

SUYOG CHOUGULE

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Professional Summary

Embedded Systems Engineer specializing in motor control, robotics, and embedded hardware and software development. Experience designing STM32-based motion controllers, BLDC/PMSM drives, autonomous mobile robots using ROS 2, and high-power power-electronics systems. Developed modular motor-control hardware spanning 400 W to 3 kW, improved robotic communication latency by more than 60 percent, and previously led development of a 50 kW DC fast-charger startup backed by INR 800,000 in grant and prototype funding.

Technical Skills

Programming: C, C++, Python

Embedded Systems: STM32, FreeRTOS, bare-metal firmware, Raspberry Pi, Linux

Robotics: ROS 2, ROS2 Control, MoveIt 2, Nav2, Gazebo

Communication: CAN, CANopen, SocketCAN, RS485, I2C, SPI, USB

Hardware Design: KiCad, multilayer PCB design, power electronics, motor drives

Tools: Git, MATLAB/Simscape, Fusion 360 Electronics

Professional Experience

MedPlus India Pvt. Ltd.

Embedded Systems Engineer

Hyderabad, India

May 2025 – Present

- Lead development of a modular BLDC/PMSM motion-control platform based on the STSPIN32G4, spanning embedded control hardware, firmware, interchangeable 400 W–3 kW inverter stages, feedback interfaces, and CANopen communication.
- Develop the embedded and sensor architecture for a warehouse AGV using ROS 2 Nav2, 2D LiDAR, and RGB-D sensing for autonomous navigation and obstacle detection.
- Lead technical evaluation and integration of sensors, motors, motor-control electronics, and other robotic hardware, coordinating directly with suppliers through prototype selection and system integration.
- Lead development of a lithium-ion/supercapacitor energy-storage system targeting approximately 60-second charging, including pack architecture, cell configuration, charging strategy, balancing, protection, and system-level design.

Twara Robotics (formerly Gati Robotics)

Associate Engineer - Embedded Systems

@ARTPARK IISC Bangalore, India

Jul 2024 – May 2025

- Redesigned the robotic-arm communication backend in C++, reducing end-to-end command latency by more than 60 percent compared with the previous script-based implementation.
- Developed embedded startup, motor initialization, I/O control, persistent position recovery, and CAN/RS485 communication for robotic-arm control hardware.
- Developed ROS2 Control hardware interfaces for Twara actuators, AMR platforms, and robotic arms, and integrated MoveIt 2 for motion planning and servo control.

Embedded Systems Intern

Jan 2024 – Jun 2024

- Developed ROS2 Control interfaces and robotic-arm software integrating motor drivers with MoveIt 2.

Embedded Systems Intern - Remote

Aug 2023 – Dec 2023

- Developed a reusable ROS 2 driver for Twara actuators and motor-control software for a Dynamixel-based soft-robotics test platform.

Ripple Technologies (Startup)

Founder and Embedded/Power Electronics Engineer

Manipal, India

Nov 2021 – Dec 2024

- Secured INR 700,000 through the Government of India NIDHI PRAYAS program and INR 100,000 in institutional prototype funding for DC fast-charger development.
- Led electrical and embedded design of a 50 kW DC fast charger integrating a Vienna rectifier and phase-shifted full-bridge DC-DC converter.
- Designed high-power PCBs, gate-driver circuits, voltage/current sensing, and STM32 firmware for IGBT/SiC switching stages; implemented real-time control and fault detection.

Selected Engineering Projects

Modular BLDC/PMSM Motion Controller | MedPlus

- Designed a compact FOC motion controller around the STSPIN32G4 system-in-package, leveraging its integrated MCU and three-phase gate driver to minimize controller size and external component count.
- Architected the controller as two modular PCBs: a control/driver board and a separate MOSFET inverter board, allowing the control platform to be reused across multiple power stages.
- Designed inverter variants spanning approximately 400 W to 3 kW to support BLDC/PMSM motors across different voltage and power requirements.
- Implemented cascaded current, velocity, and position control with encoder/resolver feedback and CANopen communication over CAN 2.0B.

Warehouse AGV Sensor and Navigation Architecture | MedPlus

- Developed a ROS 2 Nav2 architecture using dual 2D LiDAR sensing for localization/navigation and RGB-D perception for obstacle detection.
- Led sensor evaluation and integration, defining interface, field-of-view, range, mounting, and system requirements for LiDAR and depth-camera hardware.

Fast-Charging Lithium-Ion/Supercapacitor Energy-Storage System | MedPlus

- Led electrical architecture and system design for a lithium-ion/supercapacitor energy-storage system targeting approximately 60-second charging.
- Designed a custom battery-management system (BMS), including cell monitoring, balancing, protection, current/voltage sensing, and pack-level safety architecture.
- Defined pack voltage, series/parallel cell configuration, energy requirements, charging architecture, and protection thresholds.

Base Board for Twara Robotic Arms

- Designed the startup state machine for 24 V SMPS sequencing, motor-driver initialization, onboard I/O control, and last motor turn count (LMTC) restoration.
- Implemented EEPROM-based LMTC retention for position recovery with single-turn absolute encoders and integrated CAN and RS485 communication with motor drivers.
- Designed low-power sleep behavior and interfaces for 8 x 24 V digital outputs, 8 digital inputs, and 8 analog inputs for sensors and actuators.

ROS2 Control Driver and USB-to-CAN Interface | Twara Robotics

- Developed ROS2 Control hardware interfaces for Twara motor drivers, AMR kits, and robotic arms; integrated MoveIt 2 for real-time servoing and trajectory planning.
- Built a USB-to-CAN converter with SocketCAN support on Linux and compatibility with other operating-system tools.

Education

Manipal Institute of Technology

B.Tech in Mechatronics | CGPA: 8.3/10

Manipal, India

2020 – 2024

SV PU College

Pre-University / Class XII | 91.3%

Bangalore, India

May 2020

Leadership and Recognition

- Speaker, ROSCon India 2024, IISc Bangalore — presented “ROS 2 Control in Mobile Robots and Robotic Arms.”
- State topper in the Class XII mathematics board examination, scoring 100/100.