



*IEEE TECHNICALLY SPONSORED INTERNATIONAL SYMPOSIUM*

*OF*

**ASIAN CONTROL ASSOCIATION**

*ON*

**INTELLIGENT ROBOTICS & INDUSTRIAL AUTOMATION**

**IRIA 2021**

*19-22 SEPTEMBER 2021*  
*(Online)*

**PROGRAM SCHEDULE**



<b>Day 0 (Tutorials), 19 September 2021</b>	
<b>Tutorial – 1</b> <b>(09:00 to 12:00 IST)</b>	<b>Estimation and Fault Tolerance in Decentralized Network</b> <i>Arnab Maity, IIT Bombay</i>
<b>Tutorial – 2</b> <b>(14:00 to 17:00 IST)</b>	<b>Bio-inspired Sensing</b> <i>Amit K. Mishra, University of Cape Town, South Africa</i>
<b>Tutorial – 3</b> <b>(14:00 to 17:00 IST)</b>	<b>Linear Parameter Varying Systems and Control</b> <i>Sandip Ghosh, IIT BHU</i> <i>Abhilash Patel, IIT Delhi</i> <i>Shaikshavali Chitraganti, IIT Palakkad</i> <i>Satnesh Singh, Kyongpook National University, South Korea</i>

Day 1, 20 September 2021	
Inauguration	09:00 - 09:30 IST
Plenary Talk-1 (Kalyana Veluvolu, National University, South Korea)	09:30 - 10:30 IST
<i>Tea Break: 10:30-11:00</i>	
Parallel Sessions (3)	11:00 - 13:00 IST
<i>Lunch Break: 13:00-14:00</i>	
Plenary Talk-2 (Ghanim Putrus, Northumbria University)	14:00 - 15:00 IST
<i>Tea Break: 15:00-15:30</i>	
Parallel Sessions (3)	15:30 - 17:30 IST

Day 2, 21 September 2021	
Special Invited Talk (Manell Zakharia, French Naval Academy)	09:00 - 9:30 IST
Plenary Talk-3 (Shuzhi Sam Ge, NUS, Singapore)	09:30 - 10:30 IST
<i>Tea Break: 10:30-11:00</i>	
Parallel Sessions (3)	11:00 - 13:00 IST
<i>Lunch Break: 13:00-14:00</i>	
Parallel Session (3)	14:00 - 16:00 IST
<i>Tea Break: 16:00-17:00</i>	
Plenary Talk-4 (S. Jagannathan, Missouri University of Science and Technology)	17:00 - 18:00 IST

Day 3, 22 September 2021	
Plenary Talk-5 (D Sam Dayal Dev, ISRO Inertial Systems Unit)	08:00 – 09:00 IST
<i>Tea Break: 09:00-09:30</i>	
Plenary Talk-6 (Vinod A Prasad, Hong Kong University of Science and Technology)	09:30 - 10:30 IST
<i>Tea Break: 10:30-11:00</i>	
Parallel Sessions (3)	11:00 – 12:20 IST
Plenary Talk-7 (Vladimiro Miranda, University of Porto)	12:30 - 13:30 IST
<i>Lunch Break: 13:30-14:30</i>	
Panel Discussions (2)*	14:30 – 15:15 IST
Cultural Program	15:15 - 16:00 IST
Exposure to ACA and ACDOS, Concluding Ceremony	16:00 IST

\* Details will be uploaded in the IRIA 2021 website.

### Parallel Sessions of Technical Tracks:

Date and Timings	Morning			Afternoon		
	Session-1	Session-2	Session-3	Session-1	Session-2	Session-3
20 September 2021	Autonomous Vehicles-I (11:00 to 13:00 IST)	Autonomous Vehicles-II (11:00 to 13:00 IST)	Power System and Automation-I (11:00 to 13:00 IST)	Power System and Automation-II (15:30 to 17:30 IST)	Control and Computing-I (15:30 to 17:30 IST)	Control and Computing-II (15:30 to 17:30 IST)
21 September 2021	Control and Computing-III (11:00 to 13:00 IST)	Control and Computing-IV (11:00 to 13:00 IST)	Control and Computing-V (11:00 to 13:00 IST)	Intelligent Robotics-I (14:00 to 16:00 IST)	Intelligent Robotics-II (14:00 to 16:00 IST)	Industrial Automation-I (14:00 to 16:00 IST)
22 September 2021	Industrial Automation-II (11:00 to 12:20 IST)	Industrial Automation-III (11:00 to 12:20 IST)	Industrial Automation -IV (11:00 to 12:20 IST)			

