VDB Solar Solutions

Xiaodong wind turbine blades

Overview

Can AI-based automated wind turbine blade damage detection detect structural damage?

AI-based automated wind turbine blade damage detection has significant economic value. This article proposes a novel memory-aided denoising autoencoder for unsupervised blade damage detection, which detects structural damages with a denoising autoencoder and detects logical damages with a designed memory system.

Can Aquada-SEG be used to segment wind turbine images?

Blade segmentation is a fundamental task for blade damage inspection in the field without stopping wind turbines. This study proposes an AI-based method AQUADA-Seg to segment the images of blades from complex backgrounds by fusing optical and thermal videos taken from normal operating wind turbines.

What is the largest wind turbine blade dataset?

To the best of our knowledge, our dataset is the largest wind turbine blade dataset to date. All blade videos are taken with DJI Zenmuse H20T 2 or DJI Mavic 2 Enterprise Advanced 3 while wind turbines are in normal operation. We fixed the frame frequencies of the optical and thermal cameras to 30 FPS.

Can thermal modality detect surface damage in wind turbine blades?

Optical modality can be used to detect surface damage, but cannot be used to detect underneath damage, which is much more important than surface damage in wind turbine blades. Meanwhile, thermal modality can help to detect underneath damage.

How to improve wind turbine blade segmentation performance?

This verified that we can indeed improve the blade segmentation performance by utilizing temporal complementarity with a designed memory. In addition, since wind turbine blade videos are periodic, there is an upper bound to

improve the segmentation performance by increasing the memory size. The recommended memory size for our case is 150 frames.

How important is blade damage inspection without stopping wind turbines?

Blade damage inspection without stopping the normal operation of wind turbines has significant economic value. Blade segmentation is a fundamental task for blade damage inspection in the field without stopping wind turbines.

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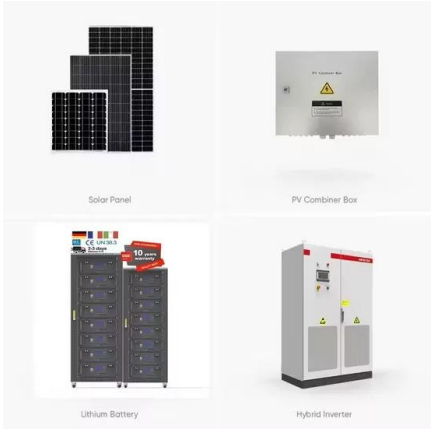
Blade Types for Wind Turbine Users , The Complete Guide

The pitch of your turbine blades--the angle of the blade's windward edge--is a key factor in maximizing your turbine's efficiency, especially at low windspeeds. Too low of a pitch and the ...

Variable importance analysis of wind turbine extreme responses ...

Zhang, Xiaodong ; Dimitrov, Nikolay. This study uses Shapley value explanations to conduct a variable importance analysis of three wind turbine extreme responses, blade tip-tower ...

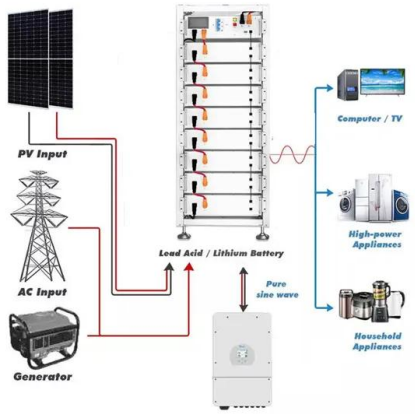


Research status and trend of wind turbine aerodynamic noise

????: Xiaodong LI E-mail:lixd@buaa .cn ????: Project supported by the National Basic Research Program of China (No. 2012CB720202) Research status and trend of wind ...

Transporting Wind Turbine Blades: How To Do It ...

However, the challenges of wind turbine blade transport are unique. Taller wind turbines provide the most efficient wind energy since winds are more reliable and potent in higher altitudes. Larger wind turbines mean ...



Highlighting 26 Top-notch Wind Turbine Blade Manufacturers

Vestas is a wind turbine manufacturing company that offers a world-class portfolio of service solutions. They provide advanced drone inspections and repair services for wind turbine ...

