

Rajesh Pedasingu

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Professional Summary

Embedded Software Engineer with 2 years of experience in embedded systems development and 1.5 years of specialized expertise in signal processing, computer vision, image processing and deep learning, gained during a Master's program at IIT Tirupati. Skilled in firmware development, RTOS (FreeRTOS) integration, and communication protocols (CAN, SPI, I2C, UART). Proven ability to build high-performance, stable software for power management systems and leverage MATLAB/Simulink for Model-Based Design (MBD) in embedded applications.

Technical Skills

Embedded systems

- Hands-on experience with industry-standard microcontrollers including ARM Cortex-R4F TMS570LS0914, DSPIC33EP512GP506, and STM32 G071RB, demonstrating proficiency in 32-bit and 16-bit embedded systems development.
- Experienced working on application software development and optimization with good knowledge of protocols like CAN, SPI, UART, and I2C.
- Possesses a strong understanding of Battery Management Systems (BMS) and Electric Vehicle functionalities, with proficiency in Embedded C programming.
- Skilled in utilizing automotive communication tools such as CANalyzer, CANoe, and PCAN for effective protocol analysis and debugging.
- Proficient in using development and debugging tools like JTAG Debuggers, CCS, MPLAB IDE, and Vehicle Analyzer.
- Experienced in project management and version control tools such as ALM and Tortoise SVN, Git, demonstrating effective collaboration and version control.
- Engaged in all phases of the Software Development Life Cycle, from requirements gathering and analysis to software development, debugging, verification, and validation.
- Good understanding of data structures and algorithms using C.
- Integrated FreeRTOS for real-time task management in embedded systems, optimizing task scheduling, and enhancing system responsiveness.
- Experience in MATLAB/Simulink-based Vehicle Control Unit (VCU) development for Brake Lamp Illumination and Distance to Empty (DTE) calculation.
- Basic knowledge of Linux.

Computer vision, Image processing, Deep Learning & Machine Learning

- Hands-on experience in implementing real-time image classification using pre-trained networks (GoogleNet, VGG-16, ResNet-18) on Nvidia Jetson Nano.
- Developed advanced image segmentation techniques including UNet, attention-guided UNet, and Mask R-CNN for precise segmentation tasks.
- Applied GANs (pix2pix, UNet-based GANs) for generating intensity-transformed sinograms for tumor detection in CT scans.
- Implemented Faster R-CNN for automated detection of mediastinal lesions in CT scans.
- Expertise in Python, TensorFlow, Keras, OpenCV, and MATLAB for developing computer vision solutions.
- Familiar with libraries such as NumPy, Pandas, Matplotlib, scikit-learn, and PyTorch for developing and implementing machine learning and computer vision models.

Work Experience

Mahindra Last Mile Mobility | Deputy Manager, Embedded Software Developer 2023 - Present

Roles and Responsibilities

- Design, develop, and configure Base Software (BSW) and Application Software (ASW) for Battery Management Systems (BMS) in 3-wheeler electric vehicles.
- Conduct R&D and root cause analysis for field failures, developing solutions to address software and hardware issues.
- Oversee embedded systems development, ensuring software quality and compliance with industry standards.
- Implement and test software fixes, firmware updates, and troubleshooting procedures to improve system performance and reliability.

Projects

Battery Management System Development with Fast Charging (NewGen 230Ah)

- Configured ADC channels and GPIO interfaces for the transition from standard to fast charging, ensuring real-time monitoring and control throughout the Battery Management System (BMS).
- Configured CAN protocols with dual message formats (11-bit and 29-bit) for both transmission (Tx) and reception (Rx) operations for different functionalities.
- Resolved external Flash memory IC failures by implementing SPI quad mode operation, avoiding hardware changes.
- Enhanced flash memory IC testing processes through product test software development at supplier sites.
- Conducted testing and correction of IO expander configurations to ensure proper mapping and alignment for cell balancing.
- Hands-on experience with tools such as Vector CANoe, Vehicle Spy, and dSPACE HIL setup.
- Integrated and configured FreeRTOS for real-time task scheduling on TI controllers, enhancing BMS performance and stability.
- Developed and implemented a Snapshot/Freeze Data function to store key ECU data (VCU, BMS, Charger, MCU) in external flash memory, with custom drivers for optimized storage and retrieval.
- Developed and integrated Watchdog Timer (WDT) functionality at the firmware level, ensuring automatic reset and fault recovery.
- Researched and developed an innovative passive cell balancing technique leveraging existing hardware to improve BMS performance.
- Proficient in communication protocols: CAN, SPI, and I2C.

Simulink-Based VCU Development for Brake Lamp Control and DTE Calculation

- Designed MATLAB/Simulink models for Distance to Empty (DTE) calculation, integrating BMS data via CAN, implementing moving average energy consumption, and utilizing NVM for power transition storage, with real-time display on the instrument cluster.
- Developed logic for Brake Lamp Illumination, activating the lamp based on brake switch input or vehicle deceleration during regenerative braking, ensuring compliance with safety standards.

Education

IIT Tirupati MTech in Signal Processing and Communications Relevant Coursework: Machine Learning, Deep Learning for Computer Vision, Medical Imaging, Artificial Intelligence, Python Programming.	Aug 2021 - May 2023 CGPA: 8.84/10
R.V.R & J.C College of Engineering BTech in Electronics and Communication Engineering	Aug 2012 - May 2016 CGPA: 9.02/10
Sri Chaitanya Junior Kalasala, Ongole Intermediate (MPC)	June 2010 - April 2012 Percentage: 94.9%
Sri Aditya Public School, Ongole SSC (10th Grade)	June 2008 - April 2010 Percentage: 89.17%

Awards and Certificates

- **Received Excellence Award From HOD, embedded systems :**
For resolving critical external flash memory IC reset issues by implementing SPI Quad mode, ensuring uninterrupted vehicle operation and enhancing quality processes.
- **Received Quarterly Excellence Award from HOD, Embedded Systems:**
For effective problem-solving in resolving the SOC-DTE zero issue by improving I2C driver logic ,restoring vehicle functionality, and regaining customer trust.
- **dSPACE SCALEXIO HIL Training:** Awarded by dSPACE.
- **dSPACE AutomationDesk Training:** Awarded by dSPACE.