD from Indian Institute of Technology (BHU) Varanasi, India. He has published many papers in various refereed international and national journals, and conference proceedings. He is currently working as an Assistant Professor in Mechanical Engineering Department at the Presidency University, Bangalore, Karnataka, India. His areas of research interest include Machining, Friction-stir welding and Processing, non-conventional machining processes, characterization using magnetic Barkhausen noise technique, Machine learning application. He is the reviewer of many refereed international journals of repute.

Satellite Communication in Climate Change and Weather Monitoring

Uthayakumar G S

St. Joseph's Institute of Technology, India

Satellite communication uses to create any communication link that involves the use of a artificial satellite in its propagation path. The communication link using satellite plays a vital role in modern life style all over the world. Two thousand artificial satellites are in use. They can be found in the earth orbits, elliptical and low earth orbits for point-to-point communication, mobile communications and the distribution of television and radio programs around the world. The following frequency ranges are used Ultra High Frequency(UHF), Super High frequency and radio signals propagating to and from a satellite in the earth orbit. In a vacuum radio signals propagate at the speed of light, but in the presence of plasma in the ionosphere, the signals are affected by the group delay and phase advance and attenuation due to absorption and scintillation. The atmospheric effect on the signal is frequency dependent and to a first approximation to the amount of structure in the plasma present along the propagation path. Due to ionosphere conditions Space weather will be varying continuously. The effects of space weather on propagation can be mitigated through engineering design solutions. There is a strong interplay between climate change, human activities and the state of natural resources. To demonstrate this, three complementing "case studies" have been conducted on fresh water management, marine resources and maritime transport. The number of people living in areas affected by severe water stress is expected to increase by another 1 billion to over 3.9 billion. Paradoxically, a significant by product of climate change is the rapid melting of polar ice caps, which had introduced the possibility of exploiting rich oil and gas deposits in previously inaccessible seabed (e.g. Arctic). In parallel, climate change impacts, such as melting ice sheets and likely increases in extreme weather events (e.g. hurricanes) are affecting ever more shipping routes and maritime traffic.

Biography

I am basically an Electronics and Communication Engineer with M.B.A(Marketing) and M.E.(Medical Electronics) and completed Ph.D in College of Engineering, Anna University. I have completed Master of Social work(M.S.W) through IGNOU, New Delhi. I have 31 years of experience in various fields in IT over 12 years of design and development experience and in teaching I have 20 years of experience. I have published more than 30 international journal papers and presented papers at various international and national level conferences

in different engineering colleges. I have initiated various IEEE technical student branch chapters such as Communication Society, Antenna and Propagation Society, Industrial Electronics Society, Engineering in Medicine and Biology Society, Broadcast Technology Society, Computer Society, Computational Intelligence Society and Control Systems Society in our college.

Effect Of Wind on Plant

Makenne Yemeli Lola, Kengne Romanic and
Pelap François Beceau

Department of Physics, Faculty of Sciences, University of Dschang, Cameroon

New complex features of a pinus family plant subjected to wind load by proposing an analog electronic simulator with an active RC realization that mimics the real-time dynamics of the system was examined. Findings reveal that the periodic or chaotic dynamics of the system depend on the favored initial conditions. We observe the dynamical behavior of the plant showing transition from periodic to chaotic states. This is very beneficial because it allows observing that when the value of the wind amplitude ratio changes continuously, the plant behavior may change in a discontinuous way. It also helps to understand the impact of wind on plant dynamics in particular and in forest in general which is very crucial for understanding several plant communities. We show that plant exhibits multiple forms (periodic/chaotic) of repetitive spiking oscillations reflecting the phenomenon of bursting. For the periodic bursting oscillations, we observe that after each peak of excitation due to the wind load, the plant returns directly to its state of rest. Whereas the chaotic bursting oscillations breaks the energy of the wind into decreasing value packets and its occurrence has the merit of reducing the effects of wind energy on the plant; action which ensures the stability of the plant even in chaotic cases. We also note that the numerical study based on the isospike technique permits efficient discovery and separation between periodic and chaotic orbits visited during the temporal evolution. Based on the chaos phase-control techniques, we establish that various chaotic oscillations disappeared after applying the chaos phase control strategy in the system compared to the uncontrolled case. Moreover, the chaos phase control strategy is introduced to instantly inform how the correct choice of the phase minimizes the effects of the wind and thus eliminates chaotic behavior of the plant by simply driving it towards a variety of periodic orbits.

Biography

Date and place of birth : 16 April 1984, Batcham, Cameroon.

Marital status : Single

Nationality : Cameroonian

Science organization: Since 2013, Active Member of the UR-2MSP (Research Unit of Mechanics and Modelling of Physical Systems.

Diploma:

2020: PhD Degree Diploma of Physics in Mechanics-Energetic (Dynamical systems), Department of Physics, Faculty of Sciences, University of Dschang, Cameroon, Grade: Very honorable with oral congratulations from the Members

of the jury.

2012: Master's Degree Diploma of Physics, Department of Physics, Faculty of Sciences, University of Dschang, Cameroon, Grade: Good.

2009: Bachelor's Degree Diploma of Physics, Department of Physics, Faculty of Sciences, University of Dschang, Cameroon, Grade: Average.

2006: G.C.E advanced level, Government Secondary Bilingual High School Batcham, Cameroon,

Grade: Average.

Modeling Cloud Seeding Technology for Rain Enhancement Over the Arid and Semiarid Areas of Ethiopia

Megbar Wondie

Atmospheric Physics Research Division, College of Natural and Computational Science, Debre Markos University, Ethiopia

The government of Ethiopia has started exploring different innovative approaches to tackle the scarcity of water in arid and semi-arid regions of the country. In line with this strategy, precipitation enhancement through weather modification technology is getting strong attention and some initial attempts have been made to assess its feasibility. Therefore, this paper aims to model cloud-seeding technology for rain enhancement and check its effectiveness in arid and semiarid regions of Ethiopia. Different relevant measurements including ground-based as well as reanalysis data from 2021-2022 are used to improve relevant cloud-seeded models. Reanalysis data are validated with ground-based data using different error metrics. The improved cloud-seeded modeling is developed for precipitation enhancement for the arid and semiarid regions of Ethiopia. An atmospheric moisture budget is used for improving the cloud-seeded model. The results indicated that the developed model and the direct operation are well agreed upon. The relative precipitation (RP) (after the application of cloud-seeded per before the application of cloud-seeded during spring, summer, and autumn is found 1.31, 0.98, and 1.03 respectively. The changing precipitation between cloud seeded and before seeded for spring, summer, and autumn is found at 1.38, -0.19, and 0.11 mm respectively; whereas changing temperature is found at 1.08, 1.78, and -1.06 k respectively. In general, the model result indicated that cloud-seeded technology is effective over Ethiopia when the daily resultant wind speed is less than 1.5 m/s and cloud base height (CBH) is less than 1700 m. Furthermore, by observing RP from the improved cloud-seeded model results, rain enhancement science is applicable for Ethiopia during the spring and slightly autumn seasons. Hence, before artificial aerosol is seeded into the cloud, the operators should be nowcast and forecast the daily wind speed and CBH of the target area unless an economic crisis will have happened.

Biography

Dr Megbar Wondie is a Ph.D. and Assistant Professor at Debre Markos University, Ethiopia. In 2011, he got his B.Sc. degree in Applied Physics from Hawassa University, Ethiopia. In 2013 he got his M.Sc. degree in Radiation Physics from Mekelle University, Ethiopia. In 2019 he successfully defended his Ph.D. degree in atmospheric and weather radar physics at Bahir Dar University, Ethiopia. Dr Megbar wins 6 national and international research projects from Ethiopian Space Science and Technology Institute (ESSTI), Blue Nile Water Institute (BNWI), International Center of Insect Physiology and Ecology (icipe), and Debre Markos University. He published 11 science and Scopus-indexed journals (Elsevier and springer) as principal author, 2 book chapters, and 26 proceedings. Furthermore, Dr Megbar presents his research findings at more than 35 national and international conferences. His research thematic areas are focused climate dynamics, climate change modeling and observation. At this time, he doing research on aerosol

interaction with moisture and mountain for cloud formation and precipitation enhancement causes, climate change mitigation, and adaptation mechanisms through artificial intelligence (AI). He served as a journal reviewer for Springer Nature, Progress in Earth and Planetary Science, Walailak Journal of Science and Technology, and the International Journal of Environment and Climate Change. He has Computer Skills in Matlab programming, IRIS radar software, Climate Data Operator (CDO), GPS, GrADS in Linux environment, and R. He expert on climate models such as Sc-PDSI, PSI, GCM, RCM and ECMWF.

Applications Of Game Theory in Wireless Communications

Pradip Kumar Barik

Pandit Deendayal Energy University, India

Future wireless networks are envisioned to support various services such as high-speed access, telecommuting, interactive media, video conferencing, real-time Internet games, e-business ecosystems, smart homes, automated highways, and disaster relief. Game theory is a formal framework with a set of mathematical tools to study the complex interactions among interdependent rational players. Combining game theory with the design of efficient distributed algorithms for wireless networks is desirable but at the same time challenging. On the one hand, wireless network users are generally selfish in nature. For instance, distributed mobile users tend to maximize their own performance, regardless of how this maximization affects the other users in the network, subsequently giving rise to competitive scenarios. On the other hand, in some scenarios, cooperation is required among wireless network users for performance enhancement.

In this talk, I shall discuss about a few applications of Game Theory for wireless communications. I shall take two examples of Non-cooperative and Cooperative game used in such scenarios. Further, one research problem for intercell D2D communication and its solution using Repeated Game Theory will be discussed at the end.

Biography

Dr. Pradip Kumar Barik received the B.Tech degree in Electronics and Communication Engineering from Kalyani Govt. Engg. College, West Bengal, India in 2012, M.Tech in Communication Engineering from NITK Surathkal in 2014, and Ph.D. from IIT Kharagpur in 2021. He is a Gold Medalist from NITK Surathkal. He was with Broadcom India PVT LTD as system design engineer in Cellular Protocol Development and Testing division. Dr. Pradip is currently working as Assistant Professor at Pandit Deendayal Energy University, Gandhinagar India in the department of Information and Communication Technology. He has published several scientific journals and conferences in the domain of wireless communication and IoT. His current research interest include adaptive multimedia services over heterogeneous cellular networks, cross-layer optimization in wireless networks, resource allocation for D2D and M2M communication, applications of graph theory, game theory, and machine learning for wireless communication.

Enhancing Data Security of Cloud Based LMS

Sandip Roy

Department of Computer Science & Engineering of the JIS University, India

Around the world, the educational system is evolving. The new trend can be found in traditional classroom systems as well as digitalization systems. Cloud-based Learning Management Systems (LMS) will accelerate the educational industry forward in the next few years because they can provide end—user with a versatile, convenient, secure, and cost-effective learning process. The cloud-based LMS approach is the most effective and proper learning model in the worldwide educational sector, particularly if the organization is in a state of depression owing to a global pandemic. It can be utilized over the internet with several users on the same platform. As a result, the initial requirement is important to enable the LMS model. Despite its many advantages, LMS confronts challenges such as confidentiality, user acceptance, and traffic. In a pandemic like Covid 19, the entire planet depends on a safe LMS platform to establish student and instructor trust. Therefore, with this work, the attempt has been made to explain one LMS model that may provide its users with optimal security, a user-friendly environment, and quick access. This paper discusses the use of the cloud attack, and also cryptographic and steganographic security models and techniques to address these issues. There's also information on what kinds of security vulnerabilities or operations on cloud data are feasible, and also how to deal with them using various algorithms.

Biography

Dr. Sandip Roy is a Professor of the Department of Computer Science & Engineering of the JIS University, Kolkata, India. He obtained his Ph.D. in Computer Science & Engineering from University of Kalyani, India in 2018. Dr. Roy received M.Tech. degree in Computer Science & Engineering in 2011, and B.Tech. in Information Technology in 2008 from Maulana Abul Kalam Azad University of Technology, West Bengal (Formerly known as West Bengal University of Technology). He was a post-doctoral fellow in the Computer Science and Engineering of Srinivas University, Mangalore, India. He also served as Research Assistant with different collaborative industry projects of Simplex Infrastructures Ltd., and Bharti Airtel Ltd. etc. He has authored over 200 papers in peer-reviewed journals, conferences, and is a recipient of the Best Paper Award from ICACEA in 2015. He has also authored eight books and also granted fifteen patents. He has also been awarded as Best Young HOD of the Year Award (Below 40 Years) - IARE 2021 Awards, GISR Foundation, 2021 and also received of "SIR SRINIVASA RAMANUJAN TEACHING EXCELLENCE 2021" from Nikhil Bharat Shiksha Parisad in 2021. His main areas of research interests are Data Science, Internet of Things, Cloud Computing, Green Computing, and Smart Technologies.

A Systematic Survey on Fog Steered IOT: Architecture, Prevalent Threats and Trust Models

Shalini Chandra and **Richa Verma**

Department of Computer Science, Babasaheb Bhimrao Ambedkar Univeristy, India

Internet of Things (IoT) is considered as a scheme that consists of smart objects furnished with sensors, processing and networking technologies amalgamated to work together and provide an ecosystem in which smart services are delivered to end-users. Fog computing is the name given to a next level computing that extends cloud services closer to the end-devices. The main idea behind the introduction of this concept is the reduction of latency that exists in a typical IoT-cloud scenario. But, if on one side it accelerates the computing jobs; on the of-side, it increases the attack surface due to the presence of fog layer in between the two existing layers. The data gets computed near to the end-user, thus making it more vulnerable. Hence, it may be said that the threats that may not even exist in a cloud environment come into the picture at fog level. In this paper, we intend to thoroughly discuss various fog level architectures with the threats prevalent at this layer through systematic literature review (SLR). This article aims to classify systematically and statistically, analyse the prevalent attacks that occur in IoT-Fog scheme that are published between 2012- 2020. When two or more devices share information, trust plays a pre-eminent role. So, the authors have also considered 'trust' in this study. The effect of trust on the different pillars of security is critically examined. Also, it is found that most of the researchers are emphasizing to prioritize trust in Fog- IoT scenario as it is a point of paramount significance.

Biography

Richa Verma is pursuing Ph.D. in Computer Science from Department of Computer Science, Babasaheb Bhimrao Ambedkar University (A Central University), Lucknow, UP. She is Gold Medalist in Master's in Information Technology from same University in 2017.Her research interests are in the areas of Network Security, Fog computing and IoT Security.

