Frontier of Artificial Network

Department of Data Science
香港城市大學
City University of Hong Kong

Interpretable and Robust Randomized Neural Networks for Real-World Learning

Invited Speaker

Md Sajid

IIT Indore

Date: January 28, 2026 (Wednesday)

Time: 16:30-17:30 (Hong Kong Time)

Zoom Meeting: 801 137 0362

Biography

M. Sajid is a Ph.D. candidate in the OPTIMAL Research Lab at the Indian Institute of Technology Indore, working under the supervision of Prof. M. Tanveer. He received his Master's degree in Mathematics from IIT Delhi in 2021. His research focuses on interpretable, efficient, and robust machine learning, with particular emphasis on randomized neural networks, fuzzy and graph-based learning, and kernel methods for learning under uncertainty, noise, and class imbalance. His work includes applications to Alzheimer's disease diagnosis using MRI and EEG data. He has published in leading journals such as IEEE TNNLS, IEEE TFS, Pattern Recognition, and Information Sciences. In addition to his research activities, he has held several leadership roles, including Founding Chair of the IEEE Computational Intelligence Society Student Branch Chapter at IIT Indore and Secretary of the IEEE CIS Madhya Pradesh Section, and has actively contributed to organizing international conferences, workshops, and mentoring programs such as ICONIP'22, IEEE CIS summer and winter schools.

Abstract

Randomized neural networks, particularly Random Vector Functional Link (RVFL) networks, are efficient alternatives to deep learning but often lack interpretability and robustness against noise and class imbalance. In this talk, I present a research framework that enhances RVFLs through neuro-fuzzy learning, graph embedding, and ensemble strategies. First, I introduce Neuro-Fuzzy RVFL (NF-RVFL) and ensemble deep RVFL (edRVFL-FIS), which leverage fuzzy mechanisms to enable transparent, human-interpretable IF–THEN reasoning. Second, I present the Graph-Embedded Intuitionistic Fuzzy RVFL (GE-IFRVFL-CIL), designed to handle uncertainty and severe class imbalance while preserving data geometry. Extensive experiments on benchmarks and Alzheimer's diagnosis demonstrate that these scalable models offer improved robustness and interpretability for real-world applications.