

Forecasting of Wave Height Time Series Using AdaBoost and XGBoost, Case Study in Pangandaran, Indonesia

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Abstract

Wave height forecasting has a vital role in coastal activities. The prediction results help minimize losses on various ocean activities, such as sea transportation and designing coastal structures. The numerical method is usually utilized for wave height forecasting, but it requires high computational resources to solve its complexity. Moreover, the high-resolution grid resolution is also required to produce an accurate prediction. In this paper, XGBoost and AdaBoost methods are used to forecast the wave height accurately. Five years of data is used in this study, 4.5 years of data as training data, and six months of data as testing data. The testing data is used to forecast 7 days, 14 days, 30 days, 45 days, and 60 days ahead. The wave data at the southern part of the Pangandaran region, Indonesia, is used as a study case. The forecasting results by using XGBoost and AdaBoost are compared, to obtain the highest accuracy. Hyperparameter tuning for both methods is also used in this study to optimize the model's performance. The GridSearch algorithm used for hyperparameter tuning to find the best parameters value combination for both models. The highest accuracy of forecasting results is 0.064 for RMSE and 0.987 for the coefficient correlation value.

Keywords: wave height forecasting, xgboost, adaboost, boosting algorithm, hyperparameter tuning



