THE CHINESE UNIVERSITY OF HONG KONG
Department of Electronic Engineering
Seminar

Conebeam CT Intelligent Imaging

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Abstract

Conebeam computed tomography (CBCT) technology has made remarkable progress in the past two decades, and the introduction of artificial intelligence has propelled the field into a completely new stage of development. This symposium will focus on the latest research results of CBCT intelligent imaging and its key applications in modern medical diagnosis and treatment. The core of CBCT intelligent imaging lies in combining deep learning algorithms with conventional image reconstruction techniques. Recent research breakthroughs include neural network-based sparse view reconstruction, multi-modal image fusion, and low-dose control. These innovative approaches not only significantly improve image quality and spatial resolution, but also effectively reduce the radiation exposure of patients. In terms of clinical applications, CBCT intelligent imaging has shown great potential in various fields such as oral and maxillofacial surgery, ENT and mammography. Through the integration of multi-source data and advanced image analysis technology, CBCT intelligent imaging system can provide more accurate diagnostic information, assist in the development of personalised treatment plans, and enable real-time intraoperative navigation. Currently, the main challenges facing CBCT intelligent imaging include real-time image reconstruction, motion artefact correction and large-scale clinical validation. Future research directions will focus on developing more efficient deep learning models, exploring new sensor technologies, and advancing multimodal image fusion. In addition, the application of AI in the field of medical imaging has brought about a series of ethical and regulatory issues, which need to be solved by the joint efforts of academia and industry.

Biography

Prof. Tianye Niu, a seasoned expert in X-ray tomography with 15 years of experience, holds a position as a Professor at the School of Information Science and Technology, University of Science and Technology of China. He has established an innovative research framework, spanning from theoretical methodologies to practical clinical applications, and from core technology devices to medical equipment, leveraging his self-developed technologies. Dr. Niu's scholarly contributions include 49 publications in leading journals and 22 granted invention patents. He has led several significant international science and technology innovation projects, including those under the national key research and development programs, the "863" program of the Ministry of Science and Technology for young scientists, and the National Natural Science Foundation. His accolades include recognition as a distinguished expert among Zhejiang Province's overseas high-level talents, Class B of Shenzhen's overseas high-level talents, and selection for the list of the world's top 2% scientists by Elsevier and Stanford University. His developed equipment was exclusively invited to the 2022 Zhuhai Air Show, marking its significance in the medical field. Dr. Niu's achievements have also been acknowledged with the Second Prize for Technological Invention by the Chinese Society of Stereology and the National Natural Science Foundation Outstanding Young Scientist Fund (Overseas) awards.

***** ALL ARE WELCOME *****

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