Plenary Talk-1				
Name	Affiliation	Title/Abstract of the Talk	Date	Time
Kalyana Veluvolu	School of Electronics Engineering, National University, South Korea	Precision, robustness, dexterity, and intelligence are the design indices for current generation surgical robotics. To augment the required precision and dexterity into microsurgical work-flow, hand-held robotic instruments are developed to compensate physiological tremor in real-time. The active compensation is challenging due to the time-varying unknown delay introduced by hardware (sensors) and software (causal linear filters) that adversely affects the device real-time performance. The current techniques for 3D tip position control rely on modeling and canceling the tremor in 3-axes (x, y, z) separately. Our recent findings show significant correlations in tremor across the three dimensions (x, y, z) and the grip force (f). This talk will first introduce the challenges and present our research efforts on multi-dimensional (3D and 4D) tremor modeling that show improved performance.	20-09-2021	9:30 to 10:30 IST

**Plenary Talk-2**

<b>Name</b>	<b>Affiliation</b>	<b>Title/Abstract of the Talk</b>	<b>Date</b>	<b>Time</b>
Ghanim Putrus	Electrical Power Engineering, Department of Electrical Engineering, Northumbria University	Energy and transport sectors are undergoing significant changes. With the increased concern about climate change, the interest in renewable energy generation and electric transport is continually increasing. Integrating electric supply and transport systems is the way forward to reduce their high carbon footprint, improve the environment and provide sustainable energy and transport. Smart technologies and automation are currently available to provide the necessary means to support this integration. This talk will give an overview of recent developments in the electricity supply and electric transport systems, and the role of artificial intelligence and automation in supporting their integration. The focus will be on the opportunities and emerging smart grid technologies that will help maintain reliable and affordable electricity and transport systems whilst improving their efficiency and lowering their environmental impacts.	20-09-2021	14:00 to 15:00 IST

**Plenary Talk-3**

Name	Affiliation	Title/Abstract of the Talk	Date	Time
Shuzhi Sam Ge	Department of Electrical and Computer Engineering, NUS, Singapore	<p><b>Abstract:</b> In the literature of control science and engineering, we are more concerned with convergence of the states of any dynamic systems, and gradually pay attention to academically challenging and practically relevant finite time convergence where finite- time control drives the states converge within a certain time moment, regardless of how each state element converges even though it is an very important and critical issue in many accurate, precise and delicated operations. In this report, we first introduce various fundamental and basic ideas of time-synchronized control, moving the boundary well beyond the well-established notions and outcomes of standard “finite-time stability”. Then, we introduce a control problem with unique finite/fixed-time stability considerations, namely time-synchronized control, where all the system state elements converge to the origin at the same time. Finally, we share with you more nice properties for this interesting time-synchronized property attained, e.g., shortening the travel length and reducing the energy consumption. We welcome interest excellent individuals further push the boundary further beyond!</p>	21-09-2021	9:30 to 10:00 IST

**Plenary Talk-4**

Name	Affiliation	Title/Abstract of the Talk	Date	Time
Sarangapani Jagannathan	Department of Electrical and Computer Engineering, Missouri University of Science and Technology, United States	Machine learning (ML)/artificial intelligence (AI) is making advances faster that the society is able to absorb, understand and assimilate them in areas such as image recognition, natural language processing, and data analytics; at the same time feedback control that employ AI and ML are becoming more pervasive and critical. Today, application of learning controllers can be found in areas as diverse as process control, energy or smart grid, civil infrastructure, healthcare, manufacturing, automotive, transportation, entertainment, and consumer appliances. Moreover, controllers designed in discrete-time have the important advantage that they can be directly implemented in digital form using modern-day embedded hardware. Unfortunately, discrete-time design using Lyapunov stability analysis is far more complex than the continuous-time counterpart since the first difference in Lyapunov function is quadratic in the states and not linear as in the case of continuous-time. Further, optimal control of uncertain linear or nonlinear dynamic systems is a major challenge. By incorporating learning feature, optimal adaptive control of such uncertain dynamical systems in discrete-time can be designed. In this talk, an overview of first and second-generation feedback controllers with learning component in discrete-time will be discussed. Subsequently, the discrete-time learning-based optimal adaptive control of uncertain nonlinear dynamic systems will be presented in a systematic manner using a forward in time approach based on reinforcement learning (RL)/approximate dynamic programming (ADP). Challenges in developing the three generation of learning controllers will be addressed using practical examples such as automotive engine emission control, robotics and others. The talk will conclude with a short discussion of open research problems in the area of deep learning based control.	21-09-2021	17:00 to 18:00 IST



