Jiaqing Liu

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Education

University of Washington   **Sept. 2023 – June 2025**
M.S. in Electrical and Computer Engineering, GPA: 4.0/4.0

Southwest Jiaotong University (SWJTU), *China*   **Sept. 2019 – June 2023**
B.S. in Biomedical Engineering, GPA: 3.8/4.0
- **Honors:** SWJTU Academic Excellence Scholarships 2020 - 2022
- **Relevant Courses:** Embedded & Real-Time Systems, Machine Learning, Data Structures & Algorithms, Signals & Systems, Biomedical Sensing & Electronics, Wearable Devices in Mobile Healthcare

Research Experience

Wearable Healthcare Lab, SWJTU   Sept. 2021 – June 2023
Research Assistant, Advised by Dr. Weili Deng   *Advised by Dr. Weili Deng*

Thesis: Self-Powered Tactile Panels with Piezo-ionic Hydrogel Sensors
- Designed a flexible multi-channel sensor array capable of generating tiny voltage pulses upon touch, operating without an external power supply.
- Fabricated doped micro-porous hydrogel materials and conducted comprehensive characterizations in terms of material properties, mechanical robustness, and electrical performance.
- Visualized tactile intensities and precise touch positions during dynamic wearable test applications.

Project: Smart Diaper for Alzheimer's Patients
- Developed a smart diaper prototype tailored for Alzheimer's patients, integrating interdigitated humidity sensors, a customized **PCB**, and **Bluetooth** data transfer to alert caregivers of patients' incontinence and prevent rashes.
- Designed and implemented a companion mobile app using **Android Studio**, enabling the display of real-time sensor data and the issuance of incontinence alerts to caregivers on smartphones.
- Utilized **TensorFlow** to train a Convolutional Neural Network (CNN) model, which was then employed in the mobile app to determine incontinence events, achieving an accuracy rate of 93.82%.

Publication

Jiaqing Liu, Guo Tian, Weiqing Yang, Weili Deng. Recent progress in flexible piezoelectric devices toward human-machine interactions. Soft Science 2022;2:22.

Projects

CheerUp: Music Therapy using Emotion Recognition   Jan. 2024 – Present
- Utilized **OpenCV** and **TensorFlow** to deploy a pre-trained visual emotion recognition model on a **Raspberry Pi 4**, enabling real-time emotion detection.
- Integrated the Spotify API to automatically select and play music corresponding to the detected mood, aiming to enhance users' well-being and mental health during low periods.
- Currently designing a user-friendly **GUI** to improve the human-computer interaction experience, making the system more accessible and intuitive for users.

Sickle Cell Disease (SCD) Physician Chatbot

Jan. 2024 – Present

UW Capstone, Sponsored by **Novo Nordisk Inc.**

Seattle, WA

- Developing a cross-platform chatbot **mobile** app for **iOS/Android** using React Native, designed to assist doctors with limited knowledge of SCD—such as ER physicians—by providing accurate and timely clinical treatment guidelines for patients.
- Integrating the Flask backend with **OpenAI API** to transform user inputs into vector data for efficient chatbot response pairing and retrieval.
- Using **Pinecone VectorDB** to manage over 100 vector embeddings and deploy the chatbot on an **AWS EC2** instance, ensuring scalability and reliability in handling user interactions and data storage.

COVID-19 Cases Visualization

Apr. 2021 – June 2021

- Designed a COVID-19 visualization web application using **React.js**, and implemented a **RESTful API** with **Flask** to fetch and display up-to-date pandemic statistics and trends.
- Utilized **Google Maps API** to illustrate COVID-19 distributions and trends across various cities.
- Integrated **NumPy, SciPy and Pandas** libraries to forecast pandemic impact based on SEIR models.
- Deployed the website on **AWS**, using Elastic Beanstalk and EC2 for scalable and reliable hosting.

SpO2 Monitoring Wristband

Oct. 2020 – Jan. 2020

- Designed a flexible oximeter system for hypoxemia detection and alert, alleviating sleep-disordered breathing.
- Integrated an MSP430 microcontroller with a MAX30102 module to measure blood oxygen values by the **PPG** principle, and displayed them on an LCD screen.
- Researched PDMS elastic material to encapsulate the device for better flexibility and wearing comfort.

Technical Skills

Languages: Python, Java, JavaScript/TypeScript, C/C++, HTML/CSS, SQL
Boards: Raspberry Pi, Arduino, STM-32
Tools/Frameworks: Git, Keil, LabView, Docker, Firebase, Shell, AWS, Linux, OpenCV, TensorFlow
Software: Altium Designer, Multisim, AutoCAD, SolidWorks