IEEE Internet of Things Journal Special Issue on

Responsible and Federated Foundation Models for IIoT

By incorporating cutting-edge IoT sensing, big data analysis, and artificial intelligence into industrial production process, Industrial Internet of Things (IIoT) plays important roles in enhancing production efficiency, reducing resource and power consumption, improving product quality, and so on. The current large parametric foundation models, represented by ChatGPT and Sora, have made significant progress, particularly in domains such as natural language processing and computer vision. The foundation model can collaborate with or optimize smaller scale models, and combining the two can provide more efficient solutions for the IIoT. At the same time, the emergence of credible federated learning introduces a paradigm that supports collaborative model training across distributed devices, thereby safeguarding data privacy and maximizing data utilization efficiency. This development aligns seamlessly with the stringent data privacy requirements of IIoT applications. Consequently, credible/federated foundation models for IIoT are very promising by the integration of credible federated learning and foundation models. While some advancements have been achieved in this field, there remains a compelling need for further exploration of credible and federated foundation models, also the framework for credible collaboration between foundational and small models.

The IEEE Internet of Things Special Issue on Credible and Federated Foundation Models for IIoT strives to comprehensively address various facets intertwined with credible federated learning and foundation models within the domain of IIoT. We invite authors to submit their latest original research results on the following topics, but are not limited to:

- Cross-modal and multimodal foundation models for IIoT
- Refinement of foundation models through fine-tuning for IIoT
- Learning paradigm for training foundation models via federated learning for IIoT
- Collaboration mechanisms between foundation models and small models
- Federated unlearning approach for foundation models after organizational changes in the IIoT
- Federated retrieval augmented generation (RAG)
- Framework for fusion or collaboration between foundation models
- Reasoning optimization of foundation models and federated learning for IIoT
- Ensuring responsibility of IIoT using Federated Learning and Foundation Models
- Optimization strategies for Federated Learning and/or pre-training foundation models targeted at IIoT applications
- Establishing large foundation model repositories for IIoT applications
- Federated life long learning and AI governance control in IIoT
- Responsible AI engineering for foundation model-based industrial applications

Submission Information

The original manuscripts to be submitted need to follow the guidelines described at: http://ieeeiotj.org/guidelinesfor-authors/, which should not be concurrently submitted for

publication in other venues. Authors should submit their manuscripts through the IEEE Manuscript Central at: https://mc.manuscriptcentral.com/iot. The authors must select as "SI: Responsible and Federated Foundation Models for IIoT" when they reach the Article Type" step in the submission process.

Important Dates

Submission Deadline:	March 15th, 2025
First Reviews Due:	May 1, 2025
Revision Due:	June 1, 2025
Second Reviews Due/Notification:	July 1, 2025
Final Manuscript Due:	July 31st, 2025
Publication Date:	October 2025

Guest Editors

Weishan Zhang (zhangws@upc.edu.cn), China University of Petroleum (East China), China
Paolo Bellavista (paolo.bellavista@unibo.it), University of Bologna, Italy
Lu (Qinghua.Lu@data61.csiro.au), Data61, CSIRO, Australia
Xiaokang Zhou (zhou@kansai-u.ac.jp), Kansai University, Japan
Chonggang Wang (CGWANG@IEEE.org), InterDigital, USA