Report on One-Day Seminar on Underwater Robotics: Design and Control Challenges

Organized by:

Department of Electrical and Electronics Engineering (EEE) & Mechanical Engineering

Venue:

Sreenivasa Institute of Technology and Management Studies, Chittoor

Date and Time:

13th September 2024, 10:00 AM

Coordinators:

- **Dr. P. Sudheer**, HOD - EEE
- **Mr. Satish Kumar**, HOD - Mechanical

Resource Person:

- **Dr. Thiyagarajan**, Professor at IIT Tirupati

Introduction:

A one-day seminar titled "Underwater Robotics: Design and Control Challenges" was conducted on 13th September 2024 at Sreenivasa Institute of Technology and Management Studies, Chittoor. The seminar was jointly organized by the Department of Electrical and Electronics Engineering (EEE) and the Department of Mechanical Engineering under the able coordination of **Dr. P. Sudheer**, HOD of EEE, and **Mr. Satish Kumar**, HOD of Mechanical Engineering. The seminar was primarily designed for EEE and Mechanical Engineering students to introduce them to the growing field of underwater robotics.

Objective:

The seminar aimed to expose students to the challenges and intricacies of designing and controlling underwater robots, a critical technology in underwater exploration, research, and industrial applications. The key focus areas included the mechanical design, control mechanisms, and sensor systems used in underwater robotics.

Resource Person:

The seminar was led by **Dr. Thiyagarajan**, a renowned professor from IIT Tirupati, who is an expert in underwater robotics and control systems. With a wealth of experience in robotics, Dr. Thiyagarajan provided valuable insights into the technological challenges faced in underwater environments and how engineers tackle these problems.

Key Topics Covered:

1. **Introduction to Underwater Robotics**
    - Overview of underwater robotics and their importance in exploration, surveillance, and research.
    - Applications in industries such as offshore oil drilling, marine research, and defense.
2. **Design Challenges**
    - Mechanical design considerations for underwater robots, including pressure tolerance, material selection, and buoyancy control.
    - Hydrodynamic factors affecting the movement and stability of robots underwater.
3. **Control Challenges**
    - Techniques for controlling underwater robots, including remote and autonomous operation.
    - Challenges related to communication and navigation in underwater environments, where GPS signals are unavailable.
4. **Sensor Systems**
    - The role of various sensors, such as sonar, cameras, and pressure sensors, in enabling robots to navigate and operate in underwater conditions.
    - Limitations of sensor technologies in the underwater environment due to poor visibility and signal degradation.
5. **Research and Development Opportunities**
    - Discussion on ongoing research in underwater robotics and the future scope for advancements in this field.
    - Opportunities for students in both EEE and Mechanical Engineering to contribute to the development of underwater robotic systems.

Audience:

The seminar was well-attended by students from both the EEE and Mechanical departments. The students were actively engaged throughout the session, participating in discussions and raising thoughtful questions related to the practical aspects of underwater robotics.

Conclusion:

The one-day seminar successfully provided students with an understanding of the various design and control challenges associated with underwater robotics. Dr. Thiyagarajan's expert knowledge and practical insights inspired students to explore this exciting and evolving field. The seminar concluded with a vote of thanks delivered by Dr. P. Sudheer, HOD of EEE, who emphasized the importance of interdisciplinary collaboration in advancing technology.

The event was a significant step towards promoting awareness and interest in underwater robotics among engineering students and encouraging them to pursue research and development in this domain.

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Signature of the Faculty

(Dr.P.Sudheer)