

Abstract

In coastal operations, such as naval engineering and navigation, sea level forecasting is important because it can be used to devise potential coastal development and planning plans, minimizing their significant consequences. Conventional sea level predictions, such as tidal harmonic analysis, do not consider the influence of non-tidal elements and require long-term historical sea level data. In this thesis paper using deep learning approaches for predicting the sea level, namely the Recurrent Neural Network (RNN) and the Long Short Term Memory (LSTM), This method has also been used in the computer program ELVER Sea Level Prediction registered as Intellectual Property Rights (IPR) with number EC00202120506. The data used were available sea level data from IDSL (Inexpensive Device for Sea Level Measurement) in Sebesi, Sunda Strait, Indonesia. As training data, we used only 3 months of data to train the model for predicting 3, 5, 7, 10, and 14 days ahead. We compare results of prediction by using conventional tidal harmonic analysis with results of RNN and LSTM. The LSTM results showed good overall performance compared to the RNN and the tidal harmonic analysis, with a value of R^2 above 0.97 and an RMSE value of 0.036 for the 14 days prediction. Moreover, the use of soft computing with RNN and LSTM can accommodate non-tidal harmonic data such as sea level anomalies.

Keywords: sea level, forecasting, deep learning, RNN, LSTM