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IEEE Internet of Things Journal

Special Issue on Advancing Intelligent IoT Systems through Transformer Architectures: New Paradigms, Applications, and Challenges

The evolution of Internet of Things (IoT) into the Intelligent Internet of Things (IIoT) marks a significant shift from conventional connected devices to systems capable of real-time data processing, decision-making, and autonomous operations. IIoT systems generate vast amounts of real-time data from diverse sources, including sensors, video streams, logs, and human-machine interfaces. Traditional deep learning approaches, including convolutional neural networks and recurrent neural networks, have demonstrated efficacy in specific domains but struggle with large-scale, multimodal IIoT data due to their inherent architectural limitations.

Transformers, initially introduced for natural language processing, have rapidly emerged as a leading architecture in deep learning, significantly transforming the manner in which machines process data. With their scalability, flexibility, and cutting-edge performance, Transformers are increasingly seen as a promising solution to address the challenges unique to the IIoT environment. Their ability to handle large data volumes, process heterogeneous inputs, and uncover complex patterns positions them as a powerful tool for intelligent IIoT systems.

However, adapting Transformers to meet the demands of IIoT systems introduces several technical and practical challenges, ranging from computational constraints and model efficiency to issues related to data privacy and security. This special issue focuses on exploring the transformative impact of Transformer architectures on the evolution of intelligent Internet of Things (IIoT) systems. Key areas of interest include:

- Transformer-Based IIoT Data Processing
- Edge Computing with Transformers for IIoT
- Multimodal Data Fusion Using Transformers
- Self-Supervised Learning for IIoT with Transformers
- AI-Driven IIoT Security with Transformer Models
- Transformer-Enabled Predictive Maintenance in IIoT
- Transformer Models for IIoT in Smart Cities
- Scalable Transformer Architectures for IIoT Networks
- Federated Learning with Transformers for IIoT

Important Dates

- Submission Deadline: August 31st, 2025
- First Review Due: September 30th, 2025
- Revision Due: October 31st, 2025
- Second Reviews Due/Notification: December 31st 2025
- Final Manuscript Due: February 28th, 2026
- Publication Date: May 2026

Submission

The original manuscripts to be submitted need to follow the guidelines at: <https://iee-iotj.org/wp-content/uploads/2025/02/IEEE-IoTJ-Author-Guidelines.pdf>, which should not be concurrently submitted for publication in other venues. Authors should submit their manuscripts through the IEEE Author Portal at: <https://iee.atyponrex.com/journal/iot>. The authors must select as "SI: (Advancing Intelligent IoT Systems through Transformer Architectures: New Paradigms, Applications, and Challenges)" when they reach the "Article Type" step in the submission process.

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