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AI-Driven Early Warning System for Climate Disaster Prediction Using LSTM Networks

Climate change has led to an increase in the frequency and severity of extreme weather events, including floods, droughts, and heat waves, posing significant threats to vulnerable communities. Traditional early warning systems often fail to provide accurate and timely predictions due to the complexity and non-linearity of climate patterns. This project proposes an AI-driven Early Warning System (EWS) using Long Short-Term Memory (LSTM) networks to enhance climate disaster prediction and preparedness.

The study will utilize time-series climate data (rainfall, temperature) sourced from meteorological stations. The data will be preprocessed and fed into an LSTM-based deep learning model to capture long-term dependencies and trends in climate variations. The model's performance will be evaluated using Root Mean Square Error (RMSE), Mean Absolute Error (MAE), and R-squared (R^2) scores to ensure accuracy and reliability.

The developed system will be integrated with real-time climate monitoring infrastructure and deployed for automated disaster alerts via mobile applications, SMS, and web-based platforms. The expected outcome is a robust, AI-powered early warning system that enhances disaster preparedness, reduces loss of life and property, and supports policymakers in climate risk mitigation strategies. This study contributes to achieving Sustainable Development Goal 13 (Climate Action) by leveraging Big Data and AI to enhance climate resilience in affected regions.

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