ICE ASSOCIATION NEWSLETTER

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EDITOR'S NOTE:

Dear Readers,

I am delighted to present the latest issue of Sensors newsletter as the editor of the 2022 edition. This edition features articles and features that showcase the latest research and advancements in our department and the field of Instrumentation and Control Engineering.

The articles in this issue cover a variety of topics, such as the department's published papers, applied patents, and attended conferences. Additionally, we explore the current trends and developments in Instrumentation and Control Engineering. Our aim is to provide informative and insightful articles that inspire you to learn more about this field and encourage your participation in future editions of Sensors.

We are continuously looking for ways to improve our newsletter and deliver relevant and useful content to our readers. So, if you have any feedback or suggestions for future topics, please do not hesitate to contact us.
Thank you for your ongoing support and interest in Sensors.
Best regards,

-Sreenidhi

VISION AND MISSION:

The department of Instrumentation and Control has always strived for perfection, and this is achieved by following our departments Vision and Mission

Vision:

- To become a world-class centre of excellence in Instrumentation and Control Engineering.

Mission:

- To inspire our students to realise their aspirations and potential through quality education in Instrumentation and Control Engineering.
- To enhance knowledge, create passion for learning, foster innovation, and nurture talents towards serving the society and the country.
- To encourage our faculty and students to keep in pace with the latest technological developments and to pursue research in those areas.
- To enable our students to engage themselves in entrepreneurship and product development for the benefit of the global community.

We believe that our vision and mission statement will provide a clear direction and purpose for our department, as well as inspire our faculty and students to strive towards excellence

LIST OF PAPERS PUBLISHED BY DEPARTMENT:

The Department of Instrumentation and Control has garnered a number of breakthroughs in numerous fields related to its domain this semester. Listed below is a gist of a few of the papers published by our department:

1. Simulation of Shape memory wire-based exoskeleton for flexion and Extension of the upper limb.

2. Empirical Mode Decomposition, S-method and Steepest Gradient[1]based Reconstruction Algorithm for Denoising Lung Sound.

3. An MFCC Features-driven subject-independent Convolution Neural Network for Detection of Chronic and Non-chronic Pulmonary Diseases.

LIST OF JOURNAL PUBLICATIONS FROM THE DEPARTMENT

1. Simulation of Shape memory wire-based exoskeleton for flexion and Extension of the upper limb.

2. Machine learning-based self-sensing of the stiffness of shape memory alloy coil actuator.

3. Pre-trained ensemble model for identification of emotion during COVID-19 based on emergency response support system dataset.

4. RFID technology and its diverse applications: A brief exposition with a proposed Machine Learning approach.

LIST OF WORKSHOPS CONDUCTED BY DEPARTMENT

Our department over the years has always strived toward creating a more hands-on learning experience for anyone imbibed with the passion for expanding knowledge across different domains and to achieve that very aim, the esteemed faculty of the department have conducted several workshops, a few of them being,

1."Internet Of Things System Design" with the Speaker from STEPS

2. "International Automation Professionals Day" with Speaker : Mr M.S.Ramesh, General   Manager (Engineering), BHEL, Tiruchirappalli.

3.Workshop on Internet of Things & Wireless Sensor Network with speakers: Application Engineers, TETCOS LLP, Bangalore.

4.Career in Cybersecurity SEMINAR UNDER International Society of Automation (ISA) with Speaker: Mr Manjunath Hiregange, GE

5."Cyber hygiene in day to day life" from International Society of Automation (ISA) with Speaker: Mr. Sakthi Kumar Manohar, GE

SEMINARS

1. The successful and a knowledge rich seminar on "A New Era of Collaboration and Simulation" conducted by Mr. Sasikumar Ramachandran Nair, an expert in NVIDIA Graphics Pvt. Ltd. The seminar was held on March 30th, 2022, and was attended by numerous professionals and enthusiasts in the field.

Mr. Sasikumar provided insights on how modern technology has enabled a new era of collaboration and simulation, which is crucial for the success of various industries such as healthcare, automotive, and aerospace. He emphasized how the advancements in the field of virtual reality and machine learning have revolutionized the way we approach design and testing.

During the seminar, Mr. Sasikumar demonstrated how NVIDIA Graphics Pvt. Ltd. has been at the forefront of these innovations and provided an overview of their latest technologies. The participants were able to witness firsthand how these technologies can be used to improve the accuracy and efficiency of simulation-based tasks.

