香港中文大學 CUHK | 語言學及現代語言系 Department of Linguistics and Modern Languages

Predicting Dementia from Speech using Large Language Models

Prof. Hualou LIANG

The Hong Kong Polytechnic University

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Time: 4:30pm - 6:15pm (Hong Kong Time, UTC +8)

Venue: Room 101, Leung Kau Kui Building, The Chinese University of Hong Kong

Abstract

Artificial intelligence (AI) research has seen substantial progress on a variety of applications including healthcare. In this talk, I will present our recent work using the very technologies used to build ChatGPT for early detection of Alzheimer's disease (AD). AD is a currently incurable brain disorder. Speech, a quintessentially human ability, has emerged as an important biomarker of neurodegenerative disorders like AD. Can AI-driven speech analysis help identify AD? We show in this work that GPT-5, a specific large language model (LLM) developed by OpenAI, could be a step towards early prediction of AD through speech. Specifically, we demonstrate that text embedding, powered by GPT-5, can be reliably used to (1) distinguish individuals with AD from healthy controls, and (2) infer the subject's cognitive testing score, both solely based on speech data. Our results suggest that there is a huge potential to develop and translate a fully deployable AI-driven tools for early diagnosis of dementia and direct tailored interventions to individual needs, thereby improving quality of life for individuals with dementia. If time permits, I will cover more recent and emergent research on smaller open-source LLMs like Llama 4, focusing on developing privacy-compliant, locally refined models. These models offer on-premises solutions for privately held data while performing nearly as well as state-of-the-art proprietary models.

Speaker

Hualou Liang, PhD, is Chair Professor of Neuroscience and Artificial Intelligence, Associate Director of the University Research Facility in Behavioral and Systems Neuroscience (UBSN), and Interim Head of Division of Artificial Intelligence and the Humanities at the Hong Kong Polytechnic University. He was previously Professor of Biomedical Engineering at Drexel University. His research is focused on neural data science, machine learning, and biomedical natural language processing. He is an elected Fellow of the American Institute for Medical Biological Engineering (AIMBE). He is known for pioneering the application of causal functional connectivity measures, particularly Granger causality, to the analysis of neural data. He has authored more than 100 articles in peer-reviewed core international journals including *Neuron, PNAS, Journal of Neuroscience, NeuroImage, and Human Brain Mapping*. His recent research on LLMs for early detection of cognitive decline has been featured in media outlets such as *Psychology Today, Jerusalem Post, The New York Times, and IEEE Spectrum*.

All Are Welcome

Enquiries

Department of Linguistics and Modern Languages, CUHK

Tel: (852)3943 1516 Fax: (852)2603 7755 E-mail: lin@cuhk.edu.hk