**Plenary Talk-5**

Name	Affiliation	Title/Abstract of the Talk	Date	Time
D Sam Dayal Dev	Distinguished Scientist/Director, ISRO Inertial Systems Unit, Thiruvananthapuram	Robotics is becoming increasingly popular in the space sector and finding good market share in upcoming technology areas of On Orbit Operations (O 3) and interplanetary explorations. Space robots are mainly classified into two categories - free flying Robots, which are micro/Nano class satellites equipped with robotic arms and/or their constellations and – anthropomorphic rugged Humanoid robots,with longer sustenance capability in hostile environments. When it comes to near space operations such as on orbit servicing, refuelling, debris capture, assembly of large structures in space and earth observation, the free flyers are a favourite due to their quick turn-around time, versatility and substantially reduced costs. To serve as assistants for exploration missions and for sustainable infrastructure development in interplanetary missions, the Humanoids would fare well with their ability to work in human engineered environments. However, to leverage the utility of robotics in space sector, many critical technologies need to be specifically mastered and several existing ones have to be miniaturised especially in areas of sensors, actuators, antenna systems,Inter-satellite communications, propulsion systems, navigation and control. The advent of AI into space also throws open a plethora of possibilities to improve the autonomy and intelligence of these class of robotic probes. The talk will address the requirements and challenges in the Navigation, Guidance and Control of the small satellites, the state-of-the-art sensors and actuators used, recent trends in navigation, challenges in manipulation of robotic arms in space,applications of AI in automatic diagnostics based on Telemetry as well as the potential research areas for future of small satellites. The talk will also dwell on the technologies that would be demonstrated in the Smart Space Robot - Technology demonstrator satellite developed by ISRO.	22-09-2021	8:00 to 9:00 IST

**Plenary Talk-6**

<b>Name</b>	<b>Affiliation</b>	<b>Title/Abstract of the Talk</b>	<b>Date</b>	<b>Time</b>
Vinod A Prasad	Department of Electronic and Computer Engineering, Hong Kong University of Science and Technology	Brain-Machine Interfaces are systems that translate the user's thoughts (intentions) coded by brain activity measures into actions through a control signal without using activity of any muscles or peripheral nerves. These control signals can potentially be employed to substitute motor capabilities (e.g. brain-controlled prosthetics for amputees or patients with spinal cord injuries, brain-controlled wheel chair); to help in the restoration of such functions (e.g. as a tool for stroke rehabilitation), to enable alternative communication (e.g. virtual keyboard, speller etc.) for those who are disabled or otherwise unable to communicate, and other applications such as serious games for enhancing cognition skills. This talk will provide an overview of Brain-Machine Interface (BMI), research challenges and potential applications. The talk will cover some selected non-invasive BMI research work from our group, which includes motor imagery decoding for stroke rehabilitation, neurofeedback computer games for improving the attention and cognitive skills, detection of familiarity from brainwaves (possible applications in psychology, criminal investigation etc.), biometric identification, Error-related Potentials and its applications. The talk will conclude highlighting potential future BMI research topics.	22-09-2021	9:30 to 10:30 IST

**Plenary Talk-7**

Name	Affiliation	Title/Abstract of the Talk	Date	Time
Vladimiro Miranda	Department of Electrical and Computer Engineering, INESC TEC and University of Porto, Porto, Portugal	<p>The large scale integration of new renewables in power and energy systems is a source of hope, in the context of decarbonisation and fight against global warming, but creates at the same time new challenges. Meanwhile, systems are becoming more equipped than ever to deal with secure operation issues, as a diversity of sensors, with extremely different characteristics and data collection rates, are becoming of widespread adoption. This pervasive monitoring goes from high-frequency data collection from PMUs to low rate smart meters as well as historical and forecasted values. This creates a level and density of monitoring and surveillance of the power system that moves concepts into the 4.0 realm, where systems become conducted more based on data than based on a priori models. This talk will address new trends in building accurate system awareness representations at power system control centres, by creating an internal mapping of the external world with contributions of different types of measurements from distinct types of sensors. This representation must be resilient to bad data and malicious cyber-attacks. The information fusion process resorts to a combination of classical mathematical models, information theoretic learning concepts and Bayesian inference processes, so that system awareness may be developed at distinct levels of aggregation and along distinct time scales, including awareness of system dynamics at 20 ms steps and diagnosing possible causes from novelty events. While the talk is focused on power systems, the concepts are general and can be transposed to other domains where operation or navigation require state estimation or environment awareness at different levels of aggregation.</p>	22-09-2021	12:30 to 13:30 IST

