

IEEE ICUS 2022
Invited Session Summary

Title of Session

Collaborative Aircraft Target Recognition Driven by Data and Knowledge

Name, Salutation and Affiliation of Organizers

1. Prof. Quanbo Ge

Nanjing University of Information Science & Technology, China

2. Prof. Hong Li

Chinese Flight Test Establishment, China

3. Prof. Yanling Zhang

Beijing University of Science and Technology, China

Biosketches of Organizers



Quanbo Ge, male, born in 1980, Ph.D., Post-Doctoral Researcher with the Zhejiang University. He is now a Professor, a doctoral supervisor, and one of vice Chairmen at School of Automation, Nanjing University of Information Science and Technology. He was also one of winners of the 4th Young Scientist Award of the Chinese Association of Automation (2018) . He was also one of the winners of the Science Foundation for Distinguished Young Scholars of Zhejiang Province. He was a visiting

scholar at the Department of Electrical and Computer Engineering of the University of Minnesota. There are nearly 40 published and accepted high-level SCI papers including IEEE TAC, IEEE TIE, IEEE TNNLS, IEEE TC and other IEEE transactions 20 papers. He has been supported more than 20 projects including four national Natural Science Foundation of China projects, national defense science and Technology Innovation major project, and Zhejiang Outstanding Youth Fund project. His research interests include engineering information fusion theory and methods, collaborative optimization of unmanned systems, intelligent evaluation of man-machine hybrid systems and big data analysis of smart grids, etc. He is vice Chairman of Youth Committee of Chinese Association of Automation, Deputy secretary general of Hybrid Intelligence Committee, member of Information Fusion Branch of Chinese Aeronautical Society etc. He is also one of IEEE TSMCA Associate Editors and Editorial Board members of Journal of Acta Automatica Sinica, Journal of Command and Control, and Journal of Control Engineering.



Hong Li, male, Chief Engineer of Test Specialty of China Flight Test Establishment, Chief Technical Expert of Aviation Industry Group, Technical Expert of Naval Equipment Department and Technical Expert of Test Identification of Air Force Equipment Department. In 2019, he was selected into the National Talent Project and awarded the national "Young and middle-aged Experts with Outstanding Contributions". In 2020, he was recommended by Aviation Industry Group corporation to enjoy the government allowance of The State Council. He is mainly engaged in the research and application of target tracking, Optical-Electronic information processing, intelligent data analysis, etc. He has published more than 20 high-level academic papers, authorized more than 20 invention patents, and received more than 10 awards from the group and provincial and ministerial levels.



Yanling Zhang received the B.S. degree in the major of information and computing science, Xidian University in 2009, and the Ph.D. degree from College of Engineering, Peking University in 2015. Currently, she is an associate professor with School of Automation and Electrical Engineering, University of Science and Technology Beijing. Her current research interests include evolutionary game theory, game learning algorithms, and multi-agent systems. She has published more than thirty

academic papers, including more than twenty papers indexed by SCI, more than ten papers appearing in the magazines of JCR Q1 or JCR Q2, and several most-cited papers. She was awarded with the best paper prize by the 24th international conference on neural information processing. She take/took charge of several national level projects and provincial/ministry level projects. She undertake/undertook the review missions of many high-level academic magazines, including IEEE Transactions on Automatic Control, IEEE Transactions on Neural Networks and Learning Systems, Applied Mathematics and Computation, Scientific Reports and so on.

Details of Session

Automatic Target Recognition (ATR) has become an important core component of information-based battlefield situational awareness, enemy identification and enemy intent prediction, and its accuracy, stability and rapidity are important foundations for situational assessment and threat determination. With the increasing multi-platform and systematization of modern electronic information systems, as well as the increasing adversarial nature of modern air and sea mission scenarios, the problems of environmental complexity, mission time-varying, interference diversity and strong uncertainty of sensory data in modern battlefields have become exceptionally prominent, thus leading to a large number of new problems and challenges that have been encountered in the research of collaborative detection

and identification methods for aircraft targets. Data-driven and knowledge-driven are two typical approaches in current collaborative target recognition research, but each has advantages and different scenario adaptations. For the collaborative recognition of non-cooperative targets with weak features in complex scenes, it is difficult for a single-driven approach to meet the increasing requirements of engineering practice, which makes the deep integration of data-driven and knowledge-driven a necessary trend. This invited topic invites original papers containing innovative ideas, concepts, new discoveries, improvements, and new applications related to the theme of " Collaborative Aircraft Target Recognition Driven by Data and Knowledge " as follows.

- Multi-source heterogeneous information fusion theory
- Multi-source targets cooperative recognition theory
- Self-learning optimized target identification based on performance feedback
- Data- and knowledge-driven fusion theory
- Collaborative recognition of aircraft targets in hybrid drive mode