SUBHAM SAHA

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Academic Objective & Research Interests

B.Tech candidate in Electrical and Electronics Engineering (CGPA: 8.67) with hands-on expertise in EV powertrain simulation, embedded control systems, and power electronics hardware. Seeking an MS in Electrical Engineering to specialize in high-efficiency electric drivetrains, deterministic control architectures, and multi-physics system modeling for next-generation sustainable mobility platforms.

Education

Vellore Institute of Technology (VIT), Vellore, India — September 2022 – Present
Bachelor of Technology (B.Tech) in Electrical and Electronics Engineering — **CGPA: 7.6/10**
Relevant Coursework: Power Systems, Control Systems, Electrical Machines, Power Electronics, Embedded Systems, Circuit Theory, Analog & Digital Electronics, Microprocessors & Microcontrollers.

Research & Technical Projects

1 Multi-Physics Digital Twin of Formula Student EV Powertrain — *August 2024 – Present*

- Engineered a high-fidelity digital twin of a Formula Student electric racing vehicle integrating a battery thermal management system (BTMS), 3-phase traction network, and full chassis dynamics model within a unified multi-domain simulation environment.
- Executed transient multi-physics simulations in MATLAB Simscape to characterize electrochemical battery degradation, thermal heat dissipation profiles, and power stage switching behavior across standard and custom racing drive cycles.
- Derived predictive analytical models for cell-sizing and energy management strategy optimization, directly informing component selection and improving projected race energy efficiency margins.

Technologies: MATLAB, Simulink, Simscape

2 Hybrid Biped Robot with Integrated Tracked Locomotion — *March 2025 – December 2025*

- Designed and fabricated a 4-DOF hybrid bipedal robotic prototype combining walking and rolling kinematics; modeled all subassemblies in Fusion 360 and validated mass distribution via MATLAB to confirm static and dynamic single-leg equilibrium.
- Deployed an ESP32-based embedded architecture with a 6-axis IMU for real-time tilt and slip compensation; eliminated gearboxes through direct-drive design, reducing system energy losses by 30%.
- Implemented closed-loop trajectory planning algorithms leveraging continuous IMU feedback to dynamically correct servo positions across non-uniform terrains.

Technologies: MATLAB, Simulink, ROS, Gazebo, Fusion 360, Ansys, Arduino IDE

3 Custom 4-Layer PCB Design for Formula Student ECU (FS Team Ojas Racing) — *May 2024 – Present*

- Architected front and rear ECUs using a distributed dual-microcontroller topology; designed and validated a custom 4-layer PCB with optimized signal routing, improving electrical network noise immunity by 25%.
- Designed critical low-voltage safety circuitry including Tractive System Active Light (TSAL) controls and driver cockpit interfaces in strict compliance with Formula Student technical regulations.
- Managed end-to-end hardware integration across the vehicle's LV network, coordinating component procurement and cross-disciplinary design reviews to meet competition deadlines.

Technologies: KiCAD, Altium Designer, AutoCAD Electrical

4 Spam/Ham Message Classification Engine via NLP — *December 2023*

- Constructed an end-to-end NLP pipeline for binary text classification, implementing tokenization, stop-word filtering, and TF-IDF feature extraction to prepare raw text corpora for statistical modeling.
- Trained and cross-validated multiple supervised classifiers (Naive Bayes, SVM, Logistic Regression), achieving 93% overall accuracy with minimized false-positive rates.

Technologies: Python, NLTK, Scikit-learn, Pandas

Engineering Internships

1 Schneider Electric India — Bengaluru, India
HMI Project Intern — *May – August 2025*

- Designed and validated industrial automation nodes using EcoStruxure Operator Terminal Expert and Machine Expert; configured master-slave PLC communication and HMI interfaces for deterministic factory floor control systems.
- Built an optimized dark-theme UI subsystem for proprietary enterprise software using C# and WPF, improving information hierarchy and reducing panel operator fatigue.
- Contributed to the agile HMI release lifecycle, authoring technical documentation on software licensing security frameworks and new feature integrations.

Technologies: EcoStruxure, C#, WPF, PLC programming

2 Bahrain Electromechanical Services Company (BEMS) Bahrain
Project Engineering Intern *June – July 2024*

- Supported engineering design reviews for the $525M Bahrain Marina development; performed grounding grid calculations ensuring low-impedance fault pathways ($< 1\,\Omega$), formulated surge protection configurations, and sized medium-voltage cable trays across multiple building blocks.
- Reviewed and audited 30+ Issued for Construction (IFC) schematics covering fire safety loops, low-current sensor lines, and integrated security systems, verifying compliance with project standards prior to onsite deployment.

Technologies: AutoCAD Electrical, MV system design, IFC schematic review

Technical Skills

Programming & Computing:	MATLAB, Python, C/C++, Java, R, C#, WPF
ECAD & EDA Software:	KiCAD, Altium Designer, EasyEDA, AutoCAD Electrical, EcoStruxure
Simulation & Multi-Physics:	Simscape, OrCAD PSpice, NI Multisim, NI LabVIEW, Ansys, Gazebo, ROS
CAD & Prototyping:	Fusion 360, Canva, Figma

Leadership & Team Achievements

FS Team Ojas Racing, VIT Vellore *May 2024 – Present*
Electrical Hardware Engineer & Outreach Lead

- Led electrical hardware design for the Formula Student competition vehicle including ECU architecture, 4-layer PCB design, and LV safety systems (see Project 3 for full technical scope).
- Spearheaded corporate outreach and financial modeling, securing multi-sponsor funding to sustain team operations and competition entries.

Instrument Society of India (ISOI) Student Chapter, VIT *June – July 2024*
Design Operations Lead

- Produced 40+ promotional creatives for flagship college events including Riviera and Gravitas, displayed across all major VIT venues to maximize outreach and visibility.
- Coordinated logistics for technical hackathons and symposiums; managed end-to-end event execution for 300+ participants.
- Trained and mentored a 15-member creative division on human-centric UI design using Canva and Figma, standardizing branding guidelines and reducing asset production time.

Certifications & Continuing Education

- *Advanced PCB Design Mastery with Altium Designer* – Coursera 2025
- *Commercial Project Architecture Simulation* – Siemens 2025
- *Distributed Generation Systems & Microgrids* – Schneider Electric University 2025
- *Artificial Intelligence Core Methodologies Training* – Acmegrade 2024

Community Involvement

Event Organizer – Guest Care *2025*
Schneider Electric Hackathon "Screencraft", VIT Vellore in collaboration with Schneider Electric

- Coordinated guest logistics and hospitality for 300+ participants, ensuring smooth event flow and positive attendee feedback.

Workshop Instructor – Canva Basics *2025*
Instrument Society of India (ISOI), VIT University

- Conducted a hands-on design workshop for 40+ students, improving digital design literacy and visual communication skills across the student chapter.

Languages

English (Proficient), Hindi (Fluent), Bengali (Native), German (Elementary A1)