

# Special Session XII

## Special Session Basic Information:

### 专栏题目

### Session Title

中文：新一代人工智能系统的可靠性

英文：Reliability of Next-Generation AI Systems

### 专栏介绍和征稿主题

### Introduction and topics

中文：

随着大语言模型、具身智能、计算机视觉与数据科学的快速发展，人工智能系统正加速进入科研、制造、医疗、智能感知与自主决策等关键场景。与此同时，模型幻觉、分布漂移、多模态感知误差、决策不稳定、数据质量波动以及部署环境不确定性，使新一代 AI 系统的可靠性、可预测性与安全部署成为重要科学与工程问题。

本专栏聚焦新一代人工智能系统的可靠性与预测研究，旨在推动可靠性工程、机器学习、计算机视觉、具身智能与数据科学的交叉融合。欢迎理论方法、实验研究、系统应用与案例分析等稿件。特别鼓励以下方向投稿：

- 大语言模型的可靠性评估、鲁棒性分析与失效模式研究
- 具身智能与智能体系统的感知—决策—执行可靠性
- 计算机视觉模型在噪声、遮挡、域偏移与开放环境下的稳健性
- 数据质量、数据漂移、不确定性量化与可信学习
- AI 系统的故障诊断、预测与健康管理
- 面向高风险场景的可靠性设计、验证与基准测试
- 多模态模型、生成式 AI 与自主系统的安全部署
- 数据驱动方法在寿命预测、剩余寿命估计与运维决策中的应用

英文：

With the rapid development of large language models, embodied intelligence, computer vision, and data science, AI systems are being deployed in critical scenarios such as scientific research, manufacturing, healthcare, intelligent perception, and autonomous decision-making. At the same time, hallucination, distribution shift, multimodal perception errors, decision instability, data-quality variation, and deployment uncertainty have made reliability, predictability, and safe deployment central scientific and engineering challenges.

This special session focuses on reliability and prognostics of next-generation AI systems, with the aim of advancing the integration of reliability engineering, machine learning, computer vision, embodied intelligence, and data science. We welcome theoretical studies, methodological developments, experimental investigations, system applications, and case studies. Contributions are particularly encouraged in the following areas:

- Reliability evaluation, robustness analysis, and failure modes of large language models
- Perception–decision–action reliability of embodied intelligence and agentic systems
- Robustness of computer vision models under noise, occlusion, domain shift, and open environments
- Data quality, data drift, uncertainty quantification, and trustworthy learning
- Fault diagnosis, prognostics, and health management of AI systems
- Reliability-oriented design, verification, and benchmarking for high-consequence applications
- Safe deployment of multimodal models, generative AI, and autonomous systems
- Data-driven methods for life prediction, remaining useful life estimation, and maintenance decision support

## Special Session Chair(s):

	<b>姓名</b> <b>Name</b>	龚元浩 (Yuanhao Gong)
	<b>称谓</b> <b>Prefix</b>	研究员 (Professor)
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### Organizer's Brief Biography

中文：龚元浩，研究员。2007 年获得清华大学学士学位，2015 年获得瑞士苏黎世联邦理工学院计算机博士学位。其研究方向包括机器学习、计算机视觉与智能分析方法，已在 *Nature Methods* 等国际期刊和 CVPR 等国际会议发表百余篇学术论文，获得 IEEE ISBI 最佳论文奖等多个国际奖项，并多次入选全球前 2% 顶尖科学家榜单。

英文：Prof. Yuanhao Gong is a researcher at the Chinese Academy of Sciences. He received his bachelor's degree from Tsinghua University in 2007 and his Ph.D. in computer science from ETH Zurich in 2015. His research interests include machine learning, computer vision, and intelligent data analysis. He has published more than 100 papers in leading journals and conferences, including *Nature Methods* and CVPR, and has received multiple international awards, including the IEEE ISBI Best Paper Award.

	<b>姓名</b> <b>Name</b>	Xinan Chen 陈浠楠
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### Organizer's Brief Biography

中文：陈浠楠博士现任宁波诺丁汉大学计算机科学系助理教授，此前曾任西交利物浦大学国际商学院助理教授。他拥有英国诺丁汉大学计算机科学与运筹学博士学位，以及利物浦大学硕士学位和电子科技大学学士学位。其研究聚焦于启发式算法、智能优化与人工智能驱动下的复杂决策方法，重点解决高维、动态和约束条件下的实际优化问题。围绕本专栏关注的新一代人工智能系统方法与应用，陈博士在制造运营、港口物流、交通系统、光学器件设计和蛋白质优化等领域开展了系统研究，致力于通过 AI 方法提升复杂系统的决策能力、资源配置效率与智能化水平。

英文：Dr. Xinan Chen is an Assistant Professor in the Department of Computer Science at the University of Nottingham Ningbo China. He previously served as an Assistant Professor at the International Business School, Xi'an Jiaotong-Liverpool University. He received his Ph.D. in Computer Science and Operations Research from the University of Nottingham, together with his master's degree from the University of Liverpool and bachelor's degree from the University of Electronic Science and Technology of China. His research focuses on heuristic algorithms, intelligent optimization, and AI-driven decision-making for complex real-world problems, especially under high-dimensional, dynamic, and constrained settings. In connection with this special session, his work contributes to AI methods and applications for complex systems across manufacturing operations, port logistics, transportation systems, optical device design, and protein optimization.

	<b>姓名</b> <b>Name</b>	王焯 Ye Wang
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### Organizer's Brief Biography

中文：王焯，博士，中国科学院长春光学精密机械与物理研究所特别研究助理。2015 年和 2018 年于吉林大学分别获得学士、硕士学位，2023 年于国防科技大学获得博士学位。研究方向包括迁移学习、多模态大模型与 AI Agent。已发表 AI 领域期刊和会议论文 18 篇，其中 CCF-A 类会议论文 4 篇、SCI 一区论文 8 篇。曾任美国 Trucker Path 大数据算法工程师、GODAS 软件人工智能增强模块负责人，参与多项国家重大专项工程，在人工智能算法与高端装备融合方面积累了较丰富经验。

英文：Dr Ye Wang is a Special Research Assistant at the Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences. She received her bachelor's and master's degrees from Jilin University and her Ph.D. from the National University of Defense Technology in 2023. Her research interests include transfer learning, multimodal large models, and AI agents. She has published 18 papers in AI-related journals and conferences, including 4 CCF-A conference papers and 8 Q1 SCI journal papers. She has also worked on the integration of AI algorithms with high-end equipment through industrial and national major projects.

	<b>姓名</b> <b>Name</b>	张驰知 (Chizhi Zhang)
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### Organizer's Brief Biography

中文：张驰知，教授，中国科学院长春光学精密机械与物理研究所先进计算与数字技术研究中心青年研究员、博士生导师。研究方向包括可靠性工程、退化建模、预测与健康管理和可信人工智能以及 AI 驱动工程仿真。其工作面向光电系统、智能装备与复杂工程场景，致力于构建兼具物理可解释性与数据适应性的可靠性分析与寿命预测方法。

英文：Prof. Chizhi Zhang is a Young Researcher and Ph.D. supervisor at the Advanced Computing and Digital Technology Research Centre, Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences. His research interests include reliability engineering, degradation modelling, prognostics and health management, trustworthy AI, and AI-driven engineering simulation. His work addresses optoelectronic systems, intelligent equipment, and complex engineering applications, with an emphasis on physically interpretable and data-adaptive methods for reliability analysis and life prediction.