Prediction of wind power station accidents

Can a data-driven health status assessment predict wind turbine failures?
Recently,data-driven approaches have been introduced into the health status assessment of wind turbines. However,obtaining high-precision failure predictions and interpretable health status assessments is still challenging. In this research,we propose a unified framework for predicting failures in and assessing the health of wind turbines.

Why is early warning of wind turbine failure important?
It is crucial to realize efficient early warning of wind turbine failure to avoid equipment breakdown,to prolong the service life of wind turbines,and to maximize the revenue and efficiency of wind power projects. For this purpose,wind turbines are used as the research object.

Are wind turbine accident news related to outcomes?
The studies closest to our work are [5, 8], as these two studies both analyze wind turbine accident news (where failures are also considered as accidents). In , based on a tabular dataset of accident news, the authors analyzed the relationship between two major factors and two major responses, effects, and outcomes.

Do wind turbine failures need to be predicted?
Such failures cannot be detected and will not directly affect the operation of the wind turbine. Strictly speaking,these failures do not need to be predicted,as long as they are corrected soon after the occurrence. Conversely,such failures can be predicted by adding sensors accordingly.

Can a unified framework be used to predict wind turbine failures?
However,obtaining high-precision failure predictions and interpretable health status assessments is still challenging. In this research,we propose a unified framework for predicting failuresin and assessing the health of wind turbines. First,we empirically grouped wind turbine failures into four categories.

What are the risks of a wind turbine?
portant risks of wind turbines,namely,wind turbine accidents,failures,and breakdowns. accident news. brella term "accidents." Wind turbine accidents may be caused by mechatronic failures,natural events,or human interventions. They may result in damage to wind turbines,wind farms,and associated propert ies,such as roads.

The normalized climatology of zonally averaged seasonal wind power over the U.S. Great Plains (110°W-90°W) during 1992-2022 from (a) ERA5 data and (b) SPEAR"s seasonal retrospective ...

growth on the turbines is not part of standard weather prediction data, forecasts of power production can have

large errors when ice-growth occurs. We propose a statistical method based on random ...

Wind Power Prediction in New Stations based on Knowledge of Existing Stations: A Cluster based Multi Source Domain Adaptation Approach ... Gale weather can easily cause high-speed train accidents ...

According to the length of forecast time, wind power output forecast can be divided into ultra-short-term forecast, short-term forecast, and medium- and long-term forecast [8, 9]. Ultra-short-term forecasts focus on active output power within 30 minutes to 4 hours, short-term forecasts focus on that within 1 to 3 days, and medium- and long-term forecasts focus on that in the ...

The growing trend of wind generation in power systems and its uncertain nature have recently highlighted the importance of wind power prediction. In this paper a new wind power prediction approach ...

Katata, G., Ota, M., Terada, H., Chino, M. & Nagai, H. Atmospheric discharge and dispersion of radionuclides during the Fukushima Daiichi Nuclear Power Plant accident Part I: source term ...

Wind power forecasting and prediction methods are used by system operators to plan unit commitment, scheduling and dispatch and by electricity traders and wind farm owners to maximize profit.

Our data clearly shows that blade failure is the most common accident with wind turbines, closely followed by fire. This is in agreement with GCube, the largest provider of insurance to renewable energy schemes. In June 2015, the wind industry"s own publication "WindPower Monthly" published an article confirming that

Extreme weather events can severely affect the operation and power generation of wind farms and threaten the stability and safety of grids with high penetration of renewable energy. ...

A fuzzy clustering method and a prediction correction method based on the Copula function are used to establish an analytical model of wind power generation output characteristics.

To forecast wind power, the trained and validated model is put to the test using testing data. ... First, based on the unique features of the meteorological data and the wind power plant"s location, the effectiveness of the deep learning models used may vary. Therefore, in order to evaluate the generalization of models, additional validation ...

the surroundings. All sites have several wind turbines but observations from each of the running wind turbines are averaged to one value per park. The turbines at stations E and F do have a de-icing system in operation to prevent ice-growth. However, this system only works imperfectly and they still experience periods of production loss. Therefore,

Accurately predicting severe accident data in nuclear power plants is of utmost importance for ensuring their

safety and reliability. However, existing methods often lack interpretability, thereby limiting their utility in ...

The first wind turbine developed in China dates back to the 1970s, which joined the power grid in the Sijiao Island, Zhejiang Province. After the 18-kW wind turbine, 200 kW, 250 kW, 600 kW, and 750 kW fixed pitch wind turbines were developed, and the MW level wind turbine was developed in 2003.Currently, the majority of wind turbines in China are 1.5 to 3 MW.

As the scale of the power grid becomes larger, the requirements for transmission reliability are getting higher. Due to the large geographical span and the harsh environment of the power transmission line, it has become the most severely affected equipment of the power grid by natural factors. However, the quantitative assessment of transmission line tripping accidents ...

At the Japan Atomic Energy Agency (JAEA), to assess the evolution of the long-term existing exposure situations after the accident, prediction models have been developed for ambient dose equivalent rate ...

Despite the significance and growth of wind energy as a major source of renewable energy, research on the risks of wind turbines in the form of accidents and failures has attracted limited attention.

Wind energy plays a major role in meeting the world"s growing power demand, due to which wind speed forecasting is essential for power system management, energy trading and maintaining the balance between consumption and generation for a stable electricity market. In this article, three different types of predicting techniques have been implemented for ...

The turbines at stations E. and F do have a de-icing system in operation to prevent ice- ... The results in [65] show that in the prediction of icing-related wind power production loss, the ...

Based on the "2-4" Model, this paper establishes a fault tree-BN model of safety accident causation for onshore wind power engineering during the construction period, clarifying the network model of accidents occurring during this phase, which has significant theoretical and practical significance for improving the safety of wind power construction projects, and ...

By the end of August 2022, the installed capacity of wind power in China was 344.5 million kW, up 16.6% year on year; The newly installed capacity of wind power was 16.14 million kW [].However, because wind power is highly correlated with meteorological factors and has strong volatility, grid-connected wind power generation not only provides clean energy, but ...

Wind power is a vital power grid component, and wind power forecasting represents a challenging task. In this study, a series of multiobjective predictive models were created utilising a range of cutting-edge machine ...

The experimental power data in this paper comprise the hourly level power of the PV power stations and wind

power plants in Xinjiang, China, from 2018 to 2019. The power data were collected in an energy data platform and recorded per 15 min, including 96 power data points in one day.

A Fault and Capacity Loss Prediction Method of Wind Power Station under Extreme Weather Ling Li,1 Yixin Zhuo,1 Wenchuan Meng,2 Ze Chen,3 and Heng Wei1 1Dispatching Control Center of Guangxi Power Grid, ... prediction of wind turbines, are used as the base learners in this study; LightGBM is selected as a meta-learner because of ...

High contamination densities of 137 Cs exceeding 1480 kBqm -2 were observed from 150 to 250 km northeast of the Chernobyl nuclear power plant after the accident in April 1986 1,2,3,4,5,6.The ...

We analyzed mid-to long-term 137 Cs wash-off from the catchments contaminated due to the Chernobyl accident in 1986 and the Fukushima Dai-ichi Nuclear Power Plant accident in 2011.