Manav Sengupta

Technical Co-Lead, Robotics & Systems Design — Full Stack Developer — Embedded Systems Enthusiast

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Education

2023 – Present **Bachelor of Technology, Electronics and Instrumentation Engineering**, *National Institute of Technology, Agartala*
2nd Year

Technical Skills

Languages	Python, C/C++, JavaScript, HTML, CSS, SQL
Frameworks	Django, Bootstrap, React (basic)
Tools	CoppeliaSim, Git, VS Code, Arduino IDE, MySQL, Firebase
Platforms	Amazon Seller Central, Android Studio, Google Cloud Platform
Robotics	PID, LQR, Sensor integration, Serial communication, Bot control logic, Raspberry Pi, OpenCV

Projects

2020 **Quantum Realm Blogs (Wagtail CMS)**
- Collaborative blog site using Django Wagtail, supports post submission and comments.
- Encourages contribution in physics and quantum computing topics.

2021 **OMR Detection Software**
- Teachers can upload scanned answer sheets; software grades using OpenCV.
- Accelerates manual checking with high accuracy.

2022 **Automatic Aquarium Air Pump System**
- Ensures continuous oxygenation during power cuts using backup sensing and relay switching.

2023 **DCC ShutterSeek**, Django-based image search app using Unsplash & Pixabay APIs
- Full-stack Django web app with dynamic image fetching.
- Displays image metadata with elegant templates and pagination.

2023 **Self-Balancing Bot in CoppeliaSim**
- PID and LQR controlled robot to stabilize motion in real-time.
- Implemented runtime tilt-based feedback correction.

2024 **Laser-based Digital Communication System**
- Data transmission using laser, with Hamming ECC to detect & correct single-bit errors.
- Designed LDR-based receiver to decode 4-bit signals.

2024 **Op-Amp Based Overcurrent Protection**
- Designed a cost-effective current limiter using op-amps and solid-state relay.
- Offers instant cutoff under overcurrent conditions, ideal for lab-grade power systems.

2024 **Digital Piano using Passive Buzzer**
- Built using 555 timer in monostable mode.
- Can play customizable notes and full melodies.

2024 **Function Generator**
- Generates square, triangle, and sine waves with variable frequency output.

2024 **Soil Moisture Sensor**
- Designed an impedance-based moisture sensing system for plant irrigation.

2024 **Hand Gesture Robot**
- Raspberry Pi Pico W-based robot controlled via camera using OpenCV and gestures.
- Enabled remote bot control through hand sign recognition.

2024 **Qiskit Projects**
- Simulated quantum circuits for teleportation and superposition.
- Began exploration into quantum algorithm building blocks.

2024 **ECG System with Arrhythmia Detection**
- Developed a Raspberry Pi Pico based ECG data acquisition and analysis system.
- Integrated machine learning for arrhythmia detection; part of a research patent.

2025 **Digital Voting Machine**
- Pure hardware-based system using D Flip-Flops and full adders.
- 4-bit vote counter; displays votes for 3 candidates on trigger.

2025 **Intelligent Robotic Assistant**
- Multi-sensor bot with obstacle, edge, temperature, and stability monitoring.
- IMU-based control; performs pick-and-place tasks with robotic arm.

2025 **Combined ECG-EEG Diagnostic Kit (Ongoing)**
- Working on affordable bio-sensing kit for patients with ECG + EEG analysis.
- Aims to serve as business prototype in collaboration with professors.

Experience

2022 – 2024 **Web Developer**, *Fluff and Fins Co.*, Kolkata, West Bengal

- Built websites using HTML, CSS, JavaScript, jQuery.
- SEO optimization, blog content creation, and media editing.

2022 – Present **Founder & R&D Manager**, *Amazon E-commerce Store*, Kolkata,West Bengal, India

- Sold dry aquarium products; handled logistics, pricing, branding, GST.

2023 – Present **Technical Co-Lead, Robotics & Systems Design**, *ANARC Robotics Club, NIT Agartala*

- Led sessions and built bots for competitions like IIT Kharagpur's Robowars.
- Mentored juniors and contributed to autonomous and control systems.

2023 – Present **Core Tech Member**, *Elite Developers & Coders Club, NIT Agartala*

- Built full-stack apps; participated in open-source and mentoring.

Achievements

JEE Mains 2023	AIR 38,342 with 98 percentile in Physics
Club Leadership	Promoted to Technical Co-Lead at ANARC Robotics Club
Innovation	Developed multiple real-world hardware prototypes
Physics Enthusiast	Strong foundation in modern physics and quantum computing

Certifications & Prototypes

AI Project	Built AI Chat App with integrated secure backend
Microcontroller	Arduino/Nano-based sensor circuits & laser comms
Digital Electronics	Voting machine using D Flip-Flops and full adders (hardware-only)
CampusAssist Mobile App	A Django-based platform where students can: ○ Place and fulfill orders from on-campus stores like shopping complexes and cafeterias. ○ Offer and receive help with assignments, notes, and submissions for payment. ○ Use location-based task matching and live in-app messaging for seamless coordination. ○ Access features like user authentication, payment logging, task tracking, and rating. ○ Enjoy a responsive Bootstrap-powered frontend optimized for both mobile and desktop.

Interests

Technology	Robotics, Embedded Systems, Quantum Computing, AI, Healthcare Technology