ABSTRACT

Accurate and timely weather prediction is increasingly important as the incidence of extreme weather increases, which has a significant impact on life and the economy. This research develops a weather prediction system based on Wireless Sensor Network and Internet of Things (IoT) Technology with the application of machine learning to improve the accuracy of weather predictions in certain areas. This system utilizes weather sensors integrated through IoT to collect real-time weather data, which is then analyzed using machine learning models, especially XGBoost, to predict future weather conditions.

The sensor calibration process is performed using the linear regression method to match the sensor readings with accurate reference values. The XGBoost model is trained with the calibrated and processed data to produce more accurate predictions. The model evaluation showed encouraging results with high metric values in accuracy of 98.62%, precision of 96.57%, recall of 99.42%, and F1-score of 97.97%, signifying the model's success in identifying complex weather patterns. The system is expected to make a significant contribution to early warning and risk mitigation of hydrometeorological disasters, enabling communities and economic actors to make more informed decisions in the face of weather changes.

Keywords: Weather Prediction, IoT, Machine learning, XGBoost, Sensor Network, Wireless Sensor Network.