Design of energy storage power station problem detection method

Can a Bayesian optimized neural network detect voltage faults in energy storage batteries?

Accurately detecting voltage faults is essential for ensuring the safe and stable operation of energy storage power station systems. To swiftly identify operational faults in energy storage batteries, this study introduces a voltage anomaly prediction method based on a Bayesian optimized (BO)-Informer neural network.

Why is predicting voltage anomalies important in energy storage stations?

Early and precise prediction of voltage anomalies during the operation of energy storage stations is crucial to prevent the occurrence of voltage-related faults,as these anomalies often indicate the possibility of more serious issues.

Can neural network models predict battery voltage anomalies in energy storage plant?

Based on the pre-processed dataset, the Informer and Bayesian-Informer neural network models were used to predict battery voltage anomalies in the energy storage plant. In this study, the dataset was divided into training and test sets in the ratio of 7:3.

What is the voltage range of energy storage power station?

The range of abnormal voltage is from 0 to 3.39 V,and the temperature range is from 22 to 28 °C. The current jump is caused by the switching between charging and discharging of the energy storage power station. The SOC ranges from 17.5 to 86.6%.

Can a battery model be used to detect voltage anomalies?

Future studies can investigate extensions of the model to diagnose specific types of voltage anomalies, enhancing fault detection capabilities. Additionally, exploring the model's adaptability for voltage prediction in other battery systems can also be considered.

How many data were collected from Battery 60?

The BMS dataset of the energy storage plant was sampled at a time interval of 60 s,and 11,671 datafrom battery 60 for the period 3 August 2023 to 11 August 2023 were used as the dataset.

Since entering the 21st century, with the rapid development of industries all over the world, the consumption of fossil fuels has increased rapidly, especially the automobile industry, accounting for more than half of the total fuel consumption [1], [2].With the extensive use of fossil fuels, problems such as energy depletion, environmental pollution and global warming ...

With an increasing number of lithium-ion battery (LIB) energy storage station being built globally, safety accidents occur frequently. Diagnosing faults accurately and quickly ...

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Lithium-ion batteries (LIBs) are widely used in electrochemical energy storage and in other fields. However, LIBs are prone to thermal runaway (TR) under abusive conditions, ...

The methodology used in reviewing the literature on technical solutions of energy systems in achieving net zero was conducted via a systematic search for published works using various relevant keywords, such as but not limited to "net zero energy" "100 % renewable energy planning", "renewable energy scenario analysis", "energy transition modelling towards ...

Global problems such as environmental pollution and energy depletion have been greatly alleviated by the arrival of electric vehicles (EVs) [1, 2].Lithium-ion batteries have become the main power source for EVs due to their high energy density, high power density, long life, and no memory effect [3, 4].However, with the rapid development of EVs, the frequency of ...

Non-sinusoidal currents can cause phase deviation and the resulting harmonics in voltage and current waveforms affect the power factor [5].On the other hand, voltage quality problems cause voltage sags, swells and voltage distortions [6] spite drawing nonlinear currents, EV chargers can provide various ancillary services to the grid such as frequency ...

Abstract: Aiming at the problem of fault prognostics for the energy storage power station, this paper proposes a novel data-driven method named multiple elastic ...

Highlights o A short circuit fault battery modelling method is proposed. o A manta ray foraging optimization algorithm is used to identify model parameters. o The short ...

Distributed photovoltaic power stations are an effective way to develop and utilize solar energy resources. Using high-resolution remote sensing images to obtain the locations, ...

To mitigate the intermittency of the RES, and to ensure a reliable green energy supply, the battery energy storage system (BESS) is introduced into power systems [1]. The BESS" importance as a smart grid component is increasing as the share of utility-scale BESSs is growing every year [2].

With the establishment of a large number of clean energy power stations nationwide, there is an urgent need to establish long-duration energy storage stations to absorb the excess electricity ...

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