

What is a fault detection method for a wind turbine generator?

Conventional fault detection methods for wind turbine (WT) generators often grapple with inadequate warning times and poor portability. These issues contribute to heightened safety risks and an increased false positive rate (FPR) and false negative rate (FNR).

Do wind turbines have fault detection schemes?

It is worth mentioning that the parts of wind turbines may have malfunctions that should be detected using fault detection schemes. As mentioned in the introduction section, there are two sources of the wind turbine systems data including the SCADA and simulated data.

Can vibration analysis detect wind turbine drivetrain faults?

Teng W et al (2021) Vibration analysis for fault detection of wind turbine drivetrains--a comprehensive investigation. *Sensors* 21:1686 Wen X, Xu Z (2021) Wind turbine fault diagnosis based on Relief-PCA and DNN.

Does SCADA data provide a fault detection system for wind turbines?

Dao PB (2022) Condition monitoring and fault diagnosis of wind turbines based on structural break detection in SCADA data. *Renewable Energy* 185:641-654 Yin S, Wang G, Karimi HR (2014) Data-driven design of robust fault detection system for wind turbines. *Mechatronics* 24:298-306

What are sensor faults in a wind turbine?

For a wind turbine, the sensor faults include pitch position sensor faults, rotor speed sensor faults, and generator speed sensor faults. On the other hand, the actuator faults are due to converter coupling faults and pitch system faults. Furthermore, system faults can be found in the wind turbine drive train.

Are data-driven fault detection strategies effective in process monitoring of wind turbine systems?

Although significant efforts have been made in the process monitoring of wind turbine systems, to the best knowledge of the authors, there is no systematic comparative studies of data-driven fault detection strategies are available in the literature. Therefore, this is the main motivation behind this study.

Deep neural network (NN) applications for wind turbine fault detection can benefit from the more fine-grained view of data that is provided by a higher temporal resolution. 13 AI models have been applied to high-frequency vibration data in a few works; however, these have usually first applied classical signal processing approaches to generate ...

BRIGHAM ET AL. machine terminal quantity analysis, for detecting induction machine faults. 10-12 Stator current is commonly used in MCSA since it is sensitive to the rotor faults, and it is a suitable method to obtain

a diagnostic index allowing the discrimination between faulty and healthy conditions. 13 Rotor asymmetry has been shown to induce a change in the generator ...

An Early Fault Detection Method for Wind Turbine Main Bearings Based on Self-Attention GRU Network and Binary Segmentation Change-point Detection Algorithm. May 2023; Energies 16(10):4123;

Introduction. With the increase in the capacity of wind turbine assembly machines, wind power generation brings economic benefits and also raised important crucial challenges related to reliability (Qiao and Lu, 2015; Wang et al., 2019). On the one hand, wind power generation technology has been developed rapidly, but wind turbine (WT) fault detection and condition ...

Some wind turbines can produce power up to 4.8 MW. However, wind turbines can be subjected to several faults whether they are sensor faults, actuator faults, and system faults. For a wind turbine, the sensor faults include pitch position sensor faults, rotor speed sensor faults, and generator speed sensor faults.

Tang et al. employ an improved lightGBM algorithm for online fault detection in gearboxes of wind turbines. Farrar et al. give an ... To achieve this goal, we use the following normalized inputs: wind turbine status, measured wind speed, actual generator power, absolute yaw position, rotor speed, and yaw motor status, as detailed in 2.1.2. We ...

A health assessment and fault prediction method for wind turbine generators is proposed in this article. In health assessment module, considering generator status transferring along with environment and wind turbine-self operating, variables under wind turbine normal working are divided into two parameter spaces and recognized, namely operating conditions ...

Purpose This research tackles the complexities of detecting bearing faults in wind turbines, which involves non-Gaussian, non-stationary signals submerged in diverse noise sources. The study aims to present an effective algorithm to address these challenges. **Methods** The proposed algorithm integrates ICEEMDAN decomposition for signal analysis under ...

WIND ENERGY Wind Energ. 2009; 12:574-593 Published online 20 January 2009 in Wiley Interscience () DOI: 10.1002/we.319 Research Article * Correspondence to: A. Zaher, Electronic & Electrical Engineering Department, University of Strathclyde, 204 George St, Royal College Building, Glasgow G1 1XW, UK.

In practice, faulty samples of wind turbine (WT) gearboxes are far smaller than normal samples during operation, and most of the existing fault diagnosis methods for WT gearboxes only focus on the ...

The goal of this dissertation research is to develop online nonintrusive condition monitoring and fault detection methods for wind turbine generators (WTGs). The proposed methods use only the ...

Research into the detection of anomalies in SCADA data of wind turbines is currently a hot topic. This strong interest is driven by the fact that more and more sensor data from wind

The fast growing wind industry requires a more sophisticated fault detection approach in pitch-regulated wind turbine generators (WTG), particularly in the pitch system that has led to the highest failure frequency and downtime.

operational mode information at wind turbine level, which is significant for anomaly detection. SCADA solution can be applied as a cheaper way to prevent energy losses or wind turbine faults detection, contrasting with the CBM approach [4-9]. Kim et al. [4] used wind turbines measurements to develop anomaly detection

Condition monitoring and anomaly detection of wind turbine based on cascaded and bidirectional deep learning networks. Appl. Energy, 305 (2022), p. 117925. View PDF ... A threshold self-setting condition monitoring scheme for wind turbine generator bearings based on deep convolutional generative adversarial networks. Measurement, 167 (2021), p ...

Zhang et al. (2018) proposed a wind turbine fault diagnosis method combining Random Forest (RF) and extreme gradient boosting (XGBoost) that were used to establish the data-driven WT fault detection framework. RF is used to rank the ...

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