<b>Day 0 (Tutorials), 19 September 2021</b>	
<b>Tutorial – 1</b> <b>(09:00 to 12:00 IST)</b>	<b>Estimation and Fault Tolerance in Decentralized Network</b> <i>Arnab Maity, IIT Bombay</i>
<b>Lunch Break: 12:00 to 14:00</b>	
<b>Tutorial – 2</b> <b>(14:00 to 17:00 IST)</b>	<b>Bio-inspired Sensing</b> <i>Amit K. Mishra, University of Cape Town, South Africa</i>
<b>Tutorial – 3</b> <b>(14:00 to 17:00 IST)</b>	<b>Linear Parameter Varying Systems and Control</b> <i>Sandip Ghosh, IIT BHU</i> <i>Abhilash Patel, IIT Delhi</i> <i>Shaikshavali Chitraganti, IIT Palakkad</i> <i>Satnesh Singh, Kyongpook National University, South Korea</i>

**Day 1: 20/09/2021, Parallel Session-1, Autonomous Vehicles-I**

Session Chair: D. R. Parhi and Co-Chair: Umesh Sahu

Paper No.	Title of the paper	Authors	Time (IST)
5	A New Optimal Controller for Formation Control of Autonomous Underwater Vehicles under Communication Constraints	Chhavi Suryendu*, Bidyadhar Subudhi (India)	11:00 to 11:20
7	Control Allocation in an Over Actuated Octocopter Drone	Ranjan Vepa* (United Kingdom)	11:20 to 11:40
12	An Experimental Comparison of Visual SLAM Systems	Aayushi Gautam, Suraj Mahangade, Vishal Gupta*, Rishikesh Madan, Kavi Arya (India)	11:40 to 12:00
13	Real-time gesture control UAV with a low resource framework	Manohar Bhat, Gopikishan Mahto, Smit Bhupendra Kesaria*, Vikrant Fernandes, Kavi Arya (India)	12:00 to 12:20
69	Leader Follower Distributed Consensus Control of Heterogeneous Multi-Agent System with Model Predictive Control	Gopakumar K, Shihabudheen KV* (India)	12:20 to 12:40
82	Comparison of Phasor Estimation Techniques for AC Microgrid Protection	Rudranarayan Pradhan*, Premalata Jena (India)	12:40 to 13:00

**Day 1: 20/09/2021, Parallel Session-2, Autonomous Vehicles-II****Session Chair: Sandip Ghosh and Co-Chair: Arun Ghosh**

Paper No.	Title of the paper	Authors	Time (IST)
100	Smart Uv-C Disinfector for Pathogens and Covid-19	Karen Maria Fernandes, Arundhati Gracia Da Silva*, Tanvi Bharat Matkar, Rohan Raghuvir Parab, Niyam Joseph Savio Marchon (India)	11:00 to 11:20
115	Center of View Based Guidance Angles for Collision-Free Autonomous Flight of Unmanned Aerial Vehicle	Kamal Sandeep Karreddula*, Alok Kanti Deb (India)	11:20 to 11:40
118	Detection of Normal and Abnormal Conditions for Boundary Surveillance Using Unmanned Aerial Vehicle	Kamal Sandeep Karreddula*, Alok Kanti Deb (India)	11:40 to 12:00
140	Real-Time Obstacle Avoidance Algorithm for Dynamic Environment on Probabilistic Road Map	Pritam Ojha, Atul Thakur* (India)	12:00 to 12:20
143	Control Design for Unmanned Aerial Vehicle Using Fractional Order Backstepping Control and Extended Homogenous Control	Heera Lal Maurya*, Padmini Singh, Laxmidhar Behera, Nishchal Kumar Verma (India)	12:20 to 12:40
3	Design and Implementation of a Multi-Purpose End-Effector Tool for Industrial Robot	Jyotisana Meena*, T. K. Sunil Kumar, Amal TR (India)	12:40 to 13:00

**Day 1: 20/09/2021, Parallel Session-3, Power System and Automation-I****Session Chair: P. K. Ray and Co-Chair: Arnab Ghosh**

