Aeybel Varghese

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Education

University of Texas at Austin — Austin, TX
B.S. in Electrical and Computer Engineering — *Aug 2020 – May 2024*

San Jacinto College South — Houston, TX
A.A in General Studies; Dual Credit Student — *Aug 2016 – Jun 2020*

Skills

Programming Languages: C/C++, Java, Python, Verilog, C#, Javscript, ARM & x86 Assembly, HTML+CSS, RegEx

Technologies/Tools: Git, Arduino, ROS, Linux, Node.js, React, Electron, MongoDB, GDB, Valgrind, GNU perf, Verilator, Autodesk Eagle, Autodesk Fusion 360, KiCad

Work Experience

Undergraduate Teaching Assistant - University at Texas at Austin — Austin, TX
Undergraduate Teaching Assistant for Embedded Systems & Design Laboratory — *Fall 2023 – Ongoing*

- Conducted interactive laboratory sessions, demonstrating the proper use of tools and equipment, fostering a collaborative learning environment, and providing guidance to students in understanding core concepts and practical applications.
- Created and maintained lab manuals and instructional materials, ensuring clarity and coherence in the course materials.
- Collaborated with faculty to design new lab exercises, incorporating real-world challenges to enhance students' problem-solving abilities in embedded systems design.

Independent Study Engineering Mentorship - San Jacinto College South — Houston, TX
Software Engineer & Team Lead — *Spring 2019 – Fall 2019*

- Studied Mars' climate and atmosphere to model planetary conditions and create a 3D surface visualization using Unity3D.
- Gathered student data to build nationality-linked physical feature dataset. Trained neural network for multi-class nationality classification with these features.

Relevant Coursework

Major Coursework: Embedded & Real-time Sys. Lab, Operating Systems, Embedded Sys. Design Lab, Computer Architecture, Digital Logic Design, Algorithms, Discrete Mathematics, Software Design & Imp. I Honors, Software Design & Imp. II, Software Eng. & Design Lab, Intro to Embedded Systems Honors.

Minor Coursework: Intro to Electrical Engr., Circuit Theory, Calculus I-II, Physics I-II & Lab, Diff. Eqns., Linear Algebra, Engineering Communication, Probability

Projects

SimpleCore | *github.com/AeybelV/SimpleCore* — Ongoing

- A RISC-V RV32I core in Verilog, complete with Verilator test benches and a Python simulation.

Hashscan | *github.com/AeybelV/hashscan* — Summer 2023

- High-performance hash identification utility for swift analysis of strings and large files. Harnesses Intel Hyperscan library and SIMD for rapid RegEx pattern matching on x86 machines, enabling blazing-fast hash identification.

Hash | *github.com/AeybelV/hash* — Ongoing

- Versatile C library encompassing a variety of cryptographic and non-cryptographic hashing functions. Offers diverse implementations of various hashing algorithms which can be selected to cater to specific requirements or constraints; such as leveraging hardware acceleration or low memory footprint.

RTOS — Spring 2023

- Developed a Real-Time Operating System during the Embedded & Realtime Systems Course, ensuring deadline-driven scheduling. Engineered with dynamic and strict priority scheduling, adaptive heap management, in-memory crash logging, and comprehensive debugging and performance tools. Deployed the OS on a robot-car for a first-place finish in the final lab racing competition.

Mouse Headset — Fall 2022

- Engineered a USB HID Mouse headset in the Embedded System Design Lab course, enabling mouse cursor control through head movements when connected to a computer. Demonstrated its application to navigate the cockpit view in Microsoft Flight Simulator's and to pilot a plane, leading to a third-place finish in the final-lab competition.

USB MacroPad — Fall 2022

- Built a 9-key Macropad on a STM32 microcontroller platform; runs custom firmware. Currently transitioning to RP2040 microcontroller and the popular open-source QMK firmware for enhanced features.

NFC Business Card — Spring 2022

- Designed a sleek NFC business card on a custom PCB, featuring my information silk-screened on the PCB. Contains a NFC chip and PCB antenna to effortlessly open my LinkedIn with a simple tap on mobile devices.