

XIJIE HUANG

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EDUCATION

Hong Kong University of Science and Technology

Ph.D. in Computer Science Engineering, [HKUST Vision and System Design Lab](#)

Hong Kong SAR
Sept 2020 - Present

- Advisor: [Prof. Tim Kwang-Ting CHENG](#) and [Prof. Zhiqiang SHEN](#),
- HKUST Postgraduate Studentship and RedBird Scholarship

Shanghai Jiao Tong University

B.E. in School of Electronics Information and Electrical Engineering

Shanghai, China
Sept 2016 - June 2020

- Overall GPA: 89.4/100 (91.3/100 for junior year) [Ranking:2/55](#)
- Advisor: [Prof. Cewu Lu](#), Machine Vision and Intelligence Group, SJTU

University of California, Los Angeles

Visiting Research Student

Los Angeles, USA
June 2019 - Sept 2019

- Research intern to UCLA ECE department (Cross-disciplinary Scholars in Science & Technology Program)
- Overall GPA: 4.0/4.0
- Best Presentation Award (Among 90 students in CSST Program)
- Advisors: [Prof. Mani B. Srivastava](#), Department of Electrical Computer Engineering, UCLA

RESEARCH INTERESTS

My research interests lie in the general area of artificial intelligence, particularly in deep learning and its applications in computer vision and model compression. More concretely, My research interests focus on mixed-precision quantization, algorithm-hardware co-design, human-object interaction (HOI) recognition, and scene understanding.

RESEARCH/PROJECT EXPERIENCE

Hardware-Software Co-design of Model Compression, HKUST

- Proposed Stochastic Differentiable Quantization (SDQ), which is an efficient and effective mixed-precision quantization technique outperforming full-precision ResNet and MobileNet on ImageNet with an average bitwidth lower than 4.
- Proposed an efficient variation-aware vision transformer (ViT) quantization framework. It is the first work to analyze and locate the variation in ViT quantization. Our solution to variation in ViTs leads to state-of-the-art accuracy on the ImageNet-1K dataset across different ViT models (DeiT, Swin, SReT).
- As a member of [AI Chip Center for Emerging Smart Systems \(ACCESS\)](#), building and evaluating hardware-friendly model compression techniques on AI chips. Our tiny accelerator with a customized data fetch hardware architecture named single input multiple output scratch pad (SIMO SPad) can achieve 1.40 to 2.98 greater DSP efficiency and offers 1.91 greater energy efficiency compared to the state-of-the-art accelerators.

Automated Vision-Based Wellness Analysis for Elderly Care Centers, HKUST

- Researching in building a vision-based elderly care system that can provide immediate assistance and useful insights for caretakers. Collaborating with the heaven of hope care center and has built a healthcare dataset based on video recording.
- Designing human-centered scene understanding model, achieving state-of-the-art accuracy on scene graph generation (SSG) task and human-object interaction (HOI) recognition task.

Engagement Analysis for Virtual training, HKUST

- Collaborated with [Own The Room](#), build vision-based facial and gesture analysis system to automatically predict the engagement of users in virtual training.

SSC project to monitor and reduce food waste at on-campus canteens, HKUST

- Built and fine-tune the food classification and food waste prediction models. Successfully finished the pilot run at campus (LG1/LG7) to raise the awareness of students on foodwaste.

Machine Vision and Intelligence Group, Department of Computer Science, SJTU

- Proposed **Transferable Interactiveness Network** to tackle the imbalanced distribution in human action recognition problems, especially human-object interaction detection problems
- Built the state-of-the-art knowledge base and engine of human activity understanding **HAKE**. HAKE provides elaborate and abundant with 7 M+ fine-grained part level annotations in a large scale of images and videos. In supervised, few-shot and transfer learning, our approach achieves significant improvements on large-scale activity benchmarks

Networked Embedded Systems Laboratory, Department of Electrical Computer Engineering, UCLA

- Designed an algorithm to detect Trojan backdoor in deep neural networks (i.e., whether a neural network has been compromised by malware that causes the model to produce incorrect results when the input includes special triggers.)
- Proposed a detection framework called **NeuronInspect**, using visual interpretability technique to effectively detect Trojan backdoors in deep neural networks without restoring the trigger and any backdoor samples
- Evaluate **NeuronInspect** on different attack scenarios and prove better robustness and effectiveness over previous state-of-the-art trojan backdoor detection techniques by a great margin

PUBLICATIONS & PRE-PRINT

SDQ: Stochastic Differentiable Quantization with Mixed Precision

Xijie Huang, Zhiqiang Shen, Shichao Li, Zechun Liu, Xianghong Hu, Jeffry Wicaksana, Eric Xing, Kwang-Ting Cheng
International Conference on Machine Learning (ICML) 2022 (Acceptance Rate: 21.9%)

