National Institute of Technology Rourkela

Synopsis Seminar

Seminar Title	: Signal Detection Techniques for NOMA System Using Deep Neural Networks
Speaker	: Bibekananda Panda (Rollno : 519ec1021)
Supervisor	: Prof. Poonam Singh
Venue	: Seminar Room EC-303
Date and Time	: 08 Jan 2025 (05.00 PM)
Abstract	: Non-orthogonal multiple access (NOMA) techniques have drawn much attention for massive connectivity, heterogeneous data traffic with ultra-low latency requirements, and ultra-high bandwidth efficiency for the future generation of wireless communication systems. Signal detection is essential in wireless communication systems because it enables the simultaneous decoding of multiple superimposed signals from different users. NOMA detection techniques require conventional successive interference cancellation (SIC) techniques for uplink and downlink transmissions to decode the transmitted signals. Due to the propagation delay and fading channels, multipath fading significantly impacts the SIC process and correct signal detection. Hence, this study proposes efficient deep learning-based techniques such as temporal, spatiotemporal, and hybrid models with dilated and causal convolution and attention mechanisms to overcome conventional SIC detection limitations. A notable contribution includes deep learning frameworks for feature extraction and machine learning framework classification. An exhaustive experimental analysis is carried out to validate the utility of the proposed schemes using various key performance metrics, and the proposed contributions in this research work collectively aim to improve the signal detection probability in the NOMA communication system.