Shalini Chandra is working as Assistant Professor in the Department of Computer Science, Babasaheb Bhimrao Ambedkar University (A Central University), Lucknow, UP. Her research area is Network security, Fog Computing, software security and software quality

Semantic Segmentation of Landcover For Cropland Mapping and Area Estimation Using Machine Learning Techniques

S. Lingwal[1], K.K. Bhatia[2] and **M. Singh[2]**

[1]*GBPIET, Pauri Garhwal, India*
[2]*J.C.Bose University of Science & Technology, India*

The paper has focused on the global landcover for the identification of cropland areas. Population growth and rapid industrialization are somehow disturbing the agricultural lands and eventually the food production needed for human survival. Appropriate agricultural land monitoring requires proper management of land resources. The paper has proposed a method for cropland mapping by semantic segmentation of landcover to identify the cropland boundaries and estimate the cropland areas using machine learning techniques. The process has initially applied various filters to identify the features responsible for detecting the land boundaries through the edge detection process. The images are masked or annotated to produce the ground truth for the label identification of croplands, rivers, buildings, and backgrounds. The selected features are transferred to a machine learning model for the semantic segmentation process. The methodology has applied Random Forest, which has compared to two other techniques, Support Vector Machine and Multilayer perceptron, for the semantic segmentation process. Our dataset is composed of satellite images collected from the QGIS application. The paper has derived the conclusion that Random forest has given the best result for segmenting the image into different regions with 99% training accuracy and 90% test accuracy. The results are cross-validated by computing the Mean IoU and kappa coefficient that shows 93% and 69% score value respectively for Random Forest, found maximum among all. The paper has also calculated the area covered under the different segmented regions. Overall, Random Forest has produced promising results for semantic segmentation of landcover for cropland mapping.

Biography

Dr. Surabhi Lingwal did her B.Tech and M.Tech in Computer Science & Engineering from Govind Ballabh Pant Engineering College, Uttarakhand, India. She has done her PhD from J. C. Bose University of Science & Technology, YMCA, Faridabad, India. Presently, she is serving as an Assistant Professor in the Department of Computer Science & Engineering at Govind Ballabh Pant Institute of Engineering & Technology, Pauri Garhwal, Uttarakhand, India. She has a total of 7 years of teaching experience and 2 years of research experience. Her research area includes Artificial Intelligence, Machine Learning, Deep Learning and Computer Vision. She has published several papers in various reputed international and national journals.

Deep Networks for Securing 5G Communications: Advancements, Challenges, And Future Directions

A. Naveena

G.Narayanamma Institute of Technology and Science (for women), India

The fifth-generation (5G) of wireless communications brings forth a plethora of innovative applications and services, but it also introduces new security challenges due to its complex and dynamic nature. As 5G networks become more pervasive, it is crucial to develop robust security mechanisms to protect sensitive information and ensure the integrity, confidentiality, and availability of communications. This abstract provides an overview of the role of deep networks in securing 5G communications, highlighting advancements, challenges, and future directions in this domain.

Deep networks, specifically deep learning models, have shown promising capabilities in addressing security threats in 5G networks. They can efficiently analyze and classify vast amounts of data to detect anomalies, identify malicious activities, and mitigate attacks. Deep learning models such as convolutional neural networks (CNNs) and recurrent neural networks (RNNs) have been applied to various security aspects, including intrusion detection, traffic analysis, user authentication, and privacy preservation.

However, deploying deep networks for securing 5G communications poses significant challenges. The high computational and memory requirements of deep learning models may strain the limited resources of 5G devices and network infrastructure. Additionally, the lack of labeled training data for emerging 5G-specific threats hinders the development of accurate and robust deep network models. Adversarial attacks targeting deep learning models also pose a significant concern, as attackers can exploit vulnerabilities and manipulate network behavior.

To overcome these challenges, ongoing research efforts are focused on developing lightweight and energy-efficient deep network architectures tailored for 5G security. Transfer learning and federated learning techniques are explored to leverage existing knowledge and collaborative efforts while ensuring data privacy. Furthermore, the integration of hardware acceleration, such as specialized neural processing units (NPUs), can enhance the efficiency and performance of deep networks in resource-constrained 5G devices.

The future directions of deep networks for securing 5G communications involve the exploration of hybrid approaches, combining deep learning with other security techniques like blockchain and secure multi-party computation. Additionally, advancements in explainable AI and interpretability of deep learning models can enhance trust and facilitate the adoption of these techniques in critical security applications.

In conclusion, deep networks hold great potential for addressing security challenges in 5G communications. By leveraging the power of deep learning models, 5G networks can detect and mitigate security threats effectively. However, further research is necessary to overcome the challenges associated with resource limitations, data availability, and adversarial attacks. By addressing these issues, deep networks can play a pivotal role in ensuring the secure and trustworthy deployment of 5G communications, enabling the realization of its full potential in a connected and secure digital era.

Biography

Dr. A.Naveena is a passionate academician and researcher. She completed her B.Tech in Electronics and Telematics Engineering from GNITS, Hyderabad, M.E in Digital Systems from Osmania University, Hyderabad and Ph.D in Electronics and Communication Engineering with specialization in Wireless Communications and Networks from JNTUH, Hyderabad. She has total 20 years of teaching experience in G. Narayanamma Institute of Technology and Science (for women), Hyderabad. She has 9 years of experience in Research & Development. At present she is working as Assistant Professor in ETE department, GNITS, Hyderabad since June 16th, 2003. Her areas of interest are Wireless communications and Networks, IoT, Machine Learning, Deep Learning. She has published more than 20 papers in International reputed indexed journals and 15 papers in International Conferences. She has supervised 8 M.Tech projects and 16 B.Tech projects.

Urbanization And Its Impact on Land Surface Temperature Using Remote Sensing and Geographic Information Systems in Response to Land Surface/Land Cover Change in Greater Chennai Region, India

Ch. Samurembi Chanu[1] & Ravi Shankar[2]

[1]Department of Geology, Anna University, India.
[2]Department of Space, National Remote Sensing Centre/Indian Remote Sensing Organization, India.

The Greater Chennai Region (GCR) in India has witnessed rapid urban expansion and extensive development in the last few decades. Due to this development, this region is facing many environmental impacts. To mitigate these impacts, it is important to study the historical changes to measure the urban sprawl of the GCR and its impact on land surface temperature (LST). The aim of this study is to achieve this goal. For this purpose, land use/land cover maps (LULC) derived from Landsat 5 TM for 1988, 2004 and Landsat 8 OLI for 2022 are produced using different classification techniques. A spectral radiance model and a web-based atmospheric correction model were used to successfully evaluate LST from the thermal bands of the Landsat data. The overall accuracy of Landsat-derived land use data was 91.2% in 1988, 94.5% in 2004, and 90.5% in 2022. Analysis of LULC changes showed that vegetation was loss to urban land by 51.72% and barren land by 17.23% over the period 1988–2022. This rapid urban growth leads to a significant reduction in vegetation areas, increasing LST, and changing the urban microclimate. The results of this study can help policymakers characterize urban construction for future developments.

Biography

Dr. Ch. Samurembi Chanu Professionally is a Scientist with more than 15 years of experience in Department of Space, Space Application Manipur, India. She completed her Doctorate from Department of Geology, Anna University, Chennai, India. Her Recent Publication include

- Impacts of regional climate model projected rainfall, sea-level rise, and urbanization on a coastal aquifer. Environmental Science and Pollution Research. Vol.29 (1). (2022).pp. 1-18.
- A geospatial approach for assessing the relation between changing land use/land cover and parameters including the land surface temperature of Chennai metropolitan city, India. Arabian Journal of Geosciences. Vol.14, No.132. (2021).pp.1-16.
- Use of GRACE time-series data for estimating groundwater storage at a small scale. Journal of Earth System Science. Vol.129. (2020). pp. 129-215.

Her research interest include in Land Use and Land Cover, Urbanization, Groundwater Potential Mapping, Ground Water Quality Mapping, Remote Sensing, GIS, GRACE, Landside Hazard Zonation, and Flood Hazard Zonation.

Estimation Procedures on The Shannon and Renyi entropy Measures of Generalized Exponential Distribution Under the Progressive Censoring

Kousik Maiti[1] and **Suchandan Kayal[2]**

[1]*School of Applied Science & Humanities, Haldia Institute of Technology, India*
[2]*Department of Mathematics, National Institute of Technology Rourkela, India*

Here, we discuss the estimation of the Shannon and Renyi entropy measures of a generalized exponential (GE) distribution under a progressive type-II censoring scheme. For this purpose, the maximum likelihood estimates are obtained and also evaluate Bayes estimates under the symmetric and asymmetric loss functions as squared error, LINEX, and generalized entropy. In the Bayesian estimation process, we consider independent gamma priors and used Lindley's approximation and importance sampling methods for computational. Further, a simulation study is performed to compare the performance of the proposed estimates. Finally, a real-life dataset is considered and analyzed for illustrative purposes. Here, we take into account a real-world dataset to illustrate the proposed estimations. It shows the number of million revolutions each of the 23 ball bearings could withstand before failing in a life test, which is due to Lawless (2011). Below is a list of the dataset.

17.88 28.92 33 41.52 42.12 45.6 48.4 51.84 51.96 54.12 55.56 67.8 68.64 68.64 68.88 84.12

93.12 98.64 105.12 105.84 127.92 128.04 173.4.

We take into account numerous approaches while doing the goodness of fit test. Table 1 displays the MLE values together with five goodness of fit test statistics. Comparing the generalized exponential or exponentiated exponential (EE) distribution to other distributions, such as the Weibull (WEI), exponential (EXP), and inverted exponential (IE) distributions, the numerical values in Table indicate that the generalized exponential distribution fits the data the best.

Distribution	$\hat{\alpha}$	$\hat{\lambda}$	BIC	AICc	AIC	$-ln\,L$	KS
EE	5.2961	30.9205	232.2267	230.5558	229.9558	112.9779	0.1055
WEI	2.1018	81.8745	233.6549	231.984	231.3839	113.6920	0.1510
EXP		0.0138	246.0030	245.0581	244.8675	121.4338	0.2622
IE		55.0551	246.5874	245.6423	245.4519	121.7259	0.3060

The histogram of the real dataset related to the number of million revolutions before failure and the density plots of four lifetime distributions are presented in Figure. The density plots are depicted using maximum likelihood method. From the graphs, we visualize that the EE distribution covers the maximum area of the data sets comparing to other distributions
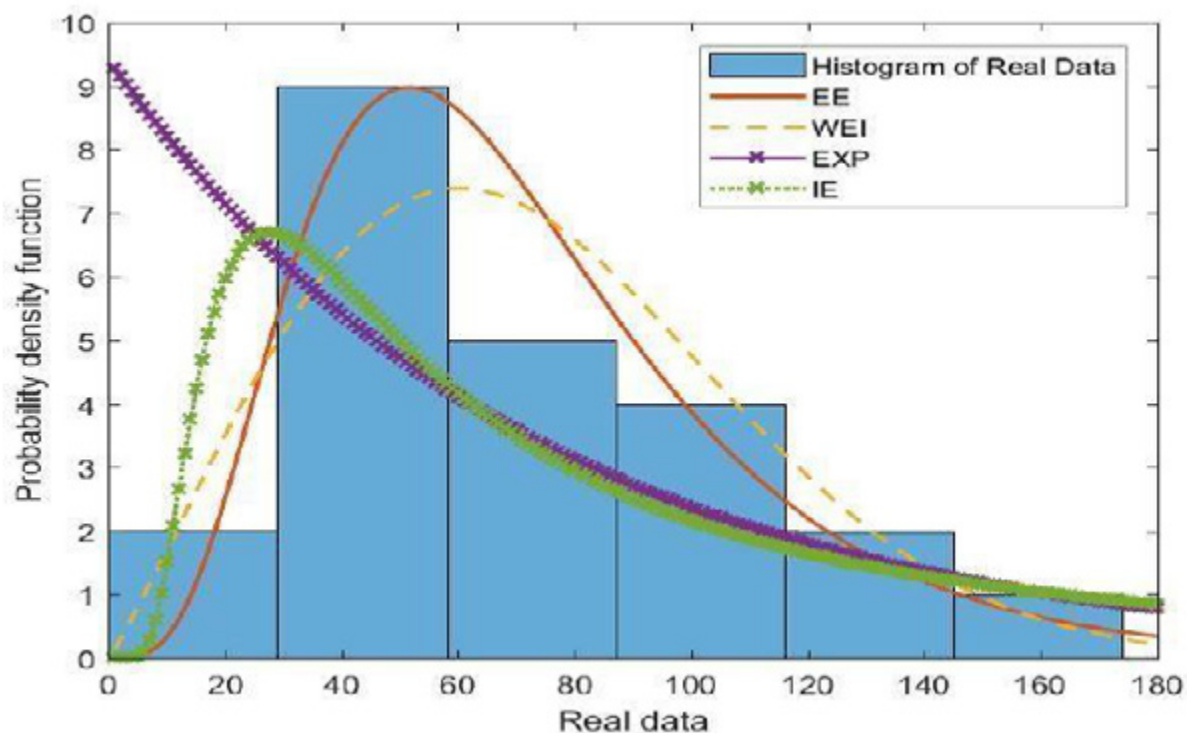
Biography

Dr. Kousik Maiti has been working as an Assistant Professor at the Haldia Institute of Technology, Haldia, West Bengal, India. He completed his Ph.D. from the Department of Mathematics, National Institute of Technology Rourkela, Odisha in 2022. His broad area of research is Statistical Inferences. The title of his Ph.D. thesis is ``Statistical Inference based on Progressive type-II censored Samples from Lifetime Distributions''. He did his M.Sc. in Applied Mathematics at the Vidyasagar University, India in 2014 and his B.Ed. from Maharshi Dayanand University, Haryana, India in 2015, respectively.

Dr. Suchandan Kayal completed his Ph.D. in Statistics from the Indian Institute of Technology Kharagpur, West Bengal, India in 2011. Currently, he is an Associate Professor in the Department of Mathematics, National Institute of Technology Rourkela, Odisha, India. His research interest includes Applied Probability and Statistical Inference.

Modelling Approaches for Estimating Water Losses in An Ecosystem Using Light Radionuclides

Niranjan Kumar[1,2]

[1]Indian Institutes of Technology Bombay, India
[2]Indian Institutes of Management, India

Detailed and exhaustive comparative study for calculating and modelling water losses from the different surface water sources as well as by the tree is researched and after that the nuclear chemical methods model was implemented to compare the process

and result accuracy; limitation and peculiarity in running this model and was investigated and described in comparison with SWAT (soil; water and tree components) and DEM modelling approaches after rain or in dry. The noble approach for determining the evapotranspiration is conducted using chemical nuclear isotopic method for two fresh water stream and the straight forwardness of this method is quite a high level in accuracy and relevent for the fresh water stream of rectangular channel provided the flow having 0.6 m/sec evaporated by cross sectional area of 1.72 sqm having the discharge 0.172 cumec of water which evaporating 840 lit per day of water in the stream length 3.5 km while the 0.1 m/sec flow in pistia cover stream of smaller stretch Phudphora having area of the cross section 3.23 sqm and the 0.1938 cumec; water volume passing every second through it evaporated 426.19 lit per day in a stream length of 1.4 km; water including 46.35 lit/d by the pistia alone in surface area cover of 24080 sqm by the transpiration rate 0.01925mg/ml/day/sqcm. The gas chromatograph sample volume of 3 ml water in which measured concentration of 018 ($t_{1/2}$ =100 days) nuclides was 63 ppm on an average and solubility of dissolved nitrogen were found 16 ml/lit in the stream water for production of nuclides; along with it transpirational water losses in 15 tree species were also calculated. Betula bhojpatra and Dalbergia sisso species found losing water at maximum rate and the correlation factor with moisture contains is r=0.09 and correlation between Concentration and O18 is r=0. 029.While surface soil of the forest area losing water at the 0.00043g/g/day/cm2.

