DINESH BABU R

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Senior Embedded Software Engineer – Motor Control | BMS | Electric Vehicles | Robotics

CAREER OBJECTIVE

To pursue a challenging career in Embedded Systems by leveraging my expertise in Motor Control and Battery Management Systems to develop advanced Electric Vehicle (EV) solutions and warehouse robotics applications.

PROFESSIONAL SUMMARY

Results driven Embedded Software Engineer with 8+ years of experience in the design, development, validation, and deployment of embedded systems, from requirements gathering to production and commercial deployment. Specialized in Motor Control and Battery Management Systems (BMS) for Electric Vehicles (EVs), Robotics, and Consumer Electronics. Hands-on expertise in 8/16/32-bit Microcontrollers and Microprocessors, with strong skills in Embedded C and low-level driver development. Proficient in embedded development tools (IDEs, emulators) and adept at debugging real-time problems. Skilled in communication protocol integration SPI, I2C, UART, CAN, LIN, BLE, and Wi-Fi. Experienced in RTOS-based and bare-metal firmware development, including algorithm implementation, application development, and hardware board bring-up. Proficient in handling lab equipment such as Oscilloscopes, digital multimeters, DC voltage sources, electronic loads, function generators, and other testing instruments for debugging, validation, and hardware bring-up.

PATENT

Speed Command System for BLDC Motor-based Ceiling Fan using Wall Mounted Universal Capacitive Step Type Fan Regulator
Patent Application No: 201941042375
https://iprsearch.ipindia.gov.in/PublicSearch/PublicationSearch/ApplicationStatus

PROFESSIONAL EXPERIENCE

Motherson Automotive Technologies and Engineering. Chennai, India (Mar 2025 – Present)

Senior Embedded Software Engineer – Motor Control & BMS

- Led an embedded team and managed the entire product lifecycle for the development of 24V and 48V Battery Management Systems (BMS) and servo motor drive for robotics applications, supporting 8S and 16S battery configurations.
- Led cross-functional teams using Jira for task management, sprint planning, and project tracking to ensure timely and efficient delivery.

Excelpoint Systems India Pvt.Ltd. Bangalore, India. (Jul 2023 – Dec 2024)

Senior Embedded Software Engineer –Motor Control & BMS

- Developed a full-fledged 72V BMS for EV application with 20S battery configuration.
- Developed SPI daisy-chain interface for cell/pack monitoring ICs and implemented accurate SoC/SoH algorithms. Improved temperature sensing with Steinhart-Hart method and lookup tables. Led testing and validation using data loggers and GUI tools.

- Coordinated coding efforts using C and Python, improving software performance metrics by 30%.

Sosaley Technologies Pvt. Ltd. Chennai, India. (May 2022 – Jul 2023)

Senior Embedded Engineer – Motor Control

- Designed a 250W and 1kW BLDC controller with Trapezoidal and FOC based Sensored motor algorithms for EV Applications.
- Developed a full-fledged 48V BMS for EV application with 16S battery configuration.
- Developed UART-based control between VCU and MCU with mode control

Received the "Best Engineer of the Year 2022" award for innovations in EV technology, and the "Best Team 5C Quality of the Year 2022" award for excellence in 5C compliance.

Kaynes Technology India Pvt. Ltd. Mysore, India. (Jan 2021 – May 2022)

Firmware Engineer – Motor Control

- Led development of a PMSM drive with MPPT, field weakening, and a PIR-based smart speed regulation system.
- Design a low-cost PMSM drive using a single and three shunt current control method.
- Implemented field weakening control to reduce motor hissing noise, enhance speed and enable smooth startup.

Versa Drives Pvt. Ltd. Coimbatore, India. (Jul 2017 – Jan 2021)

Firmware Engineer – Motor Control

- Delivered Low-voltage BLDC fan controllers with IR and capacitive regulator input.
- Implemented catch-up logic for smooth startup and high precision speed regulation
- Created ultra-low noise, sensorless dual-shunt BLDC ceiling fan system with field-oriented control algorithms.
- Implemented three-layer PI control for speed, torque, and power control operation.

Received the "Upcoming Person of the Year 2019" award for innovations in bldc technology.

PROJECTS

Project #1: 48V & 72V Battery Management System – EV Application Role: Project lead

Designed a safety-focused BMS for 16S, and 20S NMC/LFP battery packs with OCV and Coulomb Counting-based SoC, SoH, cell balancing, and temperature measurement. Implemented fault handling for OV, UV, OTP, and OCP. Developed SPI-based daisy-chain communication for slave boards and enabled multi-protocol support including CAN, LIN, UART, and SPI. Designed the BMS controller in compliance with ASIL-D and ISO 26262 standards. Integrated UART-based bootloader programming with a custom Python GUI for firmware updates.

Project #2: 24V & 48V Battery Management System - Robotics Application Role: Project lead

Designed a safety-focused BMS for 8S and 16S NMC/LFP battery packs with OCV and Coulomb Counting-based SoC, SoH, cell balancing, and temperature measurement. Implemented fault handling for OV, UV, OTP, and OCP.

Project #3: 1kW & 3kW BLDC Motor Controller – EV Application Role: Project lead

Designed and developed a bare-metal 1kW BLDC motor controller for electric mobility applications, implementing HAL-based sensored control using trapezoidal and FOC methods for efficient and reliable operation. Optimized PWM and commutation strategies to ensure smooth performance across varying loads, integrating protection features such as overcurrent, overtemperature, and undervoltage handling. Developed a UART-based interface for diagnostics and control and led testing and validation through load simulations and real-time monitoring tools. Supported multiple e-bike riding modes including Throttle, Cruise, Power, and Pedal Assist (PAS). Implemented CAN communication between the MCU, BMS, and VCU for seamless EV integration.

Project #4: 250W BLDC Motor Controller Role: Project lead

The 36V DC driver powers and controls low-voltage BLDC hub motors commonly used in e-bikes for their efficiency and reliability. Sensored Field-Oriented Control (FOC) and Trapezoidal BLDC algorithms are key motor control techniques that optimize power delivery and enhance motor performance in e-bikes.

Project #5: Low and High Voltage BLDC Ceiling Fan Role: Firmware Engineer

Designed a low-cost 24V PMSM drive powered by a 230V AC driver using single, two, and three-shunt current control with FOC algorithm. Implemented field weakening, MPPT, and three-layer PI loops for smooth and efficient operation. Added high current injection for startup, NEC IR control, and BLE/Wi-Fi (Modbus) for remote speed management. Enabled BLDC speed control via capacitor-type fan regulators with step change and position detection, overcoming fixed SMPS voltage limitations. Developed a high-voltage ceiling fan system using a 90–440V AC driver to run sensored and sensorless HV-BLDC motors with single-shunt control. Delivered high-performance, cost-effective solutions for the Indian market.

Project #6: Door Open Timer Role: Firmware Engineer

Developed a 24V DC device to control elevator door opening within a set time after floor arrival. Designed as a backup to activate the door if the main lift control board fails.

EDUCATION

B.E – Electronics & Communication Engineering, VSB Engineering College, Karur – 2017

Diploma – ECE, TRN Polytechnic College, Dharapuram – 2014

Declaration:

I hereby declare that the particulars furnished above are true to the best of my knowledge.

Yours faithfully: Dinesh Babu R