2. We are delighted to share with you the success of an industrial lecture on the Internet of Things (IoT) held on March 7th, 2022, by Mr. V. S. Ramesh, an expert in STEPS Knowledge Services Pvt. Ltd. The seminar was attended by professionals and students from various fields.

Mr. V. S. Ramesh gave an insightful presentation on the latest developments in the IoT industry and how it is transforming the way we live and work. He emphasized the importance of IoT in the industrial sector and how it can help improve productivity, reduce costs, and increase efficiency.The participants were engaged throughout the seminar, and they appreciated the practical and informative approach of Mr. V. S. Ramesh. The lecture concluded with an interactive Q&A session, where

the participants asked insightful questions, and Mr. V. S. Ramesh provided detailed answers.

INDUSTRIAL LECTURES

1. Overview of Delhi Electrical Power Load Dispatch Center and EV Infrastructure by retired DGM of Delhi Transco.

2. Smart sensor Technology & IOT by Director of STEPs Knowledge Services Pvt. Ltd.

3. Product Design by senior consultant in Cognizant

4. Machine Learning and Deep learning by Mr.Ragavendran working in NVIDIA.

SENSORS

The national level technical symposium of the Instrumentation and Control Engineering branch was started and was coined the name, 'SENSORS', which is undeniably the chef-d'oeuvre of the department. The prime motive of SENSORS is to encourage practical learning apart from classroom learning through informative lectures to make the students aware of various technological advancements in the field of Instrumentation and Control Engineering, hands-on workshops in order

to provide students with a more in-depth insight into the theoretical concepts and innovative and challenging events that pit some of the brightest minds in the country against one another. It also serves as an ideal platform for students to keep abreast of the latest technology changes and for the industry to partner with the young minds of the country to carry out cutting edge research activities.

The previous edition held in 2022 saw a multitude of new events and a plethora of workshops being organized. As the previous edition turned out to be a humongous success, the student and the teaching fraternity expectations have exceeded to an unexpected high for the next edition of SENSORS.

WORKSHOPS AND EVENTS

As a part of sensors, serving as one of the jewels in the crown,the workshops and events which were conducted marvellously are stated below:
1. Front End Web Development by Madhav Bahl, a software engineer in Microsoft.
2. **Tech Triathlon:**
   1. Webinar on current trends in robotics and automation by our guest lecturer Puru Rastogi, CEO of Mowito Automation
   2. Workshop in Introduction to ROS (Robotic operating system).
   3. Robo Wizard:challenge to work on a real-world problem building software stack for robots.
3. Intern Talks by esteemed students within our department under various domains.

TECH CORNER:

Innovations around sensor fusion (particularly for autonomous driving)

Sensors are an essential component of autonomous vehicles, as they provide it with information about its surroundings. The vehicle's onboard computer uses this information to navigate and make decisions. Three key sensors for autonomous driving include LiDAR, radar, and 3D cameras (image sensors). Major car OEMs, such as Mercedes, BMW, Volvo, and General Motors, have opted for LiDAR as a sensor for autonomous driving. Previously (prior to 2021), Tesla mostly relied on radar technology. Recently, however, the company began the transition to Tesla Vision (a camera-based system) by removing radar from the Model 3 and Model Y in 2021, followed by Model S and Model X in 2022.

Companies, including Sony, Mobileye, and Waymo, are currently focusing on IoT sensor technology innovation by combining cameras with other sensing technologies like LiDAR and radar to improve the image analysis of their autonomous driving solutions. As cameras, radars, and LiDARs sense different features of the environment, the idea behind this combination (also referred to as "sensor fusion" or "redundancy") is to provide systems with a richer single-world model to decide a course of action or calculate an output. Overall, the sensors in an autonomous vehicle work together to provide a complete picture of the vehicle's surroundings, enabling it to make safe and efficient driving decisions.

Example: Sony is relying on the benefits of using cameras with either LiDAR or radar for object recognition tasks in autonomous driving applications. For example, the company is currently working on a solution that combines camera and radar. This combination may be beneficial for recognizing people and vehicles at night. The camera and LiDAR combination is beneficial for parking assistance functions, which require highly accurate distance measurements.

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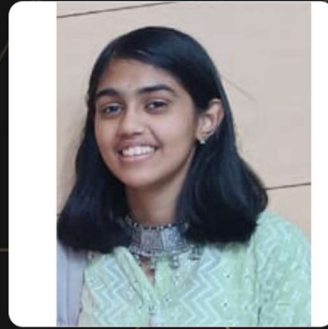
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