ABHAI TIWARI

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Faridabad, Haryana

PROFESSIONAL SUMMARY

Team Lead with **8+ years of embedded systems engineering** experience, specializing in **automotive AUTOSAR development** and ECU firmware design. Proven expertise in safety-critical automotive systems, diagnostics, and real-time embedded platforms. Demonstrated leadership in technical teams and strong track record delivering production-grade automotive software for international OEMs (MAN, HKMC, BMW suppliers). Proficient in AUTOSAR classic architecture, diagnostic protocols (UDS), and advanced debugging methodologies with Vector tools.

CORE COMPETENCIES

Automotive Embedded Systems:
AUTOSAR (Classic & Adaptive concepts) | ECU Firmware Development | Diagnostics (UDS/ODX) | RTOS (FreeRTOS, Zephyr) | CAN/LIN Communication Protocols | Safety-Critical Systems Development | Real-Time System Design

Development Tools & Platforms:
DaVinci Developer/Configurator | EB Tresos | Vector CANoe/CANape | MobilGene Studio | Renesas Flash Library (FCL) | Trace32 Debugger | iSystem Debugger | S32 Design Studio

Microcontroller Expertise:
Renesas RH850 (F1L, F1K Series) | STM32 ARM Cortex-M (F407, F410) | ESP32 | ATmega Series | Automotive-grade MCUs

Programming & Languages:
Embedded C/C++ | MATLAB (Code Generation for AUTOSAR) | Python | CAPL (CAN Protocol Language)

Software Engineering:
Git/Gerrit/GitLab | JIRA | Confluence | DOORS | Static Code Analysis (PcLint) | SDLC adherence | Agile methodologies

Design & PCB:
Schematic Design | PCB Layout (Eagle, EasyEDA, Proteus) | Sensor Interfacing | Circuit Simulation (Proteus, Multisim)

Communication Protocols:
CAN | LIN | SPI | I2C | UART | Bluetooth | BLE | Wi-Fi | X-Bee

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PROFESSIONAL EXPERIENCE

DH Lighting India Pvt Ltd, Faridabad

Team Lead | Jan 2024 – Present

Firmware development for automotive lighting systems, team recruitment, change request handling, and technical mentorship

- Leading firmware development initiatives for automotive lighting ECUs and smart control systems
- Managing technical team recruitment and skill development program for embedded systems engineers
- Overseeing requirement analysis and design phases for production firmware releases
- Implementing quality assurance protocols and static code analysis standards across projects
- **Project: Smart Mood Lamp** – Designed intuitive control interface and firmware architecture for ambient lightings

Motherson Innovation Tech Limited, Noida

Lead Software Engineer | Mar 2023 – Jan 2024

Automotive ECU firmware development for international OEM projects; Team leadership for MAN and HKMC programs

- Spearheaded firmware development for MAN and HKMC project portfolios as technical lead
- Coordinated cross-functional teams across design, verification, and testing phases
- Managed change request workflows and technical documentation for compliance and traceability
- Reduced bug resolution cycle time by implementing structured debugging protocols

Motherson Innovation Tech Limited, Noida

Senior Embedded Software Engineer (Automotive) | Jan 2022 – Mar 2023

Firmware development, ECU debugging, and static code analysis for automotive CMS applications

Project 1: MAN Camera Monitoring System (CMS) – Renesas RH850 F1L

- Designed and implemented firmware modules for camera monitoring system and safety functions
- Performed comprehensive bug fixing using DaVinci Configurator, DaVinci Developer, and EB Tresos

- Conducted software requirement analysis and detailed design documentation aligned with AUTOSAR specification
- Executed ECU diagnostics using UDS (Unified Diagnostic Services) protocol; validated diagnostic tree against requirements
- Hands-on configuration of AUTOSAR application layer, BSW, and COM stack
- Integrated and tested CANoe simulation models for multi-ECU communication verification
- Utilized CANape for dynamic parameter monitoring and calibration

Project 2: HKMC Camera Monitoring System (CMS) – Renesas RH850 F1K

- Implemented firmware functionality for camera monitoring System & subsystems
- Executed detailed design development with comprehensive unit testing specifications
- Performed static code analysis using PcLint to ensure MISRA C compliance and code quality
- Advanced debugging using iSystem software (debugger) and Renesas E1 hardware debugger
- Identified and resolved complex firmware bugs through systematic analysis and root-cause investigation

Virtual Employee Pvt Ltd (TeckValley), Noida

Team Lead | Jan 2021 – Jan 2022

Firmware development for IoT and sensor-based embedded systems using ESP32 platform

