

Special Session VI

Special Session Basic Information:

专栏题目 Session Title	中文：短期电力负荷预测：基于模糊深度学习的不稳定数据质量解决方案 英文：Short-Term Electricity Load Forecasting: A Solution for Unstable Data Quality Based on Fuzzy Deep Learning
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专栏介绍和征稿主题 Introduction and topics

中文：本研究聚焦数据质量不稳定条件下的短期电力负荷预测问题，针对实际场景中常见的数据噪声、局部缺失及部分模型参数不可用等情况，构建了一种融合模糊逻辑、LSTM、自注意力机制和 ResNetPlus 的两阶段深度学习模型。该模型通过模糊逻辑增强对不确定数据的处理能力，利用 LSTM 提取长短期时序特征，自注意力机制动态识别关键特征，并结合 ResNetPlus 和后补偿机制进一步修正预测结果。实验在北美 Utility、马来西亚和 ISO-NE 等多个数据集上进行验证，结果表明，该方法在预测精度、抗噪声能力、缺失数据适应性及跨区域泛化能力方面均表现较好，可为电网调度、能源配置和稳定运行提供更可靠的负荷预测支持。

英文：This study focuses on the problem of short-term electricity load forecasting under conditions of unstable data quality. To address common issues in real-world scenarios, such as data noise, local missing values, and the unavailability of certain model parameters, we have developed a two-stage deep learning model that integrates fuzzy logic, LSTM, self-attention mechanisms, and ResNetPlus. This model enhances the ability to handle uncertain data through fuzzy logic, utilizes LSTM to extract long- and short-term time-series features, employs the self-attention mechanism to dynamically identify key features, and further refines the prediction results by combining ResNetPlus with a post-compensation mechanism. Experiments were conducted on multiple datasets, including North American Utility, Malaysia, and ISO-NE. The results demonstrate that this method performs well in terms of prediction accuracy, noise resistance, adaptability to missing data, and cross-regional generalization, providing more reliable load forecasting support for power grid dispatch, energy allocation, and stable operation.

Special Session Chair(s):

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Organizer's Brief Biography

中文：董吉哲，副教授、博导，主要研究围绕电力系统优化、负荷预测、人工智能在电力系统中的应用等方向展开，在包括 IEEE Trans.上发表了 SCI、EI 论文 40 余篇、授权专利 30 余项、主持 10 余项科技项目，以第一完成人获得吉林省科技进步三等奖。

英文：Dong Jizhe, Associate Professor and Ph.D. advisor, focuses his research on power system optimization, load forecasting, and the application of artificial intelligence in power systems. He has published more than 40 SCI- and EI-indexed papers—including in IEEE Transactions—holds more than 30 authorized patents, and has led more than 10 scientific and technological projects. As the principal investigator, he received the Third Prize for Scientific and Technological Progress from Jilin Province.