Sahil Narkhede

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LinkedIn Profile | GitHub Profile

Summary

Electronics and Telecommunication Engineering undergraduate with strong practical experience in robotics, embedded systems, and real-time control. Proficient in C/C++ and Structured Text concepts, with a solid foundation in industrial control logic and hardware schematics. As an active member of Team Automatons (Robotics R&D Team at PCCOE), I contribute to national-level competitions such as DD Robocon, where teamwork, innovation, and precision are key. Participated in the IRC-International Rover Challenge at BITS Pilani. Driven by a passion for automation, commissioning control systems, and creating practical engineering solutions.

Education

Pimpri Chinchwad College of Engineering (PCCOE) — **Pune, Maharashtra**
Bachelor of Technology (B.Tech): Electronics & Telecommunication — *Aug. 2023 – Expected May 2027*

Experience

Project Intern / Engineering Trainee — **Pune, Maharashtra**
Dassault Systèmes — *Jan 2026 – July 2026*

- Heavy-Duty Railway Track Rover (Autonomous Systems): Designed the high-level system architecture for an autonomous track navigation rover, integrating OpenCV-based vision pipelines for track inspection and obstacle detection.
- Developed industrial fail-safe control logic with a 500ms Watchdog Timeout, Emergency Stop (E-Stop), and hardware-debounced sensor inputs for autonomous reliability.

Electronics & Embedded R&D Engineer — **Pune, Maharashtra**
Team Automatons Robotics R&D Team at PCCOE — *Aug 2024 – Dec 2025*

- Developed robust communication architectures (CAN, SPI, I2C) connecting multiple processing nodes (ESP32, Teensy 4.1, Arduino) for deterministic, real-time control.
- Assisted in hardware testing, sensor interfacing, and system-level validation for high-performance national competition robots.

Projects & Key Achievements

- **PLC Automation & Control:** Programmed and tested **Delta PLC control logic** using **Ladder Diagram (LD)** and **Function Block Diagrams (FBD)** for automated systems including traffic light control and water pump automation. Experienced in reading **electrical schematics and wiring diagrams** for seamless hardware-software integration.
- **HMI & SCADA Integration (Fundamentals):** Developed conceptual understanding of HMI programming interfaces and SCADA data acquisition for real-time visualization and troubleshooting of automated processes.
- **CAN Bus Communication:** Implemented a robust **CAN Bus communication protocol** using **MCP2515 over SPI** for synchronized real-time communication between **ESP32, Arduino Mega, and Teensy 4.1** controllers for distributed robotic control.
- **PID Tuning & Control Optimization:** Developed **PID-based closed-loop motor control** using **encoder feedback** for accurate speed regulation. Tuned controller gains to reduce overshoot, minimize steady-state error, and improve transient response.
- **LoRa Module Integration:** Implemented **LoRa wireless communication** between embedded nodes for **long-range, low-power data transmission.** Integrated LoRa modules via **SPI protocol** with microcontrollers.
- **Communication Protocols (SPI, UART & I2C):** Implemented **SPI, UART, and I2C protocols** for seamless **microcontroller-to-microcontroller** and high-speed peripheral communication.
- **Heavy-Duty Railway Track Rover (Hardware & Telemetry):** Engineered the embedded hardware implementation using **ESP32** for autonomous track navigation. Interfaced **GPS and GSM modules via UART** for real-time localization.
- **Hardware Prototyping & Motor Control:** Led **component selection** and defined hardware specifications through iterative prototyping. Integrated high-torque **BLDC, Servo, and DC motors** with industrial drivers including **ESC, BTS7960, Cytron, and PCA**.

Technical Skills & Interests

- **Microcontrollers:** 32-bit (ESP32, Teensy 4.1), 8-bit (Arduino)
- **Programming & Core Skills:** Embedded C, C++, Structured Text, Ladder Diagram (LD), Function Block Diagram (FBD), Arduino, Verilog HDL
- **Hardware & Protocols:** PLC (Delta), Electrical Schematics, HMI/SCADA Fundamentals, Motor Control Systems, PID Control, SPI, CAN, UART, I2C, LoRa
- **Hardware & Testing Tools:** MSO, Oscilloscope, DSO, Multimeter
- **Soft Skills:** Collaborative Teamwork, On-Site Troubleshooting, System Commissioning
- **Areas of Interest:** Industrial Automation, PLC Programming, Embedded Control, Autonomous Systems