

SCIENCE CHINA Information Sciences

Call for Papers

Special Topic: Distributed Learning, Filtering, and Games



Distributed learning, filtering, and games form the theoretical foundation for perception, decision-making, and coordination in large-scale multi-agent systems. As IoT, unmanned systems, smart grids, and industrial Internet rapidly develop, traditional centralized methods face fundamental challenges in scalability, robustness, and privacy, while distributed approaches relying on local information exchange offer a key solution. Scientifically, the deep integration of these three areas is highly valuable—distributed learning handles data-driven model construction, distributed filtering addresses state sensing under uncertainty, and distributed game theory deals with strategic adaptation under conflicts—and their coupling in information flow, computation, and convergence dynamics promises a new theoretical framework for complex distributed intelligent systems. In applications, this synergy directly supports cooperative sensing/obstacle avoidance in drone/vehicle swarms, distributed state estimation and demand response in smart grids, cooperative localization/resource allocation in IoV, channel access games in industrial wireless networks, and heterogeneous computing scheduling for large-model edge-cloud training. This special issue aims to highlight common scientific problems, innovative algorithms, and validation results, moving distributed intelligence from “independent algorithm development” toward “learning-filtering-game synergy.”

We invite original research, reviews, and engineering papers on topics including but not limited to:

(1) Theory and technology of distributed intelligent learning

Federated learning, split learning, decentralized distributed learning algorithms and frameworks; optimization strategies, communication efficiency improvements, and computing resource scheduling for large-scale

distributed machine learning; robustness, generalization, and fairness in distributed deep learning; lightweight distributed learning techniques for edge devices and heterogeneous networks; theory and applications of distributed self-supervised learning, reinforcement learning, and multi-agent collaborative learning.

(2) Distributed filtering and state estimation

Design and optimization of distributed filtering algorithms for nonlinear/non-Gaussian systems; adaptive filtering, robust filtering, fault-tolerant filtering, and improved distributed Kalman filtering; distributed state estimation, signal denoising, and information fusion under complex network topologies; anti-interference techniques for distributed filtering under dynamic delays, data loss, and malicious attacks; distributed filtering fusion and high-precision modelling from multi-source sensory data.

(3) Distributed game theory and cooperative decision-making

Distributed game modelling, equilibrium analysis, and strategy iteration for multi-agent systems; evolutionary games, Stackelberg games, and cooperative games in distributed systems; game-theoretic optimization mechanisms for distributed resource scheduling, task allocation, and path planning; incentive mechanism design, privacy protection, and interest balancing in distributed systems from a game perspective; stability and convergence analysis of distributed games under dynamic and uncertain environments.

(4) Interdisciplinary integration and applications

New distributed learning paradigms based on filtering perception and game optimization; integrated frameworks combining distributed learning, filtering, and games; distributed cooperative sensing and decision-making in intelligent swarms, industrial IoT, smart energy, and intelligent transportation; privacy security, attack-resilient games, and trustworthy learning in distributed systems; engineering practice and real-world deployment of distributed information processing in complex scenarios.

(5) Applications and system validation

Distributed cooperative sensing, control, and gaming in unmanned systems (drones, autonomous vehicles, robot swarms); distributed state estimation and demand-side gaming in smart grids and microgrids; cooperative localization, decision-making, and resource allocation in the Internet of Vehicles and intelligent transportation systems; distributed filtering and channel access gaming in industrial IoT and wireless sensor networks; real-system validation of edge intelligence, distributed large-model training, and inference.

(6) Other emerging frontiers

Privacy computing in distributed optimization and learning (differential privacy, secure multi-party computation); convergence analysis of distributed algorithms under asynchronous, dynamic, or switching topologies; scalable distributed algorithm design for large-scale multi-agent systems; fundamental theory and information-theoretic limits of distributed learning, filtering, and games.

All submitted manuscripts must be written in English and must not be under consideration elsewhere for publication.

Submission

The papers should be prepared using the SCIS template, and should be submitted online through the manuscript submission system of the SCIENCE CHINA Information Sciences. The submission website is <https://mc03.manuscriptcentral.com/scis>. You should choose **Special Topic: Distributed Learning, Filtering, and Games (2027)**. Information and guidelines on preparation of manuscripts are available on the journal website: <http://scis.scichina.com>.

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Important Dates

Manuscript submission deadline: **Nov. 30, 2026**

First Round of Reviews: Jan. 31, 2027

Final Acceptance Notification: Feb. 28, 2027

Publication: May 1, 2027

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