

Kai Huang

CONTACT INFORMATION

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RESEARCH INTERESTS

On-device AI, AI for systems, AI-assisted wireless communication systems

EDUCATION

University of Pittsburgh, Pittsburgh, PA
Ph.D. student, Electrical and Computer Engineering
Advisor: Prof. Wei Gao

On-going

University of Science and Technology of China (USTC), Hefei, Anhui,
B.E., Electronic Information Engineering

July 2019

RESEARCH EXPERIENCE

Research Assistant

2019-present

Dept. of Electrical and Computer Engineering, University of Pittsburgh

- Designing a selective training scheme that can accelerate on-device neural network training.
- Developed and implemented an offloading scheme that allows extremely weak devices (e.g., MCUs with <1MB memory) to achieve real-time (<20ms) neural network inference. It is the first work that leverages Explainable AI to speed up neural network inference on weak devices.
- Developed and implemented a backscatter system that leverages neural network inference to improve its RF energy efficiency by up to 3.5x. The neural network is tailored based on the domain knowledge of backscatter communication, and hence is very lightweight and can be effectively trained even with a limited amount of data.

PUBLICATIONS

Conference Papers

* indicates equal contributions

1. Xiangyu Yin, Kai Huang, Erick Forno, Wei Chen, Heng Huang, Wei Gao. "PTEase: Objective Airway Examination for Pulmonary Telemedicine using Commodity Smartphones." In Proceedings of the 21st International Conference on Mobile Systems, Applications, and Services (**MobiSys'23**) (to appear)
2. Kai Huang, Boyuan Yang, Wei Gao. "ElasticTrainer: Speeding Up On-Device Training with Runtime Elastic Tensor Selection." In Proceedings of the 21st International Conference on Mobile Systems, Applications, and Services (**MobiSys'23**) (to appear)
3. Chen Ruihong, Kai Huang, Wei Gao. "AiFi: AI-Enabled Interference Cancellation in WiFi Networks with Commodity PHY-Layer Information." Proceedings of the 20th ACM Conference on Embedded Networked Sensor Systems (**SenSys'22**), pp. 134-148. 2022.
4. Xiangyu Yin, Kai Huang, Erick Forno, Wei Chen, Heng Huang, Wei Gao. "Out-Clinic Pulmonary Disease Evaluation via Acoustic Sensing and Multi-Task Learning on Commodity Smartphones." The Fourth Workshop on Continual and Multimodal Learning for Internet of Things (**CML-IOT'22 Best Paper Award**)
5. Kai Huang, Wei Gao. "Real-time Neural Network Inference on Extremely Weak Devices: Agile Offloading with Explainable AI." In Proceedings of the 28th Annual International Conference on Mobile Computing and Networking (**MobiCom'22**), pp. 200-213. 2022.
6. Kai Huang, Ruihong Chen, Wei Gao. "RAScatter: Achieving Energy-Efficient Backscatter Readers via AI-Assisted Power Adaptation." In 2022 IEEE/ACM Seventh International Conference on Internet-of-Things Design and Implementation (**IoTDI'22**), pp. 1-13. IEEE, 2022.
7. Song, Xingzhe, Kai Huang, Wei Gao. "FaceListener: Recognizing Human Facial Expressions via Acoustic Sensing on Commodity Headphones." In 2022 21st ACM/IEEE International

