
Abstract

Wave height prediction is vital in various fields of work and activities at sea, one of which is for ship navigation and operations. These activities depend on current ocean wave data and predictions for the future. This paper uses the Transformer model to predict ocean wave heights accurately. Although it is a new model, it effectively measures wave height. This study used six years and seven months of data divided into six years and seven months as training data and testing data, respectively. We used testing data to forecast the next three days, seven days, 14 days, and 30 days. As wave data, we use the reanalysis ERA5 data from ECMWF at Pelabuhan Ratu, Indonesia, obtained from ERA-5 as a case study. We compare the forecasting results to get the highest accuracy using Transformer and Long Short-Term Memory (LSTM). Our results show that the LSTM model has the best accuracy than the Transformer model. The highest accuracy of sea wave height forecasting for the LSTM model is 0.034 for MSE, 0.186 for RMSE, and 0.996 for R, and the best accuracy of sea wave height forecasting for the Transformer model is 0.118 for MSE, 0.334 for RMSE, and 0.992 for R.

Keywords: *Wave height forecasting, Long Short-Term Memory (LSTM), Transformer.*
