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IEEE Internet of Things Journal

Special Issue on AI Agent Enabled Small-Large Model Collaboration for Internet of Things

As IoT systems evolve from connected sensing to connected intelligence, AI agents are expected to support goal-driven services across resource-constrained devices and edge infrastructures. However, real-world IoT deployments still face a gap between capability and deployability. On-device intelligence is limited by latency, energy, memory, and connectivity, while cloud-only solutions suffer from intermittent links, bandwidth cost, service availability, and privacy concerns. These issues become more critical in agentic workflows, where multi-step reasoning, memory access, and tool orchestration may introduce additional errors and delays.

Small–large model collaboration at the network edge offers a promising solution. On-device small models can provide always-on responsiveness, local privacy-preserving processing, and fallback under disconnections, while cloud large models offer on-demand knowledge, complex reasoning, and adaptive guidance. AI agents can coordinate this collaboration by deciding when to invoke large models, what information to transmit, and how to integrate cloud-side intelligence into local actions. This special issue aims to collect original, high-quality research on deployable, efficient, and trustworthy small–large model collaboration for AI agents in real-world IoT settings. We welcome submissions on topics including, but not limited to:

- Small–large model collaborative architectures for IoT devices and edge servers
- Small–large model collaboration for infrastructure-less IoT scenarios
- Small–large model deployment in satellite and non-terrestrial networks for IoT
- Delay-tolerant and mobile-edge access to large models for AI agents
- Agent-enabled task decomposition for device–cloud collaboration
- AI Agent model routing and orchestration under resource constraints
- Large-to-small knowledge transfer for edge deployment
- Joint communication and computation for AI-agent-enabled IoT systems
- Multi-modal small–large collaboration for cross-modal alignment at the edge
- Security and privacy in small–large AI agent collaboration for IoT
- End-to-end benchmarking metrics and evaluation frameworks

Important Dates

- Submission Deadline: December 15th, 2026
- First Review Due: March 1st, 2027
- Revision Due: April 15th, 2027
- Second Reviews Due/Notification: June 1st, 2027
- Final Manuscript Due: June 15th, 2027
- Publication Date: August 2027

Submission

The original manuscripts to be submitted need to follow the guidelines at: https://ieee-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://ieee.atyponrex.com/journal/iot. The authors must select as "Special Issue on AI Agent Enabled Small-Large Model Collaboration for Internet of Things" when they reach the "Article Type" step in the submission process.

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