<b>Paper No.</b>	<b>Title of the paper</b>	<b>Authors</b>	<b>Time (IST)</b>
15	A Self-Tuned Adaptation Rate Lyapunov Based Voltage Controller for a Grid Connected PV System	Malay Bhunia, Bidyadhar Subudhi, <b>Pravat Ray*</b> (India)	11:00 to 11:20
16	Intelligent Load Frequency Control of an Isolated Microgrid	Akash Bartwal, Pravat Ray* (India)	11:20 to 11:40
114	An Affine Projection Algorithm Based Control of Grid Tied PV-DSTATCOM System	<b>Byomakesh Dash*</b> , Satish Choudhury, Bidyadhar Subudhi, Renu Sharma (India)	11:40 to 12:00
91	Comparative Analysis of Direct SVM and Indirect SVM Techniques for Direct Matrix Converter	Sanjeev Kumar Maddhesiya, <b>Israyelu Maraka</b> , Sashidhar Sampathirao* (India)	12:00 to 12:20
102	Comparison of Voltage Stability Index with Optimal Placement of SSSC Considering Maximum Loadability	<b>Santosh Kumar Gupta*</b> , Sanjeev Kumar Mallik, Jayant Mani Tripathi, Pankaj Sahu (India)	12:20 to 12:40
112	A Sigmoid Least Mean Fourth Based Control Scheme for a Single-Stage Grid-Tied PV System	Abhisek Parida, Bidyadhar Subudhi, <b>Pravat Ray*</b> (India)	12:40 to 13:00

**Day 1: 20/09/2021, Parallel Session-1, Power System and Automation-II****Session Chair: P. K. Ray and Co-Chair: Arnab Ghosh**

<b>Paper No.</b>	<b>Title of the paper</b>	<b>Authors</b>	<b>Time (IST)</b>
1	Class Topper Optimization Based Fuzzy-PI Controller Design to Solve Load Frequency Control in Microgrids	Santhosh Badavath, <b>Ankur Rai</b> , Dushmanta Kumar Das* (India)	15:30 to 15:50
30	Design and Dynamic Performance Analysis of a Snubber-Less LLC Converter Using Variable Frequency Control for Electric Vehicle Industry	<b>Rajendra Prasad Upputuri*</b> , Bidyadhar Subudhi, Pravat Ray, Arnab Ghosh, Ghanim Putrus, Mousa Marzband (India)	15:50 to 16:10
60	Direct Power Control of a Three-Phase AC-DC Converter for Grid-Connected Solar Photovoltaic System	<b>Arnab Ghosh*</b> (India)	16:10 to 16:30
97	Mobile Covid Sanitization Robot	<b>Anusha Madan*</b> , Arati Ganesh, Preethi N, Sahana Bandekar, Nagashree A.N (India)	16:30 to 16:50
116	Lifetime Estimation of DC-Link Capacitor in a Standalone PV System with an Integrated Backup Battery	Subrat Kumar Panda, <b>Sasmita Behera*</b> , Soumik Saswat Patnaik (India)	16:50 to 17:10
62	Distributed Extended-State-Observer Based Backstepping Control of a Photovoltaic Integrated AC Microgrid	<b>Swagat Kumar Panda*</b> , Bidyadhar Subudhi (India)	17:10 to 17:30



**Day 1: 20/09/2021, Parallel Session-2, Control and Computing-I****Session Chair: D. R. Parhi and Co-Chair: Umesh Sahu**

<b>Paper No.</b>	<b>Title of the paper</b>	<b>Authors</b>	<b>Time (IST)</b>
9	Stock Market Risk Prediction of Indian Stocks Using Kalman Filter: Towards Automation of Finance Industry	Gaurav Patowari, Rajeeb Dey* (India)	15:30 to 15:50
26	Design of Neural Network based PID and MPC for Nano Satellite Angle Control	Prajwal Shettigar J*, Sagar Ghosal, Lochan Kshetrimayum, Indiran Thirunavukkarasu (India)	15:50 to 16:10
17	Inter-Area Oscillation Damping Considering Time-Varying Communication Delay of Wide-Area Power System	Subrat Kumar Pradhan*, Dushmanta Kumar Das (India)	16:10 to 16:30
27	Intelligent Design of a Pitch-Rate Controller for a Single-Stage Launch Vehicle	Sagar Ghosal*, Prajwal Shettigar J, Lochan Kshetrimayum, Bidyadhar Subudhi (India)	16:30 to 16:50
29	An Optimal Fractional-Order-Proportional-Integral Controller for a Grid-Tied Photovoltaic System	Swati Sucharita Pradhan, Raseswari Pradhan*, Bidyadhar Subudhi (India)	16:50 to 17:10
47	Development of Controllers for Active Power Sharing in a Microgrid	Pravat Ray, Pratap Puhan*, Binayak Behera (India)	17:10 to 17:30

