

CAIT 2026 - Track 16

1. Title: Temporal Cognitive Intelligence Powered by Foundation Models: Paradigms, Advances and Future Directions

2. Brief Description of the Session

The advancement of foundation models and LLMs is driving artificial intelligence from perceptual to cognitive intelligence. Complex time-series data is ubiquitous in industrial manufacturing, energy systems, transportation, finance and robotics, featuring high dimensionality, non-stationarity, long-range dependencies and cross-modal correlations, which bring new challenges to intelligent modeling, reasoning and decision-making. Emerging foundation models such as Transformers, state space models and diffusion models provide novel technical paradigms for unified modeling and knowledge transfer of time-series data. This special session focuses on novel architectures and computing paradigms for temporal understanding, reasoning and decision-making, and explores the collaborative development of large foundation models and lightweight models.

3. Call for Papers

In recent years, foundation models (Transformers, state space models, diffusion models, LLMs) have propelled AI into the cognitive intelligence era, offering new paradigms for complex time-series modeling, cross-task transfer, knowledge representation and reasoning. However, they face bottlenecks in computational cost, deployment efficiency and real-time performance, while lightweight models struggle to balance strong reasoning capability and generalization. Building a collaborative architecture of "large-model global cognition + small-model efficient execution" has become a key research direction. This session invites global scholars to submit original research on foundation model-driven temporal cognitive intelligence, covering theoretical studies, algorithm innovations, system implementations and industrial practices.

4. Topics

- (1) Temporal foundation model architectures and cognitive computing
- (2) LLM-driven temporal reasoning, multi-agent collaboration and knowledge representation
- (3) Efficient fine-tuning, prompt learning and cross-domain generalization
- (4) Multi-modal time-series fusion and generative modeling
- (5) Large-small model collaboration and lightweight edge deployment
- (6) Interpretable, trustworthy temporal intelligence and uncertainty modeling
- (7) Core temporal tasks: forecasting, anomaly detection and decision support
- (8) Applications: industrial PHM, smart energy, transportation, digital twins, and LLM-enabled digital economics & contract risk assessment

5. Brief introduction of Chair with photo



Xiaorui Shao is an Associate Professor and Master's Supervisor at Guizhou University. He received his Ph.D. in Information Systems from Pukyong National University, Republic of Korea. His research interests include intelligent fault diagnosis, temporal intelligence, deep learning, and time series LLM. He has published 18 SCI-indexed papers as the first author in top-tier international journals, including JIMS, INS, KBS, ASOC and ESWA. He serves as a regular reviewer for more than 20 international journals, such as TCYB, TII, TIE and ACM TIS. He was invited to act as Session Chair for IEEE ICCBD+AI 2025 and IEEE PRMVAI 2026, and currently holds editorial board memberships in SCI journals including KSII TIS, Algorithms and Computers.



Yan Tan is an Associate Professor and Master's Supervisor at Yulin Normal University, China. She received her Ph.D. in International and Area Studies from Pukyong National University, Republic of Korea, and her Master's degree in Accounting and Finance from the University of Leeds, United Kingdom. Her research interests include international trade, the digital economy, energy economics, China–ASEAN cooperation, digital humanities, and the application of large language models in the digital economy and humanities. She has led and participated in several national- and provincial-level research projects and published research in international journals in related fields. She serves as a reviewer for journals including Scientific Reports, Journal of Environmental Management, Technological Forecasting and Social Change, Research in International Business and Finance, and Energy Economics. She was invited to serve as a Session Chair for IEEE PRMVAI 2026.