Project: Touch Screen Controller Based Air Sampling Pump Controller

- Architected and developed ESP32-based firmware using ESP-IDF framework for real-time sampling control
- Implemented professional GUI using LVGL (Light and Versatile Graphics Library) with responsive touch interface
- Designed multi-sensor integration firmware: differential pressure sensor (SDP21), temperature, humidity monitoring
- Implemented pump control logic with temporal sampling, data storage, and calibration routines
- Integrated FreeRTOS for deterministic real-time task scheduling and inter-task synchronization
- Oversaw technical team for quality assurance and testing procedures

StretchSkin Technologies Pte. Ltd., Singapore

Embedded AI Engineer | Dec 2018 – Feb 2020

Wearable device firmware development combining embedded AI, machine learning, and sensor fusion

Project 1: Wearable Smart Glove – Hand gesture recognition using ML pattern recognition

- Developed real-time firmware for IMU-based motion tracking and pattern classification
- Implemented machine learning algorithms for multi-gesture recognition with >92% accuracy
- Firmware architecture supporting gaming, therapeutic rehabilitation, and Industry 4.0 applications

Project 2: Flexible Heater Controller with Mobile Interface

- Developed heater controller firmware with wireless Android control interface
- Implemented thermal management algorithms and safety interlocks

Project 3: StretchFit – Biomarker Capturing Wearable Device

- Engineered multi-sensor fusion firmware for real-time health metrics: heart rate, SpO_2, step count, body temperature
- Implemented signal processing algorithms for sensor data accuracy and noise filtering
- Integrated cloud connectivity for health data analytics and personalized insights

AIGROEDGE Technologies Pvt. Ltd. (AigroLabs), New Delhi

Co-Founder & Tech Lead | Jan 2019 – Jan 2021

MeitY-backed deep-tech startup incubated at Electropreneur Park, focused on Edge AI and precision agriculture IoT

Product: KRAASHAK – IoT Soil Analytics Device

- Architected proprietary Edge IoT platform using **ESP32** with 5+ integrated agricultural sensors (NPK, pH, Moisture, CO_2, Temperature)
- Designed end-to-end embedded system architecture: sensor acquisition → edge processing → cloud IoT Core (AWS/MQTT)
- Implemented lightweight **machine learning algorithms on-device** for real-time soil analysis, reducing cloud transmission by 40%
- Developed robust wireless communication stack (Wi-Fi, Bluetooth, LoRaWAN concepts) for remote device management
- **Signal Processing & Sensor Fusion:** Designed calibration routines and signal conditioning for multi-sensor data fusion
- **Product Leadership:** Managed full product lifecycle from concept to manufacturing: hardware design (Eagle PCB), firmware (ESP-IDF), manufacturing partnerships, and customer support
- Built and mentored cross-functional engineering team spanning firmware, hardware, and cloud integration domains

- Achieved **MeitY recognition** and government innovation grants for deep-tech advancement in AgriTech

CSIR-Central Electronics Engineering Research Institute (CEERI), Pilani

Junior Research Fellow | Apr 2017 – Dec 2018

Water quality monitoring systems and predictive maintenance using embedded IoT and ML

Project: Real-Time Wireless Multi-Sensor System for RO Plant Monitoring

- Engineered microcontroller-based embedded system for industrial RO plant supervision and water quality analysis
- Integrated water quality sensors (pH, TDS, Conductivity, ORP) with calibration algorithms
- Developed wireless sensor calibration functionality using smartphone interface
- Built Android application for real-time cloud-based monitoring (Firebase backend)
- Implemented machine learning models for predictive RO membrane health and maintenance scheduling
- Deployed IoT architecture for remote plant diagnostics and performance analytics

IIMT College of Engineering, Gr. Noida

Research Associate / Research Trainee | Sep 2016 – Jun 2017

IoT systems, smart security, and environmental monitoring projects

Projects:

- **Smart Female Security System:** GSM/GPS-based alert system with wearable sensor AI for threat detection
- **Smart Wheelchair:** Hand gesture-controlled, battery-powered wheelchair with anti-collision safety
- **Environment Monitoring IoT System:** Methane, humidity, temperature monitoring via Raspberry Pi with cloud upload
- **Wireless Data Logging:** X-Bee protocol implementation for distributed gas sensor networks

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EDUCATION

Bachelor of Technology (B.Tech) | Aug 2012 – Jun 2016
Electronics and Instrumentation Engineering | IIMT College of Engineering | Dr. A. P. J. Abdul Kalam Technical University (AKTU), Lucknow
CGPA: 70.5%

TECHNICAL EXPERTISE

AUTOSAR & Automotive Development

- AUTOSAR Classic architecture (full stack understanding)
- Application Layer, BSW (Basic Software), and COM stack configuration
- ECU diagnostics: UDS protocol, ODX specification
- MATLAB code generation for AUTOSAR components
- Embedded Coder for production-grade C code generation
- ECU calibration and measurement concepts

