ABSTRACT

This research aims to develop a solar power forecasting system by utilizing Internet of Things (IoT) technology and Long Short-Term Memory (LSTM) algorithm. Solar energy as a renewable energy source has high potential, but forecasting solar electricity production is still a challenge due to high data variability. In this research, the data to be forecasted, such as sun exposure, current, and voltage, are collected in real-time by IoT devices consisting of solar panels, INA219 sensors, Solar Charge Controller (SOC), NodeMCU ESP8266, inverter, and Valve Regulated Battery (VRLA). The data collected by the IoT devices is analyzed using an LSTM model, which involves Forget Gate, Input Gate, and Output gate mechanisms, to manage relevant information in predicting solar power. The accuracy of the model was assessed using Mean Absolute Percentage Error (MAPE), Mean Absolute Error (MAE), Root Mean Square Error (RMSE), and Coefficient of Determination (R2). The results show that the model can provide precise information compared to traditional forecasting techniques, even though the data used has high variability. The contribution of this research is to analyze the use of IoT in real-time data collection for solar power forecasting and to investigate and evaluate the accuracy of the LSTM model accuracy with SimpleRNN comparison method in dealing with solar energy data fluctuations.

Keywords: *Solar Power Forecasting, Internet of Things (IoT), Long Short-Term Memory (LSTM), Renewable Energy, LSTM Model Accuracy.*