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on

**Navigating New Frontiers: AI-Enhanced Solutions for Underwater Challenges and
Industrial Efficiency**

by

Dr. Md Junayed Hasan

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Join Zoom Meeting link:

<https://rgu-ac-uk.zoom.us/j/88238349660?pwd=ZDFBSHVENDJVYmJJSnIxNVg5MVNtZz09>

Meeting ID: 882 3834 9660, Passcode: 915206

Abstract:

The exploration and utilisation of underwater environments pose significant challenges due to the complex and dynamic nature of these realms. Traditional methodologies often fall short in addressing these obstacles, necessitating innovative approaches. This talk presents the ongoing work of Dr Junayed at the National Subsea Centre, in collaboration with the Robert Gordon University School of Engineering and the Robotics and Autonomous Systems Research Group of the University of Strathclyde. In this work, the research focuses on the development of a medium fidelity digital twin system for underwater inspection, highlighting a multifaceted approach to overcoming the limitations of current underwater exploration and monitoring technologies.

Central to our research is the advancement of autonomous algorithms capable of detecting target objects via sonar, exploring the potential of underwater stereo vision as a viable alternative to LiDAR for acquiring precise distance information of target objects. This endeavor encompasses a spectrum of techniques, from data enhancement for quality improvement to multimodal data fusion, ranging from feature to data level integration. The application of advanced AI algorithms for classification and detection plays a pivotal role in this process, facilitating the effective operation of robotic haptic hands in securely grasping and inspecting the target objects.

The culmination of this research aims at the creation of a medium fidelity digital twin model of the underwater environment. This approach not only promises to revolutionize the efficiency and safety of underwater inspections but also paves the way for enhanced industrial efficiency

across various sectors. Through this discussion, the aim to shed light on the significant strides being made towards harnessing the power of AI in navigating the new frontiers of underwater challenges and industrial efficiency.

Short biography of speaker:

Dr. Md Junayed Hasan is an accomplished researcher in Computer Science and Engineering, specializing in explainable AI, industrial data science, and sensor-driven data modelling. With a Ph.D. focused on leveraging machine learning for real-world applications, Dr. Hasan has over seven years of experience in developing autonomous systems for a wide array of sectors, including smart manufacturing, energy efficiency, and subaquatic exploration.

Currently based at the National Subsea Centre, Dr. Hasan is establishing the development of advanced condition monitoring systems for the subsea environment, utilizing AI and big data analytics to support sustainable energy initiatives in the North Sea Basin and beyond. His collaborative work with academic and industrial partners has led to over 30 scientific publications, significant funding exceeding £800,000, and contributions towards achieving United Nations Sustainable Development Goals 9 (Industry, Innovation, and Infrastructure), 11 (Sustainable Cities and Communities), and 14 (Life Below Water).