Microcontroller & Embedded Platforms

- **Automotive MCUs:** Renesas RH850 (F1L, F1K), STM32 Cortex-M series (F407, F410)
- **IoT/General Purpose:** ESP32, Arduino, Raspberry Pi, ATmega series
- Real-time operating systems: FreeRTOS, Zephyr RTOS concepts
- System-on-Chip programming and peripheral drivers

Communication & Networking Protocols

- **Automotive:** CAN (Classical, FD), LIN, FlexRay concepts
- **Wireless:** Bluetooth, BLE, Wi-Fi (802.11), X-Bee, GSM, ESP-NOW
- **Wired:** UART, SPI, I2C, CAN with protocol analysis
- Protocol analysis and debugging using Vector tools

Development & Debugging Tools

- **Vector Tools:** CANoe (simulation, testing), CANape (measurement, calibration), CAPL scripting
- **AUTOSAR Tools:** DaVinci Developer, DaVinci Configurator, EB Tresos Classic
- **Renesas Tools:** Renesas Flash Library (FCL), iSystem debugger, Renesas E1 hardware debugger, S32 Design Studio
- **Code Analysis:** PcLint for static analysis, MISRA C compliance checking
- **Version Control:** Git, Gerrit, GitLab with branching strategies
- **Project Management:** JIRA, Confluence, TFS, DOORS

Design & Hardware

- PCB design and schematic development (Eagle, EasyEDA, Proteus)
- Sensor interfacing and signal conditioning

- Circuit simulation and analysis (Multisim, Proteus)
- Hardware bring-up and board-level debugging

Programming Languages

- **Embedded C/C++:** Production-grade firmware development
- **MATLAB:** AUTOSAR component code generation, Simulink modeling
- **Python:** Data visualization, machine learning, scripting
- **CAPL:** CAN protocol automation in Vector CANoe

Supplementary Skills

- GUI development: LVGL, Python (Tkinter, Kivy), Android (MIT App Inventor, Android Studio)
- Machine learning: Data preprocessing, classification, regression, ensemble models
- Edge AI implementation in embedded systems
- Cloud integration: Firebase, Google Cloud Platform

CERTIFICATIONS & PROFESSIONAL DEVELOPMENT

- **MATLAB: Code Generation for Classic AUTOSAR Software Components** – Training Certificate
- **MATLAB: Embedded Coder for Production Code Generation** – Training Certificate
- **Electrobit: EB Tresos Classic AUTOSAR Configuration** – Training Certificate
- **Machine Learning Specialization** – Online Learning Certificate
- **Introduction to Machine Learning using Scikit-Learn** – Online Learning Certificate
- **Python Programming** – Online Learning Certificate
- **PCB Designing Using Proteus & Eagle** – Online Learning Certificate
- **PID Controller Design using Arduino** – Online Learning Certificate
- **IEEE Student Member** – Antennas and Propagation Society (2014–2017)

PUBLICATIONS & CONFERENCE PRESENTATIONS

[1] Malik, S., Tiwari, A., K., K., Akbar, S.A., & Mahajan, S.K. (2015). "A Simple Capacitance to Time Converter Circuit for Capacitive Sensor with Offset Capacitance." *Oral Presentation at National Symposium on Instrumentation (NSI-40)*, IISc Bangalore.

[2] Tiwari, A., Sadistap, S., & Mahajan, S.K. (2017). "Development of Environment Monitoring System Using Internet of Things." *International Conference on Computer, Communication and Computational Sciences (RACCCS-2017).*

[3] Sahu, B., Tiwari, A., Raheja, J.L., & Kumar, S. (2020). "Development of Machine Learning & Edge IoT Based Non-destructive Food Quality Monitoring System using Raspberry Pi." *IEEE International Conference on Computing, Power and Communication Technologies (GUCON)*, Greater Noida, India. **DOI:** 10.1109/GUCON48875.2020.9231061

[4] Srivastava, S., Tiwari, A., Kumar, P., & Sadistap, S. (2020). "A Multispectral Spectroscopic Based Sensing System for Quality Parameters Measurement in Raw Milk Samples." *Sensor Letters*, 18(4), 311-321.

ACHIEVEMENTS & RECOGNITION

- **First Prize:** Circuit Designing Competition, IIMT College of Engineering (Mar 2014, Sep 2014)
- **Research Contributions:** 4 peer-reviewed publications in automotive, IoT, and sensor systems domains
- **Team Leadership:** Built and mentored technical teams across 3+ organizations; successful recruitment and skill development programs
- **OEM Collaboration:** Direct experience working with international automotive OEMs (MAN, HKMC) on production ECU projects
- **Process Improvement:** Implemented structured debugging protocols reducing bug resolution time by 30%

DECLARATION

I hereby declare that all information provided in this resume is true and accurate to the best of my knowledge and belief.

Date: December 16, 2025
Place: Faridabad, Haryana

(ABHAI TIWARI)

Last Updated: December 16, 2025