Haikang Diao

Gender: Male

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Education

School of Integrated Circuits, **Peking University**

Ph.D. in Integrated Circuit Advisor: Prof. Xiyuan Tang **Sep.2022~ present**

School of Information Science and Technology, **Fudan University**

M.S. in Electronic Science and Technology Advisor: Prof. Wei Chen **Sep.2019~ Jun.2021**

- Class ranking 5/35
- Outstanding graduate of Fudan University, 2022

School of Information Science and Technology, **Fudan University**

B.E. in Electronic Information Science and Technology **Sep.2015~ Jun.2019**

- Excellent League Member, 2017
- Top Ten Students of the School of Information Science and Technology, 2019

Research Interests

- Computing-in-memory Design.
- Neural Network Compression and Acceleration.
- Embedded System Design and Edge Computing in IoT.

Research Experiences

1. **Digital SRAM Computing-in-memory Macro Design**

- Designed an Multiply-Less Approximate Digital SRAM CIM Macro for AI Inference.

2. **Neural Network Compression and Acceleration（Internship in Huawei Noah's Ark Lab)**

- Quantified AdderNet to 4-8 bit width to further improve the efficiency of the model .
- Implemented Adder-MLP using adder operator instead of multiplier operator.

3. **Edge-Computing System based on Smart Mat for Sleep Posture Recognition in IoT:**

- Designed a smart mat system based on a flexible pressure sensor array to capture the pressure distribution map of the human body and used machine learning algorithms to predict postures.
- Proposed a lightweight algorithm based on frequency channel selection to compress the size and computation of neural networks, which in turn enables the deployment of complete algorithms into inexpensive microcontroller chips for edge computing in IoT.

4. **Embedded System Design in IoT** :

- Microcontroller cores testing, microcontroller hardware driver library development (such as UART,

ADC, GPIO, etc.), embedded system design and debugging.

- Developed a gateway system for building energy consumption data collection based on NB-IoT and LoRa. The project received a patent and two national awards and was also commercialized.

Honors and Awards

- ✓ Outstanding graduate of Fudan University, 2022.
- ✓ National Third Prize of National Undergraduate Biomedical Engineering Innovation Design Competition, 2021.
- ✓ The First Prize Scholarship, 2020.
- ✓ National Second Prize of China University Student Service Outsourcing Innovation and Entrepreneurship Competition(1%), 2019.
- ✓ Top Ten Students of the School of Information Science and Technology, 2019.

Patents

1. Tingting Zha, **Haikang Diao**, Yun Gao, Kailing Chen. An Internet of Things control system based on LoRa sub-module networking, *ZL202020284198.1*.

Teaching Assistant Experiences

SoC Microsystem: Theory and Implementation Fudan University 2018, 2019, 2020

Publication List

1. Yifan He, **Haikang Diao,** Chen Tang, Wenbin Jia, Xiyuan Tang, Yuan Wang, Jinshan Yue, Xueqing Li, Huazhong Yang, Hongyang Jia, and Yongpan Liu, "A 28-nm 38-to-102-TOPS/W 8-b Multiply-Less Approximate Digital SRAM Compute-In-Memory Macro for Neural-Network Inference," IEEE International Solid-State Circuits Conference (ISSCC), Feb. 2023.
2. Ying Nie, Kai Han, **Haikang Diao**, Chuanjian Liu, Enhua Wu, Yunhe Wang, "Redistribution of Weights and Activations for AdderNet Quantization." In Thirty-sixth Conference on Neural Information Processing Systems(NeurIPS), 2022.
3. **Haikang Diao**, Chen Chen, Wei Yuan, Amara Amara, Wei Chen, "Deep Residual Networks for Sleep Posture Recognition With Unobtrusive Miniature Scale Smart Mat System," in *IEEE Transactions on Biomedical Circuits and Systems*, vol. 15, no. 1, pp. 111-121, Feb. 2021.
4. **Haikang Diao**, Chen Chen, Wei C`hen, Wei Yuan, Amara Amara, "Unobtrusive Smart Mat System for Sleep Posture Recognition," *2021 IEEE International Symposium on Circuits and Systems (ISCAS)*, 2021, pp. 1- 5.
5. **Haikang Diao**, Chen Chen, Xiangyu Liu, Amara Amara, Toshiyo Tamura, Benny Lo, Jiahao Fan, Long Meng, Wei Chen, "Real-time and Cost-effective Smart Mat System based on Frequency Channel Selection for Sleep Posture Recognition in IoMT." *IEEE Internet of Things Journal*
6. **Haikang Diao**, Chen Chen, Xiangyu Liu, Amara Amara, Wei Chen, "Edge-Computing System based on Smart Mat for Sleep Posture Recognition in IoMT." *10th EAI International Conference on Wireless Mobile Communication and Healthcare (EAI MobiHeath).*
7. Long Meng, Xinyu Jiang, Xiangyu Liu, Jiahao Fan, Haoran Ren, Yao Guo, **Haikang Diao,** Zihao Wang, Chen Chen, Chenyun Dai, Wei Chen, "User-Tailored Hand Gesture Recognition System for Wearable Prosthesis and Armband Based on Surface Electromyogram," in IEEE Transactions on Instrumentation and Measurement, 2022.