Ritviz Aggarwal

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Education

M.S. Ramaiah Institute of Technology Expected 2028
B.E. in Electronics & Instrumentation Engineering; CGPA: 8.32 *Bengaluru, Karnataka*

Technical Skills

Programming: C, C++, Python, Bash
Digital Design: Verilog, SystemVerilog, RTL Design, Self Checking Testbenches, Race Condition Debugging, Cycle Accurate Simulation
EDA Tools: Altium Designer, TINA-TI, SPICE, GTKWave, Icarus Verilog, Yosys, NextPNR (iCE40 FPGA flow)
Embedded Systems: ARM Cortex-M4 (STM32F411), Cortex-M33 (NXP MCXN236), Bare Metal C, MCU Bring-up, Memory Mapped I/O, I2C, UART, USB HID
PCB and Analog: Schematic Capture, Layout, Gerber and BOM Output, Op-amp Circuits
Test and Debug: Oscilloscopes, Logic Analyzers, Datasheet Driven Component Selection, Hardware and Software Debugging
Development Tools: Git, GitHub, Linux

Experience

Research Intern, Indian Institute of Technology Delhi (IIT Delhi) *Selected 2026*

- Selected to develop **custom circuitry** for **semiconductor test and measurement**

Projects

STM32F411 Development Board | ***Altium · STM32 · Cortex-M4 · I2C*** github.com/Rizz-Vizz/stm32f411-dev-board

- Designed a custom **4 layer PCB** for an STM32F411 board with an **MPU-6050 IMU**, from schematic capture through routing, and validated the power architecture
- Produced **Gerbers, drill files and BOM**, then brought up the board and wrote **bare metal C** for I2C communication with the IMU, debugging with an oscilloscope

RV32I RISC-V CPU Core | ***Verilog · C/C++ · MMIO*** github.com/Rizz-Vizz/riscv-rv32i-core

- Designed a **single cycle RV32I processor** in Verilog from scratch (fetch, decode, execute, memory, writeback) with memory mapped **UART and GPIO**
- Wrote a **self checking testbench** that runs real C programs built with the RISC-V GNU Toolchain, verifying all **47 base instructions**
- Debugged timing and datapath issues using cycle accurate simulation in GTKWave

Tilt Controlled USB HID Mouse | ***C · Cortex-M33 · USB HID*** github.com/Rizz-Vizz/tilt-air-mouse-mcxn236

- Wrote bare metal firmware for the **NXP FRDM-MCXN236** that reads an **I2C accelerometer**, applies smoothing and a dead zone, and sends tilt as **USB HID** mouse reports
- Built a Python dashboard that tunes the device live over a **UART** text protocol, with saved profiles and a hold to re-centre gesture
- Measured **0 px idle drift** over 60 s, **30 of 30** single and double click recognition, and about **250 input events per second**

Hardware Neural MAC Unit | ***Verilog · FPGA · Yosys · NextPNR*** github.com/Rizz-Vizz/Hardware-Neural-MAC

- Built a **Multiply-Accumulate unit** and **ReLU** activation from individual logic gates, the core arithmetic block behind every neural network
- Ran the full FPGA pipeline for an iCE40 target: synthesis, placement, routing and timing analysis

LED Chaser PCB Design | ***Altium · 555 Timer · CD4017*** github.com/Rizz-Vizz/LED-Chaser-PCB-Design

- Took a sequential **LED chaser** circuit from schematic to **CAM generated fabrication files** ready for manufacturing

ASLKv2010 Analog Lab and Instructional Curriculum | ***TINA-TI · SPICE*** github.com/Rizz-Vizz/ASLKv2010

- Built **op-amp and analog circuits** on the TI and Wiley Analog System Lab Kit, validated simulations against real hardware with an oscilloscope, and wrote instructional material for junior students

Certifications

Linux Foundation, Introduction to RISC-V (LFD110) | Altium Education, PCB Basic Design