Automated Vision-Based Wellness Analysis for Elderly Care Centers

Xijie Huang, Jeffry Wicaksana, Shichao Li, Kwang-Ting Cheng
AAAI Conference on Artificial Intelligence (AAAI) W3PHIAI 2022

FedMix: Mixed Supervised Federated Learning for Medical Image Segmentation

Jeffry Wicaksana, Zengqiang Yan, Dong Zhang, **Xijie Huang**, Huimin Wu, Xing Yang, Kwang-Ting Cheng
IEEE Transactions on Medical Imaging 2022

Transferable Interactiveness Knowledge for Human-Object Interaction Detection

Yong-Lu Li, Xinpeng Liu, Xiaoqian Wu, **Xijie Huang**, Liang Xu, Cewu Lu
IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI) 2021

Latent Fingerprint Image Enhancement based on progressive generative adversarial network

Xijie Huang, Peng Qian, Manhua Liu
IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2020 Biometric Workshop

PaStaNet: Toward Human Activity Knowledge Engine

Yong-Lu Li, Liang Xu, Xinpeng Liu, **Xijie Huang**, Shiyi Wang, Hao-Shu Fang, Cewu Lu
IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2020 (Acceptance Rate: 22.09%)

Transferable Interactiveness Knowledge for Human-Object Interaction Detection

Yong-Lu Li, Siyuan Zhou, **Xijie Huang**, Liang Xu, Ze Ma, Hao-shu Fang, Yanfeng Wang, Cewu Lu
IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2019 (Acceptance Rate: 25.15%)

Efficient Variation-aware Vision Transformer Quantization

Xijie Huang, Jiajun Zha, Jingye Chen, Zhiqiang Shen, Kwang-Ting Cheng
Preprint

A Tiny Accelerator for Mixed-bit Sparse CNN based on Efficient Fetch Method of SIMO SPad

Xianghong Hu, Xuejiao Liu, Yu Liu, **Xijie Huang**, Xihao Guan, Luhong Liang, Chi-Ying Tsui, Kwang-Ting Cheng
Preprint

Handling Underrepresented Classes for Voxel-based Stereo 3D Object Detection

Shichao Li, **Xijie Huang**, Zhiqiang Shen, Kwang-Ting Cheng
Preprint

NeuronInspect: Detecting Backdoors in Neural Networks via Output Explanations

Xijie Huang, Moustafa Alzantot, Mani.B.Srivastava
Preprint

HAKE: Human Activity Knowledge Engine

Yong-Lu Li, Liang Xu, Xinpeng Liu, **Xijie Huang**, Ze Ma, Hao-Shu Fang, Cewu Lu
Preprint

SELECTED ACADEMIC ACHIEVEMENTS

National Scholarship (Top 2% students in Shanghai Jiao Tong University)	2017
A Class Scholarship (Top 2% students in Shanghai Jiao Tong University)	2017
Second Prize in China Undergraduate Mathematical Contest in Modeling, Shanghai Division.	2017
Endress+Hauser Scholarship, Endress+Hauser Inc.	2018
Meritorious Winner in MCM & ICM, Comap.	2018
CSST Scholarship (USD \$5,343) University of California, Los Angeles	2019
Best Presentation Award (Among 90 research interns at UCLA)	2019
RongChang Academic Scholarship (Highest honor in Shanghai Jiao Tong University, Top 20 of 16000 students)	2019
A Class Oversea Research Fellowship	2019
8th place in ICCV 2019 Person In Context Human-Object Interaction Challenge	2019
RedBird Scholarship (HKD \$40000) Hong Kong University of Science and Technology	2020-2022
Postgraduate Studentship, Hong Kong University of Science and Technology	2020-2022
AAAI-22 Student Scholarship	2022

SERVICES AND EXPERIENCES

Reviewer

- Conference: CVPR 2023, AAAI 2022, WACV 2022, ICML 2022 (Top 10% Reviewer), ECCV 2022

Teaching Assistant

- COMP 2211 (Exploring Artificial Intelligence), Fall 2022, Lecture: Professor Desmond Tsoi
- COMP 5421 (Computer Vision), Spring 2021, Lecture: Professor Dan Xu
- COMP 1021 (Introduction to Computer Science), Fall 2021, Lecturer: Professor David Rossitor

Volunteer

- Shanghai International Marathon (2016)
- China-Korea Symposium on Artificial Intelligence and Brain Science (2019)

COMPUTER AND LANGUAGE SKILLS

Natural Languages	Chinese (native), English (fluent), Japanese(fluent)
Programming Languages	Python, MATLAB, C, C++
Deep Learning Framework	PyTorch, TensorFlow, Keras
Miscellaneous Skills	LaTeX, Altium Designer, Proteus, LabVIEW

STANDARD TEST

TOEFL	105 (Reading:28 Listening:30 Speaking:24 Writing:23)
GRE	322 (Q170+V152) + 3.5(AW)