ARCAI 2026 Special Sessions Proposal Form

Format: Maximum 4 pages. All pages are formatted to letter paper size with margins of one inch on every side. All texts use single space, Times New Roman, and a font size of 11.

Success of SS: At least 6 accepted & registered papers with authors from at least 2 independent institutions (other than the organizers institutions) should be required for each SS.

Submission: This form should be submitted to icarcai.info@gmail.com once completed.

Special Session on "AI-Enabled Robotic Cyber-Physical Systems: Networked Control, Digital Twins, and Embodied Intelligence."

Organized by

Principal Organizer(s): (Names with email address and affiliation)

Dr. Tianhao Qie (stewaqie@cityu.edu.hk , City university of Hong Kong)

Dr. Xin Wang (wx815307656@foxmail.com , Hong Kong Polytechnic University)

Dr. Yuji Zeng (yujizeng@cityu.edu.hk , City university of Hong Kong)

Prof. Herbert Ho Ching Iu (herbert.iu@uwa.edu.au , The University of Western Australia)

- **Technical Outline of the Session and Topics (100-150 words):**

Outline of the Session

Cyber-Physical Systems are becoming increasingly intelligent, autonomous, and interconnected through the integration of robotics, AI, sensing, communication networks, and real-time control. In this transformation, AI techniques such as machine learning, reinforcement learning, computer vision, graph neural networks, digital twins, and foundation models are enabling new capabilities in perception, decision-making, motion planning, monitoring, optimization, and resilient operation.

This Special Session aims to bring together researchers and practitioners working on AI-enabled robotic and industrial cyber-physical systems. It welcomes contributions on theoretical methods, algorithm development, robotic hardware, motor and actuator design, embodied intelligence, digital-twin platforms, networked control, and real-world industrial applications.

Topics of the Session

o *AI-Enabled Networked Control for Robotic and Industrial Cyber-Physical Systems*
o *Embodied Intelligence for Autonomous Robotic Systems*
o *Learning-Based Control, Motion Planning, and Decision-Making for Industrial Robots*
o *Robotic Motor Design, Actuator Optimization, and Intelligent Drive Systems*
o *AI-Assisted Motor Control, Fault Diagnosis, and Health Monitoring for Robotic Actuators*
o *Digital-Twin Intelligence for Robotic, Industrial, Energy, and Transportation Systems*
o *Data-Driven Monitoring, Diagnosis, Prognostics, and Optimization for Robotic Systems*
o *Reinforcement Learning and Adaptive Control for Autonomous Systems*
o *Multi-Robot Coordination, Cooperative Control, and Consensus in Industrial Environments*
o *Graph Neural Networks and Trustworthy Machine Learning for Industrial Intelligence*

Accepted and presented papers will be submitted for inclusion into Springer-Lecture Notes in Networks and Systems subject to meeting its scope and quality requirements and indexed by EI Compendex and Scopus. Selected papers will be invited to SCI Journal Special Issues.

- *Computer Vision, Perception, and Sensor Fusion for Robotic Cyber-Physical Systems*
- *Human–Robot Collaboration, Safety, and Explainable AI in Industrial Automation*
- *Resilience, Fault Recovery, and Risk-Aware Operation of Networked Robotic Systems*
- *Edge AI, Real-Time Implementation, and Embedded Intelligence for Robotic Platforms*
- *AI Safety, Standardization, Interoperability, and Verification in Industrial AI Systems*

Accepted and presented papers will be submitted for inclusion into Springer-Lecture Notes in Networks and Systems subject to meeting its scope and quality requirements and indexed by EI Compendex and Scopus. Selected papers will be invited to SCI Journal Special Issues.