

Special Session

Code: tw1f1

Title

Perception, Control and Optimization for Land Transportation Systems

Proposer / Main Organizer

Provide complete address/affiliation, phone, email and biography.

The main organizer will be the primary contact person to whom all correspondence will be sent.

Hongjie Liu, Associate Professor (Main Organizer)

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Hongjie Liu received his B.S. degree in Automatic Control from Beijing Jiaotong University, Beijing, China in 2006, and M.S. degree and Ph. D. degree in Traffic Information Engineering and Control from Beijing Jiaotong University, Beijing, China in 2008 and 2019, respectively. He joined Beijing Jiaotong University in 2008 and is now an associate professor. He visited New Jersey Institute of Technology, Newark, NJ, USA as a visiting scholar between Sep. 2017 and Sep. 2018. His current research interests include safety design, formal modeling, verification and optimization in railway train control systems.

Ming Chai, Associate Professor

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Ming Chai received his Ph.D. degree from computer science department, Humboldt University of Berlin, Germany, in 2016. He is currently an associate professor of railway traffic information engineering and control with the National Engineering Research Center of Rail Transportation Operation and Control Systems, Beijing Jiaotong University. His research interests include autonomous and self-adaptive systems, control and optimization of train operations, test generation for ML components, Verification of safety and security for AI-based applications, specification languages, formal verification, and their applications in the railway community.

Xiwang Guo, Associate Professor

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Xiwang Guo received his B.S. degree in Computer Science and Technology from Shenyang Institute of Engineering, Shenyang, China, in 2006, M.S. degree in Aeronautics and Astronautics Manufacturing Engineering from Shenyang Aerospace University, Shenyang, China, in 2009, Ph. D. degree in System Engineering from Northeastern University, Shenyang, China, in 2015. He is currently an associate professor of the College of Computer and Communication Engineering at Liaoning Shihua University. From 2016 to 2018, he was a visiting scholar of Department of Electrical and Computer Engineering, New Jersey Institute of Technology, Newark, NJ, USA. His current research interests include Petri nets, remanufacturing, recycling and reuse of automotive, intelligent optimization algorithm.

IEEE Member or SMC Society Member

Hongjie Liu, IEEE Member and SMC Society Member

Category

Please select one of the following categories:

- Cybernetics

Number of Expected Paper Submissions:

6 or more

Keywords

See list of topics in the [Call for Papers](#)

[Optimization; Agent-Based Modeling; Fuzzy Systems and their applications](#)

Brief Description and Justification (200-250 words):

Land transportation systems (LTS) are typical networked, intelligent and autonomous control systems. In these systems, perception, control and optimization are critical and fundamental functions that affect system stability, safety, reliability, robustness, and efficiency.

Advanced enabling technologies, such as Artificial Intelligence (AI), machine learning, block-chain, big data analysis, digital twin, collaborative design, modeling, testing and formal verification, offer many advantages for improving the land transportation systems. Meanwhile, new challenges have emerged when applying these techniques and innovations.

This session focuses on understanding the challenges and innovative solutions on perception, control and optimization problems in land transportation systems with the help of cutting-edge technologies. We hope to attract high-quality research articles in this field. Review articles that describe the current state of the art are also welcome. Novel submissions relating practical and theoretical solutions to the challenges in the design, testing and validation phases of land transportation systems are all welcome. Submissions of scientific results from experts in academia and industry worldwide are strongly encouraged.

Topics to be covered include, but are not limited to, the following:

- AI applications in LTS
- Block-chain techniques in LTS
- Intrusion detection and prevention systems in LTS
- Risk identification, assessment, and mitigation in LTS
- Real-time sensing, processing, and actuation in LTS
- Sensor networks in LTS
- Self-adaptive and adaptive control in LTS
- Software design theory for LTS
- Formal Methods for LTS

- Design and performance optimization in LTS
- Collaborative software design methods for LTS
- Testing, validation, verification, simulation, and visualization of LTS
- Humans and software system interaction in LTS