# "Real time flood forecasting using machine learning"

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Floods are among the most frequent and destructive natural disasters, especially in regions with high rainfall and vulnerable infrastructure, such as many parts of India. Traditional flood prediction systems often suffer from limitations in accuracy, responsiveness, and data integration. This study presents a real-time flood forecasting model using machine learning techniques that address these challenges by leveraging both spatial and temporal data. The proposed system integrates satellite imagery, rainfall data, soil moisture, river flow rates, and topographical features to detect patterns that signal impending flood events. Convolutional Neural Networks (CNNs) are employed to extract spatial features from geospatial data, while Recurrent Neural Networks (RNNs), particularly Long Short-Term Memory (LSTM) networks, model temporal sequences in environmental conditions. Unlike conventional hydrological models, this hybrid approach enables the system to learn complex relationships and provide accurate predictions with minimal delay. The model is continuously updated with real-time data to improve its performance over time. Validation using historical datasets from flood-prone regions in India demonstrates a significant improvement in prediction accuracy and early warning capability. This research aims to enhance disaster preparedness by providing timely alerts to authorities and communities, ultimately reducing the human and economic toll of flood events.

Keywords-"Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs), Long Short-Term Memory (LSTM), hybrid approach, hydrological models"