Load forecasting in power system

Power system load forecasting is crucial for power system planning, operation, and control, which reduces operational costs and improves economic efficiency. However, the current forecasting techniques, including LSTM and ARIMA models, ignore the influence of important factors like weather conditions, public holidays, and social events on power ...

Accurate models for electric power load forecasting are essential to the operation and planning of a utility company. Load forecasts are extremely important for energy suppliers and other participants in electric energy generation, transmission, distribution and markets. This paper presents a review of electricity demand forecasting techniques.

Traditional Load Forecasting Techniques Traditional LF techniques refer to a set of methods and algorithms used to predict future electricity demand. These techniques have been used for decades by electric utilities and power system operators to plan and manage their power generation and distribution systems.

Load forecast plays a crucial role in all aspects of planning, operation and control of an electric power system. It is an essential function for operating a power network reliably and economically. Load forecast can be classified as short term load forecast (STLF), midterm load forecast (MTLF), and long& #x2010;term load forecast (LTLF). Forecasting methodologies can be classified on ...

For instance, Fig. 3 illustrates the three crucial components on the demand side of power systems: load forecasting, anomaly detection, and demand response. Each of these components follows the data-driven approach, which begins with data processing to collect input data from various sources such as power distribution systems, previous ...

operation of power system, and any error/uncertainty in forecast affects the economy and control aspect of power system. Especially in the mid- and long-term horizons, since load forecasting is highly related to the system development, attention has been paid to the impact of load forecasting on system design [3] and economics [4].

Although many forecasting methods were developed, none can be generalized for all demand patterns. Therefore, this paper presents a pragmatic methodology that can be used as a guide to construct Electric Power Load Forecasting models. This methodology is mainly based on decomposition and segmentation of the load time series.

Meanwhile, the conventional load forecasting problems in power systems in terms of various lead times and time resolutions have been summarized. It is not strange that the short-term load forecasting problem in IESs received the most attention considering that short-term load forecasts are important for energy management in buildings deployed ...

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Abstract: The main and pivot part of electric companies is the load forecasting. Decision-makers and think tank of power sectors should forecast the future need of electricity with large accuracy and small error to give uninterrupted and free of load shedding power to consumers.

Clustering Based Load Forecasting Techniques Clustering-based LF techniques refer to a class of methods that utilize clustering techniques to group similar load patterns, and then use these patterns to forecast future demand.

Load forecasting is a pivotal part of the power utility companies. To provide load-shedding free and uninterrupted power to the consumer, decision-makers in the. A Comprehensive Review of the Load Forecasting Techniques Using Single and Hybrid Predictive Models Abstract: Load forecasting is a pivotal part of the power utility companies. To ...

The study of power load forecasting is gaining greater significance nowadays, particularly with the use and integration of renewable power sources and external power stations. Power forecasting is an important task in the planning, control, and operation of utility power systems. In addition, load forecasting (LF) aims to estimate the power or energy needed to ...

Accurate models for electric power load forecasting are essential to the operation and planning of a utility company. Load forecasting helps an ... 272 APPLIED MATHEMATICS FOR POWER SYSTEMS 3. Forecasting Met hods Over the last few decades a number of forecasting methods have been developed. Two of the methods, so-called end-use and econometric ap-

DOI: 10.1109/access.2022.3187839 Corpus ID: 250231565; Load Forecasting Techniques for Power System: Research Challenges and Survey @article{Ahmad2022LoadFT, title={Load Forecasting Techniques for Power System: Research Challenges and Survey}, author={Naqash Ahmad and Yazeed Yasin Ghadi and Muhammad Adnan and Mansoor Ali}, journal={IEEE ...

A forecast with improved accuracy may defer building additional generating units or defer the need for a long-term power contract. From an economics perspective, it is the saving of deferring the marginal unit. The accuracy of a load forecast has budgetary implications for the power supplier.

Short-term load forecasting (STLF) is critical for the energy industry. Accurate predictions of future electricity demand are necessary to ensure power systems" reliable and efficient operation. Various STLF models have been proposed in recent years, each with strengths and weaknesses. This paper comprehensively reviews some STLF models, ...

Energy forecasting covers a wide range of prediction problems in the utility industry, such as forecasting demand, generation, price, and power load over time horizons and different power levels. Short-term load forecasting allows the system operator to make important decisions during network management and planning, which represents an ...

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Accurate load forecasting is the premise of reasonable arrangement of generation, transmission and distribution. Improving the accuracy of load forecasting is conducive to reasonable arrangement of operation mode and maintenance plan in power system or microgrid, so as to reduce operational cost and improve benefits of power system or microgrid.

Load forecasting is also a component of broader energy forecasting, which includes predictions for the availability and pricing of fuels such as oil and gas, as well as renewable energy sources. In this publication, we set out to provide you with guidelines to assist with your approach to ESG reporting. Why is load forecasting important?

An accurate load forecasting is essential for assessing risks and optimizing power system operation, as required to optimize power supply, energy distribution, and the management of efficient ...

Ho K-L et al (1990) Short term load forecasting of Taiwan power system using a knowledge-based expert system. IEEE Trans Power Syst 5(4):1214-1221. Article Google Scholar Papalexopoulos AD, Hesterberg TC (1989) A regression-based approach to short-term system load forecasting. In: Conference papers power industry computer application ...

Load forecasts are the building blocks for many planning efforts. Time horizons vary from long-range forecasts that project energy and demand for the next 30 years to mid-term forecasts that project for the next few years and short-term forecasts that project for the upcoming hours or days. Our team offers the following: Long-range load forecasts

Mid-term load forecasting of power systems by a new prediction method. Energy Convers. Manage., 49 (10) (2008), pp. 2678-2687. View PDF View article View in Scopus Google Scholar. Askari and Keynia, 2020. Askari M., Keynia F. Mid-term electricity load forecasting by a new composite method based on optimal learning MLP algorithm.

The accurate forecasting of short-term load plays a significant role in power systems operation and planning. This paper suggests a short-term load forecasting model combining Convolutional Neural Network (CNN) and Long Short-Term Memory (LSTM). The developed CNN-LSTM aims to capture both spatial and temporal dependencies within the load data, leveraging the strengths ...

Accurate load forecasting is critical for power system dependability, avoiding blackouts, and controlling energy generation and transmission costs . The amount of data used as inputs, the desired period, the spatial and temporal (from every minute to annually), and the size can all affect how a model is set up, and the need for forecasting can ...

Aiming to the disadvantages of short-term load forecasting with empirical mode decomposition (EMD) such as mode mixing and many high-frequency random components, a new short-term load forecasting model

based on ensemble empirical mode decomposition (EEMD) and sub-section particle swarm optimization (SS-PSO) is proposed in this paper. ...

Based on time-scale, load forecast can be broadly classified into three main categories : Short-term load forecast (STLF): The time-period of STLF lasts for few minutes, hours to one-day ahead or a week. STLF aims at economic dispatch and optimal generator unit commitment, while addressing real-time control and security assessment.