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Title: Recent Development in Electricity Price Forecasting Based on Computational Intelligence Techniques in Deregulated Power Market

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Abstract:

The development of artificial intelligence (AI) based techniques for electricity price forecasting (EPF) provides essential information to electricity market participants and managers because of its greater handling capability of complex input and output relationships. Therefore, this research investigates and analyzes the performance of different optimization methods in the training phase of artificial neural network (ANN) and adaptive neuro-fuzzy inference system (ANFIS) for the accuracy enhancement of EPF. In this work, a multi-objective optimization-based feature selection technique with the capability of eliminating non-linear and interacting features is implemented to create an efficient day-ahead price forecasting. In the beginning, the multi-objective binary backtracking search algorithm (MOBBSA)-based feature selection technique is used to examine various combinations of input variables to choose the suitable feature subsets, which minimizes, simultaneously, both the number of features and the estimation error. In the later phase, the selected features are transferred into the machine learning-based techniques to map the input variables to the output in order to forecast the electricity price. Furthermore, to increase the forecasting accuracy, a backtracking search algorithm (BSA) is applied as an efficient evolutionary search algorithm in the learning procedure of the ANFIS approach. The performance of the forecasting methods for the Queensland power market in the year 2018, which is well-known as the most competitive market in the world, is investigated and compared to show the superiority of the proposed methods over other selected methods.