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Research on applying Multiple LSTM Network on WRF models for sea surface wind prediction

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In this paper, we propose a novel LSTM network that can potentially be used to provide sea surface wind prediction models under supervised learning. Multiple LSTMs can be stacked and temporally concatenated to form an encoding-forecasting structure. The Multiple LSTMs are then seamless integration with Weather Research and Forecasting model (WRF) for the simulation of wind to assess their effectiveness. We study the performances of the WRF-LSTM sequential learning models to predict the 6h wind speed at Bohai A-platform Station with 23190 samples. The performance study results show that the Bias of WRF and WRF-LSTM are 2.32m/s and 1.86 m/s, respectively. The WRF-LSTM predicts the 6h wind speed more accurately, moreover, WRF-LSTM are capable of predicting the peaks in wind accurately. The performance study results show that this work can be extended to the ocean wind nowcasting problem. However, there is a need for a detailed study on the effects of the individual parameters and ideal choice of input features.