Aarav Vidhawan
Computer Engineer – Architecture & Embedded Systems
avidhawan@ucsd.edu • + 1 (858) 699-2174 • linkedin.com/in/a-vidhawan • github.com/a-vidhawan

EDUCATION

UNIVERSITY OF CALIFORNIA SAN DIEGO   **San Diego, CA**
Bachelor of Science, Computer Engineering | GPA: 3.85 | Provost Honors   **2022-Present**
RELEVANT COURSEWORK: COMPUTER ARCHITECTURE, DIGITAL SYSTEMS, ADVANCED DIGITAL DESIGN PROJECT, DIGITAL CIRCUITS, LINEAR ALGEBRA, INTRO TO MACHINE LEARNING, COMPUTER ORGANIZATION, DATA STRUCTURES & ALGORITHMS, OPERATING SYSTEMS.

UNIVERSITY OF CALIFORNIA SAN DIEGO   **San Diego, CA**
Master of Science, Computer Engineering - Accepted for BS/MS   **STARTING 2026**

EXPERIENCE

CSE DEPARTMENT TUTOR | PROBLEM SOLVING, COMMUNICATION, ARM, C   **San Diego, CA**
CSE 141/L TUTOR - COMPUTER ARCHITECTURE   **June, 2025 – August, 2025**
- Led weekly sections and office hours for **~50** undergrads. Prepared targeted problem sets on **ARMv8** pipelines, hazards, caches and memory models. Responded to **~40** forum questions, with avg **<2** hrs response time.
- Co-designed and proctored midterms and final. Graded **~80** submissions with a designed rubric.
- 1 on 1 discussion in Office Hours led to an average of **~15** point increase on Midterm 2 and **~10%** on the Final.
- Guided **100+ students** in **CSE 141L** through designing custom ISAs and single-cycle CPUs in SystemVerilog. Debugged datapath and control logic, improving synthesis success and comprehension of microarchitecture.

VLSI SYSTEM DESIGN | CH32V, Arduino, Assembly, C++   **Bangalore, India**
RESEARCH INTERN   **October, 2024 – November, 2024**
- Profiled **CH32V RISC-V** instruction execution and branch/memory latencies; analyzed **50+ traces** and found ~**12% stall overhead** from load dependencies and mispredictions. All simulation and debugging performed on **VirtualBox** on Win 11.
- Optimized assembly loops, removing redundant loads/stores, cutting execution cycles by **~10%** - preserving functionality.
- Built a **MacroPad proof-of-concept** using the VSDSquadron Mini, integrating display and dual-button firmware on CH32V.

UCSD ITS - INFORMATION TECHNOLOGY SERVICES | JAVASCRIPT, REACT, HTML, CSS, SERVICENOW   **San Diego, CA**
DOCUMENT AND CASE MANAGEMENT - STUDENT DEVELOPER   **October, 2023 - June, 2024**
- Shipped **10+** production forms/workflows (Messaging Colab, Laptop Borrow Request, etc) used by **~3,000+** students and faculty, automation improvements cut manual handling from ~**30** min to ~**15** min per request(**-50%**).
- Built **3+** Analysis dashboards using ServiceNow's experience builder. Required **25+** hours of coursework.
- Built QA scripts, and performed over **100+** E2E tests of other developer's work.

PROJECTS

MACROPAD - PROJECT LEAD | C++, KICAD, LTSPICE, TEAM MANAGEMENT
- Designed a modular ESP32 MacroPad with **9**, **64x64 RGB OLEDs**, mechanical keys, and **2** rotary encoders.
- Seamless desktop activation via custom, cross-platform Qt companion application. Written in C++ and Objective C.
- Implemented using serial protocol supporting profile switch < **50 ms**, and activation latency <**40 ms.**
- Designed driver circuit for the **SSD1357z** controller, integrated into custom PCB for the keyboard.

Sora v1.0 - Self Designed ISA and CPU | SYSTEMVERILOG, PYTHON, QUARTUS, MODELSIM
- Authored a **9-bit ISA** (**16 instr**, **2 addressing modes**, **load-store**) with an **8-bit datapath**. Wrote assembler in Python.
- Achieved Hamming Distance Calculation and **double precision** multiplication using only **9 bits**. Fastest execute in the class.
- Single-cycle, with RTL in SystemVerilog, simulated in ModelSim, and resource mapped on Cyclone-V using QuartusPrime.

VITERBI ENCODER/DECODER | SYSTEMVERILOG, MODELSIM, QUARTUS
- Implemented a convolutional encoder (**rate 1/2, K=7**) and a pipelined Viterbi decoder (**ACS + traceback depth 35**). Passed the end-to-end tx/rx testbench and verified **min branch metric = 0** in a no-error channel.
- Built deterministic + random error-injection. Evaluated uncorrected errors across periodic/burst patterns up to a **1/16** rate.
- Synthesized on Cyclone V. Exported RTL-viewer/netlist and wrote state-transition/branch-metric notes for reproducibility.

LEADERSHIP/ EXTRACURRICULAR

HKN (Eta Kappa Nu) - CSE Department Chair (Events)
- Designed and hosted over **10+ technical workshops**, like the Macro Key and I2C Workshop, and also ECE Depths Seminar.
- Communicated with over **20+ professors and alumni** to invite them as panelists and speakers for events.
- Participated in weekly meetings to facilitate the creation and execution of HKN events, ranging from professional to social.

Early Learning and Cognition Lab (UCSD) - Volunteer Engineer
- Designed a child-proof "blicket" machine used to study probabilistic vs deterministic learning.
- Built using an Arduino, 5 hall sensors, a rotary mode switch and an RGB LED. 3D designed enclosure as well.

SKILLS

HARDWARE DESIGN & VERIFICATION: SYSTEMVERILOG, VERILOG, QUARTUS, MODELSIM, VIVADO, PSPICE/LTSPICE
EMBEDDED/FIRMWARE: C, C++, ARDUINO, ESP32, FREERTOS, CH32V, SPI, I2C, USART.
SOFTWARE: PYTHON, JAVA, JAVASCRIPT, HTML, CSS, LINUX, TCL, CUDA
TOOLS: GITHUB, VSCODE, KICAD, JIRA/CONFLUENCE, LAB GEAR (WAVEFORM GENERATOR, OSCILLOSCOPE, SOLDERING IRON)