Huatao Xu

Postdoctoral Researcher

+852 9821 6847 | xuhuatao95@gmail.com | dapowan.github.io | dapowan

I am a postdoctoral researcher at The Hong Kong University of Science and Technology, working with Prof. Mo Li. I obtained my Ph.D. degree from Nanyang Technological University, supervised by Prof. Mo Li and co-supervised by Assoc. Prof. Rui Tan. I am broadly interested in ubiquitous computing, especially in related fields of building wearable-based or wireless-based sensing interfaces to bridge gaps between computing resources and human's daily lives. My current research focuses on wearable-based sensing, including human activity recognition, localization, authentication, etc.

Work Experience

The Hong Kong University of Science and Technology (HKUST) — *Hong Kong, China*
Postdoctoral Researcher — ***Jun. 2024 - Till Now***

The Hong Kong University of Science and Technology (HKUST) — *Hong Kong, China*
Research Assistant — ***Mar. 2024 - June. 2024***

Education

Nanyang Technological University (NTU) — *Singapore, Singapore*
Ph.D. of Computer Science — ***Jan. 2021 - Mar. 2024***

Shanghai Jiao Tong University (SJTU) — *Shanghai, China*
Master of Software Engineering — ***Sept. 2017 - Mar. 2020***

Nanjing University (NJU) — *Nanjing, China*
Bachelor of Software Engineering — ***Sept. 2013 - Jun. 2017***

Publications

CollabTrans: Device-cloud Collaborative Inference Framework for Transformer-based Models
Jingcan Chen, **Huatao Xu**, Zhuoran Chen, Mo Li
[Under review]

NeuroFFT: Practical Neuro-Inspired Sparse Fast Fourier Transform
Andreas Kuster, **Huatao Xu**, Rui Tan, Mo Li
[Under review]

Towards Practical Acoustic Sensing: Overcoming Interference from Intrinsic Sounds
Yubin Lan, **Huatao Xu**, Qian Zhang, Lei Yan, Dichen Cao, Dong Wang
[Under review]

HaKT: Learning Systems Expansion with Efficient Heterogeneity-aware Knowledge Transfer
Gaole Dai, **Huatao Xu**, Rui Tan, Mo Li
[Under review]

AutoLife: Automatic Life Journaling with Smartphones and LLMs
Huatao Xu, Zilin Zeng, Panrong Tong, Mo Li, Mani Srivastava
ACM IMWUT/UbiComp 2025 (CCF-A)

WiMU: Real-time Indoor Localization via Wi-Fi/IMU Fusion with Minimal Site Survey
Qirui Yang, **Huatao Xu**, Mengxuan Song, Mo Li
ACM IMWUT/UbiComp 2025 (CCF-A)

Experience Paper: Adopting Activity Recognition in On-demand Food Delivery Business
Huatao Xu*, Yan Zhang*, Wei Gao, Guobin Shen, Mo Li
ACM MobiCom 2025 (CCF-A) [Nationwide Commercial Adoption on Ele.me.]

Building Generalizable Deep Learning Solutions for AIoT Applications
Huatao Xu
ACM MobiSys (CCF-B) Rising Start Forum 2025

ContrastSense: Domain-invariant Contrastive Learning for In-the-wild Wearable Sensing
Gaole Dai, **Huatao Xu**, Hyungjun Yoon, Mo Li, Rui Tan, Sung-Ju Lee
ACM IMWUT/UbiComp 2025 (CCF-A)

Penetrative AI: Making LLMs Comprehend the Physical World
Huatao Xu, Liying Han, Qirui Yang, Mo Li, Mani Srivastava
ACL Findings 2024 (CCF-A)

Practically Adopting Human Activity Recognition
Huatao Xu, Pengfei Zhou, Rui Tan, Mo Li
ACM MobiCom 2023 (CCF-A)

Facilitating Radar-Based Gesture Recognition With Self-Supervised Learning
Zhiyao Sheng, **Huatao Xu**, Qian Zhang, Dong Wang
IEEE SECON 2022 (CCF-B)

LIMU-BERT: Unleashing the Potential of Unlabeled Data for IMU Sensing Applications
Huatao Xu, Pengfei Zhou, Rui Tan, Mo Li, Guobin Shen
ACM SenSys 2021 (CCF-B) [SenSys 2021 Best Paper Runner-up, GetMobile Research Highlight 2022]