Tab Table 3:Stream characterization Phudphora

Serial No.	Breadth of stream (m)	Depth of water cm.	Length of stream (m)	Float distance	Time observation	Flowrate
1		20				
2	17.50	59	1400	3.80	60	0.06
3		50				

Table 4 :Stream Characterisation Phudsyngkai

Observation	Depth of stream (m) cm	Breadth of stream (m)	Length of stream (km)	Float distance (m)	Time Sec.	Flowrate m/s
1	50	6.5				
2	30	4.5				
3	50	3	3.5	1.5	15	0.1
4		6				
5		1.5				

Table 5: Water Analysis Spectroscopy Result.

Sample code	O^{18}concentration in ppm
PH1	62
PH2	64
Average	63
Reference sample HPM	410
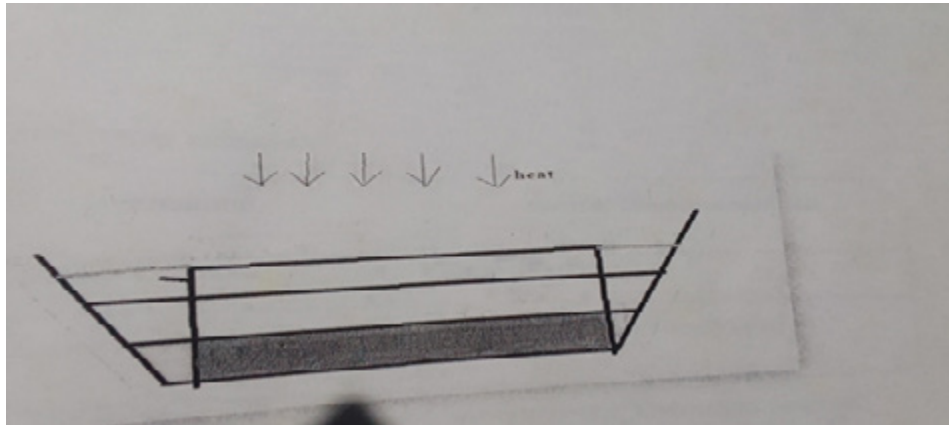
Figure channel of the stream cross section

Figur stream flowing in the study area

Biography

Dr.Niranjan Kumar is a free lance researcher in Science and Technology and travelled several nations for study and research purposes authored Several books and scientific research manuscripts in international journal and credited several international patent in his name ;chaired as distinguished speakers in international conferences and Editorial board member of American journal Earth Science. His area of interest is technological development and environment science and computing software; and nuclear; chemical ;hydrological and environmental engineering radiation and radioecology. He pioneered many scientific works credited for establishing research Department of Advance study in studying radiation and radioecology in foremost scientific disciplines in Asian region and he owned a consultant company named Kumar International R&D Consultant Pvt.Ltd.He is the recipient of several international prestigious award. He works for Ministry of Defence India.

Efficient Classification and Recognition of The Fruit Images Using Hybrid Features and Grey Wolf Optimization Algorithm

Harmandeep Singh Gill[1] and **Baljit Singh Khehra[2]**

[1]Computer Science Department, Mata Gujri Khalsa College, India
[2]kartarpur Professor CSE, JGND punjab state open university, India

In the present scenario, fruit and vegetable classi- fication research has been done by many research scholars and institutions, especially due to huge seuccess rate of deep learning applications in the image classification related problems. Image classification schemes aplicable to the fruit images to date do not extract optimal features from the acquired images efficiently. In the present study, deep learning approach is used to obtain the deep features and these features are used to classify the fruit images. Hybrid feature approach is used to improve the performance of the fruit type classification. The hybrid features features set cotains complementary information that could help differentiate between the optimized features, further Grey wolf optmizer is utilized to recognize the types of fruits in the images. The proposed approach is tested on primary datasource of fruit images acquired from the orchards of Agriculture Department, Khalsa College Amritsar.

Advancements In Satellite-Based Atmospheric Data Analysis: Insights and Future Prospects

Imane. SEKMOUDI

Independent researcher, Morocco

Satellite remote sensing has revolutionized our understanding of the Earth's atmosphere by providing valuable insights into its composition and dynamics. This study presents a comprehensive overview of atmospheric data obtained through satellite observations and highlights their significant contributions to atmospheric science research. We explore a wide array of atmospheric parameters derived from these observations and their relevance in understanding atmospheric processes, air quality monitoring, and weather forecasting.

We delve into the diverse range of atmospheric parameters that can be extracted from satellite observations, including atmospheric temperature and humidity profiles, total column ozone and trace gas concentrations. Emphasizing the significance of these parameters, we discuss their role in advancing our understanding of the Earth's atmospheric behavior and its impact on climate and environmental systems.

Furthermore, we present notable scientific discoveries and contributions arising from satellite-derived atmospheric data. Specifically, we showcase the assessment of air pollutants, with a focused examination of the effects observed during the COVID-19 lockdown period in Morocco. By highlighting such examples, we demonstrate the capability of satellite observations to monitor and analyze environmental changes and their associated impacts.

Lastly, we address the challenges and future prospects of satellite-based atmospheric observations. We emphasize the need for improved spatial and temporal resolutions, advanced retrieval algorithms, and the integration of multiple satellite sensors to enhance our understanding of the atmosphere. We underline the significance of ongoing satellite missions, such as NASA's Earth Observation System and ESA's Sentinel program, in filling knowledge gaps and supporting global environmental monitoring initiatives.

In conclusion, satellite observations have revolutionized our ability to monitor and comprehend the Earth's atmosphere. The wealth of atmospheric data acquired from satellites has significantly propelled atmospheric science, climate research, and environmental monitoring. Continuous advancements in satellite technology and data processing techniques will further enhance our understanding of intricate atmospheric processes and their implications for the Earth's climate system.

Biography

Imane Sekmoudi is an accomplished environmental and water sciences professional with a doctorate in environmental sciences. Currently, she serves as a state engineer at the Ministry of Energy Transition and Sustainable Development in Morocco. In her role as an executive at the Observatory for the environment and sustainable development in the Casablanca-Settat region, Imane manages environmental information and supervises the dedicated information system. Her work involves collecting, analyzing, and disseminating data on environmental indicators, supporting evidence-based decision-making. Imane is also dedicated to capacity building, organizing workshops and training programs to enhance knowledge on climate change and biodiversity preservation. Furthermore, she plays an integral role in monitoring air quality in the region, producing weekly bulletins that inform policymakers and the public for better environmental protection and public health. Imane's expertise and contributions advance sustainable development in Morocco, supporting the ministry's efforts towards a greener and more sustainable future.

Ensuring Privacy and Confidentiality of Cloud Data: A Comparative Analysis of Diverse Cryptographic Solutions Based on Run Time Trend

J.K.Dawson[1], T. Frimpong[2], J.B.Hayfron Acquah[2] and Y.M. Missah[2]

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The cloud is becoming a hub for sensitive data as technology develops, making it increasingly vulnerable, especially as more people get access. Data should be protected and secured since a larger number of individuals utilize the cloud for a variety of purposes. Confidentiality and privacy of data is attained through the use of cryptographic techniques. While each cryptographic method completes the same objective, they all employ different amounts of CPU, memory, throughput, encryption, and decryption times. It is necessary to contrast the various possibilities in order to choose the optimal cryptographic algorithm. An integrated data size of $5n*\square10\square^2$ (KB ($\square$1,2,4,10,20,40) is evaluated in this article. Performance metrics including run time, memory use, and throughput time were used in the comparison. To determine the effectiveness of each cryptographic technique, the data sizes were run fifteen (15) times, and the mean simulation results were then reported. In terms of run time trend, NCS is superior to the other algorithms according to Friedman's test and Bonferroni's Post Hoc test.

Biography

John Kwao Dawson is a PhD candidate in Computer Science at the Kwame Nkrumah University of Science and Technology. He holds a Master of Philosophy in Information Technology and Bachelor's in Information Technology from the Kwame Nkrumah University of Science and Technology and University of Education Winneba, respectively. His area of research is cloud computing, algorithm design, machine learning, artificial intelligence and data and network security.

Optimal Parameters and Optimal Trajectories of Rockets Moving in The Atmosphere

Kiforenko Boris

The problem of formalized description of the properties and characteristics of the functioning of the studied objects is constantly relevant to scientific cognition. It is especially aggravated at the modern stage due to unprecedented expansion of quantitative approaches. Its relevance is increasing due to the fact that the scientific community is aware of the role of mathematics as the only language of interdisciplinary communication, capable of taming the chaos of the Babylonian pandemonium of modern science, not to let "the river of knowledge ... disintegrate into separate streams and dry up" [1, p. 14]. [1, p.14].

The main difference between the mechanics of space flight and classical astrodynamics is the need to consider the thrust forces of spacecraft (SC) engines. The need to achieve space velocities in conditions of impossibility of energy feeding from the Earth makes the problem of rationality of control unprecedentedly acute. In this regard, the problems of rocket flight mechanics in the first works of the scientific stage of research are considered as variation [2]. Below is an analysis of the problems of optimal controls in the mechanics of rocket flight in the atmosphere when launching spacecraft into the orbit of planetary satellites and on flight trajectories to the planets of the solar system and beyond its limits.

The thrust of the rocket engine   when moving in the atmosphere differs from the value thrust of engine in a vacuum : T_v

$$T = T_V - p_h \sigma,$$

$$(1)$$

here p_h - pressure of gases in the medium into which the jet of the rocket engine is expelled, σ is the area of the outlet cross-section of the motor nozzle. The state of theoretical gas dynamics at present does not allow us to offer a formalized description of the dependence of the value on flight conditions and rocket body geometry, allowing the use of variational methods to solve the problem of motion optimization. Introduce the relay control function δ, taking the value of one on the active section and zero on the passive sections of traffic:

$$T\bar{e} = (qV - p_h\sigma)\delta\bar{e}, \quad \frac{dm}{dt} = -q\delta.$$

$$(2)$$

It is assumed that the control is done by switching on ($\delta = 1$) or by switching off ($\delta = 0$) the engine. When using such of the engine description, the boundary control of the working body flow rate $q = q_0$ is optimal on all active ($\delta = 1$) flight sections in all specific tasks [3]. The effectiveness of the control will be evaluated using the example of optimization of the vertical plane motion of the aircraft. The motion of the aircraft center of mass without of the lifting force with tangential thrust direction is described by a system of differential equations:

$$\frac{dr}{dt} = v \sin \vartheta, \quad \frac{d\varphi}{dt} = \frac{v}{r} \cos \vartheta,$$

$$\frac{dv}{dt} = \frac{a_0(1 - p_h(r))\delta - F(r,v)}{m} - \frac{\sin \vartheta}{r^2}, \quad \frac{d\vartheta}{dt} = \left(v - \frac{1}{rv}\right)\frac{\cos \vartheta}{r}, \quad \frac{dm}{dt} = -\frac{a_0}{V_0}\delta. \tag{3}$$
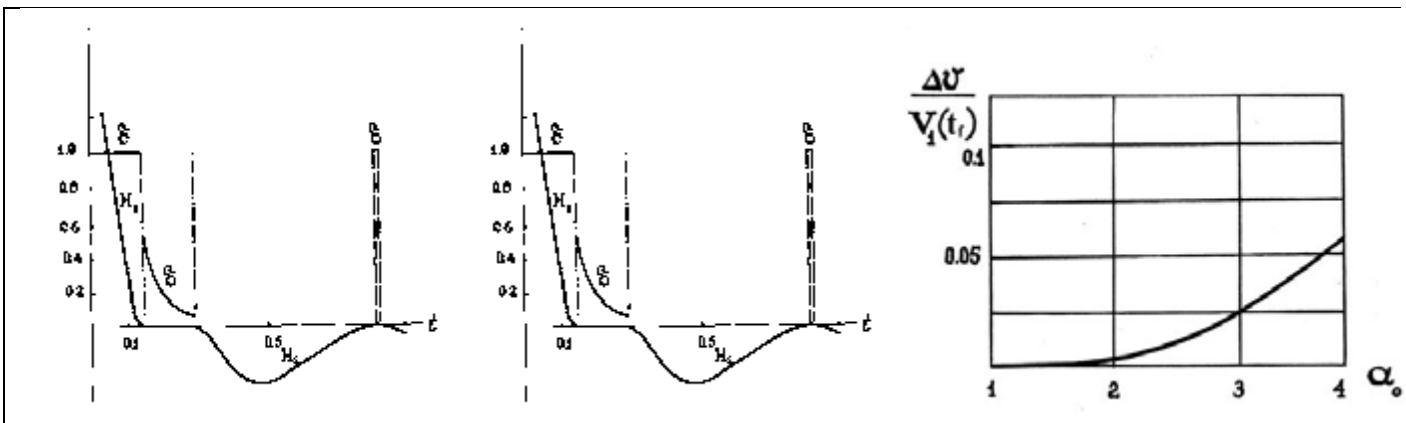

Fig.1   Fig.2   Fig.3

Fig. 1, 2 shows the dependence of the control time, the switching function and phase variables along the optimal trajectory of the aircraft's exit into the orbit of the Earth's satellite. Fig. 3 illustrates the dependence of the effectiveness of the optimal control when the aircraft is placed into the orbit of the Earth satellite. We quantitatively evaluate the effectiveness by comparing the aircraft speed when placing it into an orbit by the scheme illustrated in Figures 1, 2 and when placing it into the same orbit by a simple scheme: two active arcs separated by a passive arc. The difference of values of these velocities Δv , denote, orbital velocity $V_1(t_f)$ Variable a_0 in the system (4) and in Fig. 3 - the ratio of the maximum engine thrust to the initial mass of the aircraft.

The advisability of moving along part of the trajectory with less thrust is determined by the desire to balance two requirements. On the one hand, it is desirable to reach the goal of the maneuver faster, i.e. to choose the maximum thrust. However, the higher the speed, the greater the aerodynamic drag. Therefore, in dense layers of the atmosphere it is worth to reduce the speed, saving fuel for a faster movement after entering a less dense environment.

Thus, the study of variational problems of flight mechanics has established that the optimal trajectories of the spacecraft can contain areas of maximum, intermediate, and zero thrust. As for the passive arcs, their analysis is carried out in terms of celestial mechanics. Impulse approximation is usually used to analyze the active sections of the flight. In those cases where this technique is recognized to be insufficiently accurate, approximate approaches to accounting for their real duration, outlined in well-known monographs (see, for example, [5]), have been proposed.

As for the variable thrust movement $\partial = \delta(t)$, attention to them is caused by the fact that their practical implementation is a considerable "headache" for designers of both rocket engines and control systems. Therefore, to evaluate the efficiency of such "exotic" control, to find out losses during transition to simpler, from the point of view of realization, control methods is undoubtedly an actual task. The mentioned peculiarity led to the necessity of development of a more precise mathematical description of the rocket engine as a control object. The corresponding mathematical model is proposed in the article [6]. In this work, a nonlinear flow characteristic of the engine over the entire range of variation of the flow rate is presented q – from zero to the maximum value. If the real engine does not allow throttling of the thrust value, the plot is realized by a finite number of engine on-offs. The more of them, the more accurate is the real approximation of the optimal control. The limiting control method is a sliding mode consisting of an infinite number of control switches in a finite time interval. Obtaining a sliding mode in the analysis of any optimization problem should alert the researcher. The very possibility of including a singular arc in the composition of a trajectory is provided by the basic hypothesis of control theory about inertia-free control[4]).

