

Deepak Joshi

+91 9540199975 — joshi.deepak0711@gmail.com — linkedin.com/in/deepak1172001 — GitHub

EDUCATION

Dr. A.P.J. Abdul Kalam Technical University (AKTU)

July 2024

B.Tech – Electronics and Communication Engineering

TECHNICAL SKILLS

- **Software & Systems:** C, C++ (modern), Python, C#, SQL; OpenCV, MATLAB, Linux (Ubuntu), GPIO/interrupt/peripheral programming, Raspberry Pi, Renesas ec2.
- **Protocols & Connectivity:** TCP/IP, Modbus RTU/TCP, SLMP, CAN, MQTT (basic); device integration across PLCs, motor drivers, vision controllers, and MES systems.
- **Dev, Build & Debug:** Git, JIRA, Logic Analyzer; GX Works, LabVIEW, SQL Server.

PROFESSIONAL EXPERIENCE

Jay Switch India Pvt. Ltd. (MINDA GROUP)

Nov 2025 – Present

R&D Engineer – Embedded Systems

Gurugram

- Writing C/C++ firmware for automotive-grade switching hardware on Linux – GPIO control, interrupt-driven state machines, peripheral register programming, and actuator sequencing.
- Diagnosed intermittent CAN faults on the Tata Sierra ECU using a logic analyzer; traced root cause to an interrupt scheduling conflict delaying CAN frames past the controller timeout – resolved and validated across 50+ regression cycles, confirming ~18% latency improvement.
- Manage HAL layer testing, state-machine validation, and regression runs across firmware releases; defect lifecycle tracked in JIRA through to closure.

NMTronics India Pvt. Ltd.

Jan 2024 – Nov 2025

Application Engineer – Embedded Systems & Automation

Noida

- Wrote embedded C/C++ firmware for SMT/SPM inspection machines and robotic automation systems – covered sensor interfacing, actuator control, motion sequencing, and I/O logic on real production hardware.
- Built vision pipelines in C++/Python with OpenCV on Raspberry Pi for PCB and automotive EOL inspection: camera acquisition, image preprocessing, and real-time classification running within production takt-time.
- Worked on a ROS2-based pick-and-place system (Mitsubishi MELFA arm) for a Tata Electronics OEM line in Pune – involved motion planning with MoveIt2, custom ROS2 node development, and deployment via Docker on Linux.
- Integrated PLCs, robot controllers, and vision systems over Modbus TCP/IP, Industrial Ethernet, and SLMP; debugged communication issues at the field level across Apple and Hyundai OEM programs.

KEY PROJECTS

ScanXT – Automated PCB Inspection System (Apple Manufacturing Program, NMTronics)

C, C++, OpenCV, MATLAB, Linux

- Built the image-processing pipeline in C++ for high-volume Apple manufacturing: frame acquisition from industrial scanners, preprocessing (denoise, colour normalisation, undistortion), and per-defect classification – missing components, polarity errors, solder quality, conformal coating coverage.
- Iteratively tuned detection thresholds against a library of reference boards; false-negative rates had to fall within Apple DAP acceptance criteria before production sign-off. All defects raised during qualification were tracked, resolved, and formally documented.
- Also wrote the firmware controlling scanner motion and inspection sequencing – this was the main project where I had to think about both the vision algorithm accuracy and the real-time constraints of the hardware underneath it.

Automatic Seat Controller ECU – Tata Sierra Platform (Minda)

Embedded C++, CAN Protocol Testing, Regression Testing, Logic Analyzer

- Developed and executed test cases for ECU control logic with **CAN-based communication validation** for an automotive seat adjustment system.
- Debugged CAN frame timing faults using logic analyzer; isolated interrupt scheduling conflicts – resolved with **~18% reduction in control latency** post-fix.
- Ran **50+ regression test cycles**, reducing integration defects by ~25% through structured defect lifecycle tracking and Git-based S/W management.

Vision-Based EOL Inspection – Hyundai Motor Manufacturing (NMTronics)

Python, C++, OpenCV, Raspberry Pi, Cognex, Modbus TCP/IP

- Deployed an automated vision inspection pipeline on Raspberry Pi to replace manual EOL checks on the Hyundai automotive line – frame acquisition, OpenCV preprocessing, and classification; Cognex smart cameras integrated with PLC and MES over Modbus TCP/IP.
- Profiled the pipeline stage-by-stage to eliminate latency bottlenecks; validated classification accuracy against reference parts after each optimisation pass until the system met the line's takt-time constraint.

Mitsubishi MELFA ROS2 Pick-and-Place System – Tata Electronics, Pune (NMTronics)

C++, Python, ROS2, MoveIt2, CMake, Docker, TCP/IP

- Developed a ROS2-based pick-and-place system for a Tata Electronics OEM line in Pune using the Mitsubishi MELFA RV-FR 6DOF robot arm – the task was automated transfer of IC trays to motherboard positions at production throughput.
- Integrated the Mitsubishi ROS2 driver (C++/CMake) with MoveIt2 for motion planning and trajectory execution; wrote custom ROS2 nodes to handle pick sequencing, gripper control, and error recovery logic.
- Deployed and managed the full software stack in a containerised Docker environment; handled robot-host communication over TCP/IP and tuned motion parameters to meet the line's cycle time requirements.