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Power Grid Line Ampacity Forecasting Based on a Long-Short-Term Memory Neural Network

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Abstract : Improving the line ampacity while using existing power grids is an important issue that electricity dispatchers are now facing. Using the information provided by the dynamic thermal rating (DTR) of transmission lines, an overhead power grid can operate safely. However, dispatchers usually lack real-time DTR information. Thus, this study proposes a long-short-term memory (LSTM)-based method, which is one of the neural network models. The LSTM-based method predicts the DTR of lines using the weather data provided by Central Weather Bureau (CWB) of Taiwan. The possible thermal bottlenecks at different locations along the line and the margin of line ampacity can be real-time determined by the proposed LSTM-based prediction method. A case study that targets the 345 kV power grid of TaiPower in Taiwan is utilized to examine the performance of the proposed method. The simulation results show that the proposed method is useful to provide the information for the smart grid application in the future.

Keywords : electricity dispatch, line ampacity prediction, dynamic thermal rating, long-short-term memory neural network, smart grid
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