Forecasting of Sea Level Using Hybrid CNN-LSTM, Case Study in Pangandaran, Indonesia

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Abstrak

Sea level forecasting is very useful and helpful for maritime activity by predict the tidal condition in the future. The classic way to predict sea level is to use tidal harmonic analysis. However, this method requires long data to get good accuracy. Therefore many research has been conducted to replace the Tidal Harmonic Analysis model with machine learning to get better performance. One of the most famous machine learning model which is mostly used in time-series forecasting is LSTM. On the other side, there is CNN that has the capability to fast learn and automatically extract raw input data so that the data can be applied to time series forecasting. In this research, we proposed LSTM combined with CNN for long-term sea level forecasting. The sea level data used in this study is from TAD Servers, IDSL-307 that is located in Pangandaran with time duration 1 year, started from 1 January 2020 until 31 December 2020. For the data that we used, the LSTM produce slightly better result, with RMSE 0.0985, R^2 0.9455.

Keywords: Sea Level, Long-Short-Term Memory, LSTM, Convulutional Neural Network, CNN, CNN-LSTM, ConvLSTM