And only when the controls of the object being described are really low-inertia, the information about the optimality of sliding modes is not only of theoretical interest. In the problems of spaceflight mechanics, the thrust magnitude can be considered an inertialess control only at a finite number of switches on an optimal trajectory with a finite time of flight. This is confirmed, in particular, by the diagrams $T(t)$ for real rocket engines given in monographs on rocket dynamics (see, for example, [7]).

During the discussion of the simple mathematical models of rocket engines described above, doubts were often expressed about the expediency of their formulation at a time when there are complex multiparameter descriptions that take into account the specific features of such a complex construction, which is a modern rocket engine. However, the more complex the model, the more complex its formalized description. When using models like [8], it would be an extremely difficult task to make sure that singular arcs would be included in the flight path. As we can see, it was possible to do this using a much simpler model (3). Therefore, the basic rule of modeling in any research: the mathematical model of the object under study must be adequate to the goal of the research.

A Hybrid Atmospheric Satellite Image-Processing Method for Dust and Horizontal Visibility Detection

Mehdi Amiri[1,2]
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One of the problems in the lives of people in the Middle East is dust storms and their effects on the lives of people in that region. My goal has been to develop methods to detect dust and horizontal visibility depth through satellite images. By doing this, both meteorological scientists and the aviation industry will help in early and accurate detection of atmospheric phenomena. The figure below shows the studied area.

A map of the studied region

The proposed model consists of two main parts, the first part uses the particle swarm optimization algorithm to extract suitable features, the second part uses the nonlinear ensemble approach to detect dust concentration and horizontal visibility. First, five machine learning methods including GMDH neural network, a multilayer perceptron neural network, multiple linear regression, a random forest algorithm, and support vector machine technique are used as reference models. Each of the five reference models is then used as a nonlinear ensemble model. Also, to compare with the result of the proposed approach and ensure the optimality of the method, the common voting approach based on the collection model is used. The following table shows that ensemble-RF and ensemble-SVM methods were more accurate in all cases compared to RF. Therefore, it can be stated that the integration of machine learning models in a non-linear ensemble improves horizontal visibility detection in dusty conditions.

Comparing the best classification methods with ensemble methods

Methods	Evaluation criteria				
	Accuracy	Precision	Sensitivity	Specificity	F-score
Ensemble RF	0.950	0.953	0.953	0.983	0.953
Random Forest	0.925	0.929	0.931	0.973	0.930
Ensemble SVM	0.950	0.953	0.953	0.983	0.953
Max	0.950	9.953	0.953	0.983	0.953

Biography

I am Dr. Mehdi Amiri, PhD in computer engineering, majoring in software, and currently I am the director of the Information Technology Department of the Allameh Tabarsi Science and Technology Center in Iran. I work in the fields of artificial intelligence and machine learning, satellite image processing, data science and data analysis. My article is an extract from my PhD thesis and is the result of 4 years of research and study on helping to detect atmospheric phenomena through satellite images with the help of artificial intelligence and machine learning techniques. 4 valid articles were extracted from my thesis. Also, my research topic was introduced as one of the successful research projects of the Iran Meteorological Organization.

Amharic Language Image Captions Generation Using Hybridized Attention-Based Deep Neural Networks

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Image captioning is an automatic way of providing textual description to a given image. This task encompasses two main Artificial Intelligence areas namely Computer Vision and Natural Language Processing. The main aim of this study is to build an enhanced deep learning model that can generate Amharic Language image captions of an image. Amharic Language is the official working language of the Government of Ethiopia. These days, there are few image caption studies in the English Language and these models are focused on the image features to generate the image captions. These approaches increase the gap between the visual features and the textual features and lead to inadequate semantic representation of image caption. This study proposed a hybridized attention-based deep neural network (DNNs) to generate semantically meaningful Amharic Language image captions. The proposed approach consists of an Inception-V3 CNN encoder to generate the image features. A Visual attention is applied to capture the significant features of the image. A Bidirectional Gated Recurrent unit (Bi-GRU) with attention is implemented as a decoder to generate the image captions. The Flickr8k and BNATURE image datasets are used to build the model. The Google translator and Amharic language experts are used to translated the English captions of the two datasets into Amharic Language caption. The model achieved better results on 1G-BLEU, 2G-BLEU, 3G-BLEU, and 4G-BLEU, which are 60.6, 50.1, 43.7, and 38.8 blue scores respectively. Generally, the result demonstrated the significance of the Hybrid approach in the Amharic Language image caption.

Design Of Microstrip Smart Antenna with DENLMS Beam Steering Algorithm for Millimetre Wave Frequency Application

Mohini Narendra Naik and **Hassanali Gulamali Virani**

Goa College of Engineering, India

Microstrip patch smart antenna is modelled for millimetre wave frequency application to improve the performance of antenna in terms of gain and bandwidth. In particular, beam steering antennas have become quite common in contemporary antenna propagation. Because it reduces noise, conserves energy, and improves the bandwidth and gain of the microstrip antenna. The antennas of beam steering antennas are designed to create narrow focused beams with minimum side lobes. The major intention of this research is to design a smart antenna with beam steering strategy. Roger substrate was used to create the antenna. The 5G network has intended with frequency range 1 (FR1—sub-6 GHz range) covers the range from 450 MHz to 6 GHz and frequency range 2 (FR2—mm Wave) covers the region from 24.25 to 52.6 GHz. Our research use the FR2—mm Wave frequency range of 24.25–52.6 GHz. The DENLMS beam steering algorithm, on the other hand, which is presented to increase the directional gain, beam steering abilities and side lobe level. The LMS method is changed by normalising to boost the convergence rate, resulting in delayed error normalised LMS (DENLMS). The DENLMS technique is a gradient-based strategy that involves an iterative method that performs consecutive weight vector corrections in the direction of the gradient vector's negative, finally leading to the current time's minimal mean square error. The system has used DENLMS to achieve beamforming as a result of this. Furthermore, the DENLMS method is used in the MATLAB simulation to compute the ideal complex weights, taking into account alternative angles for the intended User (+ 45 and 45) and Interferer (+ 30 and 30). Then the antenna elements supplied these ideal weights through HFSS for beam steering in a new direction. Directivity, return loss, surface current distribution, and radiation pattern parameters are assessed and compared to existing designs to show that the developed antenna has a high efficiency.

Biography

Mohini Narendra Naik received B.E. degree in Electronics and Telecommunication Engineering from Padre Conceicao College of Engineering, Goa University, India, in the year 2011 and M.E. degree in Electronic Communication and Instrumentation from Goa College of Engineering, Goa University in the year 2015. She is currently working towards the Ph.D degree in Antenna Systems as the area of specialization at the Goa University with Goa College of Engineering as a research center. She is currently working as an Assistant Professor with the Department of Electronics and Telecommunication Engineering, Don Bosco College of Engineering-Goa, India. Her research interests include antenna design and simulation, millimetre wave applications, smart antenna design. She can be contacted at email: mohini.naik@dbcegoa.ac.in

Temporal Evolution of Co-Seismic Landslides Using Satellite Imagery in Lesser Himalaya of Pakistan

Muhammad Ali and **Sumbal Bahar Saba**

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Natural disasters are posing unprecedented threats to economy and people wellbeing. Landslide susceptibility has been increased globally particularly in developing countries due to unplanned land development, flooding, and earthquakes. The Himalayas are characterized by discontinuities that are delineated by fault lines or traces (tectonically active regime), where earthquakes frequently occur and trigger landslides. However, landslides are not only triggered by the Himalayan region's strong seismic and tectonic activity; they can also be brought on by other factors including population growth, unplanned infrastructure expansion, torrential rainfall, riverine floods, flash floods, and deforestation. In this context, the present study has examined the quantitative and qualitative changes in the temporal evolution of co-seismic landslides. For this purpose satellite images from 2002, 2004, 2005, 2008, 2012, 2014 and 2016 were considered. The study has also evaluated the correlation of landslides with various controlling geo-environmental parameters in Muzaffarabad area, a seismically and tectonically active region in the lesser Himalayas, Pakistan. According to the results, an overall increase was observed in the landslide area since the earthquake of October 08, 2005. Rock fall, slide (translational and rotational), and flow slide were found to be the most common types of landslides prior to the major earthquake event, but now debris avalanche, topple, and lateral spread are dominant. Among the geo- environmental factors, high degree slopes, proximity to fault lines, and drainage were identified to be the most important causes of landslides in the study area.

Application Of Hybrid SFLA-ACO Algorithm and CAM Softwares For Optimization of Drilling Tool Path Problems

Muhammad Umer[2], Nasir Mehmood[1], and **Umer Asgher[3]**

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[3]*Quality Assurance & NUST International Office Directorate (QA & NIO Dte), National University of Science and Technology (NUST), Pakistan*

In drilling process almost seventy percent time is spent in tool switching and moving the spindle from one hole to the other. This time travel is non productive as it does not take part in actual drilling process. Therefore, this non productive time needs to be optimized. Different metaheuristic algorithms have been applied to minimize this non productive tool travel time. In this study, two metaheuristic approaches, shuffled frog leaping algorithm (SFLA) and ant colony optimization (ACO) have been hybridized. In industry, the CAM softwares are employed for minimization of non productive tool travel time and it is considered that the path obtained by using the CAM softwares is the optimized path. However this is not the case in all problems. In order to show the contribution of the SFLA-ACO algorithm and to prove that results achieved through CAM softwares are not always optimized, hybrid SFLA-ACO algorithm has been applied to two drilling problems as case studies with the main objective of minimization of non productive tool travel time. The drilling problems which are taken from the manufacturing industry include ventilator manifold problem and lift axle mounting bracket problem. The results of hybrid SFLA-ACO algorithm have been compared with the results of commercially available computer aided manufacturing (CAM) software. For comparison purpose, the CAM softwares used are Creo 6.0, Pro E, Siemens NX and Solidworks. The comparison shows that the results of proposed hybrid SFLA-ACO algorithm are better than commercially available CAM softwares in both real world manufacturing problems.

Biography

Muhammad Umer is at Sir Syed CASE Institute of Technology, Islamabad. He has done his PhD in Design and Manufacturing Engineering from NUST, Pakistan. His areas of interest include optimization of manufacturing systems and processes. He has vast experience of manufacturing engineering and management of productions.

PEERS ALLEY MEDIA

Effect of Magnetic Connectivity on CubeSat Needle Probe Measurement

Nadia Imtiaz

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We investigate numerically the impact of magnetic field orientation on needle Langmuir probe (NLP) on- board nano-satellites. For this purpose, we model the interaction between the CubeSat and ionospheric plasma under realistic plasma conditions by using the 3D Particle-In-Cell code PTetra. The magnetic field and plasma parameters are estimated from the International Geomagnetic Reference Field (IGRF) and International Reference Ionosphere (IRI) models, respectively. The study demonstrates the effect of magnetic field connectivity by computing the current-voltage characteristics of the NLP on a 3U CubeSat. Three different orientations of the magnetic field are considered such that the probe spacecraft system is either magnetically connected or magnetically disconnected. The magnetically connected case corresponds to the orientation of the magnetic field in which the magnetic field lines intersect the NLP and the satellite body. Conversely, in the magnetically disconnected case the magnetic field lines intersect the probe but do not intersect the spacecraft body. The current characteristics of the needle probe computed for the cases considered, illustrate the sensitivity of the collected current to the orientation of the magnetic field. It can be inferred that the effect of the magnetic field connectivity can also be taken in to account for the interpretation of in situ measurements of the needle Langmuir probes on CubeSats. The present study will be helpful to understand the detailed interaction between nano-satellites and the low Earth orbit plasma environment.

Application Of Hybrid SFLA-ACO Algorithm and CAM Softwares For Optimization of Drilling Tool Path Problems

Nasir Mehmood[1], Muhammad Umer[2] and **Umer Asgher**[3]

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In drilling process almost seventy percent time is spent in tool switching and moving the spindle from one hole to the other. This time travel is non productive as it does not take part in actual drilling process. Therefore, this non productive time needs to be optimized. Different metaheuristic algorithms have been applied to minimize this non productive tool travel time. In this study, two metaheuristic approaches, shuffled frog leaping algorithm (SFLA) and ant colony optimization (ACO) have been hybridized. In industry, the CAM softwares are employed for minimization of non productive tool travel time and it is considered that the path obtained by using the CAM softwares is the optimized path. However this is not the case in all problems. In order to show the contribution of the SFLA-ACO algorithm and to prove that results achieved through CAM softwares are not always optimized, hybrid SFLA-ACO algorithm has been applied to two drilling problems as case studies with the main objective of minimization of non productive tool travel time. The drilling problems which are taken from the manufacturing industry include ventilator manifold problem and lift axle mounting bracket problem. The results of hybrid SFLA-ACO algorithm have been compared with the results of commercially available computer aided manufacturing (CAM) software. For comparison purpose, the CAM softwares used are Creo 6.0, Pro E, Siemens NX and Solidworks. The comparison shows that the results of proposed hybrid SFLA-ACO algorithm are better than commercially available CAM softwares in both real world manufacturing problems.

Biography

Nasir Mehmood is PhD scholar at Sir Syed CASE Institute of Technology, Islamabad. He he done his BE in Mechanical Engineering and Masters in Design and Manufacturing Engineering from NUST, Pakistan. His areas of interest include optimization of manufacturing systems and processes. He has vast experience of manufacturing engineering and management of productions.

Newton's Forward Interpolation Method for Solving Nonlinear Algebraic Equation

Nasr Al Din IDE

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As we know, the interpolation is one of the most basic and most useful numerical techniques in Mathematics. Newton's Forward interpolation method is one of most important of these methods. Its most important task in numerical analysis to find roots of nonlinear equations, several methods already exist to find roots. but in this paper, we introduce the interpolation technique for this purpose. The proposed method derived from the newton forward interpolation method and we compared the results with another existing method (bisection method (BM), regula-falsi method (RFM), secant method (SM), newton Raphson method (NRM)) and the method proposed by Sunaullah J. (SJM). it's observed that the proposed method have fast convergence but it have same order of convergence of the method (SJM). Maple software is used to solve problems by different methods.

Analysis Of Two-Dimensional Heat Transfer Problem Using the Boundary Integral Equation

Nimona Ketema Kebeba[1] and **Gizaw Debito Haifo[2]**

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In this paper, we examine the problem of two-dimensional heat equations with certain initial and boundary conditions are considered. In a two-dimensional heat transport problem, the boundary integral equation technique was applied. The problem is expressed by an integral equation using the fundamental solution in Green's identity. In this study, we transform the boundary value problem for the stead- state heat transfer problem into a boundary integral equation and drive the solution of the two-dimensional heat transfer problem using the boundary integral equation for the mixed boundary value problem by using Green's identity and fundamental solution.

