Hsiang (Jeff) Hsu

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EXPERIENCE

Robotics Software Engineer **at Creator Burger/Cucina Inc,** San Francisco, CA **Feb 2022 – Present**

- Lead system architect for advancing across all stacks (ie. robot codebase, cloud deployment, remote-operation infrastructures, operator toolsets, production test-suites) to scale the automated gourmet burger robots (ie. 1-man kitchen)
- Redesigned and virtualized entire infrastructure to achieve 97% space and weight reduction, 80% cost reduction, while adding automatic failover (99.99% uptime) and abstracting hardware requirements from software deployment (concurrent upgrade)
- Productionized with established stacks such as ansible, influxdb, grafana, tailscale, jupyterhub/notebook, docker, and AWS
- Developed C++ code across the stack from motor/sensor drivers, middleware (grpc), to finite-state machines (yakindu)

Robotics Systems Engineer **at May Mobility,** Ann Arbor, MI **Jun 2019 – Feb 2022**

- Lead linux developer for 3 OEM vehicle platforms' drive-by-wire software (Toyota Sienna, Lexus, and Ford Transit). Understood how different DBW architectures affect autonomy<>manual hand-over logics and worked with cross-functional teams (ie. embedded, autonomy, and safety) to ensure safety-critical transitions are always guaranteed
- Versed in both OEM systems (DTC diagnostic, CAN reverse engineering) and ADK knowledge (autonomy sensors, custom SOCs, networking, scripting, and software integrations)
- Solely developed the first in-house real-time data visualization for the Polaris GEM vehicle platform (C and JS)
- Design, prototype, and wrote bare-metal C code for in-house ECUs (TMS570) and PCB boards (IMU dev kits)

Autonomous Robotics Researcher **at Georgia Tech**, Atlanta, GA **Sep 2016 – May 2019**

- Designed, manufactured, and clinically validated two powered autonomous hip exoskeletons from end-to-end (full stack)
- Created and deployed first of its kind EMG pattern recognition (ML) controller using LabVIEW FPGA (NI myRIO's Xilinx), which allows for volitional control of the exoskeleton by executing real-time intent recognition
- Wrote bit-banging SPI code in FPGA to achieve 10kHz sensory reading (10 channels @ 1kHz) on a mobile microcontroller while maintaining high-fidelity control loops for actuator responses (PID tuning/control @ 1kHz)

Mechatronic Engineering Intern **at Ekso Bionics**, Richmond, CA **Jun 2017 – Aug 2017**

- Designed a new mechatronic solution (C++) to give sensory logging capability to a pure mechanical exoskeleton arm (ZeroG)

Prototype Instructor **at Georgia Tech Invention Studio**, Atlanta, GA **Jun 2016 – Apr 2019**

- Expertized in all prototyping machines such as 3D printers, 5-axis waterjet, laser cutters, woodworking/metalworking tools

EDUCATION

Georgia Institute of Technology, Atlanta, GA May 2012 - May 2019

- B.S. + M.S. in Mechanical Engineering (*Thesis – Wearable Exoskeleton*) GPA: 3.86

TECHNICAL SKILLS

Programming: C++, C, Bash, Python, LabVIEW, MATLAB, JS
Software: GDB, Docker, LCM/ROS2, SolidWorks, Eagle, AWS
Infrastructure: Hypervisor (proxmox), LXC, Cluster/Swarm, Firewall (opnsense), Database (influxdb, mariadb), VPN (wireguard), Packet capture (wireshark), LAMP, Gitlab CI/CD
Project Management: Git, Jira, Confluence, Asana
Development OS: Linux, Windows, MacOS
Hardware: Microcontrollers (ARM/AVR/NI/TI/Pi), Embedded sensors (UART/SPI/I2C/CAN/RS422/RS485), Motors, Encoder, IMU, ADC/DAC, JTAG, Oscilloscope

PROJECTS (git publication blog)

Home Server and Automation (Role – infrastructure)

- Architected Linux servers for developments (git, docker, cluster), learnings (tcp/ip), and convenience (home automation)

EMG Gesture Controlled Roomba (Role – algorithm)

- Implement bare-metal ML algorithm for the Myo armband (BLE) and achieved 99% gesture accuracy in Matlab and python

3-DOF Medical Robot Manipulator (Role – full stack)

- Designed and prototyped a controllable surgical robot arm for navigating inside the oral cavity with ATmega2560 in C++

Autonomous Driving DIY Car (Role – full stack)

- Prototyped a DIY car with wood and applied a dead-reckoning localization and obstacle avoidance algorithm in C

Wireless Posture Monitoring Wearable (Role – algorithm)

- Used Magdwick's filter on an IMU to estimate the absolute orientation and created an IOT wearable with ESP8266 in C++