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Rainfall Prediction using Machine Learning

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Abstract: *Predicting rainfall correctly is very important for farming, water use, disaster management, and climate studies. If we can know about rainfall in advance, it helps people in both villages and cities stay safe and plan better. Rainfall is hard to predict because it depends on many things like temperature, humidity, wind, and air pressure. In this study, we used machine learning (ML) techniques to make rainfall predictions using past weather data. We tested different ML models like Support Vector Machine (SVM), Decision Tree (DT), Random Forest (RF), and Linear Regression. Among these, the Random Forest model gave the best results with an accuracy of 84%. It worked well because it combines many decision trees to make better predictions. SVM also worked, but not as well, because it cannot easily understand very complex weather patterns. We also used feature selection to choose only the most important data for training the models. To check how good each model was, we used scores like precision, recall, and F1-score.In the end, our study showed that Random Forest and other ensemble models are very good at predicting rainfall. These ML models can help a lot in areas like farming and disaster planning by giving better weather predictions.*

Keywords: Rainfall Prediction, Machine Learning, Random Forest Model, Support Vector Machine (SVM), Decision Tree Algorithm, Prediction Accuracy, Feature Selection, Disaster Response, Agricultural Planning, Climate Forecasting.