Biography

My name is Angela Nimona Ketema and I am from Ethiopia. I attended undergrad at Ambo University and received a Bachelor of Science Degree in Mathematics. I earned my master's degree in Mathematics with specialization Differential Equation from the Wollega University 2018. I have a huge passion for teaching mathematics. It is a subject I feel entirely confident in, and this reflected in my ability to teach in a simple, yet highly effective manner to cater for students of all standards and abilities. I have worked as Mathematics instructor at Mizan Tepi University for five years and also I have served as Mathematics Teacher in Secondary School for eight years. Currently I am a Senior Lecturer at Ethiopian Defence University.

Formulated Mathematical Model for Delayed Particle Flow in Cascaded Sub-Surface Water Reservoirs with Validation on River Flow

Ombaki Richard[1] and Kerongo Joash[2]

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Migration of pollutant particles into sub-surface water reservoirs through point sources largely involve mixing processes within the system of water flow. Possible potential sources of pollution to these point sources include municipal wastes, septic systems, landfills, uncontrolled hazardous wastes and sewage storage tanks. The mixing processes of pollutant significantly alter their predictive rate of flow in the water reservoirs, and therefore the time inherent in mixing processes need to be accounted for. In this study, pollution of sub-surface water reservoirs mainly rivers and streams through contaminated water point sources (CWPS) was studied through a conceptual perspective of mixing problem processes in water tanks. The objective was to formulate a discrete time delay mathematical model which describes the dynamics of water reservoir pollution that involve single species contaminants such as nitrates, phosphorous and detergents from a point source. The concentration $\Box(\Box)$ of pollutants was expressed as a function of the inflow and outflow rates using the principle for the conservation of mass. The major assumption made in modeling of mixing problems using tanks is that mixing is instantaneous. Practical realities dictate that mixing cannot occur instantaneously throughout the tank. So as to accommodate these realities, the study refined the systems of Ordinary Differential Equations (ODEs) generated from principles of mixing problems in cascading tanks, into a system of Delayed Differential Equations (DDEs) so that the concentration of pollutant leaving the reservoir at time $\Box$ would be equal to the average concentration at some earlier instant, $(\Box - \Box)$ for the delay $\Box > 0$. The formulated model is a mathematical discrete time delay model which can be used to describe the dynamics of sub-surface water reservoir pollution through a point source. The model was simulated on municipal River Nyakomisaro in Kisii County, Kenya. Physical and kinematic parameters of the river (cross-sectional lengths, depths, flow velocities) at three river sectional reservoirs were measured and the obtained parameter values were then used to evaluate coefficients of the formulated model equation. The system of DDEs from this simulation was solved numerically on MATLAB using dde23 software. From the graphical views for concentration of pollutant $\Box(\Box)$ versus time $(\Box)$, it was established that the developed DDEs cover longer time series solutions (characteristic curves) than that from the corresponding ODEs in the same reservoir indicating that time necessary for particle flow through water reservoirs is underestimated if ODEs are used to describe particle flow. Also, the graphical views indicated similar tendencies (characteristics) in particle flow with time elapse even though initial values of concentration $\Box(\Box)$ were different for every potentially recognized single species pollutant considered in

each river reservoir. Hence, longer values of time □ will imply more pollution in the water reservoir and vice versa. The findings of this study can help for better understanding of the contaminant's accumulation levels and their rate of movement in water resource. These will assist, for example, water-quality protection agencies such as Environmental Protection Agency (EPA), World Health Organization (WHO), and National Environmental Management Authority (NEMA) for the need to generate efficient and effective remedial strategies to control or mitigate hazardous or risks arising from water pollution.

Taming The Leviathans in The Air: A Geospatial Analysis of Anti-Terrorism Air Warfare in Nigeria

Opeyemi Idowu Aluko

Ajayi Crowther University Oyo, Nigeria

Violence is a common phenomenon in human history. Several violence of different magnitude has wax and wane in different part of the world. Different methods had been applied to curb violence successively. In Nigeria, the urban violence in recent times had change dimension. It had become multi hydra headed and it had made it difficult for the security forces to curb in a short time. These leviathans include; Boko Haram terrorism, Islamic State of West Africa, Fulani Militia, Niger Delta Militia among others. The introduction of geospatial data for air bombardment in recent times in the warfare had change the dynamics of taming violence in the country. Conflict and Tyre Burning theories are used to explain the nature of violence. How had the geospatial data and air warfare assisted in mitigating terrorism in Nigeria? Data from Nigeria defence Head headquarters and Nigeria satellite Commission were analyzed. Results revealed that geospatial information analysis gives the military superior edge over the terrorist groups and it helps to engage in coordinated warfare. If the trend of geospatial data for (air) warfare is accurately sustained, the aim of taming the leviathans will be faster and easier. It will lead to rapid socioeconomic and political development in Nigeria.

Biography

Dr Opeyemi I. Aluko, is a Lecturer in Political Science Department, Faculty of Social Sciences Ajayi Crowther University Oyo, Oyo State Nigeria. He is a prolific scholar with specialization on comparative politics themes in the discipline. He has published more than 100 papers in credible peer reviewed outlets across the world and attends several conferences.

Real-Time Intelligent System for Wind Turbine Monitoring Using Fuzzy System

Pascal Dore[1], Saad Chakkor[1], Ahmed El Oualkadi[1] and Mostafa Baghouri[1]

[1]Laborattory of Information and communication technologies (LabTIC) National School of Applied Sciences of Tangier (ENSATg) University of Abdelmalek Essaadi. Morocco
[2]Laboratory LCCPS, Hassan II University, Morocco.

In these last ten years, the use of wind energy has become a strategic alternative in several countries; the increase in reliability of these systems has become a crucial issue. This is explained by the economic, human or environmental) losses that could generate even if only for a moment, their malfunctioning or their shutdown. In this context, many research methods have been developed to monitor these machines during their operation time. But the problem with these methods was that they did not take into account the criticality, the type of fault, or the degradation degree of the components to trigger an alert, so that the real-time monitoring and the decisions taken were distorted. In this work, four types of defects encountered in wind turbines are studied. Three models of the fuzzy logic system are compared on the severity of the faults in order to know which one is the most efficient. However, an estimation of the fault parameters by the Fast-Estimation of Signal Parameters via Rotational Invariant Techniques (Fast-ESPRIT) algorithm followed by an identification of each fault type by the Classification Algorithm of Fault Harmonics (CAFH) algorithm are first performed. The obtained results show the possibility of monitoring the severity of faults in electric induction machines using the Tsukamoto model in real time. The simulations are performed by using MATLAB software and the obtained results demonstrate the feasibility of such a system.
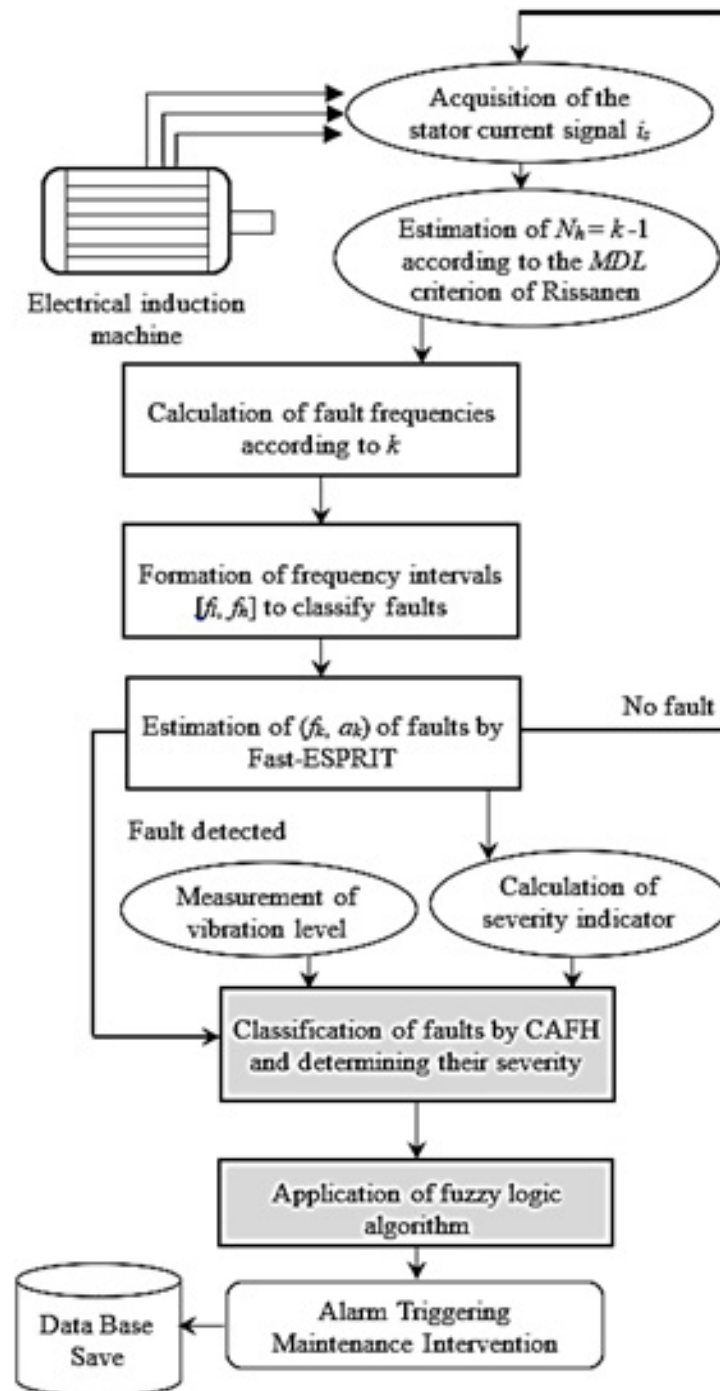
Results

Fig.1 Complete fault detection system.

Table 1. Simulation Parameters

Parameters	Value
s	0,033
q	2
f_0	50 Hz
f_r	29,01 Hz
n_b	12
N_s	1024
F_s	1000 Hz
SNR	[0 10 20 30] dB
Stator Current Amplitude	10 A
Vibration level	0.271
Computing Processor	Intel Core2 Duo T6570 2,1 GHz
FIS parameters	
Fuzzy rules type	Tsukamoto, Sugeno, Mamadani
Number of variables in input	2
number of variables in output	1
Association rules number	9
Type of AND Method	Min
Type of Implication Method	Min
Type of Aggregation Method	Max
Defuzzification type	Centroïde,Wtaver, Centroïde

Table 2. New Severity values computed from Equation 4.

SNR [dB]	Severity values				Harmonics number of each fault
	0	10	20	30	
Rotor Broken	119.49	122.15	122.37	122.78	6
Bearing fault	53.84	55.05	54.50	54.62	4
Misalignment fault	61.55	57.39	57.66	57.79	4
Air gap eccentricity fault	11.98	12.00	11.96	11.97	2

Table 3. Results of diagnosis and classification simulations for Mamdani, Sugeno and Tsukamoto fuzzy styles.

Fuzzy style system	Wind turbine's fault	Alarm value				Meaning
		0 dB	10 dB	20 dB	30 dB	
Mamdani	Rotor Broken	2.2066	2.2025	2.17	2.2016	major
	Bearing fault	1.4389	1.4389	1.17	1.4389	alert
	Misalignment fault	1.4389	1.4389	1.17	1.4389	alert
	Air gap eccentricity fault	1.1745	1.1745	1.17	1.1745	alert
Sugeno	Rotor Broken	242.4009	247.7241	248.9751	248.9750	major
	Bearing fault	67.1973	68.6528	68.1377	67.1973	alert
	Misalignment fault	76.4750	71.6865	72.0515	76.4750	alert
	Air gap eccentricity fault	14.1188	14.1368	14.1075	14.1188	minor
Tsukamoto	Rotor Broken	2.0395	2.0671	2.0693	2.0735	major
	Bearing fault	1.1913	1.2071	1.2	1.2015	alert
	Misalignment fault	1.2876	1.2371	1.2405	1.2876	alert
	Air gap eccentricity fault	0.59712	0.59712	0.59712	0.59712	minor

(a)   (b)   (c)
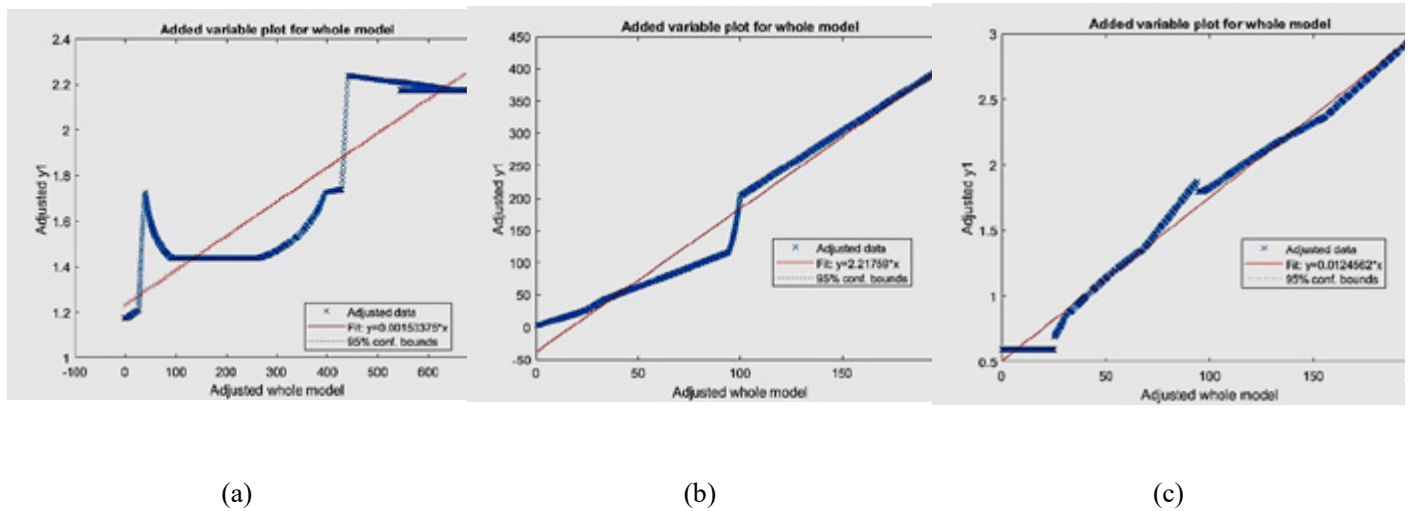
Fig. 15. FIS system fit graphs. (a) Mamdani fuzzy style, (b) Sugeno fuzzy style, (c) Tsukamoto fuzzy style.

Biography

Pascal Dore, born in Guinea in 1996, is currently a PhD student at the National School of Applied Sciences of Tangier in the Information and Communication Techniques Laboratory and works on the detection of electromechanical faults in inductive machines by spectral analysis by application of high-resolution signal processing algorithms and Artificial intelligence algorithms. He holds a Master's degree in Communication and Embedded Electronic Systems and holds a Bachelor's degree in Mathematical and Computer Sciences.

