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Deep learning applications in electricity markets

Tuesday, 17 September 2024 12:30 (30 minutes)

In this presentation, we provide an overview of deep learning applications in electricity markets, focusing on several key areas of forecasting. First, we discuss state-of-the-art methods for forecasting electricity demand, including Generalised Additive Models (GAMs), which inspired the work that follows. Second, we look at multi-resolution forecasting, which uses data at high- and low-resolution levels through the application of Convolutional Neural Networks (CNNs). Third, we explore the use of Graph Neural Networks (GNNs) to exploit information across different spatial hierarchies, thereby improving the granularity and accuracy of predictions. In particular, we show the promising role of GNNs in forecasting the French national load based on nodes at the regional level. Fourth, we study meta-learning techniques to select the optimal neural network architecture. Finally, we examine the role of foundation models in standardising and streamlining electricity demand forecasting processes. This review highlights the promising advances and practical implementations of deep learning to improve forecasting accuracy, operational efficiency and decision-making processes in electricity markets.

Type of presentation

Talk

Classification

Mainly application

Keywords

Multi-resolution forecasting, Graph Neural Networks, Meta-learning, Foundation Models

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