

IEEE ICUS 2022

Invited Session Summary

Title of Session

Theory and Approach for Unmanned System Confrontation

Name, Salutation and Affiliation of Organizers

1. Prof. Dewei Li

Shanghai Jiao Tong University, China

dwli@sjtu.edu.cn

2. Asst. Prof. Haibin Shao

Shanghai Jiao Tong University, China

shore@sjtu.edu.cn

Biosketches of Organizers



Dewei Li is a Professor in the Department of Automation at Shanghai Jiao Tong University. Professor Li received the bachelor degree and Ph.D. degree from Shanghai Jiao Tong University in 1993 and 2009, respectively. In 2011, 2014, and 2017, he did collaborative research at the Hong Kong University of Science and Technology.

His research interests mainly include modeling and optimal control of complex systems, model predictive control theory and applications, multi-agent systems, and industrial robots. He has published more than 200 papers (including Automatica, IEEE Transactions on Automatic Control, IEEE Conference on Decision and Control etc.) and a book entitled “Predictive Control: Fundamentals and Developments”. He has won the second Prize of National Natural Science Award, and the First Prize of the Natural Science Award in the Chinese Association of Automation.



Haibin Shao is currently an Assistant Professor of the Department of Automation at the Shanghai Jiao Tong University. He received the Ph.D. degree from the Shanghai Jiao Tong University, Shanghai, in 2017. He was a postdoctoral researcher at the Department of Computer Science and Engineering at the Shanghai Jiao Tong University from 2017 to 2019. He was a visiting scholar in

RAIN lab, William E. Boeing Department of Aeronautics and Astronautics, University of Washington from 2012 to 2014. He is a member of IEEE. He has published more than 50 scientific papers, including IEEE Transactions on Automatic Control, Automatica and IEEE Transactions on Neural Networks and Learning Systems. His research interests include swarm intelligence, data-driven collective learning, distributed predictive control, and distributed optimization.

Details of Session

Recently, swarm unmanned systems (e.g., the swarm of UAV) have played an increasingly important role in the military and civilian domains. Although a swarm unmanned system can be regarded as a cyber-physical system, it also exhibits notable distinctive features. In the setting of networked communication, the performance of the swarm unmanned system is more vulnerable to threats or attacks from physical layers and/or the cyber layers. Therefore, examining the theory and approaches for swarm unmanned system confrontation is conducive to the establishment of the analysis and design framework of the swarm unmanned system confrontation approach, and further lays a solid foundation for its application in practice.

This invited session invites original papers of innovative ideas, concepts, discoveries, improvements, and applications related to the topic "Theory and Approach for Unmanned System Confrontation". This invited session mainly accepts (but is not limited to) submissions related to the following topics.

- Learning-based approach for swarm unmanned system confrontation
- Performance evaluation of swarm unmanned systems in confrontation
- Secure and privacy of swarm unmanned systems
- Antagonistic game of swarm unmanned systems
- Swarm unmanned systems with cooperation and antagonism
- Self-healing in swarm unmanned systems