ABSTRACT

The main problem faced is the uncertainty of extreme weather that can impact the smooth operation of the aviation and telecommunications sectors. The purpose of this study is to develop a more accurate weather classification and prediction system using atmospheric physics parameters. The methods applied in this study involve collecting weather data, data preprocessing, feature extraction, modeling with various machine learning algorithms, including Decision Tree, Random Forest, Naïve Bayes, K-Nearest Neighbors, and Neural Network, and then evaluating the algorithm to produce a weather classification model with high accuracy. The model with the highest accuracy is then implemented in the Streamlit platform, which can be used to predict weather that can be accessed in real-time by users. This system works with models hosted on the server and communicates with clients via the HTTP protocol, both when running locally and when deployed to the Streamlit Cloud platform. The main results of the study show that the Random Forest method provides the most accurate results with an accuracy of 90.41%, as well as a precision value (macro avg) of 0.89, recall (macro avg) of 0.89, and f1-score (macro avg) of 0.88. These results are then applied in the Streamlit platform to provide an easily accessible interface for users. With this system, weather-based decision making can be done faster and more precisely, which will help improve operational efficiency in related sectors.

***Keyword**: Machine Learning, Weather Prediction, Random Forest, Streamlit.*

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