**Day 1: 20/09/2021, Parallel Session-3, Control and Computing-II****Session Chair: Sandip Ghosh and Co-Chair: Arun Ghosh**

<b>Paper No.</b>	<b>Title of the paper</b>	<b>Authors</b>	<b>Time (IST)</b>
49	Artificial Neural Network Controlled Electric Spring for SEIG Based Isolated Microgrid	Mohanty Soumya*, Choudhury Abhijeet, Pati Swagat, Kumar Kar Sanjeeb (India)	15:30 to 15:50
51	Design and Fabrication of POF Couplers/Splitters for Networking and Displacement Sensing	Ravi Kumar S*, Sunil Kumar, K, Naveen Kumar, B, Ravindra Kumar Moningi (India)	15:50 to 16:10
53	Cooperative Control with Higher Order Consensus for Geometric Configuration of Multiple UAVs Flying in Formation	Arnab Pal*, Asim Kr Naskar (India)	16:10 to 16:30
55	Harmonic Elimination of a Reduced Switch Count Cascaded Multilevel Inverter Using Grey Wolf Optimization for Renewable Energy Applications	Srikanta Kumar Dash, Satyajit Mohanty*, Satyajit Das (India)	16:30 to 16:50
70	Suspicious Human Activity Detection Using Pose Estimation and LSTM	Rohit Nale, Mahesh Sawarbandhe*, Naveen Cheggoju, Vishal Satpute (India)	16:50 to 17:10
63	Blind Digital Image Watermarking Using Henon Chaotic Map and Elliptic Curve Cryptography in Discrete Wavelets with Singular Value Decomposition	Bhuvanashree Murugadoss*, Sai Nikhilesh Reddy Karna, Jai Surya Kode, Subramani R (India)	17:10 to 17:30

**Day 2: 21/09/2021, Parallel Session-1, Control and Computing-III****Session Chair: D. Patra and Co-Chair: Anup Nandy**

<b>Paper No.</b>	<b>Title of the paper</b>	<b>Authors</b>	<b>Time (IST)</b>
71	Voltage Control Optimization by Equilibrium Optimizer for Unity Power Factor Operation of Grid-Connected Three-Phase Photovoltaic Inverter	Sasmita Behera*, Sriti Sriya Parida, Subrat Kumar Panda, Santi Behera (India)	11:00 to 11:20
73	Dynamic PIDPlus Controller for Wireless Closed Loop Control of Lag and Dead Time Dominant Slower Processes	Shivaji Thube*, Poonam Syal (India)	11:20 to 11:40
90	Sliding Mode Based Robust Lateral Control for Autonomous Vehicles	Shiv Charan Bhoi*, Subrat Kumar Swain (India)	11:40 to 12:00
96	Adaptive Lateral Motion Control with Hybrid Approach	Soumyo Das, Yugank Kumar*, Rastri Dey (India)	12:00 to 12:20
99	Distributed Adaptive Control of an Islanded Microgrid	Sweta Panda*, Gyan Ranjan Biswal, Bidyadhar Subudhi (India)	12:20 to 12:40
92	Simultaneous Motion-Slosh Control for a Self-Reconfigurable Mobile Robot	Madan Mohan Rayguru*, rajesh kumar, balakrishnan ramalingam, mohan rajesh elara (India)	12:40 to 13:00

**Day 2: 21/09/2021, Parallel Session-2, Control and Computing-IV**

**Session Chair: Arpita Sinha and Co-Chair: Shyam Kammal**

<b>Paper No.</b>	<b>Title of the paper</b>	<b>Authors</b>	<b>Time (IST)</b>
120	Performance Improvement of BLDC Motor Speed Control Using Sliding Mode Control and Observer	Pranav Shah*, Pramod Ubare, Deepak Ingole, Dayaram Nimba Sonawane (India)	11:00 to 11:20
146	Nonlinear Control of a Laboratory Gas Turbine Engine with Uncertain System Dynamics	Richa Singh*, Arnab Maity, P.S.V. Nataraj, Sunhashis Nandy (India)	11:20 to 11:40
11	Identification and Control of a Heat Exchanger	Omar Hanif*, Nihar Deshpande, Medha Chatterjee (India)	11:40 to 12:00
57	Modelling and Control of a Nonlinear Distillation Column: A, Using Fractional-Order Controllers	Omar Hanif*, Shipra Tiwari, VIVEK Kumar, Ognjen Marjanovic (India)	12:00 to 12:20
135	A Novel Hybrid Power Control Topology for Control of an Isolated Micro-Grid System	Pati Swagat*, Choudhury Abhijeet, Kumar Kar Sanjeeb, Soumya Mohanty (India)	12:20 to 12:40
111	Secure Communication System Implementation for Robot-Based Surveillance Applications	Rishikesh Jha, Ansuman Bhattacharya, Atul Thakur, Gourinath Banda, Rajarshi Ray, Raju Halder* (India)	12:40 to 13:00

