Special Session Proposal

Title

Machine learning and its applications in Wind Energy Sector

Session organizers

Imed Khabbouchi, Tunisia
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Laboratory of Electronics and Microelectronics, Faculty of Science of Monastir, Tunisia.
Laboratory of Thermal and Energy Systems Studies (LESTE), National School of Engineers of Monastir, Tunisia
Imed Khabbouchi received his engineering diploma, Master of research degree, and PhD in energy engineering from National School of Engineers of Monastir, Tunisia, in 2012 with honors. He worked at Department of Mechanical Engineering, University of Ottawa and at the Royal Military College of Canada as a researcher. During PhD preparation, his research topics included Turbulence, Fluid Mechanics, Heat Transfer, eduction of coherent structure in turbulent flows.
Now IMED KHABBOUCHI is working on renewable energies and energy transition, specifically, assessment of wind energy, wind power forecasting techniques, AI, Machine Learning techniques used for forecasting, digital twin of wind power, Electric Vehicles for energy transition, development of energy management systems for renewable energy resources etc

Uwe Ritschel, Germany
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Lehrstuhl für Windenergietechnik (LWET), Universty of Rostock, Germany.
Uwe Ritschel obtained his doctorate in physics from University of Oldenburg in Germany. For several year he has worked in Wind Energy industry first as R&I Engineer at Nordex Energy GmbH, then as a manager of his own company Windrad Engineering GmbH until December 2013.
Since January 2014 Pr Uwe Ritschel holds a chair position at University of Rostock where he has several lectures on simulation and design of wind turbines, research projects, partly with partners from wind industry, development of wind turbine technology.
In His lab he supervised several PhD and Master projects on the development on wind energy technology. He has published several journal papers, book chapters and book in the field of wind energy technology.

Brief Description of the session thematic

In recent years, we witness an extensive use and implementation of wind power to reduce the fuel based power generations and to meet the net zero goal by 2050. At the same time, in order to optimize the manufacturing, implementation and use of wind energy there had been an extensive use of Artificial Intelligence (AI) and Machine learning (ML) to achieve those goals.

The content of this special session will include the presentation of work on the latest development and use of ML in the field of Wind Energy. This session includes the main aspects and applications of ML in the wind energy sector such as power forecasting, design optimization, and maintenance planning.
Special focus will be made on recent development and innovation techniques in digital transformation and applications of ML to ensure reliable and safe wind energy transition.
Authors should contribute to the latest state-of-the art development of ML and AI based technologies to ensure more affordable and consistent wind power generation for carbon free and environmental friendly power generation.

Topics and Keywords

Wind Energy Sector

- *Wind power and wind speed forecasting*
- *Fault detection*
- *Design optimization*
- *Concept drift and data drift in ML models*
- *Optimal control*
- *Maintenance planning*
- *Digital transition of wind energy*
- *Digital Twin*

Number of pages

4 to 6 pages

Deadlines

Full paper submission: June 15th, 2024.
Authors' notification: August 30th, 2024.
Camera-ready paper submission: September 15th, 2024.

List of potential reviewers

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Submissions Procedure

The instructions for the submission of your manuscript are included in the conference website via the following link: https://icaige.tn/submission/