Special Issue

Next-Generation IoT Sensor Systems: Integrating Distributed Intelligence and Decentralised Trust

Message from the Guest Editor

The rapid evolution of IoT sensor systems demands integrated solutions for trustworthy, intelligent sensing across industrial, environmental and urban applications. Next-generation architectures require embedded AI capabilities—such as federated learning and neuromorphic computing—to enable autonomous, real-time decision-making at the edge while maintaining cryptographic data integrity and resilience against emerging threats such as model inversion attacks or sensor spoofing. This convergence necessitates novel approaches to AI-driven sensor intelligence, including verifiable neural networks and adaptive calibration algorithms, coupled with distributed trust mechanisms like lightweight blockchain attestation and zero-knowledge proofs. These solutions must address critical challenges of scalability in massive sensor deployments, privacy-preserving data fusion, and security in distributed sensing environments with heterogeneous devices and protocols.

This Special Issue seeks cutting-edge research on integrating trusted AI with IoT sensor systems. Original research, case studies, and reviews are welcome.

Guest Editor

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Deadline for manuscript submissions

20 March 2026

Sensors

an Open Access Journal by MDPI

Impact Factor 3.5
CiteScore 8.2
Indexed in PubMed

mdpi.com/si/245319

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Sensors is a leading journal devoted to fast publication of the latest achievements of technological developments and scientific research in the huge area of physical, chemical and biochemical sensors, including remote sensing and sensor networks. Both experimental and theoretical papers are published, including all aspects of sensor design, technology, proof of concept and application. Sensors organizes Special Issues devoted to specific sensing areas and applications each year.

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