CAIT2026 Special Session XV

Special Session Basic Information:

Session Title	中文：人工智能（AI）在医疗健康领域的应用 英文：The Application of Artificial Intelligence (AI) in Medical and Healthcare

Introduction and topics

会议专题简介

人工智能（AI）正通过显著提升诊断准确性和个性化治疗方案，深刻改变医疗健康行业。借助机器学习、大语言模型（LLMs）、自然语言处理、AI 智能体及数字孪生等技术，AI 实现了早期疾病检测、预测性分析和虚拟患者模拟，使医疗专业人员能够预判患者需求并主动干预。例如，大语言模型可分析临床笔记，数字孪生可模拟个体患者生理状况以测试干预措施，AI 智能体则辅助监测和决策支持。这些进展不仅改善了患者预后，还优化了临床工作流程，提高了医疗服务效率并降低了成本。基于 AI 的工具（包括由大语言模型和数字孪生驱动的工具）正越来越多地集成到各类医疗应用中，从影像技术到电子健康记录管理，均可提供及时、精准的见解，支持临床决策。

随着 AI 的持续发展，它为精准医疗和改善患者护理带来了前所未有的机遇。大语言模型、AI 智能体和数字孪生能够促进医患沟通、模拟疾病进展，并为临床医生提供实时自适应的决策支持。然而，这些进步也带来了伦理和实施方面的挑战。确保 AI 技术（包括这些新型工具）的公平可及性，并解决隐私问题，对于充分发挥 AI 潜力至关重要。此外，将 AI 集成到现有医疗系统中需要审慎考虑安全性和有效性，以建立医疗服务提供者和患者之间的信任。科学家、临床医生和政策制定者之间的持续研究与协作，对于克服这些挑战、确保 AI（尤其是基于智能体和孪生的解决方案）成为医疗领域有益的工具至关重要。通过解决这些问题，AI 将真正重塑医疗的未来，使其更具响应性、个性化和可及性。

Brief Description of the Session

Artificial Intelligence (AI) is transforming the medical and healthcare sectors by significantly enhancing diagnostic accuracy and personalizing treatment plans. Through technologies like machine learning, large language models (LLMs), natural language processing, AI agents, and digital twins, AI enables early disease detection, predictive analytics, and virtual patient simulations, allowing healthcare professionals to anticipate needs and intervene proactively. For instance, LLMs analyze clinical notes, digital twins model individual patient physiology for testing interventions, and AI agents assist in monitoring and decision support. These advancements not only improve patient outcomes but also streamline clinical workflows, making healthcare delivery more efficient and reducing costs. AI-driven tools, including those powered by LLMs and digital twins, are being increasingly integrated into various healthcare applications, from imaging to EHR management, offering timely insights that support clinical decisions.

As AI continues to evolve, it presents unprecedented opportunities for precision medicine and improved patient care. LLMs, AI agents, and digital twins can facilitate patient communication, simulate disease progression, and provide real-time adaptive decision support for clinicians. However, these advancements also bring forth ethical and implementation challenges. Ensuring equitable access to AI technologies, including these novel tools, and addressing privacy concerns are critical to harnessing AI's full potential. Additionally, integrating AI into existing healthcare systems requires careful consideration of safety and efficacy to build trust among healthcare providers and patients alike. Ongoing research and collaboration among scientists, clinicians, and policymakers are essential to overcoming these challenges and ensuring that AI, especially agentic and twin-based solutions, serves as a beneficial tool in healthcare. By addressing these concerns, AI can truly reshape the future of

healthcare, making it more responsive, personalized, and accessible.
Topics：
Research hotspots and trends of AI in medical and healthcare fields
Theory and practice of AI in medical and healthcare fields
AI based disease prediction and diagnosis
AI based elderly chronic disease management and healthcare
AI based clinical treatment and nursing
AI agents and digital twins for medical and healthcare fields

Special Session Chair(s):

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Organizer's Brief Biography

曹世华，男，博士，香港中文大学博士后，教授，正高级工程师，美国北德州大学访问学者，杭州师范大学硕士生导师，荷兰马斯特里赫特大学（Maastricht University）兼职博士生导师，在中国多个医疗信息化和护理学会协会担任副会长、理事等职务。主持了国家十一五科技支撑计划等 20 多项医疗健康信息化科研课题，在 npj digital medicine、Artificial Intelligence in Medicine 等权威期刊和会议上发表学术论文 100 多篇，入选全球 ESI 高被引论文 2 篇，拥有美日澳和中国等专利 50 项，获得中国发明协会二等奖、日内瓦国际发明展银奖等 20 多项奖项。研究领域为：人工智能辅助认知障碍筛查和辅助诊断、AD 数字生物标记物、人工智能慢病监测和管理、护理信息化、数字健康。

Shihua Cao, male, Ph.D., Postdoctoral Fellow at The Chinese University of Hong Kong, Professor and Senior Engineer. Visiting Scholar at the University of North Texas, Master's Supervisor at Hangzhou Normal University, and Adjunct Doctoral Supervisor at Maastricht University, the Netherlands. He serves as Vice President and Council Member in multiple medical informatics and nursing societies and associations in China. He has led more than 20 research projects in medical and health informatics, including the National Eleventh Five-Year Science and Technology Support Program. He has published over 100 academic papers in prestigious journals and conferences such as npj Digital Medicine and Artificial Intelligence in Medicine, with two papers selected as ESI Highly Cited Papers. He holds 50 patents, including those from the United States, Japan, Australia, and China. He has received more than 20 awards, including the Second Prize of the China Invention Association and the Silver Medal at the International Exhibition of Inventions of Geneva. His research interests include AI-assisted cognitive impairment screening and auxiliary diagnosis, digital biomarkers for Alzheimer's disease, AI-based chronic disease monitoring and management, nursing informatics, and digital health.

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Organizer's Brief Biography

邓宁博士于 2007 年在浙江大学获得生物医学工程博士学位，现任浙江大学生物医学工程与仪器科学学院副教授、博士生导师。2007 年至 2010 年间，他曾任美国加州大学洛杉矶分校（UCLA）助理研究员。近年来，邓教授已发表论文 50 余篇，建立了慢性阻塞性肺疾病、高血压和糖尿病的数字化闭环管理路径，开发了居家呼吸康复的智能技术与应用系统，在中国共建设了 17 个慢性病管理示范应用项目。其关键技术已获国家卫生健康委员会及欧盟“ICare4EU”工作组的认可和采纳。

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Dr. Ning Deng received his PhD degree in Biomedical Engineering from Zhejiang University in 2007. He is currently an associate professor and PhD Supervisor at the College of Biomedical Engineering and Instrument Science, Zhejiang University. He was an assistant researcher at University of California, Los Angeles from 2007 to 2010. In recent year, Prof. Deng has published more than 50 papers, established a digital closed-loop management path for chronic obstructive pulmonary disease, hypertension and diabetes, developed intelligent technologies and application systems for home-based respiratory rehabilitation, built a total of 17 demonstrated application for chronic disease management in China. Key technologies have been recognized and adopted by the National Health Commission and the“ICare4EU”Working Group from EU.