FaHo: Deep Learning Enhanced Holographic Localization for RFID tags
Huatao Xu, Dong Wang, Run Zhao, Qian Zhang
ACM SenSys 2019 (CCF-B)

AdaRF: Adaptive RFID-based Indoor Localization Using Deep Learning Enhanced Holography
Huatao Xu, Dong Wang, Run Zhao, Qian Zhang
ACM IMWUT/UbiComp 2019 (CCF-A)

PEC: Synthetic Aperture RFID Localization with Aperture Position Error Compensation
Run Zhao, Dong Wang, Qian Zhang, Haonan Chen, **Huatao Xu**
IEEE SECON 2019 (CCF-B)

PRMS: Phase and RSSI based Localization System for Tagged Objects on Multilayer with a Single Antenna
Huatao Xu, Run Zhao, Qian Zhang, Dong Wang
ACM MSWiM 2018 (CCF-C)

Projects

Penetrative AI ***2023-Present***
- The Penetrative AI project explores combining Large Language Models (LLMs) with IoT technology, enabling LLMs to understand and interact with the physical world.
- Related publications: Penetrative AI (ACL), AutoLife (IMWUT), AutoTour (In progress)

General Deep Learning Framework for Activity Sensing Applications ***2021-Present***
- A mobile sensing project that builds effective and general sensing models for activity recognition applications with low system overhead.
- Related publications: Experience LIMU-BERT (MobiCom), UniHAR (MobiCom), ContrastSense (IMWUT), LIMU-BERT (SenSys), RadarAE (SECON).

Indoor Localization for Smart Devices ***2023–Present***
- This project presents fusion algorithms leveraging multi-modal sensor data (e.g., WiFi, IMU) from smart devices to achieve high-accuracy indoor localization.
- Related publications: WiMU (IMWUT).

LLM-based Q&A Chatbot for University Admissions ***2024–2025***
- This project develops a university admissions Q&A chatbot system powered by large language models and RAG techniques, supporting high concurrency and improving response efficiency. Pilot collaboration launched with the Admissions Office at HKUST.

Collaborative Edge-Cloud Framework for LLM Inference *2024–2025*

- Built an edge-cloud collaborative framework for large language model inference, balancing low-latency responses with efficient system resource usage.
- Related publications: CollabTrans (under review).

RFID-based Deep Learning Enhanced Holographic Localization System *2018-2021*

- An RFID localization project that estimates accurate positions of RFID tags with deep learning techniques.
- Related publications: FaHo (SenSys), AdaRF (IMWUT), PEC (SECON).

Video Sharing Platform for Students' Handmade Products *2018–2019*

- Developed a video sharing and content management platform for primary school students to showcase the processes of making handmade products.

Intern Experience

Alibaba (Eleme) *Shanghai, China*

Algorithm Engineer Intern ***Apr. 2020 - Dec. 2020***

- Design effective models to sense couriers' physical states with smartphones, including location and activity type.

Nanjing Yikemi (Start-up company) *Nanjing, China*

Software Engineer Intern ***Jan. 2017 - Jun. 2017***

- Develop websites for a course platform and a document-sharing platform, which are both entrepreneurial projects.

Honor & Award

2025 **Rising Star**, **MobiSys**
2024 **CCDS Outstanding PhD Thesis Award**, **NTU**
2024 **Student Travel Grant**, **HotMobile**
2022 **Research Highlight**, **GetMobile**
2021 **Best Paper Runner-up**, **ACM SenSys**
2021 **Silver Medal (40/1170, top 4%)**, **Kaggle Indoor Location & Navigation Competition**
2020 **Shanghai Outstanding Graduate Student**, **SJTU**
2019 **China National Scholarship**, **SJTU**
Highest national wide scholarship for postgraduate students in China
2017-2019 **First-class Scholarship**, **SJTU**
2017 **Nanjing University Inspirational Scholarship**, **NJU**

Service

Registration chair for MobiCom'25
Invited reviewer for IOT'25, TIOT'25, IMWUT'25, TKDE'24, IMWUT'24, TOSN'23, TMC'23
TPC member FMSys