2025 第八届 IEEE 国际无人系统大会
特邀专题简介表

特邀专题名称

健壮可靠的自主无人系统关键技术

组织者

1.高洪波，研究员，中国科学技术大学

2.王程博，博士后研究员，中国科学技术大学

3.王鑫淼，博士研究生，中国科学技术大学

个人简介

高洪波，博士，中国科学技术大学信息科学与技术学院研究员、博士生导师。他于 2016 年 11 月在北航师从李德毅院士指导下获得博士学位，并曾在清华大学工作。主持了包括国家自然科学基金重点项目、科技部重点研发计划总体课题、子课题以及教育部人工智能专项在内的十余项项目，总资助超过 1200 万元人民币。作为第一作者/通讯作者，发表了 22 篇 JCR 一区/二区 SCI 论文（其中 16 篇发表在 JCR 一区顶级期刊），单篇 SCI 引用最高达 171 次，1 篇 ESI 高被引论文，Google Scholar 引用次数 1721 次，H 因子为 22，SCI 因子超过 5.0 的论文超过 20 篇，获得 5 项国际期刊会议论文奖。获得了 22 项发明专利，1 项美国专利和 1 项 PCT 专利。曾获安徽省杰青、安徽省“特支计划”创新领军人才、中国指挥与控制学会科技进步奖一等奖（排名第一）、中国通信学会科技创新青年奖、中国指挥与控制学会优秀青年科学家奖、安徽省人工智能技术奖杰出奖（排名第三）等奖项。目前担任中国指挥与控制学会理事长、青年工作委员会副主任，安徽省机器人学会监事长、青年工作委员会主任，安徽省院士专家协会、安徽省科技人才企业家协会执行理事，中国指挥与控制学会青年工作委员会副主任。他还担任 IEEE TNNLS 和 TASE 两大人工智能领域顶级 SCI 期刊的副主编，《国际先进机器人系统》知名 SCI 期刊的副主编，两次 EI 期刊编委，九次领域主席和客座主编。曾多次受邀参加国际和国内会议发表演讲，次数超过 5 次。

王程博，博士，中国科学技术大学博士后，英国利物浦约翰摩尔斯大学 Visiting Lecturer，2023 年取得大连海事大学工学博士学位，英国海洋工程科学技术协会（IMarEST）会员，英国皇家造船工程师学会（RINA）会员，中国自动化学会会员，中国人工智能学会会员。主要从事强化学习决策理论、自主船舶决策规划技术及海上无人平台等研究。发表相关学术论文 40 余篇，其中 3 项成果入选 ESI 高被引论文，2 项成果入选交通运输领域重大科技创新成果库。参与编撰专著《Offshore Robotics》，授权/申请国家发明专利 13 项，授权软件著作权 2 项。获得 2021 年博士研究生国家奖学金、2021 年度人民网奖学金、2023 年辽宁省优秀毕业生。担任 IEEE TNNLS、IEEE TITS、IEEE TASE、OE、JEET、CCS 等多个国际权威期刊和 TRB、CAC 等国际高影响力会议的审稿人。

王鑫淼，本科毕业于兰州大学。现为中国科学技术大学信息科学与技术学院自动化系博士生。主要研究方向为自主导航、类脑机制和强化学习控制的应用。

特邀专题简介

随着人工智能技术的快速发展，当今的自主无人系统（autonomous unmanned systems, AUS）可更加智能化地在各种复杂动态自然环境中运行。AUS 是一个新兴的跨学科领域，依靠大数据、人工智能以及其他科学技术的进步来创造具有集成任务、运动规划、决策和推理能力的无人系统，具有自主性、智能性和协作性等特征。由于其物理组件、网络基础设施和社会环境的无缝集成和动态性质，此类工程系统必须以越来越高的自主性和智能水平进行操作，以做出决策和操纵其环境。因此，需要发展健壮可靠的关键技术来提升自主无人系统性能。

本特邀专题邀请以下与“健壮可靠的自主无人系统关键技术”主题相关的包含创新思想、概念、新发现、改进以及新应用的原创论文。

- 健壮可靠的人工智能模型

- 先进认知与理解技术
- 高精度自主定位与导航技术
- 自主规划与智能控制技术
- 环境自适应与进化技术
- 人机混合智能技术
- 自主无人船技术
- 自主水下机器人技术
- 自主无人车技术

