National Institute of Technology Rourkela

Synopsis Seminar

Seminar Title	: Data Driven Approaches using Statistical and Deep Learning Models for Time Series Analysis of Weather Data
Speaker	: Naba Krushna Sabat (Rollno : 518ec6014)
Supervisor	: Prof. Santos Kumar Das
Venue	: ECE Conference Hall (Room No. EC 303)
Date and Time	: 25 Mar 2024 (5:30 P.M.)
Abstract	: In the realm of time series data prediction, with a specific focus on its application to weather prediction. Time series forecasting, a critical aspect of data science, involves the development of models capable of accurately predicting future data points based on historical trends. In the context of weather prediction, the necessity for precise forecasting becomes apparent, as it plays a pivotal role in various real-world applications. In agriculture, precise predictions enable farmers to optimize planting and harvesting schedules, allocate resources efficiently, and enhance overall crop management. Energy utilities depend on weather forecasts to anticipate demand patterns, particularly in the realm of renewable energy sources. Transportation industries utilize forecasts for route planning, schedule optimization, and safety measures. Additionally, accurate weather predictions play a pivotal role in disaster preparedness, allowing governments and emergency services to proactively plan and respond to natural calamities, ultimately minimizing the potential impact on communities. The necessity of time series weather prediction extends beyond the immediate concerns of weather enthusiasts it is an indispensable tool for informed decision-making across various sectors, contributing to the resilience and adaptability of societies in the face of dynamic environmental challenges. The fundamental requirements for effective time series prediction, encompassing data quality, feature engineering, and model selection. The significance of accurate weather predictions in mitigating risks, minimizing economic losses, and safeguarding lives underscores the direct impact of time series prediction on enhancing resilience in the face of dynamic environmental challenges. This thesis comprehensively explores the spectrum of time series forecasting methodologies, ranging from traditional univariate and multivariate statistical models to advanced hybrid deep learning techniques. The innovative hybrid DL models, which amalgamate the strengths of diverse methodologies to achieve superior forecasting performance under missing and noisy data. The execution of each model has entails subjecting it to examination on benchmark data set. The methodological comparisons and empirical evaluations using performance evaluation parameter elucidate the efficacy of each approach, providing valuable insights for practitioners and researchers navigating the dynamic landscape of time series forecasting.