YANBO ZHANG, RESEARCH FELLOW

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EDUCATION

Nanyang Technological University Singapore

PH.D IN COMPUTER SCIENCE AND ENGINEERING Jul. 2019 – Jan. 2023

School of Computer Science and Engineering

Harbin Institute of Technology Harbin, China

B.E. IN COMMUNICATION ENGINEERING Sept. 2013 – Jun. 2017

School of Electronics and Information Engineering

EMPLOYMENT HISTORY

Nanyang Technological University Singapore

RESEARCH FELLOW May 2023 – Present

Under the supervision of Prof. Mo Li, School of Computer Science and Engineering

Nanyang Technological University Singapore

RESEARCH ASSISTANT Dec. 2017 – Jul. 2019

Under the supervision of Prof. Mo Li, School of Computer Science and Engineering

HONORS & AWARDS

2019 - 2023 **PH.D Scholarship**, Provided by Ministry of Education, Singapore

2019 - 2023 **Research Scholarship**, Provided by Alibaba-NTU Joint Research Institute, Singapore

2021 **Silver Medal**, in Indoor Localization and Navigation Competition hosted by Microsoft Research

PUBLICATION

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

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

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

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, which is a common case during COVID pandemic. 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. Specifically, the 3D space is divided into small cubes and the spectrum accurately captures the acoustic signal reflections inside each cube. A discriminator-recognizer network is then designed takes 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. Extensive evaluation proved that the system can be generally applied to diverse applications including recognizing Digits, English letters, and Chinese characters.

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.