Department of Electrical Engineering
香港城市大學
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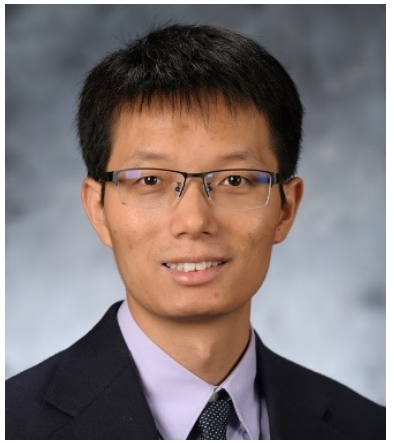
CityU Architecture Lab for Arithmetic and Security (CALAS) Seminar Series



Towards Responsible AI Systems via Self-Healing Inference and Tensor-Compressed Training

Prof. Zheng Zhang, Associate Professor, University of California, Santa Barbara

Abstract:

As modern AI is reshaping almost every aspect of our daily life, responsible AI has become an increasingly important topic: we should design and deploy AI with good intentions and positive impacts, both technically and socially. In the first part of the talk, we will focus on the trustworthiness issue of AI inference. Specifically, we will present a self-healing method, which can detect and fix the possible errors of a neural network automatically in the inference. This method is formulated as a closed-loop control. Since this method does not need a-priori attack information, it can handle a broad class of unforeseen attacks or perturbations that conventional methods cannot handle. The second part of the talk will focus on the sustainability issue of large-scale AI training. Record-breaking GPU-hours have been used to train large deep learning models, causing ever increasing carbon emissions. The huge model size also prevents energy-efficient on-device training. We will show our efforts in tensor-compressed training. This method can reduce the training variables of large models by several orders of magnitudes, enabling energy-efficient training on both cloud and resource-constraint platforms.

Biography:

Zheng Zhang received the B.S. and MPhil degrees in electronics from Huazhong University of Science and Technology (HUST) and from the University of Hong Kong, respectively. He received his PhD in Electrical Engineering and Computer Science from MIT in 2015. Dr. Zheng Zhang is currently a tenured Associate Professor of Electrical and Computer Engineering at University of California, Santa Barbara (UCSB). His research is focused on uncertainty quantification and tensor computation for electronic/photonic design automation, and for responsible and sustainable AI systems. He is a recipient of NSF CAREER award, 3 best journal paper awards from IEEE Transactions, and two best dissertation awards from ACM SIGDA and MIT Microsystems Technology Labs. His work in EDA (electronic design automation) has been recognized by the IEEE CEDA Early Career Award and ACM SIGDA Outstanding New Faculty Award.

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