Energy Demand Forecasting: Industry Practices and Challenges

Mathieu Sinn
IBM Research

Abstract

Accurate forecasting of energy demand plays a key role for utility companies, network operators, producers and suppliers of energy. Demand forecasts are utilized for unit commitment, market bidding, network operation and maintenance, integration of renewable energy sources, and for novel dynamic pricing mechanisms, e.g., demand response. In order to achieve accurate forecasts with high spatial and temporal resolution, data from various sources needs to be integrated: Smart meters, SCADA, weather forecasts, physical, statistical and geographical models.

In this talk I will give an overview of recent work within IBM Research on an intelligent large-scale energy demand forecasting solution which provides forecasts at different aggregation levels, quantifies uncertainty in demand, and estimates the amount of distributed renewable energy behind the meters. The solution can be seamlessly integrated with external applications for network planning and decision support, and has been validated with leading electric utility companies world-wide.

Categories and Subject Descriptors
G.3 PROBABILITY AND STATISTICS --- Multivariate statistics; J.2 PHYSICAL SCIENCES AND ENGINEERING --- Engineering

Keywords
Smart grids; Smart meters; Renewable energy sources; Energy demand forecasting; Analytics; Machine Learning

Short Bio

Mathieu Sinn is an Advisory Research Staff Member and Manager at the IBM Research Smarter Cities Technology Center in Dublin, Ireland, where he leads the Exploratory Predictive Analytics team and manages several research projects in Smarter Energy. Prior to joining IBM, he was working as a Postdoctoral Research Fellow at the David R. Cheriton School of Computer Science at the University of Waterloo, Canada.

Dr. Sinn has more than 10 years of research experience in Statistics, Data Mining, Machine Learning, and various applications such as computational physiology and biology, health informatics, finance, intelligent transportation and energy systems. His current research interests include scalable algorithms for robust statistical regression models, variable selection and feature extraction methods for high-dimensional data, transfer learning, and systems for exploring and reasoning about large numbers of predictive models. Dr. Sinn has authored over 35 peer-reviewed papers and served as reviewer and program committee member for leading conferences in the field.

Dr. Sinn received his B.S./M.Sc. in Computer Science in 2006 and his PhD in Mathematics in 2009 from the University of Lübeck, Germany. His research has been funded by the DFG (German Research Foundation), MITACS and the Canadian Bureau for International Education.

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