Xuanyu Liu

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EDUCATION

Southern University of Science and Technology (SUSTech)

Undergraduate, Department of Computer Science and Engineering Advisor: Prof. Jin Zhang GPA: 3.85/4.0 Rank: 20/195 Selected Honors: National Scholarship, University Motto Special Scholarship

University of California, San Diego

Visiting Student, Department of Computer Science and Engineering GPA: 4.0/4.0

Shenzhen, China Sep. 2021 - Present

San Diego, United States Mar. 2024 - Jun. 2024

PUBLICATION

[UbiComp' 24 Workshop] Xuanyu Liu, Haoxian Liu, Jiao Li, Zongqi Yang, Yi Huang, and Jin Zhang. AcousAF: Acoustic Sensing-Based Atrial Fibrillation Detection System for Mobile Phones. Companion of the 2024 ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp Companion '24). (Best Paper Award)

[arXiv] (submitted to TOSN) Xuanyu Liu, Jiao Li, Haoxian Liu, Zongqi Yang, Yi Huang, and Jin Zhang. Atrial Fibrillation Detection System via Acoustic Sensing for Mobile Phones.

RESEARCH EXPERIENCE

Undergraduate Researcher

Advanced Intelligent Mobile Systems Lab at SUSTech Supervisor: Prof. Jin Zhang Research Area: Acoustic Sensing, Smart Healthcare Jun. 2022 - Present Shenzhen, China

Research Project 1: Smartphone-based Acoustic Perception System for Heart Arrhythmia Event Detection Grant: 20,000 CNY

Outcome: One first-author paper published at the UbiComp/ISWC' 24 workshop, received **Best Paper Award**. First-author full paper is submitted to TOSN.

- Proposed a smartphone-based acoustic sensing system for cardiovascular health monitoring utilizing built-in microphones and speakers.
- Developed a 3D-printed prototype incorporating DIY mobile audio modules to validate system feasibility.
- Designed algorithms to extract subtle pulse waves from wrists using highly sensitive probing signals.
- Proposed a three-stage pulse wave purification pipeline to enhance system robustness in various scenarios.
- Collaborated with hospitals and doctors to evaluate the system across various devices and scenarios with over 25 subjects in 6 months.
- Responsible for writing, designing experiments, and creating all figures for the two papers.

Research Project 2: Acoustic Proximity Detection System for Smartphones Industry-sponsored research project

- Co-designed the preamble signal and evaluated the performance.
- Contributed to analyzing corner cases to improve system robustness in daily scenarios.
- Evaluated the algorithm performance with different devices.

Research Project 3: Sensor-free Tooth-brushing Monitoring System (ongoing) Expected completion by May 2025

• Implemented the toothbrush prototype and data collection platform using ESP32 development boards and verified the feasibility.

Research Project 4: Acoustic Sensing-based Intraocular Pressure Measuring System Concluded due to technical limitations

• Conducted extensive experiments exploring the feasibility of non-contact intraocular pressure measurement, identifying limitations and challenges for future work.

HONORS & AWARDS

BYD Scholarship (Top 3 SUSTech CSE students), BYD & SUSTechJan. 2025Best Paper Award, UbiComp/ISWC 2024 WellCompOct. 2024National Scholarship (0.3%, Nationwide), ChinaOct. 2024University Motto Special Scholarship (12/3564, Univ. Highest Honor), SUSTechOct. 2024Outstanding Student Teaching Assistant, SUSTech CSEJan. 2024Outstanding Student, SUSTechOct. 2024Merit Student Scholarship, SUSTechNov. 2022 & Nov. 2023

SELECTED PROJECTS

Roommate Matcher | Python, HTML/CSS, JavaScript, MySQL Apr. 2022 A deep learning-based recommend system that assists incoming freshmen in finding suitable roommates based on their living habits.

Homepage: https://xavier-xuan.github.io/RMMT-Doc/

- Implemented with NuxtJS (a Vue framework) as frontend and Flask (a Python web framework) as backend.
- Employed a deep learning model to evaluate the similarity between students.
- Adopted by the residential college for three years and served more than 600 freshmen.

Mini MIPS32 CPU Design | Verilog, Assembly Code

A CPU design that supports the MIPS32 instruction set and is implemented on a Xilinx FPGA development kit.

- Implemented 5-stage pipeline CPU with full forwarding.
- Tested with 800+ manually written assembly code.

Smartwatch System | C/C++

A smartwatch system implemented on the STM32 development kit, featuring functions such as remote chatting via 2.4G wireless communication modules, a scientific calculator, and a gallery reading pictures from SD cards.

- Modern and user-friendly interface implemented by integrating the LVGL framework into an extremely resource-limited development board.
- Integrated SD Card driver, FAT32 filesystem, and Tiny JPG driver to enable picture viewing on the resource-constrained machine.

Toy Tensor Library | C/C++

A tensor library in C/C++ that supports basic tensor operations and advanced features like serialization and computing acceleration.

- Implemented basic tensor operations without explicitly copying the underlying storage, including indexing, slicing, and viewing.
- Implemented basic computing acceleration using GPU. Compared performance differences between OpenMP, SIMD, and GPU acceleration for various tensor operations.

STUDENT SERVICE

Teaching Assistant for Undergraduate Course

CS207 Digital Logic at SUSTech

- Awarded the **Outstanding Student Teaching Assistant** from SUSTech CSE.
- Responsible for grading homework and exams and responding to student questions related to lectures.

Student Club Founder and President

Zhixin¹ Cooking Club at SUSTech

- Awarded the **Top 10 Club** in the university and the **Best Club** in the residential college.
- Organized dozens of club activities and two university-level activities.

SKILLS

- Programming Languages: Java, Matlab, C/C++, Python, PHP, SQL, JavaScript, HTML/CSS, Verilog
- Frameworks: Flask, Laravel, NuxtJS, LVGL
- Tools: Git, Docker, PyTorch
- Spoken Languages: English (TOEFL 102), Chinese (native)

Sep. 2023 - Jan. 2024 Shenzhen, China

Jul. 2022 - Sep. 2023

Shenzhen, China

May. 2023

Jan. 2024

Jan. 2024

¹Residential College of SUSTech