

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 Control and Optimization for Robotics and Autonomous Systems"

Organized by

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

Outline of the Session

AI-enabled control, optimization, and autonomous systems are central to the next generation of intelligent robots, transportation platforms, energy systems, and networked cyber-physical infrastructures. As sensing, communication, and computation become increasingly distributed, these systems must learn from data, coordinate across agents, and make reliable decisions under uncertainty, resource constraints, faults, and cyber-physical disturbances. This special session will provide a focused forum for researchers and practitioners to present recent advances at the intersection of robotics, control, and artificial intelligence, including learning-based and model predictive control, distributed optimization, cooperative autonomy, resilient decision-making, and real-world deployment. The session particularly welcomes contributions that connect rigorous control theory with data-driven methods to improve safety, efficiency, robustness, and intelligence in autonomous and mechatronic systems.

Topics of the Session

- o Learning-based, adaptive, and model predictive control for robotic and autonomous systems
- o Distributed optimization, estimation, and decision-making for networked multi-agent systems
- o Cooperative autonomy, swarm intelligence, and coordination of connected vehicles and mobile robots
- o AI-enabled resilient, secure, and fault-tolerant control under uncertainty and cyber-physical constraints
- o Data-driven modelling, system identification, and digital twins for mechatronic and energy systems
- o Safe reinforcement learning and human-aware autonomy for intelligent transportation and robotics
- o Real-world applications in intelligent manufacturing, energy systems, and service robotics
- o AI-enabled control and optimization for smart grids, microgrids, and renewable energy systems
- o Learning-based energy management for batteries, electric vehicles, and distributed energy resources