Individual Blade Pitch Control Method of Spar Floating Wind Turbine

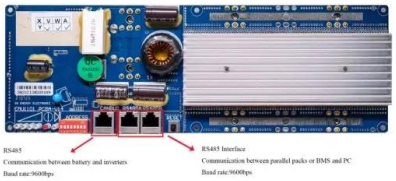
For floating wind turbines operating at sea, the wind wheels and blades are affected by aerodynamic loads, the foundation of floating platforms is affected by ...

When wind turbine blades get old what's next?

Wind turbine blades are built to last which makes them hard to recycle. Traditional solutions include using pieces of decommissioned blades in cement kilns to manufacture cement, though this can

Artificial intelligence-based blade identification in operational wind

The performance of the proposed model is verified using drone images of wind turbine blades, demonstrating near human-level precision in identifying images depicting the same individual ...



Unsteady aerodynamic characteristics of a horizontal wind turbine ...

HAWT Horizontal axis wind turbine D Wind turbine diameter B Xiaodong Wang wangxd@ncepu .cn wind turbine blades under yaw considering full 3D rota-tional effects ...

Stochastic parameterized modeling for aerodynamic design of wind

Aerodynamic optimization of the airfoil is of great significance to the shape design for wind turbine blade. However, it is tough to calculate the aerodynamic forces of ...

How Wind Turbine Blades Are Manufactured?

Future of Wind Turbine Manufacturing. Innovative advancements are making a mark: 3D Printing: Faster production, lower costs, and increased design freedom are potential ...

The Science Behind Wind Blades and How They Work

How Wind Blades Work. Wind turbine blades transform the wind's kinetic energy into rotational energy, which is then used to produce power. The fundamental mechanics of ...

Materials for Wind Turbine Blades: An Overview

Early history of wind turbines: (a) Failed blade of Smith wind turbine of 1941 (Reprinted from []; and (b) Gedser wind turbine (from []).The Gedser turbine (three blades, 24 m rotor, 200 kW, ...

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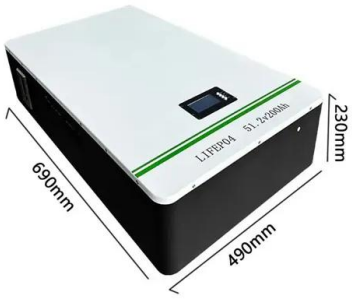
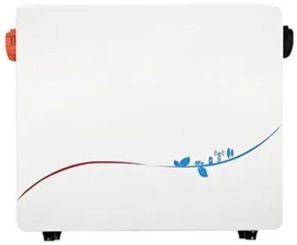
Wei Zuo, Xiaodong Wang, Shun Kang*. Numerical simulations on the wake effect of H-type vertical axis wind turbines. Energy, 2016, 106:691~700. Liu ZhiYi, Wang XiaoDong, Kang ...





The scientific reason why wind turbines have 3 blades

Choosing the Perfect Number of Blades. By and large, most wind turbines operate with three blades as standard. The decision to design turbines with three blades was ...

Investigations on the Unsteady Aerodynamic ...

Wind turbines inevitably experience yawed flows, resulting in fluctuations of the angle of attack (AOA) of airfoils, which can considerably impact the aerodynamic characteristics of the turbine blades. In this paper, a ...

Artificial intelligence-based blade identification in operational wind

@article{Sheiati2024ArtificialIB, title={Artificial intelligence-based blade identification in operational wind turbines through similarity analysis aided drone inspection}, ...

Wind Turbine Technology: A Deep Dive into Blade Designs and ...

Wind turbine blades capture kinetic energy from the wind and convert it into electricity through the rotation of the turbine's rotor. What materials are wind turbine blades made of? Wind turbine ...

Innovations in Wind Turbine Blade Engineering: Exploring

This manuscript delves into the transformative advancements in wind turbine blade technology, emphasizing the integration of innovative materials, dynamic aerodynamic ...

Xiaodong WANG , Professor , PhD , North China ...

The unsteadiness of the wind velocity direction causes the continuous change of the wind turbine attitude resulting in an alternative load and affecting the efficiency and safe operation of wind

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