THE UNIVERSITY OF HONG KONG
DEPARTMENT OF COMPUTER SCIENCE

Research Seminar

Principles of Reasoning: Designing Compositional and Collaborative Generative AIs

Speaker: Prof. William Wang, UCSB

Date: 18 April, 2024 (Thu)

Time: 11:00 (HKT)

Venue: P603, Graduate House

Abstract

A majority of existing research in large language models and generative AI systems focuses on scaling and engineering. In this talk, I argue that we need a principled understanding of the science of generative AI, in particular, to understand the reasoning ability of large language models. First, I present a Bayesian latent variable approach to enhancing in-context learning in large language models (LLMs) through optimal demonstration selection, demonstrating substantial improvements across various text classification tasks. Second, I argue that modern generative AI systems must be modular and collaborative to solve complex reasoning problems. I will introduce Logic-LM, a locally grounded neuro-symbolic framework that synergizes LLMs with symbolic solvers, significantly boosting logical problem-solving abilities. We will also briefly elaborate on how to build neuro-symbolic solutions to improve the compositionality in text-to-image systems. Our observations indicate that the future of generative AI is modular and collaborative, as opposed to a single-model system.

About the Speaker:

William Wang is Mellichamp Professor of Artificial Intelligence and Director of the UCSB Center for Responsible Machine Learning, UCSB Mind and Machine Intelligence Initiative, and the UCSB Natural Language Processing Group. His Ph.D. was from Carnegie Mellon University. His interests include the science of large language models and generative AIs, vision and language, neuro-symbolic reasoning, and responsible AI. He was recognized with several awards, including the Pierre-Simon Laplace Award by IEEE SPS (2024), the CRA Undergraduate Research Faculty Mentoring Award (2023), the British Computer Society - Karen Spärck Jones Award (2022), and the NSF CAREER Award in 2021. Dr. Wang was also listed among IEEE AI's 10 to Watch in 2020 and has received accolades for his research, including the CVPR Best Student Paper Award in 2019 and the DARPA Young Faculty Award in 2018.

All are welcome!

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