Sarthak Jain

412-427-8570 | sjain4@andrew.cmu.edu | www.linkedin.com/in/sarthak-jain-72823a1b3

Education

Carnegie Mellon University Pittsburgh, PA

BS, Electrical and Computer Engineering and Robotics *May 2028*

- **Cumulative GPA**: 3.5
- **Coursework**: Structure & Design of Digital Systems, Signals & Systems; Diff Eqs; Principles of Imperative Computation; Fundamentals of Programming & CS; Concepts of Mathematics, Matrices & Linear Transformations,

Experience

IEEExCMU Electrical Lead March 2025

- Led a 6 member electrical subteam, developing a real-time **embedded control system** for an animatronic by implementing **RTOS task architecture** coordinating motor control, audio playback, and sensor input.
- Utilized **embedded C programming**, **circuit design**, and **real-time debugging techniques** to integrate motion, lighting, and feedback systems.

Engineering Intern @ Fleeca January 2023 – July 2023

- Improved wiring processes by designing **custom tooling fixtures**, increasing throughput by **22%** and reducing error rate.
- Collaborated with senior engineers on tooling redesign for safety compliance and electrical system robustness.

Research Assistant – Photovoltaic Panel Efficiency Jan 2023 – Nov 2024

- Conducted simulation and analysis of solar irradiance under varying **spectral (wavelength) and angular dependencies.**
- Co-authored a paper published in an international renewable energy journal; worked with a Harvard PhD researcher on modeling techniques.

Project Experience

5-stage pipelined RISC-V processor | *RTL Development, SystemVerilog, Computer Architecture* June 2025

- Designed and implemented a 5-stage pipelined RISC-V processor in **SystemVerilog(SV)** using **Xilinx Vivado** (synthesis) and **QuestaSim** (verification), integrating hazard detection, forwarding logic, and pipeline control.
- Enhanced processor testbench with a **dynamic pipeline visualization in SV**, simulated with **Icarus Verilog**, to display cycle-by-cycle instruction flow across stages (Fetch, Decode, Execute, Memory, Writeback).

Line Follower Robot | *PID control tuning, Pathfinding algorithms, Motor control* Feb 2025

- Designed and programmed a precision line-following robot using **PID control** to achieve high-speed path adherence and real-time correction using **pathfinding algorithms** and integrated motor control systems.

Photovore Robot | *Sensor integration (photodiodes), Analog signal processing, Feedback control* Jan 2025

- Built an **autonomous light-chasing robot**, integrating analog photodiode sensor arrays and feedback loops.
- Designed a custom **2-layer PCB in Altium** for signal processing and motor control.

GearSketch Robot | *Inverse kinematics, Multi-axis motion planning, Precision robotics* Feb 2025

- Prototyped a 4-DOF robotic manipulator capable of **mechanically sketching custom gear profiles** using **precision stepper motor control**, **inverse kinematics,** and **trajectory planning algorithms**.

Echolocate (EDIE Hackathon) | *Human-centered assistive tech, Rapid Prototyping* March 2025

- Developed an **assistive navigation glove** for visually impaired using ultrasonic sensors and haptic motors.
- 3D-modeled custom designs in **Fusion360** to integrate electronics into an **ergonomic wearable device**.

Technical Skills

Hardware: AutoCAD/Fusion360, LTSpice, ARM Architecture, Embedded Systems, RTOS, PCB Design (Altium), Circuit Design, Sensor Integration, Microcontrollers (Arduino, Raspberry Pi), Real-time Debugging, Inverse Kinematics

Programming: C/C++, Python, Rust, Verilog, SQL, ML Algorithms, HTML, CSS, Javascript, Typescript, Linux

Tools and Simulation: MATLAB, Vivado, QuestaSim, Icarus Verilog, Pathfinding, PID tuning, Spectral Simulation

Other: Microsoft Excel, Version Control (Git), Academic Research