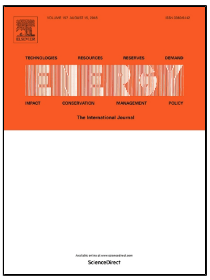
Accepted Manuscript



A deep learning model for short-term power load and probability density forecasting

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PII:	S0360-5442(18)31387-2
DOI:	10.1016/j.energy.2018.07.090
Reference:	EGY 13355
To appear in:	*Energy*
Received Date:	28 January 2018
Accepted Date:	14 July 2018

Please cite this article as: Zhifeng Guo, Kaile Zhou, Xiaoling Zhang, Shanlin Yang, A deep learning model for short-term power load and probability density forecasting, *Energy* (2018), doi: 10.1016/j.energy.2018.07.090

A deep learning model for short-term power load and probability density forecasting

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Abstract: Accurate load forecasting is critical for power system planning and operational decision making. In this study, we are the first to utilize a deep feedforward network for short-term electricity load forecasting. Our results are compared to those of popular machine learning models such as random forest and gradient boosting machine models. Then, electricity consumption patterns are explored based on monthly, weekly and temperature-based patterns in terms of feature importance. Also, a probability density forecasting method based on deep learning, quantile regression and kernel density estimation is proposed. To verify the efficiency of the proposed methods, three case studies based on daily electricity consumption data for three Chinese cities for 2014 are conducted. The empirical results demonstrate that (1) the proposed deep learning-based approach exhibits better forecasting accuracy in terms of measuring electricity consumption relative to the random forest and gradient boosting model; (2) monthly, weekly and weather-related variables are key factors that have a great influence on household electricity consumption; and (3) the proposed probability

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