

Special Issue

Machine Learning for Faults Detection of Photovoltaic Systems

Message from the Guest Editors

This Special Issue invites original research articles and comprehensive reviews that explore the application of machine learning (ML) techniques to fault detection, diagnosis and prognostics in PV systems. Topics of interest include, but are not limited to:

- Development of ML methods for analyzing electrical, thermal, optical and environmental data, including I–V curves, string currents, infrared images and electroluminescence measurements.
- Deep learning, foundation models, transfer learning and explainable AI for anomaly detection, classification and predictive maintenance.
- Hybrid approaches that integrate ML with physics-based or degradation models to enhance robustness and generalizability.
- Automated inspection using drone- or satellite-based imaging coupled with computer vision techniques.
- Benchmarking and validation of ML algorithms through real-world case studies, standardized datasets and large-scale deployments.
- Emerging directions such as edge AI, federated learning, cloud-based analytics and integration of ML-driven fault detection into smart grid and digital twin frameworks.

Guest Editors

Dr. Shruti Vyas

Institute of Artificial Intelligence (IAI), University of Central Florida, Orlando, FL 32816, USA

Dr. Mahmoud Dhimish

Department of Electrical and Photonics Engineering, Technical University of Denmark, 4000 Roskilde, Sjælland, Denmark

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Solar
Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland
Tel: +41 61 683 77 34
solar@mdpi.com

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About the Journal

Message from the Editor-in-Chief

Solar is a new international, open access journal for solar technologies. Climate change is real! Therefore, fast and wide-spread application of solar technologies is of utmost importance. Consequently, *Solar* aims to publish articles which make a real, influential, and often cited contribution not only to basic research and development, but also to the application of photovoltaics as well as to solar thermal conversion. In addition, articles discussing the politics, economy, environmental, and social issues of solar technologies are also welcome. We encourage authors to submit high-quality original articles, letters, and review articles. Our editorial and technical team guarantees a high-quality, fast reviewing process, fast publication, and promotion. With your articles, our journal will rank among the best soon!

Editor-in-Chief

Prof. Dr. Jürgen Heinz Werner
Institute for Photovoltaics and Research Center SCoPE, University of
Stuttgart, 70569 Stuttgart, Germany

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