JHANSI SAMBU

💻 EMBEDDED SOFTWARE ENGINEER | EV & AUTOMOTIVE SYSTEMS

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PROFESSIONAL PROFILE

Embedded Software Engineer with **1.6 years** of hands-on experience in EV motor control and automotive embedded systems. Specialized in sinusoidal **PMSM motor firmware**, **Renesas RL78 (F13/F14/F24)** microcontroller porting, low-level register configuration, CAN / CAN FD protocols, PWM-ADC synchronized control systems, bootloader integration, and real-time interrupt-driven software architecture. Experienced in Board Support Package (BSP) development, hardware-software integration, and physical debugging using oscilloscopes, Multimeter and PCAN diagnostic tools.

TECHNICAL SKILLS

Programming Languages:	**Embedded C**, **Python**
Microcontrollers:	**Renesas RL78 (F13, F14, F24)**, RL78/F13 Architecture Porting, **Arduino**
Communication Protocols:	**CAN, CAN FD**, UART, SPI, I2C, Ethernet, Bootloader
Automotive Standards:	**AUTOSAR (Basics)**, **UDS (Basics), ASPICE, LDRA, DOXYGEN, TEXWORKS.**
Motor Control Expertise:	**PMSM Control**, Sinusoidal Commutation, PWM, Timer, GPIO, peripheral configuration, ADC, DAC, DTC, Hall Sensor Interface, Motor Protection Logic
Development & Debugging:	**CS+ CC-RL Compiler**, **PCAN**, **Oscilloscope Analysis**, Assembly, Keil, Git, GitHub

WORK EXPERIENCE

💼 Embedded Software Engineer
May 2025 – Present

🏢 **India Nippon Electricals Ltd (TECH CENTRE) — Hosur, Tamil Nadu**

- Developed embedded firmware for **48V PMSM EV motor** using sinusoidal commutation algorithms.
- **Renesas RL78/F13 Low-Level Porting:** Successfully ported 48V PMSM EV motor legacy firmware to the **RL78/F13 (16-bit CISC MCU)**. Reconfigured Option Bytes, Option Registers, System Clock Generators (HOCO/X1).
- **Custom BSP & Driver Development:** Configured low-level peripheral drivers for **Timer Array Unit (TAU)** to generate complementary PWM signals and synchronized 10-bit ADC sampling for speed/current feedback in CS+ CC-RL IDE.
- **Code & ISR Optimization:** Re-mapped GPIO allocations, pin-mapping, and Interrupt Service Routines (ISR) to align with RL78/F13 memory limits, significantly reducing interrupt latency and execution overhead.
- **Sinusoidal Motor Control & Safety (F24):** Implemented Hall Sensor isolation and sinusoidal lookup tables for real-time PWM duty cycle updates, tracking Angle along with microsecond-level Overcurrent, Overvoltage, Undervoltage and Thermal derating protection logic, Regenerative Brake, Auto Tuning for Phase wires.
- Executed CAN / CAN FD communication protocols and bootloader integration for parameter tuning and field flashing.
- Engineered signal testing and hardware-software integration debugging using PCAN tools, high-precision oscilloscopes,,Motor rig and Multimeter. Well known in soldering; maintained code with MISRA-C standards by testing with LDRA tool.

💼 Automotive Engineering Intern
March 2023 – March 2024

🏢 **Harita Tech Surv — Hyderabad, Telangana**

- Designed and configured CAN database files (.dbc) for software testing environments.
- Developed automotive instrument cluster features powered by real-time CAN signals and ECU data.
- Assisted senior engineering teams in system resource allocation and low-level architecture configuration using software TSMaster and CANdb++.

KEY ENGINEERING PROJECTS

🚘 Smart Instrument Cluster (Automotive)
January 2024 – April 2024

- Designed dynamic instrument cluster displays visualizing real-time vehicle speed, warning indicators, state gauges, and vehicle diagnostics using CAN communication, TSMaster and CANdb++ software.

🌾 Smart Water Management System for Agriculture — December 2022 – March 2023

- Led an automated agricultural irrigation system featuring water level sensors, automated gates, RTC scheduling, and GSM communication for real-time alerts.

• Automatic Ebell — February 2022 – April 2022

It was my minor project and it is a Automatic Electronic Bell Ringing System is critical to the daily operations of certain period of time. A bell or buzzer that operates on a contact relay to turn it on and off it will be automatic.

EDUCATION

🎓 **B.Tech in Electronics & Communication Eng.**	**B.V. Raju Institute of Tech, Narsapur**	**GPA: 8.18 / 10**
🏫 **Intermediate (MPC)**	**C.V. Raman Junior College, Wanaparthy**	**Marks: 972 / 1000**
🏫 **SSC (Secondary School Certificate)**	**Sri Medha High School, Wanaparthy**	**GPA: 8.8 / 10**

CURRENTLY UPSKILLING

- **FOC Algorithms&SVPWM Techniques, MATLAB**
- **Android Porting, Booting, Traiging.**
- **RTOS, Linux.**

CERTIFICATIONS & LANGUAGES

- **IBM Certifications**: Microprocessors and Microcontrollers
- **Languages Known:** English, Telugu, Hindi, Tamil