Surya R

Embedded Software Engineer

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Motivated by a passion for continuous skill development, I thrive in dynamic environments tackling complex engineering challenges in embedded systems and robotics. My curiosity drives ongoing growth, and my technical expertise enables me to make meaningful contributions to organizational success.

Professional Summary

- 4.5 years of industrial experience in embedded systems and robotics.
- Skilled in PCB design, circuit development, and hardware integration.
- Proficient in Embedded Firmware Development.
- Strong in Shell Scripting, Embedded C, C++, and Python programming.
- Hands-on with communication protocols (UART, I2C, SPI, CAN, TCP/IP, UDP).
- Experience in Real-Time Operating Systems (FreeRTOS, Threads).
- Familiar with Robot Operating System (ROS).
- Experienced in Motion Planning, Classical and Optimal Control.
- Strong background in Hardware–Software Integration.

Technical Skills

Programming Languages	Embedded C, C++
Rarely Used	Python, Shell Script, MATLAB/Simulink
Microcontrollers	STM32FEXXX, PIC family
Development Boards	Jetson Nano, Toradex Colibri i.MX
RTOS	FreeRTOS
Threading / API	POSIX
Development Platforms	KiCad, MPLAB IDE, Keil µVision, STM32CubeIDE, Visual Studio Code, Vim
Hardware Interfaces	Sensors, Actuators, EEPROM, ADC, DAC
Protocols	UART, I2C, SPI, CAN, TCP/IP, UDP, Socket programming
Debug & Test Tools	gdb, Oscilloscope, Logic Analyzer, Multimeter, LCR Meter
Middleware	ROS 1 & 2
Version Control	GitHub
Containerization	Docker
Motion Planning/Control	Frenet, Graph & Tree algorithms, LQR, iLQR, PID, Stanley Controller
Models/Kinematics	Forward/Inverse Kinematics, Bicycle Models (Kinematic/Dynamic)
AI (Self study)	ML, DL, Sensor Fusion, CUDA C++

Professional Experience

Sibay Techno Solutions Pvt Ltd *Oct 2023 – Aug 2025*

Project 1 : Robotic Arm (6-DOF) *12 months*

Role	Embedded Systems Engineer – Motion Control, Firmware & Integration
Description	Designed and developed a 6-DOF robotic arm powered by CAN stepper motors with PID-based multi-axis control. Implemented motion planning, kinematics, and real-time feedback for automated positioning and fault-tolerant operation.
Tools/Platforms	Embedded C, C++, CAN, STM32, PID controller, sensor interfacing, Visual Studio Code
Responsibilities	• Developed low-level embedded control software for a 6-DOF robotic arm using C/C++. • Implemented kinematics and tuned PID controllers for CAN-based stepper motor drivers. • Integrated sensors, limit switches, and safety handling. • Led system integration and calibration, CAN communication and control loop performance.

Project 2 : Warehouse Robotics Automation *7 months*

Role Robotics Software Engineer – Motion Planning

Description Developed planning and control algorithms for AMRs in dynamic warehouse environments, ensuring collision-free navigation and reliable trajectory tracking.

Tools/Platforms Python, C++, ROS, Gazebo, trajectory libraries, Visual Studio Code

Responsibilities
- Designed collision-free motion strategies in simulation.
- Implemented trajectory tracking with real-time feedback.
- Validated algorithms in ROS/Gazebo simulations.

P2F Semiconductors Pvt Ltd *Feb 2023 – Sep 2023*

Project 1 : Post-silicon Validation *7 months*

Role Embedded Firmware Engineer - Baremetal

Description Designed and optimized firmware for ARM Cortex-M4 based embedded products, ensuring reliable hardware interfacing and high system stability.

Tools/Platforms Embedded C, ARM Cortex-M4, STM32CubeIDE, Keil µVision, Oscilloscope, Logic Analyzer

Responsibilities
- Developed low-level drivers (GPIO, UART, I2C, ..).
- Debugged hardware with oscilloscope and logic analyzer.
- Delivered production-grade firmware with fault handling.
- Optimized performance under tight deadlines.

Techmatiks Engineering Pvt Ltd *Aug 2020 – Jun 2022*

Project 1 : Hydraulics Automation *14 months*

Role Embedded Systems Engineer – Hardware, Software & Integration

Description Developed an automated hydraulics control system with STM32 controllers and Qt GUI, integrating solenoids, expanders, and power electronics.

Tools/Platforms Embedded C, STM32, Qt, KiCad, Toradex Colibri i.MX, Visual Studio Code

Responsibilities
- Designed custom PCBs and analog/digital circuits.
- Developed STM32 firmware for real-time hardware control.
- Built Linux-based Qt GUI for monitoring and operation.

Project 2 : Voltage & Current Monitoring *5 months*

Role Embedded Systems Engineer – Hardware, Software & Integration

Description Built a PIC16-based voltage/current monitoring system with peak voltage protection and CLCD interface for real-time visualization.

Tools/Platforms Embedded C, PIC16, CLCD, Op-Amps, PCB design tools, MPLAB X IDE

Responsibilities
- Designed analog front-end with op-amps and shunt sensors.
- Implemented firmware for acquisition and protection.
- Integrated CLCD display for monitoring.

Also contributed to the design and testing of various circuits supporting overall system functionality. Designed and developed power conversion circuits (12/24 VDC to 180–230 VDC) and automotive electronics including Royal Enfield hazard light systems.

Technical Training

Emertxe Information Technologies, Bangalore *Jul 2022 – Jan 2023*
Completed technical training in C, C++, Shell Scripting, Data Structures, and Microcontroller Programming.

Education

Bachelor of Engineering (ECE)	Bannari Amman Institute of Technology, Erode	66%	2019
Higher Secondary Certificate	Sri Vijay Vidyalaya, Hosur	72.5%	2015
Secondary School Certificate	Sishya, Tiruvannamalai	87.8%	2013