World Academy of Science, Engineering and Technology
International Journal of Energy and Environmental Engineering
Vol:12, No:06, 2018

Electricity Price Forecasting: A Comparative Analysis with Shallow-ANN and DNN

Authors : Fazıl Gökgöz, Fahrettin Filiz

Abstract : Electricity prices have sophisticated features such as high volatility, nonlinearity and high frequency that make forecasting quite difficult. Electricity price has a volatile and non-random character so that, it is possible to identify the patterns based on the historical data. Intelligent decision-making requires accurate price forecasting for market traders, retailers, and generation companies. So far, many shallow-ANN (artificial neural networks) models have been published in the literature and showed adequate forecasting results. During the last years, neural networks with many hidden layers, which are referred to as DNN (deep neural networks) have been using in the machine learning community. The goal of this study is to investigate electricity price forecasting performance of the shallow-ANN and DNN models for the Turkish day-ahead electricity market. The forecasting accuracy of the models has been evaluated with publicly available data from the Turkish day-ahead electricity market. Both shallow-ANN and DNN approach would give successful result in forecasting problems. Historical load, price and weather temperature data are used as the input variables for the models. The data set includes power consumption measurements gathered between January 2016 and December 2017 with one-hour resolution. In this regard, forecasting studies have been carried out comparatively with shallow-ANN and DNN models for Turkish electricity markets in the related time period. The main contribution of this study is the investigation of different shallow-ANN and DNN models in the field of electricity price forecast. All models are compared regarding their MAE (Mean Absolute Error) and MSE (Mean Square) results. DNN models give better forecasting performance compare to shallow-ANN. Best five MAE results for DNN models are 0.346, 0.372, 0.392, 0,402 and 0.409.

Keywords : deep learning, artificial neural networks, energy price forecasting, turkey
Conference Title : ICRERA 2018 : International Conference on Renewable Energy Resources and Applications
Conference Location : Paris, France
Conference Dates : June 25-26, 2018