Satellite-Based Analysis of Pre-Earthquake Thermal Anomalies and co-seismic Deformations, Source Parameter Modelling Using InSAR Observations

Arun K. Saraf[1], Hardeep[1] and **Josodhir Das[2]**
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The study presents an analysis of satellite-based detection techniques to investigate pre-earthquake transient thermal anomalies, co-seismic deformations and source parameter modelling using InSAR (SAR Interferometry) observations. Specifically, the research focuses on three major earthquakes which are the Iran-Iraq border earthquake of November 12th, 2017 (Mw 7.3), the New Mirpur, Pakistan earthquake of September 24th, 2019 (Mw 5.4) and the Afghanistan earthquake of June 21st, 2022 (Mw 6.0). Through the utilization of Land Surface Temperature (LST) maps using MODIS satellite thermal data, it is observed that the Iran-Iraq border earthquake exhibited a rise of 4-6°C above the normal temperature in the southwest region of the fault, both during the day and night. Similarly, the New Mirpur, Pakistan earthquake displayed a rise of 3-5°C above normal temperature in the LST maps around the southwest and northwest sides of the epicentre. A rise of 5-7°C above normal temperature was observed in both the day and night LST time series along the fault in the Afghanistan earthquake. Furthermore, InSAR techniques, coupled with Bayesian inversion approaches, were employed to estimate co-seismic ground deformations, focal solution parameters and slip distribution for all three earthquakes. The results indicate that the Iran-Iraq Border and the Pakistan seismic events occurred due to a blind reverse fault mechanism with a shallow dip, dipping NE. The distribution of slip revealed that the Iran-Iraq border earthquake exhibited a relatively equal weightage between the strike slip and the dip slip components. Conversely, the New Mirpur, Pakistan earthquake demonstrated a higher weightage for the strike slip component in the total slip distribution. The results of the Afghanistan earthquake suggest that the event may have occurred due to left lateral slip mechanism, with the fault exhibiting a steep dip towards the east with NE-SW trends at a depth of 7 km. Additionally, a significant number of aftershocks of all three events were observed along specific regions adjacent to the fault geometries, as estimated by Coulomb static stress calculations. The study also investigates the correlation between high-stress regions before and after the earthquake events employing thermal anomaly maps and Coulomb static stress maps. The findings provide evidence of a connection between pre-earthquake thermal anomalies and subsequent static stress changes. Overall, this research highlights the valuable insights that can be gained from satellite-based observations in understanding the behaviour of pre-earthquake thermal anomalies and co-seismic deformations, shedding light on earthquake mechanisms and providing useful information for hazard assessment and mitigation efforts.

Biography

Dr. Arun K. Saraf is Ph. D. (Remote Sensing) from University of Dundee, United Kingdom. Presently he is working as Professor (High Academic Grade at Level-15, Sub-level-08) in the Department of Earth Sciences, Indian Institute of Technology, Roorkee since December 1989, and teaches courses on Geographic Information Systems (GIS), Remote Sensing, Digital Elevation Models and Applications, Digital Image Processing of Satellite Data, Global Navigation Satellite Systems, Geomorphology, Advanced Technical Communication etc. and teaching to under- and post-graduate students of Integrated MTech (Geological Technology) and MSc (Applied Geology) respectively since Dec. 1989. He has been Head of Department of Earth Sciences between Jan. 2012 – Feb. 2015. He was first in the country to introduce GIS course to post-graduate students in the year 1990. In 1986, he was awarded "National Fellowship to Study Abroad" by Govt. of India for his doctoral degree. Further, in 1993 he was awarded "Indo-US S&T Fellowship" and worked in Goddard Space Flight Centre, NASA, USA for Post Doctoral Research. He has been also awarded "National Remote Sensing Award-2001" by Indian Society of Remote Sensing and "GIS Professional of the Year Award-2001" by Map India 2002 for his outstanding research contributions in the fields of Remote Sensing and GIS. Earlier, he has also been given Khosla Research Awards and Prizes by then University of Roorkee. For four consecutive years, he as Star Performer in IITR. Three times he has also been awarded Indian National Science Academy (INSA) Bilateral Exchange Fellowships. So far Prof. Saraf has published more than 100 research papers in journals of repute (ISI) and supervised 15 Ph.Ds. He was also Associate Editor of International Journal of Remote Sensing during 2003-2015. Through funding from DST, Min. of Earth Sciences, CSIR, Prof. Saraf has been able to establish and operating NOAA-HRPT Satellite Earth Station at IITR since Oct. 2002, which was first in any educational institute in the country. Recently, Prof. Saraf has conducted five online video courses (Introduction to Geographic Information Systems, Introduction to Remote Sensing, Digital Image Processing of Remote Sensing Data, Digital Elevation Models and Applications, Remote Sensing and Digital Image Processing of Satellite Data and Global Navigation Satellite Systems), under NPTEL (National Program on Technology Enhanced Learning) (a project funded by MHRD, Govt. of India). Prof. Saraf has also been recognized among Top 2% Scientists of the World (based on analysis done by Stanford University, USA) since three consecutive years. His research work in the fields of remote sensing and GIS and its applications in groundwater, earthquakes, fog, landslides etc. has earned him very high citation (Google Scholar Citation as on 14th June 2023: Total citation: 4476, h-index: 37, i10-index: 75).

Evaluating Urban Heat Islands Using the Urban Viability Index (Case Study: Karaj Metropolis)

Rahman Zandi

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As one of the most significant aspects of rapid growth without urban planning, the reduction of vegetation is often replaced by unauthorized surfaces such as buildings and other impermeable surfaces. Karaj metropolis is one of the significant urban areas located 20 km west of Tehran with such rapid growth. The present study aims to evaluate the temporal-spatial variations of land surface temperature (LST) and urban viability (Urban livability is the connection between the past and the future. Because it respects the past and the future, fights against the loss of natural resources and strives to preserve it for the human race) of Karaj metropolis as well as to examine the urban heat islands (UHIs) using the data of the Landsat 5 Thematic Mapper (TM) and Landsat 8 Operational Land Imager (OLI) for 32 years (1987-2019). The Fractal net evolution approach (FNEA) was employed to calculate UHIs, and the deductive Environmental Critical Condition (ECI) method based on LST and NDVI was used for probing the urban environmental situation. The results indicated that the average LST in Karaj metropolis is between 22 and 35°C. Furthermore, in 1990, the standard deviation of the LST was increased so that more than 7°C was observed for LST. Analysis of temperature zones and its effective parameters (Such as construction, transportation, road construction and …) in Karaj metropolis shows a negative significant correlation between LST and NDVI, and a positive one between LST and constructed urban areas.

Achieving Ultra High Tensile Property in A Common Steel by Innovative Heat Treatment

Rajkumar Singh and **Omkar Tikhe**

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This research is based on an attempt to achieve ultra-high strengths in commonly used industrial steel AISI 4340 steel, by the quench and partitioning (QP) heat treatment process. This study covers microstructure investigation and mechanical property comparison of the advanced QP process with conventional heat treatment processes like quenching and tempering (QT) and austempering processes. The microstructural examinations were preformed with optical microscopy, scanning electron microscopy, and electron backscattered diffraction. The hardness with Rockwell C scale and tensile results were utilized to compare mechanical properties. Tensile testing was carried out to measure ultimate tensile strength, yield strength, and elongation. XRD was used for residual stress measurement and for phase analysis. Conventional QT processes lead to compromise in ductility with increased strength. The austempering process showed the bainitic structure with mechanical properties comparable to specimens quenched and tempered at 560 °C. The QP process comes up with optimum mechanical properties with exceptional UTS (1802 MPa) and elongation of 12.67%. The hardness of the QP process is also higher than other processes. In QP process, the austenite occupies the interlath positions between martensite plates, its fine grain size, and connectivity between the grains resulted in much higher strength with good ductility when compared with conventional QT processes.

Clickjacking: Beware of Clicking

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Clickjacking is a newly discovered breach in network security. It is based on the functionality of web-designing in which two or more web frames are overlapped over each other. The analysis shows that there is a need for in-depth study on click-jacking attacks (client-side vulnerability) and preventive measures so that early prevention and detection of such kinds of attacks can be implemented in a timely manner. In this research work, most of the client-side attacks are studied and an overview of the clickjacking techniques is presented to provide insights of the area to the researchers in the area of network security. The overview of tools and techniques used by attackers are also investigated along with the prevention measures.

Biography

Rishabh has completed his Bacherlor's in Computer Engineering from Thapar Institute of Engineering and Technology. His research interests include security, metasploit framework and security issues in IoT. He is an active researcher in field of security.

Application Of Curve Fitting in Classification and Compression of Hyperspectral Sensor Data

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There are various methods for lossless and lossy compression of hyperspectral images, acting in the spatial or spectral domain. Regarding the importance of spectral information in hyperspectral images, compression should be done in the way that this kind of information is well preserved. Compression methods are either of the predictive function or using of codebooks. Some transformation coding are discrete cosine transform (DCT), discrete wavelet transform (DWT), or principal component analysis (PCA), that is one of the most effective ways to eliminate image correlations and reduce their volume. In this lecture a curve fitting based method is applied exclusively to compress hyperspectral images. This method concentrates on the spectral signature of each pixel of a hyperspectral image to reduce the features by finding the closest approximation function to express the curve and storing its coefficients as new features. The algorithm can be implemented pixel by pixel, hence increases the speed of compression process. This method has good results alongside previous methods such as PCA. However, the approximate curve has severe distortion in some points. But, we try to improve approximation and eliminate these distortions by different approaches such as finding the place of distortions and breakdown the SCR to a number of sub intervals, using Savitsky-Golay smoothing filter, or combining these techniques. The proposed methods, besides eliminating the distortion, dramatically improved PSNR of the reconstructed image. Experiments have been performed by using three well-known hyperspectral data sets and results demonstrate the power of the suggested methods. Also, the quefficients of fitted curves play a fantastic roll for classification of different land covers in hyperspectral images. In fact, these quefficients can be considered as new features for an ML classifier and yields to very good classification results.

IOT For Sustainable Smart Cities

S. P. Sangeetha[1], R. Divahar[2] and P. S. Aravindraj[2]

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Internet of Things (IOT) plays a significant role as a result of the rapid advancement in sensing and construction technology as well as the requirement for the creation of smart cities. The development of smart cities employing IOT applications such as smart packaging, smart waste management systems, smart lighting, intelligent environmental monitoring using sensors, smart transit, and intelligence public safety has made the building sector more environmentally friendly and effective. There is a discussion concerning the technology's limitations and potential. The lives of the people can be improved,if smart cities are constructed in an organized manner with appropriate planning and analysis. Future fulfillment of protection and privacy requirements will allow us to reap the benefits of the implementation of smart cities.In the future, when smart cities are built, we will have the finest quality environment because smart houses are implemented safely and are properly interconnected. Additionally, it will entice foreign investors to fund the businesses in our nation. It will result in the social, economic, and rural growth of our nation on a global scale. This research study explores new IOT application directions for developing sustainable smart cities. With the use of case studies, the primary barriers to the deployment of smart cities utilizing IoT were highlighted. It was determined that data security concerns and interoperability between IoT devices are the main challenges.

Biography

Dr.S.P.Sangeetha is Vice Principal Academics and Professor in Department of Civil Engineering. She is a Civil Engineer mastered in Structural Engineering. She has completed her Ph.D in Concrete Technology. Her areas of research interests are Concrete Technology, Design of Structures, Rehabilitation of concrete structures and Sustainable construction. She is the Chairperson for Civil Engineering Board, VMRF. She is an active member in Professional societies like American Concrete Institute, ISTE, IAENG,ACCE,Chennai Civil Engineers Association,etc. She has authored more than 50 Research articles indexed by Scopus, Web of Science and peer reviewed Journals.She has received several awards towards on account of her leadership and Educational excellence, to mention few:"Education Leadership Award 2022" from Glantor X pvt.Ltd; "VMRF Women Leadership awards 2021" from VMRF ;"Young Dynamic Woman Performer of the year -2020", from Global Awards, "Manitha Neyam Award– 2020" from Alaigal foundations;Academic Leadership Award" from International Glad Heads up awards 2021;"South Indian Women Achiever Award-2019" ; "Best Teaching Faculty Award" from DKIRF ;Recognition faculty Award" twice from Rotary club (2019 &2020) and Best Faculty Coordinator Award in 2021&2022.

Circular Economy: New Opportunities in Sustainable Nano Materials and Polymer Bio-Nanocomposites

SABU THOMAS

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Green chemistry started for the search of benign methods for the development of nanoparticles from nature and their use in the field of antibacterial, antioxidant, and antitumor applications. Bio wastes are eco-friendly starting materials to produce typical nanoparticles with well-defined chemical composition, size, and morphology. Cellulose, starch, chitin and chitosan are the most abundant biopolymers around the world.   All are under the polysaccharides family in which cellulose is one of the important structural components of the primary cell wall of green plants. Cellulose nanoparticles (fibers, crystals and whiskers) can be extracted from agrowaste resources such as jute, coir, bamboo, pineapple leafs, coir etc. Chitin is the second most abundant biopolymer after cellulose, it is a characteristic component of the cell walls of fungi, the exoskeletons of arthropods and nanoparticles of chitin (fibers, whiskers) can be extracted from shrimp and crab shells. Chitosan is the derivative of chitin, prepared by the removal of acetyl group from chitin (Deacetylation). Starch nano particles can be extracted from tapioca and potato wastes. These nanoparticles can be converted into smart and functional biomaterials by functionalization through chemical modifications (esterification, etherification, TEMPO oxidation, carboxylation and hydroxylation etc) due to presence of large amount of hydroxyl group on the surface. The preparation of these nanoparticles includes both series of chemical as well as mechanical treatments; crushing, grinding, alkali, bleaching and acid treatments. Transmission electron microscopy (TEM), scanning electron microscopy (SEM) and atomic force microscopy (AFM) are used to investigate the morphology of nanoscale biopolymers. Fourier transform infra-red spectroscopy (FTIR) and x ray diffraction (XRD) are being used to study the functional group changes, crystallographic texture of nanoscale biopolymers respectively. Since large quantities of bio wastes are produced annually, further utilization of cellulose, starch and chitins as functionalized materials is very much desired. The cellulose, starch and chitin nano particles are currently obtained as aqueous suspensions which are used as reinforcing additives for high performance environment-friendly biodegradable polymer materials. These nanocomposites are being used as   biomedical composites for drug/gene delivery, nano scaffolds in tissue engineering and cosmetic orthodontics. The reinforcing effect of these nanoparticles results from the formation of a percolating network based on hydrogen bonding forces. The incorporation of these nano particles in several bio-based polymers have been discussed. The role of nano particle dispersion, distribution, interfacial adhesion and orientation on the properties of the ecofriendly bio nanocomposites have been carefully evaluated.