IEEE ICUS 2024
Invited Session Summary

Title of Session

Robust and Reliable Key Technologies for Autonomous Unmanned Systems

Organizers

1. Prof. Hongbo Gao

University of Science and Technology of China

2. Dr. Chengbo Wang

University of Science and Technology of China

3. Dr. Xinmiao Wang

University of Science and Technology of China

Biosketches s of Organizers

Prof. Hongbo Gao, Researcher, Doctoral Supervisor, School of Information Science and Technology, University of Science and Technology of China. He graduated with a PhD from Beihang University in November 2016 under the supervision of Academician Deyi Li, and worked at Tsinghua University. Chaired more than 10 projects including key projects of the National Natural Science Foundation of China, integrated project topics, sub-topics of the Key R&D Program of the Ministry of Science and Technology of China, and special projects on artificial intelligence of the Ministry of Education, with total funding of more than 12 million RMB. He has published 22 JCR Zone 1 / Zone 2 SCI papers as first/corresponding author (16 papers in top JCR Zone 1 journals), with the highest single SCI citations of more than 171, one ESI highly cited paper, 1721 Google Scholar citations, H-factor of 22, more than 20 papers with SCI factor > 5.0, and 5 international journal conference paper awards. He has been granted 22 invention patents, 1 US patent and 1 PCT patent. He has been awarded the Anhui Province Outstanding Youth, the "Special Support Plan" Innovation Leader of Anhui Province, the First Prize of Science and Technology Progress Award of China Command and Control Society (rank 1), the Science and Technology Innovation Youth Award of China Communications Association, the Young Scientist Award of China Command and Control Society, and the Outstanding Award of Anhui Province Artificial Intelligence Technology Award (rank 3). He is currently the director of the

China Command and Control Society and the deputy director of the Youth Working Committee, the chairman of the supervisory board and the chairman of the youth working committee of the Anhui Robotics Society, the executive director of the Anhui Association of Academicians and Experts and the Anhui Association of Scientists and Entrepreneurs, and the deputy chairman of the youth working committee of the China Command and Control Society. He serves as Associate Editor of IEEE Trans. on Neural Network and Learning System, a leading SCI journal in artificial intelligence, and IEEE Trans. on Automation Science and Engineering, a leading SCI journal in robotics, Associate Editor of the well-known SCI journal Int. J. Adv. Robot. Syst, Editorial Board member of EI journals for two times, Section Chair and Guest Editor-in-Chief for nine times. He has been invited to present at international and national conferences more than 5 times.

Dr. Chengbo Wang, is a postdoctoral researcher at University of Science and Technology of China, a visiting lecturer from Liverpool John Moores University of UK. In 2023, he obtained his Ph.D. degree in Traffic Information Engineering and Control from Dalian Maritime University, China. He is a member of the Institute of Marine Engineering, Science, and Technology (IMarEST) and the Royal Institution of Naval Architects (RINA) in the United Kingdom, as well as a member of the Chinese Association of Automation and the Chinese Association for Artificial Intelligence. His research primarily focuses on reinforcement learning decision theory, autonomous ship decision planning technology, and unmanned platforms at sea. Wang has published 40 related academic papers, with 3 inclusion in the ESI highly cited papers, and two included in the Major Technological Innovation Achievements Library of Transportation. He contributed to the compilation of the book "Offshore Robotics" and holds 13 granted/applied national invention patents and 2 software copyright grants. Dr. Chengbo Wang has received numerous accolades, including national scholarships, the 2021 People's Net Scholarship, and being recognized as an outstanding graduate by Liaoning Province. He serves as a reviewer for several prestigious international journals and conferences such as IEEE TNNLS, IEEE TITS, IEEE TASE, OE, JEET, CCS, TRB and CAC.

Mr. Xinmiao Wang received the Bachelor's degree in Lan Zhou University. He is currently a doctoral student at the Department of Automation, School of Information Science and Technology, University of Science and Technology of China, Hefei, China. His main research interests lie in the application of autonomous navigation, brain-inspired mechanisms and reinforcement learning control.

Details of Session

With the rapid development of artificial intelligence technology, today's Autonomous Unmanned Systems (AUS) can operate more intelligently in various complex and dynamic natural environments. AUS is an emerging interdisciplinary field that relies on advancements in big data, artificial intelligence, and other scientific technologies to create unmanned systems with integrated capabilities for tasks, motion planning, decision-making, and reasoning, characterized by autonomy, intelligence, and collaboration. Due to the seamless integration and dynamic nature of its physical components, network infrastructure, and social environment, such engineering systems must operate with increasingly high levels of autonomy and intelligence to make decisions and manipulate their environments. Therefore, there is a need to develop robust and reliable key technologies to enhance the performance of autonomous unmanned systems.

The invited session invites original papers of innovative ideas and concepts, new discoveries and improvements, and novel applications relevant to the following selected topics of "Robust and Reliable Key Technologies for Autonomous Unmanned Systems".

- Robust and reliable artificial intelligence models
- Advanced cognition and understanding technologies
- High-precision autonomous positioning and navigation technologies
- Autonomous planning and intelligent control technologies
- Environmentally adaptive and evolutionary technologies
- Human-machine hybrid intelligent technologies
- Autonomous unmanned ship technologies
- Autonomous underwater robot technologies
- Autonomous unmanned vehicle technologies