Yanbo Zhang Ph.D in Computer Science

Born:	28 December, 1994
Position:	Postdoctoral Research Fellow
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My research interest is in Artificial Intelligence-assisted Wireless Sensing and Internet of Things (IoT) Communication Systems. Specific research topics include wireless sensing algorithm and system design, improvement of IoT network performance (such as physical layer collision avoidance, signal enhancement, and backhaul protocol design), and intelligent hardware design (such as the design and implementation of reconfigurable intelligent surfaces).

Work experience

May 2023 - present	**Postdoctoral Research Fellow** *School of Computer Science and Engineering,* Nanyang Technological University	*Singapore*
Dec. 2017 - Jul. 2019	**Research Assistant** *School of Computer Science and Engineering,* Nanyang Technological University	*Singapore*

Education

Sep. 2019 - Jan. 2023	**PhD in Computer Science** *School of Computer Science and Engineering,* Nanyang Technological University	*Singapore*
Sep. 2013 - Jul. 2017	**Bachelor in Communication Engineering** *School of Electronics and Information Engineering,* Harbin Institute of Technology	*Harbin, China*

Research Experience

2022 - 2023

Reconfigurable Intelligent Surfaces (RIS) for LoRaWAN in Urban Environments
Practical deployment of LoRaWAN network in urban settings faces a fundamental challenge caused by dense obstacles like large buildings. These obstacles block signal propagation and result in a number of blind spots where the end nodes hardly reach the gateway. This project addressed such a problem by letting signal propagation bypass obstacles with a reconfigurable intelligent surface. The surface consists of many independent antenna elements where each of them was designed with tunable phase shift so that to achieve controllable signal redirection. The system was prototyped and the experimental results suggested significant performance gains under practical urban environments.

2021 - 2022

Reliable Face Recognition with See-Through Mask capability
The accuracy of vision-based face recognition drops when recognizing faces with mask blockage. This project proposed a reliable facial recognition system which leverages the obstacle penetration capability of acoustic signal at near-field. The core design of this project is a acoustic facial spectrum, which is a novel acoustic representation of human faces in 3D space. A discriminator-recognizer network is designed taking in the facial spectrum and robustly recognize human faces under varying face-microphone distances or even in presence of facial mask blockage.

2020 - 2021

Device-free Handwriting Recognition for Direct Human-Computer Interfacing
Device-free hand-writing systems identify the content that a user writes by hand movement in the air, thus providing an intuitive human computer interface. This project proposed a Wi-Fi based hand-writing recognition system built with commodity Wi-Fi APs. The system was designed with unique consideration of its generality when applied to practice—being application-transferable, environment-agnostic, and user-independent. With little model training overhead, the system behaves inclusively to different users, environments, and applications, stemming from a comprehensive design of signal processing that is built into its core machine learning model.

2019 - 2020

Wi-Fi Antenna Augmentation for Improved Downlink Throughput
The expansion of antenna array has the potential of improving the spatial diversity of state-of-the-art Wi-Fi system and increase its throughput. In this project, I conducted comprehensive Wi-Fi measurement with augmented antennas, the performance gain atop practical Wi-Fi system was firstly demonstrated through real-world experiments. I further proposed an intelligent Wi-Fi antenna selection scheme to harness the diversity gain. The design was prototyped with full implementation atop commodity Wi-Fi AP. The experiment verified substantially improved throughput for downlink traffics.

Publications

IEEE TMC
2023

WiRITE: General and Practical Wi-Fi Based Hand-Writing Recognition,
Yanbo Zhang, Weiping Sun and Mo Li,
in IEEE Transactions on Mobile Computing, doi: 10.1109/TMC.2023.3265988.

IEEE TMC
2022

Channel Adapted Antenna Augmentation for Improved Wi-Fi Throughput,
Yanbo Zhang, Weiping Sun, Yidong Ren, Sung-Ju Lee and Mo Li,
in IEEE Transactions on Mobile Computing, vol. 22, no. 11, pp. 6297-6310, 1 Nov. 2023, doi: 10.1109/TMC.2022.3195453.

ACM MobiCom
2018

SWAN: Stitched Wi-Fi ANtennas,
Yaxiong Xie, **Yanbo Zhang**, Jansen Christian Liando, and Mo Li,
In Proceedings of the 24th Annual International Conference on Mobile Computing and Networking (MobiCom '18), 51–66. https://doi.org/10.1145/3241539.3241572.

IEEE Systems Journal
2018

Indoor Localization With a Single Wi-Fi Access Point Based on OFDM-MIMO,
Shuai Han, Yi Li, Weixiao Meng, Chen Li, Tianqi Liu and **Yanbo Zhang**,
in IEEE Systems Journal, vol. 13, no. 1, pp. 964-972, March 2019, doi: 10.1109/JSYST.2018.2823358.

Service

Reviewer

IEEE Transactions on Mobile Computing
IEEE Transactions on Wireless Communications
ACM Transactions on Sensor Networks