Donovan Sproule

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EDUCATION

Columbia University, The Fu Foundation School of Engineering and Applied Science. Sep 2023 – May 2025
Bachelor of Science – Computer Engineering

University of California, Santa Cruz, Baskin School of Engineering Aug 2021 – June 2023
Bachelor of Science – Robotics Engineering

Relevant Coursework: Operating Systems, Circuit Analysis, Data Structures & Algorithms, Python Abstractions, Object Embedded Systems, Digital/Analog Circuit Design, Object Oriented Programming, Computational Theory, Intro to Databases, CAD, Digital VLSI, System on Chip, Digital Signal Processing

ENGINEERING EXPERIENCE

Undergraduate Research Assistant May 2024 – Present
Robotics and Rehabilitation Lab (ROAR Lab), Columbia University

- Developed and designed Augmented Reality (AR) experiments used to gather postural data for machine learning models training robotic postural assistance to wheelchair-disabled patients. Experiments are used across the lab.
- Leading the development of a new research paper relating to rehabilitation with AR technology and haptic sensors.
- Constructed new networking based methodology to synchronize larger system
- Presented to, mentored and trained PhD colleagues on applications of AR in their lines of research.
- Reported weekly on findings to the principal investigator. Designed independent workplan and research goals.

Undergraduate Research Assistant May 2024 – Present
Systems Lab, Columbia University

- Updated existing custom hypervisor framework to conform to linux kernel 6.1 from the previous 5.15 version, facilitating security of virtual machine/host data from a compromising attacker.
- Independently reconciled changes made to original 5.15 kernel for the implementation of specifications detailed in HypSec 2019 paper with the documented changes in the official 6.x kernel release changelogs.

PERSONAL PROJECTS

NLP Transformer-Encoder Transcription Model

- Leveraged a CNN based transformer-encoder architecture to develop transcription of audio files.
- Tools used: NLP, Python, Pytorch, Signal Processing, Machine Learning

De-1 SoC FPGA Gameboy Emulator

- Created a hardware emulator accurate to patented Nintendo schematics integrated within a larger IP with modern technological upgrades.
- Created automated Verilator testbenches for incremental development.
- Tools used: FPGA, SystemVerilog, Logic Design, Embedded Systems, C, Interfacing, Quartus, Verilator

Priority Based Low Latency Scheduler

- Developed a custom process scheduling class beating the Linux default by optimizing resource usage for estimated task completion time of processes.
- Tools used: Linux, C, Scheduler Design, Multiprocessing Synchronization Techniques

Web Scraping Dataset Construction Toolkit for Convolution Neural Networks

- Built a framework facilitating the development of training datasets for image recognition CNN-ML models.
- Tools used: Python, PyTorch, Web-Scraping, Asynchronous Programming, Machine Learning

De-1 SoC FPGA Chat Client

- Leveraged low-level interfaces in an embedded context to create a client communicating with an external server.
- Tools used: FPGA, C, Peripheral interfacing, VGA, Multi-threading

SKILLS & RELEVANT COURSEWORK

Language: Fluent Spanish

Technical skills: Linux, Machine Learning, Timing Diagram Analysis, File System Design, Scheduler Design, SolidWorks, Git, FPGA, Digital Logic, Oscilloscope, Microcontroller, CNN/RNN/Transformer-Encoders, Hypervisor Design, AR/VR Development, Vim, C, C++, C#, Python, Matlab, SystemVerilog, HTML, CSS, Assembly, Scripting, LTSpice

Interests: Weightlifting, playing the guitar, Snowboarding, cooking, bartending, salsa dancing

Additional Experiences: Popeyes Crew Member, Immigrant Robotics Workshop Leader, Olive Garden Host