Investigation Of NACA2412 Airfoil Blade for Modelling, Simulation And Experimental Validation

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Rapidly growing needs for alternate fuels created an option for the sources like Wind turbines. The choice of the airfoil blade for turbulence modelling, simulation, and experimental validation is one of the most demanding phenomena required by researchers The applicability of turbulence modelling upon various parameters of inflow boundary layer under steady-state acting on the NACA2412 airfoil blade is observed. The results of simulation of the behaviour of applied wind velocity to airfoil blade is compared with the experimental data. Various airfoil blades have been presented to evaluate the turbulence models. The K-ω SST model is the most suitable for the NACA0012 airfoil blade and the Spalart-Allmaras model for NACA0015 airfoil blade. In present study the K-ε realizable model is adopted for the NACA2412 airfoil blade. Turbulence behaviour of the blade has an appreciable variation at angle of attacks between 12.5° to 15°. The values of parameters such as the lift and drag coefficients are the most important features which can be evaluated at various angles of attacks. The experimental model of NACA2412 airfoil blades validated with the x-foil predictions and the computational fluid dynamics results.

Table Comparison of the angle of attack and the lift coefficient

AoA,α	Speed(m/s)	C_l X-foil	C_l Exp	C_l CFD
0	25	0.2623	0.228	0.177437
2.5	25	0.5637	0.725	0.164043
7.5	25	0.9979	0.88	0.368967
10	25	1.1784	1.131	0.724266
12.5	25	1.261	1.227	1.031272
15	25	1.0377	1.093	1.103948
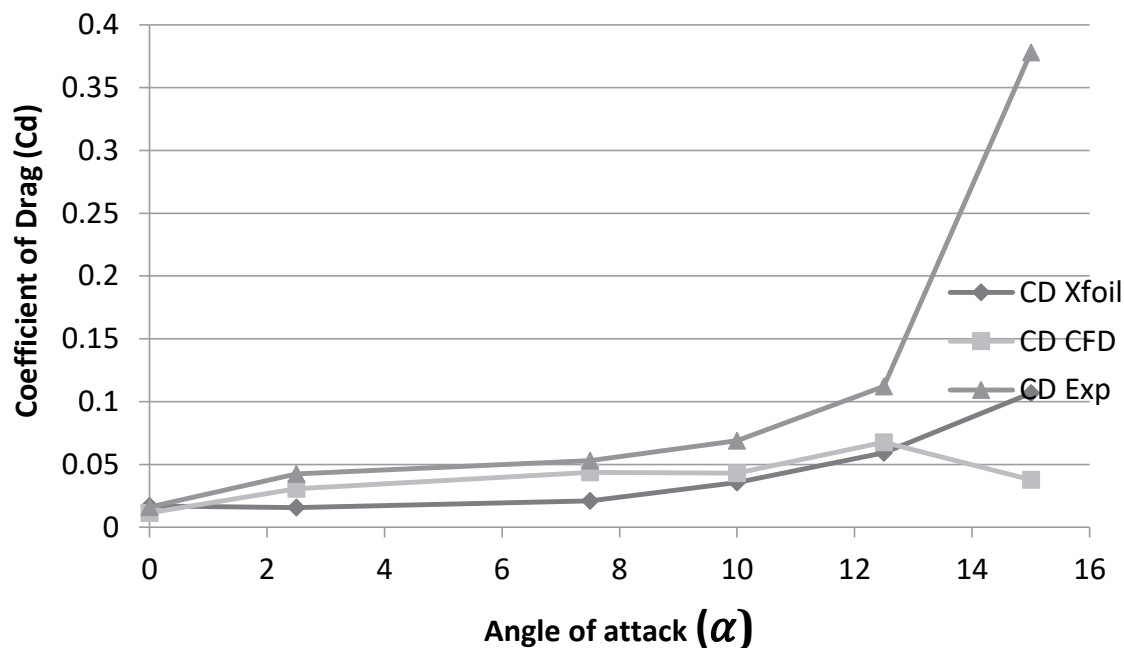
Figure Comparison of the Drag coefficient versus the angle of attack at Re=3·105

The drag coefficient Cd versus the angle of attack □ shown in Figure is compared significantly in three cases of the experimental, X-foil prediction and CFD. A dramatically change in the behaviour in three situations observed at an angle of attack more than 12.5º which is due to the stall conditions. The flow is transformed from laminar to turbulent one. Table is predicting the drag coefficient against the angle of attack.

Biography

I started my career from 2008 as a Production Engineer from the Industry of Home appliances. Afterwards, joined the Qadri group of companies as a Planning Engineer. Academic activities as a lecturer, introduced from 2010 onwards and joined Technical Education and Vocational Training Authority. Appointed as Assistant Professor in 2011 with affiliation from University of Engineering and Technology. Completed my Master Degree in 2014 and get started my PhD in 2017. I taught many Engineering subjects covering a wide range of fields. My area of specialization is designing and analysis of airfoil blades with utilization of renewable energy. Now a days, working upon new horizons of design and development. Publications in the prescribed area are going on. One of the recent publication will be presented in this congress.

Permissioned Blockchain

Sandeep Saxena

Greater Noida Institute of Technology, Greater Noida

A blockchain is an immutable transaction ledger, maintained within a distributed network of peer nodes. These nodes each maintain a copy of the ledger by applying transactions that have been validated by a consensus protocol, grouped into blocks that include a hash that bind each block to the preceding block. A permissioned blockchain is a distributed ledger that is not publicly accessible. It can only be accessed by users with permissions. The users can only perform specific actions granted to them by the ledger administrators and are required to identify themselves through certificates or other digital means.

Biography

Prof. (Dr.) Sandeep Saxena is working as Professor and HOD-CSE in Greater Noida Institute of Technology, Greater Noida, Uttar Pradesh, INDIA. He has received his Ph.D. degree in CSE from NIT Durgapur, West Bengal. He has received his MS degree in Information Security from the Indian Institute of Information Technology, Prayagraj. He has received his B.Tech. degree in CSE from U.P.T.U. Lucknow. He has more than 15 Years of Teaching and Research Experience. His areas of interest and research include Security and Privacy in Blockchain Technology and Cloud Computing, Architecture Design for Cloud Computing, Access control techniques in Cloud Computing and Blockchain Technology.

He has performed the role of a key member in more than 10 International Conferences as Keynote Speaker/Organizing Secretary/ Organizing Chair/ Session Chair. He has written 3 technical books for UP Technical University, Lucknow, and published multiple research papers in reputed international journals and conferences. He has published more than 30 research papers in reputed peer-reviewed journals/conferences indexed by (Scopus, SCIE, Google Scholars, DBLP) with high impact factors, more than 10 Patents published, and 2 Patents are granted. He is participating in multiple professional societies like IEEE (Senior Member), IAASSE (Senior Member), Life Time Member in CSI, and Life Time Member in CRSI.

He has been working for various research & development Activities, University Syllabus Design, and mentoring innovation and incubation related developments to students. He has served as reviewer and member of editorial boards of several prestigious Conferences/Journals /Transactions like IEEE, SPRINGERS and other Scopus Indexed International Journals. He was contributory in various prestigious Accreditations bodies like NAAC, NBA, and others.

Remote Sensing of Seismo-Ionosphere Precursor Using GPS

Sanjay Kumar and Arti Mishra

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Earthquake, a natural phenomenon causes huge destruction to human life, material properties, eco system and environment. Even regional structural changes may also occur. Therefore, to reduce losses it is essential to develop earthquake prediction technique both at the short and long time scales. The long time scale prediction seems to be difficult due to very weak (unobservable) signal during the early preparatory stage of earthquake. Present studies are carried out to develop techniques for short time prediction Total electron contents (TEC) derived from ground based GPS signals are analyzed to study the ionospheric perturbations due to earthquake in Nepal (28.6°N, 84.1°E, M=7.9) using spectral analysis as well as statistical method. The main shock of this earthquake was occurred at 06:11:25 UT on 25 April 2015. The anomalous perturbations in the TEC were observed from few days to few hours prior to the main shock of the earthquake. Perturbation depends on distance as well as direction of observation point from the epicenter. In addition to ionospheric perturbations, the wave-like features in detrended TEC (DTEC) were also identified. The spectral analysis of DTEC data showed an efficient tool to distinguish the perturbation between seismic induced perturbations from other sources. In addition to ionospheric perturbations, the wave-like features in DTEC were also identified. The wave like oscillation occurs few days to few hours before the main shock and associated periodicities in DTEC data varies from 20 min to more than 100 min

Biography

Dr. Sanjay Kumar is currently working as a ASSISTANT PROFESSOR in the Department of Physics, Nehru Gram Bharti (Deemed to be University), Prayagraj-221505 India. He did his MSc and PhD degree in Physics from BHU. His research interest includes ionospheric TEC perturbations, space weather impacts, scintillation, HF ray tracing, aerosol radiative forcing and its climatic implication, water vapor studies, and its dependence on meteorological parameters using ground and satellite data. Dr. Kumar has published around 60 research papers in national/ international journals.

SDN-based DDoS Attacks Detection and Mitigation using NECOMAtter

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With the advancement of networking, network attacks are increasing day-by-day. Distributed Denial of Service (DDoS) attacks are the most mitigating cyber-attacks in cloud computing. A Distributed Denial of Service attacks are well-known as an effort to create a network or server resources unattainable for the legitimate operators. These attacks are comparatively straightforward to accomplish, hard to protect against, and therefore, the attacker isn't copied back. The main problem for DDoS attacks is that such attacks constrain links on the internet. It is hard to defend the against a DDoS attack on a single network. Attack traffic can potentially be transmitted from anywhere in the world. The purpose of this study is the detection and mitigation of DDoS attacks by means of Software Defined Networks (SDN) for the protection of network security. A blend of the prevailing detection techniques and management of SDN forms a brand innovative method of DDoS mitigation in forthcoming generation networks. In this study, an NECOMAtter is used as a curator to monitor and post information of filtered malicious data packets to mitigate DDoS attack in SDN. The outcomes of the NECOMAtter based SDN for DDoS mitigation filtering malicious traffic and improve resilience against the DDoS attacks. The proposed can be applied to ISPs or Consumer Scale Networks (CSN).

Flash flood susceptibility Modelling using integrated Fluvio-morphological and Geo- hydrological approaches: A study of Highland River System in Hindu Kush Region

Shakeel Mahmood

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In Hindu Kush region, Geological and hydro-meteorological hazards are recurrent. Flash flood is one of the disastrous and recurrent hydro-meteorological hazards in Hindu Kush causing life losses, physical and socio-economic damages. This study aims flash flood susceptibility modelling by applying Fluvio-morphological and Geo- hydrological approaches in Hindu Kush Region. Watershed modelling approach is implemented to delineate the target watershed, sub-watersheds, and extract drainage network by utilizing Shuttle Radar Topographic Mission (SRTM) Digital Elevation Model (DEM) as an input data in geographic information system environment (GIS). Sub-watersheds were delineated using threshold of 30km2. The flvio-morphological parameters of each sub-basin were computed by utilizing Hortonian, Schumm, and Strahler flvio-morphological laws. Surface run-off depth of each sub-basin is estimated by applying Natural Resource Conservation Service Curve Number (NRCS) spatial hydrological model. Resultants were integrated by implementing weighted overlay analysis technique and susceptibility map is obtained. The resultant map was analysed and categorized into very high to very low susceptible zones. Spatially, the very high susceptible zone is located in the upstream areas, characterized by snow covered peaks, steep gradient and high drainage density and geologically dominated by igneous and metamorphic structures. Analysis indicated that flash flood susceptibility is directly increases with increasing surface run-off and morphometric ranking number. The approach is applicable for any watershed. Findings of the research can facilitate the policy makers to initiate flood-risk reduction strategies in highly susceptible areas.

Machine Learning Driven Mental Stress Detection on Reddit Posts Using Natural Language Processing

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The ubiquity of social media platforms offers unprecedented opportunities for detecting and addressing mental health issues at an early stage. This paper focuses on the detection of stress-related posts on Reddit, a popular social media blog site, using machine learning models and various embedding techniques. By leveraging natural language processing (NLP) tools such as ELMo word embeddings, BERT tokenizers, and the Bag of Words (BoW) approach, the authors preprocess and classify user posts to uncover patterns in the social media activity of individuals diagnosed with mental disorders. The achieved results, discussed in this paper, demonstrate a remarkable F1 score of 0.76, precision score of 0.71, and recall of 0.74 when employing solely preprocessed texts and machine learning algorithms for post classification. These results hold great significance and have the potential for real-world applications in analyzing mental stress among social media users. While this study concentrates on data from Reddit, the techniques employed can be transferred to similar social media platforms, offering a potential solution to the escalating mental health crisis.

Biography

Shaunak Inamdar is a recent graduate from Symbiosis Institute of Technology, India and he is currently pursuing a Master's in Computer Science from Arizona State University, USA. He has been an undergraduate researcher at Symbiosis Center for Applied AI (SCAAI) where his research has mainly focused on Natural Language Processing, Generative AI and the industry applications of Machine Learning. He has authored two research papers in this field and has been a part of industry-funded consulting projects throughout his undergraduate degree.

Shaunak also publishes blogs on cutting edge AI technology on his webpage. His aim for writing these blogs is to make AI more accessible to the general public and help them understand the workings of these complex systems. Shaunak has been invited to numerous conferences in the past including the World Business Dialogue in Germany (2022) and Harvard Project for Asian and International Relations (2021).

GNSS Meteorology for Extreme Precipitation Forecasting in Hilly Region: Initial Results from Newly Established Uttarakhand (UK) Continuously Operating GNSS Reference (CORS) Network, Survey of India (SOI)

Shivika Saxena, Sumit Pandey and Ramji Dwivedi

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The precipitable water vapor (PWV), an essential climate variable (ECV), has been frequently measured using Global Navigation Satellite System (GNSS) with high precision and all-weather operability. This study highlights the importance of local-level PWV analyses using a dense geodetic GNSS CORS network (mean interstation distance < 60 km) in predicting a severe storm event, and the use of multi-GNSS observations (GPS and GLONASS) compared to GNSS-only observations. The multi-GNSS processing fully exploits the potential of observations from all currently available GNSSs, significantly increasing the number of satellites and optimizing the observation geometry as compared to GNSS-only processing. This results in a more accurate and robust PWV monitoring during extreme rainfall. In a first, observations from selected four stations of a recently installed network of Continuously Operating Reference Stations (CORS) across Uttarakhand by SOI, are used to investigate the spatiotemporal features of GNSS-derived PWV under severe rainfall events of 18-19 October 2021 in Uttarakhand. The GNSS only and multi-GNSS PWV estimates with a decent buildup period, show the correlated peaks and dips in the vicinity of extreme rainfall events which is also verified by water vapor radiance satellite images from INSAT 3DR imager as well as validated using PWV estimates from ERA5 reanalysis data. The multi-GNSS PWV estimates show comparable root mean square error (RMSE) with GNSS-only observations for rainy days, which gets better for non-rainy days, when validated with ERA5 PWV. In the absence of consistent radiosonde data, ERA 5 reanalysis dataset is used for validation, although it fails to represent the true PWV scenario in a hilly terrain like UK, giving a conservative representation of the severe water vapor disturbance during the event. The time series analysis with precipitation data from automatic weather stations (AWS) shows that the PWV variation correlates well with the evolving storm (development and dissipation), as well as the movement of storm from station to station. The study demonstrates that the results of Precipitation-PWV-correlation analyses are consistent with rainfall patterns over Uttarakhand's dense network. The hourly GNSS-derived local PWV measurements in our study can depict the fast-evolving rainfall events with PWV slopes >1mm/hr during the rise and dip associated with the rainfall peaks and thus are quite useful in the short-term forecasts of precipitation. The direct relationship of PWV variations with the rainfall measurements hence can be used as a precursor to an extreme rainfall event.