**Day 2: 21/09/2021, Parallel Session-3, Control and Computing-V**

**Session Chair: Koena Mukherjee and Co-Chair: Santosh K Behera**

<b>Paper No.</b>	<b>Title of the paper</b>	<b>Authors</b>	<b>Time (IST)</b>
127	Short-Term Wind Power Forecasting Using Wavelet Based Recurrent Wavelet Neural Network for Small-Scale Wind Turbine	Prangya Parimita Pradhan*, Bidyadhar Subudhi, <b>Arnab Ghosh</b> (India)	11:00 to 11:20
113	Impact Angle Constrained Guidance with Collision Avoidance from Multiple Moving Obstacles	Manish Arjun Singh, <b>Shashi Ranjan Kumar*</b> (India)	11:20 to 11:40
139	A Review on Iterative Shrinkage Approach to Deconvolution Problem	<b>Avinash Kumar*</b> , <b>Sujit Kumar Sahoo</b> (India)	11:40 to 12:00
52	An overview of a low energy UWB localization in IoT based system	<b>Mohanty1 Sujata*</b> , Bikramaditya Das, Tripathy Aruna (India)	12:00 to 12:20
81	Experimental Study on Underwater Image Processing and Path Planning	<b>Koena Mukherjee*</b> , Soumya Gupta, Snigdha Das (India)	12:20 to 12:40
19	Path Planning of Mobile Robots in Unknown Environments Using Fuzzy Logic Based Hybrid Controller	<b>Prases Kumar Mohanty*</b> , Amit Kumar, Anand Kumar Singh, Manjeet Kumar Mahto (India)	12:40 to 13:00

**Day 2: 21/09/2021, Parallel Session-1, Intelligent Robotics-I****Session Chair: I. N. Kar and Co-Chair: Raja Rout**

<b>Paper No.</b>	<b>Title of the paper</b>	<b>Authors</b>	<b>Time (IST)</b>
24	EEG-Based Emotion Recognition Using Genetic Algorithm Optimized Multi-Layer Perceptron	Shyam Marjit, <b>Upasana Talukdar*</b> , Shyamanta Hazarika (India)	14:00 to 14:20
45	Heart Sound Abnormality Detection Using Wavelet Packet Features and Machine Learning	<b>Rohith Sai V</b> , Biswajit Karan, Garima Thakur, Ashutosh Rath, Sitanshu Sekhar Sahu* (India)	14:20 to 14:40
141	A Fish Robot: It's Modeling & Pose Estimation	Sahil Kiran Bodke, <b>Koena Mukherjee*</b> (India)	14:40 to 15:00
58	Yoga Pose Detection and Validation	<b>Ayush Gupta*</b> , Dr. Ashok Jangid (India)	15:00 to 15:20
122	Design and Modelling of Bidirectional Converter Topologies for Energy Storage in Grid Interfacing Applications	Aishworya Roy*, <b>Arnab Ghosh</b> (India)	15:20 to 15:40
80	Infrared Thermography and Computer Vision Based Human Respiration Monitoring	Varun Gupta*, <b>Preeti Jagadev</b> , Lalat Indu Giri (India)	15:40 to 16:00

**Day 2: 21/09/2021, Parallel Session-2, Intelligent Robotics-II****Session Chair: N. Sundararajan and Co-Chair: Sandip Ghosh**

<b>Paper No.</b>	<b>Title of the paper</b>	<b>Authors</b>	<b>Time (IST)</b>
93	Deep Reinforcement Learning Controller for Vision-Based Serial Flexible Link Manipulator	Umesh Sahu*, Dipti Patra, Bidyadhar Subudhi (India)	14:00 to 14:20
89	Model-Based Sensored Field Oriented Control Implementation for Permanent Magnet Synchronous Motor	Aakriti Srivastava*, Rounak Padgil, Abhishek Gupta, Ajay Lohia, N.P Nair (India)	14:20 to 14:40
106	A Robotic Software Framework for Autonomous Navigation in Unknown Environment	Md Sajid Sarwar Mir, Rajeswar Yadav, Sudip Samanta, Rajarshi Ray, Raju Halder*, Gourinath Banda, Ansuman Bhattacharya, Atul Thakur (India)	14:40 to 15:00
134	Inverse Kinematics Analysis of Cassie Robot Using Radial Basis Function Networks	Mukund Mitra, Suman Raj*, Shishir Kolathaya (India)	15:00 to 15:20
101	Comparison of Intelligent Non-Invasive Fetal Health Monitoring Schemes	Niyam Joseph Savio Marchon*, Bidyadhar Subudhi, Sujit Kumar Sahoo (India)	15:40 to 16:00

