

Huatao Xu

PH.D. CANDIDATE

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I am a third-year Ph.D. student from SCSE of Nanyang Technological University (NTU), 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.

Education

Nanyang Technological Univseristy (NTU)

Ph.D. of Computer Science, Supervised by Prof. Mo Li

Singapore, Singapore

Jan. 2021 - Present

Shanghai Jiao Tong University (SJTU)

Master of Software Engineering, Supervised by Prof. Dong Wang

Shanghai, China

Sept. 2017 - Mar. 2020

Nanjing University (NJU)

Bachelor of Software Engineering

Nanjing, China

Sept. 2013 - Jun. 2017

Publications

Penetrative AI: Making LLMs Comprehend the Physical World

Huatao Xu, Liying Han, Mo Li, Mani Srivastava

ACM HotMobile 2023 (under review)

A new concept to make large language models interact with the physical world by IoT sensors and actuators.

Practically Adopting Human Activity Recognition

Huatao Xu, Pengfei Zhou, Rui Tan, Mo Li

ACM MobiCom 2023

A practical human activity recognition for mobile devices that address data heterogeneity with realistic overhead.

Facilitating Radar-Based Gesture Recognition With Self-Supervised Learning

Zhiyao Sheng, Huatao Xu, Qian Zhang, Dong Wang

IEEE SECON 2022

A representation learning framework for radar sensing applications with self-supervised learning techniques.

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 (Best Paper Runner-up), GetMobile Research Highlight 2022

A BERT-Like self-supervised representation learning model for IMU sensing applications.

FaHo: Deep Learning Enhanced Holographic Localization for RFID tags

Huatao Xu, Dong Wang, Run Zhao, Qian Zhang

ACM SenSys 2019

A hologram and deep learning fusion position estimation method for RFID tags.

AdaRF: Adaptive RFID-based Indoor Localization Using Deep Learning Enhanced Holography

Huatao Xu, Dong Wang, Run Zhao, Qian Zhang

ACM IMWUT (UbiComp) 2019

An RFID-based localization system that creates adaptive localization models for different environments.

PEC: Synthetic Aperture RFID Localization with Aperture Position Error Compensation

Run Zhao, Dong Wang, Qian Zhang, Haonan Chen, Huatao Xu

IEEE SECON 2019

An accurate synthetic aperture RFID localization system considering aperture position error compensation.

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

A localization method that locates RFID tags in 3D space with a single antenna.

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 (HotMobile under review).

General Learning Framework for IMU Sensing Applications

2021-Present

- A mobile sensing project that builds effective and general sensing models for IMU applications with low system overhead.
- Related publications: UniHAR (MobiCom), LIMU-BERT (SenSys).

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).

Student Work Traceability Display System

2018-2019

- A platform for primary school students to share videos of the processes of making handmade products.

RFID Sensing Platform

2017-2019

- An extensible C# program that collects and displays low level RFID signals profiles reported from ImpinJ reader using LLRP protocol.

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

2022 **Research Highlight, GetMobile**

2021 **Best Paper Runner-up, ACM SenSys'21**

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

Invited reviewer for TOSN 2023

Invited reviewer for TMC 2023