Call for Papers: "Artificial Intelligence in Power Electronics"

Submission date: Oct. 30, 2024 Publication date: March 2025

Power electronic systems are transitioning towards data-centric paradigms, underpinned by ubiquitous connections that facilitate data-driven applications. By incorporating AI, power electronic systems are endowed with self-awareness and self-adaptability, thereby enhancing system autonomy. This exciting journey has seen the emergence of many innovative concepts, state-of-the-art AI tools, and cutting-edge hardware, all of which have added new dimensions to the field of power electronics. There are a plethora of applications, such as design optimization of power module heatsinks, intelligent controllers for multi-color LEDs, maximum power point tracking (MPPT) control for wind energy conversion systems, anomaly detection for inverters, and remaining useful life (RUL) prediction for supercapacitors, to name a few. The opportunities for integrating learning capabilities into systems are expanding, paving the way for the next significant leap in smart power electronic systems. This special issue aims to inspire fresh ideas and showcase the latest research achievements in this dynamic field. We invite prospective authors to submit original contributions or survey papers for review and potential publication in this special issue.

Topics of interest of AI in Power Electronics include, but are not limited to:

- AI-assisted design (heatsink, circuity, magnetics, etc.)
- AI in Design for Reliability (DfR)
- AI for accelerated test planning and experiment
- Intelligent data-driven control and optimization
- Online learning and adaptive control
- Intelligent lifetime extension and power routing
- Digital twin and surrogate models
- Cybersecurity and attack identification
- Physics-informed machine learning for power electronics
- Condition & health monitoring
- Anomaly detection, fault diagnostics, failure prognostics
- Tailored AI for data- and computation-light applications
- Uncertainty quantification and repeatability verification
- Transfer learning and domain adaption
- IoT, cloud computing, hardware implementation
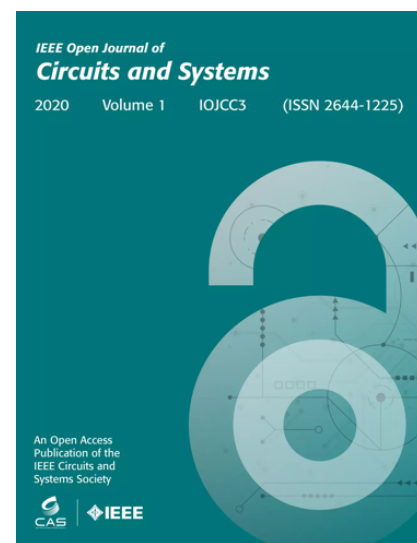- Public dataset collection and dissemination

Important Dates:

- Manuscript submission deadline Oct. 30, 2024
- First-round revision notification due Dec. 30, 2024
- Revised manuscripts due Jan. 30, 2025
- Second-round revision notification due Feb. 28, 2025
- Final manuscript due March 15, 2025
- Online publication End of March 2025

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