**Day 2: 21/09/2021, Parallel Session-3, Industrial Automation-I****Session Chair: B. K. Roy and Co-Chair: Koena Mukherjee**

<b>Paper No.</b>	<b>Title of the paper</b>	<b>Authors</b>	<b>Time (IST)</b>
125	Autonomous Landing of UAVs with Reactive Collision Avoidance Using Mixed Guidance Scheme and Neuro Adaptive Controller	Amit Kumar Tripathi*, VIJAY PATEL, Radhakant Padhi (India)	14:20 to 14:40
46	Vibration Control of an Axially Moving Beam Attached to a Translating Base	Phuong-Tung Pham, Quoc Chi Nguyen, Keum-Shik Hong* (Korea, South)	14:40 to 15:00
48	MUD Over MIMO-OFDM System in UWA Communication in the frequency region 100 Hz to 100 kHz	Bikramaditya Das*, Md Rizwan Khan (India)	15:00 to 15:20
66	Conceptual Design of a Robotic Vehicle Refuelling System	Pratik Acharya*, Arpita Sinha, Anirban Guha (USA)	15:40 to 16:00



**Day 3: 22/09/2021, Parallel Session-1, Industrial Automation-II****Session Chair: J. Prakash and Co-Chair: A. K. Deb**

<b>Paper No.</b>	<b>Title of the paper</b>	<b>Authors</b>	<b>Time (IST)</b>
67	Automatic License Plate Recognition System Using SSD	Ninad Awalgaonkar*, Prashant Bartakke, Ravindra Chaugule (India)	11:00 to 11:20
32	Performance Analysis Of Underwater Acoustic Communication System Using Iloc Technology Based On Internet Of Underwater Things (IoUT)	Bikramaditya Das*, Shaik Azeez	11:20 to 11:40
137	State estimation-based navigation of AUVs under limited underwater traffic	Bikramaditya Das*, Bidyadhar Subudhi	11:40 to 12:00
129	A Robust Tactile Sensor Matrix for Intelligent Grasping of Objects Using Robotic Grippers	Prabhu TV*, Manivannan Pudureddiyur Venkataraman, Debanik Roy Debanik Roy, Yathish Kumar G (India)	12:00 to 12:20

**Day 3: 22/09/2021, Parallel Session-2, Industrial Automation-III****Session Chair: Debi Das and Co-Chair: Dushmanta Das**

<b>Paper No.</b>	<b>Title of the paper</b>	<b>Authors</b>	<b>Time (IST)</b>
136	Low Cost Approach to a Two Agent Imitating Master-Slave Robotic System	Abhishek Agrawal*, Pratyush Kumar Padhi (India)	11:20 to 11:40
138	Robust Adaptive Feedback Linearization Controller for an Aerial Robot Working in Narrow Corridor and In-Door Environments	Vidya Sumathy*, Debasish Ghose (India)	11:40 to 12:00
54	Detection of Material Build-Up during Online Size Distribution Analysis of Iron Ore Green Pellets Using MobilenetV2	Arya Jyoti Deo, Santosh Kumar Behera*, Debi Debi Prasad (India)	12:00 to 12:20

**Day 3: 22/09/2021, Parallel Session-3, Industrial Automation-IV**

**Session Chair: Sujit Kumar S and Co-Chair: Kuntal Deka**

<b>Paper No.</b>	<b>Title of the paper</b>	<b>Authors</b>	<b>Time (IST)</b>
44	A Simplified Deep Learning Model for Acoustic Feedback Cancellation in Digital Hearing Aid	Kaksha Posnaik, <b>trilochan panigrahi*</b> , Samarat L Sabat, Meera Dash (India)	11:00 to 11:20
56	A Generalized Kalman Filter Augmented Deep-Learning Based Approach for Autonomous Landing in MAVs	Pranay Mathur*, Yash Jangir, <b>Neena Goveas</b> (India)	11:20 to 11:40