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Cyclone Intensity Estimation

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Abstract: *Tropical cyclones, also known as hurricanes or typhoons, are intense storm systems characterized by a low-pressure center, strong winds, and heavy rainfall. Forming over warm ocean waters, these cyclones pose significant threats to coastal regions worldwide, making accurate and timely intensity estimation crucial for disaster preparedness and response. Traditional methods of assessing cyclone intensity often rely on manual interpretation of satellite imagery, a process that is both time-consuming and prone to human error.To address these limitations, we propose a deep learning-based approach for automated cyclone intensity estimation. This project leverages cutting-edge deep learning architectures, including convolutional neural networks (CNNs) and recurrent neural networks (RNNs), to analyze satellite imagery and atmospheric data. By employing transfer learning, we adapt pre-trained models to enhance cyclone intensity prediction, even in the face of limited data. Additionally, the project explores the fusion of multi-modal data sources, such as satellite images and atmospheric pressure readings, to improve the accuracy of predictions.These advancements in technology and methodology offer both significant opportunities and challenges. On the one hand, the potential of machine learning in cyclone forecasting is far from fully exploited, with vast amounts of data still waiting to be harnessed. On the other hand, the unpredictable nature of tropical cyclones, driven by their complex dynamic mechanisms and susceptibility to various influencing factors, continues to challenge the stability and reliability of these predictions*

Keywords: Machine Learning, Deep learning, Convolutional neural networks, Recurrent neural networks, Feature extraction.