Biography

I am a research scholar pursuing doctoral degree in Geoinformatics at Motilal Nehru Institute of Technology (MNNIT) Allahabad, India. I completed my masters in technology in Civil Engineering from Indian Institute of technology, Kanpur, India. I am working on GNSS and other earth observation satellite data for monitoring atmospheric water vapor.

Slotted Substrate Integrated Waveguide Array Antenna For 5G MIMO Applications

Swarnadipto Ghosh[1] and **Ayona Chakraborty[2]**

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The fifth-generation (5G) of wireless communications is bolstered by the set of crucial technologies which permits to realize the growing data rate, efficiency, and connectivity demands of various networks. Substrate integrated waveguide (SIW) has become a very capable technology to incorporate in mm-wave 5G and mid-high bands 6G applications. It has high gain, massive power handling capability and provide miniaturized designs. In the present work unique arithmetically approved slotted SIW array antenna structures with slot-positions are exhibited. Statistical distributions have been mathematically modeled to represent the offset co-efficient of the magnetically coupled rectangular slots of the SIW antenna. Statistical distributions viz. Uniform, Exponential and Rician and Expo-Gaussian with various angular orientations and its effect on the radiation characteristics have been thoroughly investigated. The co-efficient of respective statistical distribution is used as an offset, angular rotation of the slot provide side lobe level (SLL) and half power beam width (HPBW) reduction. The pdf of the above mentioned distributions have been applied for the offset (Δg) definition whereas a progressive arithmetic progression (AP) is used for angular rotation (θ) of slots.
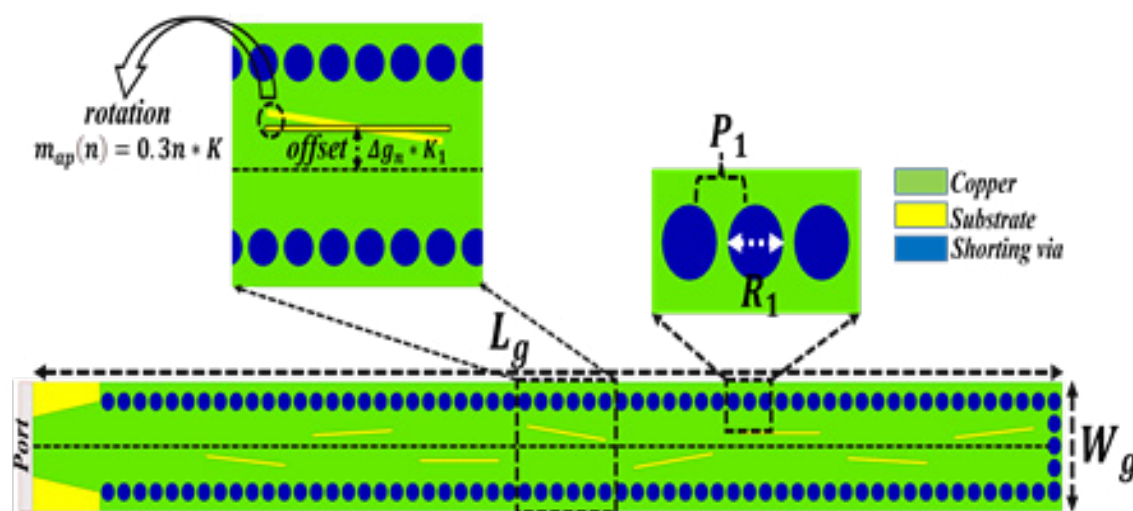

Fig.1. Schematic diagram of the proposed slotted substrate integrated waveguide (SIW) antenna

Fig 1 shows the maximum range from the center axis of the SIW is 1.5mm in each side. To make an optometric analysis on the offset for different statistical distribution, a multiplication factor m1 =1.5*K1 has been introduced with respective distribution offset co-efficient (Soff). To incorporate the angular rotation (θ), a multiplication factor m2 =0.3*K has been introduced in arithmetic progression (AP). Evidently both the offset and rotation distribution are symmetric about the vertical center line of the SIW antenna array. The variation on SLL and HPBW (refer Fig. 2) are controlled by the parameters K and K1 and has been further deduced into a customized designed nth order mathematical equation improved to achieve -20dB SLL drop and 11.5° HPBW.
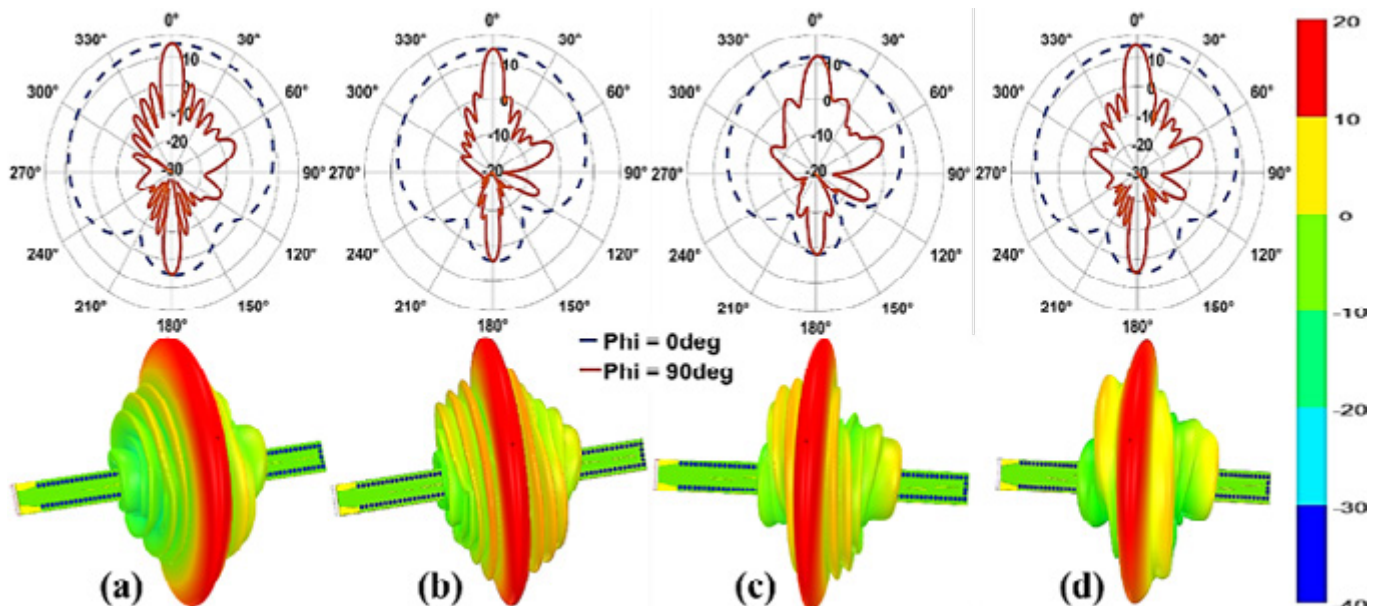
Fig.2. 2D and 3D radiation patterns for appropriate basis vector combination

Biography

SWARNADIPTO GHOSH (M'22) is an M.Tech student of RF and Microwave Engineering branch in Department of Avionics at Indian Institute of Space Science and Technology (IIST), Thiruvananthapuram. He completed his B. Tech degree in Electronics and Communication Engineering (EC) from Dream Institute of Technology (DIT), Kolkata in May 2022. His research interest includes the holographic beamforming metasurfaces, metamaterials, electromagnetic bandgap structures, ultra-wideband antennas, beam steering active metasurface for 5G/6G technology & beam forming applications etc.

Implementation Of Hybrid Optimized Deep Learning Algorithms for Identification and Analysis of Human Motion Behind the Wall Using IR-UWB RADAR

Thottempudi Pardhu[1,2] and **Vijay Kumar[2]**

[1]*BVRIT HYDERABAD College of Engineering For Women, India*
[2]*Vellore Institute of Technology, India*

This comprehensive study puts forward innovative approaches for identifying targets hidden behind walls under diverse circumstances, detecting vital signs behind obstacles, recognizing human movements, and classifying human movements, all of which play vital roles in surveillance, emergency response, and healthcare. Our research uses advanced imaging techniques, efficient clutter reduction methods, sophisticated sensor technology, and advanced machine learning algorithms.

First, it is capitalized on the simplicity and efficacy of the Back Projection algorithm for through-wall imaging (TWI) under varied conditions. To tackle the major challenge of clutter interference, which can compromise target identification, we integrate Singular Value Decomposition (SVD) in our system. SVD's knack for separating signal subspaces enhances through-wall image quality, thereby boosting the efficiency of target identification.

Secondly, our research delves into the promising realm of detecting vital signs obscured by walls, employing stepped-frequency continuous-wave radar (SFCWR). We address the target signal and clutter differentiation challenge using the threshold skewness method. This approach exploits statistical differences between target and clutter signals, resulting in heightened precision in vital sign detection.

Moreover, we propose a novel fusion of technologies, employing Walabot for initial target detection and Kinect for detailed motion analysis. This comprehensive system improves human recognition accuracy behind walls and paves the way for the evolution of sophisticated surveillance and detection systems.

Finally, an innovative technique to classify human motion behind barriers was introduced. The strengths of the Spotted Grey Wolf Optimizer (SGWO) and the Random Multimodal Deep Learning (RMDL) were combined to create a robust and accurate model. The obtained findings indicate superior precision and efficiency of the SGWO-based RMDL method in classifying human movements, thereby catalysing the creation of more sophisticated systems for human motion analysis and classification.

In conclusion, this study offers valuable insights and efficient solutions to several challenges in through-wall imaging, vital sign detection, human identification, and movement classification. The results obtained not only lead towards future research and development in this field but also aid in the development of more efficient monitoring and detection systems.

Biography

Pardhu Thottempudi, originally from the village of Luxettipet in Adilabad district, Telangana state, India, gained membership to IEEE in 2015. He commenced his academic journey with a Bachelor's degree in Electronics and Communication Engineering from MLR Institute of Technology, Hyderabad, India, completed in 2011. Further advancing his knowledge, he attained a Master's in Embedded Systems from Vignan's University, Vadlamudi, in 2013.

Thottempudi Pardhu is undertaking a PhD focused on RADAR signal processing at VIT University. His research delves into Human Motion Analysis Behind Walls using Optimized Deep Learning Algorithms, a testament to his interest in Digital Signal Processing, RADAR communications, embedded systems, and the practical application of signal processing in FPGA.

Since March 2023, Thottempudi Pardhu has held the position of Assistant Professor in the Department of Electronics and Communication Engineering at BVRIT HYDERABAD College of Engineering for Women, Hyderabad, India. He has 10+ Years of experience in teaching. His professional experience also includes a stint as a Project Intern at Research Center Imarat, Hyderabad.

Thottempudi Pardhu's academic contributions include over 35 research papers in VLSI, image processing, antennas, signal processing, and RADAR communications, published in respected international journals and presented at various IEEE conferences.

In addition to his IEEE membership, he is a lifetime member of ISTE and, since 2015, an associate member of IETE. He also holds memberships with IAENG and ISOC. Thottempudi contributed as a reviewer for several internationally recognized journals, including WSEAS Transactions and AIRCCSE.

Simulation And Analysis of The Half Car Model Suspension System Under Dynamic Conditions by Designing PID And an LQR Controller with Expected and Random Road Inputs

W .Wudu, A. Mogninet and **M .Birhan**

Department of Mechanical Engineering, Mizan Tepi University, Ethiopia

The constantly growing topic of inventive vehicle system design is of interest to researchers. The difficulty stems from the ongoing requirement for advancement in vehicle handling, ride comfort, and driving dynamics. Based on a control method for ride comfort and vehicle handling, this study has proposed a mathematical model for a 4 DOF half-car active suspension system (ASS) employing PID and an LQR (Linear Quadratic Regulator) controllers. The task is simulated using MATLAB/Simulink software. The unsprung masses of the wheels' heave displacements, the vehicle's pitching displacements, and the sprung masses of its body's heave displacements are the regulated parameters. Compared to the antiquated passive suspension technology, its performance is superior (PSS). The simulation uses two bumpy sinusoidal roads and a random road input. Finally, the performance of the suggested controllers were demonstrated using simulation software. The results of the simulation demonstrate that this study has improved its modeling and control capabilities.

Energy Optimization for Optimal Location In 5G Networks Using Improved Barnacles Mating Optimizer

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[2]Biomedical Engineering Department, College of Engineering and Technologies, Al-Mustaqbal University College, Iraq
[3]Department of Software and Informatics Engineering, College of Engineering, Iraq
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[5]Department of Computer Science, Al-Turath University College, Iraq

I n recent years, wireless sensor networks have been studied in many applications. One of the important issues studied in these networks is the optimal placement of cells in order to achieve optimal energy consumption. Therefore, intelligent algorithms have been used in most research to achieve this goal.

In order to properly roll out 5G, the network must be able to handle the increase in data traffic. The essential aspects of resource allocation systems, such as scalability and throughput, are under too much stress due to the rising amount of traffic. In the present work, network planning is characterized by the optimal selection of the base station location and transmission power in 5G networks. Here, an Amended design of the Barnacles Mating Optimizer (ABMO) Algorithm is proposed and is employed to get higher efficiency in both terms of total connected users and transmit power saving for 5G networks. Therefore, the novelty of this study is in the use of an amended design of the Barnacles Mating Optimizer (ABMO) Algorithm. This amended design improves the accuracy and performance of the ABMO and makes it more effective in finding the best locations for base stations and changing

the power level for 5G networks. The amended design also offers several advantages over some other state-of-the-art algorithms and makes the ABMO useful for improving 5G networks Simulations of the proposed ABMO algorithm are then compared with some other state-of-the-art algorithms and the results showed the right location and changing the range of the power level for the proposed method.

The outcomes show that the suggested Amended Barnacles Mating Optimizer Algorithm statistically outperforms the original BMO, and some other methods based on DE, and RGA. The findings show that the t-value for BMO and the modified BMO is 4.339e-35 which is so better than that of DE and ABMOO with 1.926e-22, and for the RGA and ABMOO with 4.826e-32.

Biography

Zahra Mohammadnejad: was born in 1982 in Iran. she received the B.Sc. degree in Software Computer engineering and the M.Sc. degree in Information Technology-Computer Networking in 2004 and 2009, respectively, from Qazvin Azad University, Qazvin, Iran. She got Honorary Doctorate for Invention and Scientific Research from Global Universal Innovation.inc (GOIDI) and she has five years working experience as a senior Network engineer, she ran her company 10 years ago and now she is a chief executive officer in Vision Tech in Iran. She has researched in wireless sensor network various scops before as her master's thesis till now. She has got several golden medals in international competitions because of her inventions in High Tech technologies.

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