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Dr. Rongshan Yu received his bachelor degree in Electrical Engineering with minor in Applied Mathematics from Shanghai Jiaotong University, China in 1995, and the PhD degree from the National University of Singapore (NUS, Singapore) in 2004. He is currently with the Department of Computer Science, Xiamen University as a professor, and vice-director of the National Institute for Data Science in Health and Medicine, Xiamen University. His research interests include high-throughput multi-omics data analysis, precision medicine, and medical artificial intelligence. He has more than 180 journal/conference publications and holds more than 20 US/International patents.

Dr. Yu was a member of the Technical Committee of the Multimedia Systems and Applications of the IEEE Circuits & Systems Society, and chair of Internet of Thing (IoT) Special Interest Group (SIG) of IEEE Signal Processing Society. He served as standard project editors of ISO/IEC 14496-3/AMD.5 (MPEG Audio Scalable Lossless Coding) and ISO/IEC 14496-5:2001/Amd.10 (SSC, DST, ALS, and SLS reference software), and associated editors of IEEE Transactions on Audio, Speech and Language Processing and IEEE Access. He is a senior member of the Institute of Electrical and Electronics Engineers (IEEE), and Fellow of the Institution of Engineering and Technology (IET). In 2007, he received the National Technology Award, Singapore in 2007 in recognition of his contributions to international standards.

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Talk topic

AI for biological science – a signal processing perspective

Abstract

In recent years, the integration of artificial intelligence (AI) with advanced high-throughput biomedical measurement technologies across genomics, proteomics, and neurobiology has led to significant breakthroughs in biology science. However, as biological processes often produce signals that are inherently noisy, complex, and difficult to detect, analyzing data generated from biological processes posing significant challenges for researchers aiming to uncover critical biological insights. This talk will explore the role of advanced signal processing techniques in enhancing the detection and interpretation of these subtle biological signals. By leveraging machine learning algorithms, we can improve noise reduction, enhance signal extraction, and enable real-time analysis of complex datasets, which lead to more reliable and reproducible biological discoveries. We will discuss exemplary case studies where AI-driven signal processing has successfully identified biomarkers for diseases, elucidated cellular communication pathways, and advanced our understanding of biological process dynamics. Furthermore, we will highlight the potential for these methodologies to accelerate discoveries in systems biology and personalized medicine. The talk aims to inspire interdisciplinary collaborations that harness the power of AI and signal processing to overcome the challenges posed by biological signal complexity and ultimately drive forward the frontiers of biological science.