Abhishek Raghuwanshi

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EDUCATION

University of British Columbia   *Vancouver, BC*
Bachelor of Applied Science in Electrical Engineering (3rd Year)   ***Sep. 2022 – May 2027***
Awards: Martin Sikes Memorial Award in ECE UBC 2024, OIS Award 2022
Activities: VP Student Life @ UBC ECESS, Facilities director+Company relations manager @ UBC EUS
- Authored and presented a paper on **Atomic Layer Deposition (ALD)** for **Semiconductor device optimization**.

SKILLS

Hardware: System Verilog, RTL, UVM, Testbench+simulation, Quartus + Modelsim, PCB design(Altium, KiCAD), SPICE, Serial protocols (UART, I2C, SPI), microcontroller systems(STM32, ESP32, Nrf5280,Nuvoton, ATMEGA)
Languages: C, C++, Python, TCL, HTML+CSS, JavaScript, Assembly(ARM and 8051), SQL, Pascal, LaTeX, makefiles
Tools: Matlab, Simulink, Git, WSL, VS Code, Visual Studio, IntelliJ, STMCube IDE, Solidworks, Onshape, Microsoft Office, Google Suite, Oscilloscopes, Arduino, Raspberry Pi, 3D printing

TECHNICAL EXPERIENCE

Electronics Team Lead   **Sep. 2023 – Present**
@ UBC Subbots   *Vancouver, BC*
- **Led a team of 18 students** in designing electronics for an Autonomous Underwater Vehicle (AUV) competing in the International RoboSub Competition.
- Developed a **custom ESC PCB**, converting PWM signals to 3-phase motor outputs with closed-loop **IMU feedback** using **C++ and Simulink**.
- Designed power distribution PCB in **Altium**, **improving efficiency by 25%** while also integrating BMS and an emergency safety kill switch.
- Delivered a **modular** and **debug-friendly** electronics system using **I2C** communication, helping the team reach RoboSub semifinals for the first time.
- Currently developing a **PoE-based Ethernet interface** PCB to communicate and power an Nvidia Jetson TX2 over tether without needing battery for testing.

PROJECTS

Webserver controlled BLE robot | *ESP32, Nrf52840, C++, HTML+CSS, Py(Flask+BLEak), Node.js*   **Jan 2025**
- Designed a **custom motor driver PCB**, improving motor control efficiency and reducing power consumption by 20%, and developed **BLE** controlled robot with <100ms latency and stable 10-meter connection.
- **Built a local web server (with both Js and Python)** and **responsive website** for real-time robot control, **supporting up to 5 users** simultaneously with a joystick web-interface for intuitive movement.
- Implemented **PID control** on an Nrf52840 based BLE micrcontroller for a self-balancing robot, enhancing stability and movement accuracy for smooth operation.

Metal detecting RC robot | *PIC32, ATmega, STM32, C, Python, Putty, makefiles*   **Mar 2024**
- Developed **two-way UART** communication via **JDY40 Bluetooth** (100m range) with <5% data loss and programmed PIC32 microcontroller for magnetic flux detection (1.40mH) with 98% accuracy.
- Built a **software control interface** using **Python for UI and STM32(in C)**, enabling robot control via keyboard (WASD), and feedback including position tracking + data plot for verifying accuracy.
- Created analog display for inductance controlled by timer interrupts on **PIC32** to show metal presence in specified ranges.

Reflow Oven Controller | *Nuvoton microcontroller system, 8051 assembly, Python*   **Feb 2024**
- **Designed hardware controls** for selecting reflow profile parameters (soak temperature/time, reflow temperature/time) and oven settings using **N76E003 microcontroller** in pure **8051 assembly**.
- Developed **Python script** for logging temperature data and displaying animations to improve user awareness.
- **Implemented dual timers in assembly** to track state durations, display time information, and generate PWM for controlling oven power via SSR box.

RISC Machine | *System Verilog (RTL+Testbench), ARM assembly, Altera FPGA*   **Nov 2023**
- Made a fully-functioning **32 bit CPU and Datapath** using **System Verilog** that decodes **ARM instructions** and executes them completely on a **DE1-SOC FPGA**.
- Executed extensive coding in System Verilog synthesized in **Quartus** and created extensive **test benches** to verify the functioning of every feature using **RTL simulation waveforms** using **Modelsim**.

EXTRACURRICULAR ACTIVITIES AND INTERESTS

- Organized **NASA International Space Apps** hackathon successfully in Vancouver, with 132 participants.
- Sports: Triathlete - Ultra-Iron Person, Intramural Tier-1 Basketball Champion, ECE and EUS sports team captain.
- Recreational **electric guitar player**, made a project to use an **FPGA board** as a **digital FX pedal.**