AKASH SHELAR

Embedded Systems Engineer | IoT Developer | Robotics & Automation

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PROFESSIONAL SUMMARY

Electronics Engineer specializing in Embedded Systems, IoT Development, and Robotics Automation. Proficient in C, C++, Embedded C, Python, Arduino, Raspberry Pi, ESP32, and STM32. Experienced in sensor integration, PCB design, communication protocols (SPI, I2C, UART, CAN), and real-time firmware development. Led multiple real-time embedded and AI-based systems including autonomous robotics and IoT platforms, with national-level competition achievements and hands-on system integration experience.

TECHNICAL SKILLS

Microcontrollers & Boards	Arduino, ESP32, ESP8266, STM32, XIAO S3, Raspberry Pi, MKS Robin Nano V3
Embedded Systems	RTOS (**Real-Time Operating System**), Firmware Development, Hardware Debugging, Embedded Prototyping
Programming Languages	C, C++, Embedded C, Python
Communication Protocols	SPI, I2C, UART, CAN, MQTT, TCP/IP
IoT & Cloud	IoT System Development, Firebase, Blynk, ESP8266, Cloud Platforms
AI & Computer Vision	OpenCV, TensorFlow, YOLO, Object Detection (COCO dataset), Python ML, Face Recognition
Sensors & Actuators	Ultrasonic, Vibration, Sound, IR, Soil Moisture, DHT, Servo Motors, Relay, Motor Drivers, LiDAR, Barcode Scanner
PCB & Design Tools	EasyEDA, Autodesk Eagle, Altium Designer, Proteus; (DFM, DFT, DFA)
Dev Tools & Platforms	VS Code, Arduino IDE, PlatformIO, Git
Mechanical & Fabrication	SolidWorks, 3D Printer Operation, Laser Cutting, CNC Machine Operating
Testing & Debugging	Oscilloscope, DSO, Multimeter, Function Generator, Wireshark, Burp Suite, Nmap
Soft Skills	Leadership, Team Management, Project Planning, Problem Solving

PROFESSIONAL EXPERIENCE

Embedded Systems Intern | **Emertxe Institute** | Bangalore, Karnataka | *Jan 2026 – Present*

- Developed **Embedded C** programs, implementing core system concepts including memory management, pointers, and hardware interfacing.
- Developed **real-time embedded applications** on **microcontrollers**, focusing on peripheral interfacing and system-level programming.

Cyber Security Intern | **Defence Guru Cyber Education Institute** | Kopargaon, Maharashtra | *Jan 2025 – May 2025*

- Conducted network security and vulnerability assessment using **Wireshark**, **Burp Suite**, and **Nmap**.
- Developed strong understanding of real-world security threats in **IoT** and connected embedded systems.

Vice-Captain – Team Sphinx | DD **Robocon & Competitive Robotics** | Sanjivani College of Engineering | *Oct 2022 – Jul 2024*

- Led a team of 19+ members as Vice-Captain; managed **electronics design**, **firmware development**, **sensor-actuator interfacing**, and full robot integration.
- Secured **13th Rank All India** in DD Robocon 2024 among 65 national teams at IIT Delhi.
- Participated in DD Robocon 2023 at IIT Delhi as core **electronics and programming** member; handled fabrication and system debugging under competition pressure.
- Represented Sanjivani College at **Robo War 6KG – Excalibur 2K24**, Amrutvahini College of Engineering, Sangamner (Apr 2024); secured **1st runner-up** at National Level Technical Event.

Virtual Robotics Intern | **KODACY (In Association with SPACE)** | Kopargaon, Maharashtra | *Oct 2023 – Nov 2023*

- Gained hands-on experience in **robot design**, **programming**, and simulation across the complete robotics project lifecycle.

KEY PROJECTS

AI-Based Border Fencing System | *Nov 2024 – Feb 2025*

- Designed and developed an AI-based multi-layer border security system using **TensorFlow + COCO dataset** for real-time intrusion detection with automated alert generation.
- Integrated **ultrasonic sensor on servo** for aerial scanning, **vibration sensor** for underground detection, and **sound sensor** for gunfire/explosion detection.
- Used **Raspberry Pi** for AI processing and **Arduino** as hardware controller for all sensors and actuators.

Tech: *Raspberry Pi, Arduino, TensorFlow, OpenCV, COCO Dataset, Ultrasonic Sensor, Vibration Sensor, Sound Sensor, Servo Motor, Python*

Smart Grocery Trolley

- Developed an autonomous smart trolley using **YOLO + OpenCV** for real-time human following and **barcode scanner** for real-time billing, digital payment, and **thermal printer** for automatic bill generation, achieving ~85% real-time human detection accuracy while reducing manual effort and improving shopping efficiency.
- Used **Raspberry Pi 5** for vision and billing logic; **Arduino** for motor and sensor control. Added unpaid exit detection with alarm triggering.

Tech: *Raspberry Pi 5, Arduino, YOLO, OpenCV, Barcode Scanner, IoT, Python, Thermal Printer, Relay*

CNC Machine

- Built complete CNC system using **Marlin firmware** on **MKS Robin Nano V3** with **NEMA 17 stepper motors** and **A4988 drivers** for PCB drawing and 3D printing applications.
- Performed XYZ-axis and step calibration; tuned Marlin firmware parameters for precise **motion control**.

Tech: *Marlin Firmware, MKS Robin Nano V3, NEMA 17, A4988 Driver, 24V SMPS, CNC*

Smart Soil Automation System

- IoT-based agriculture system monitoring **soil moisture, temperature, humidity**, and light with automated **relay-controlled water pump** and **Blynk** mobile dashboard for remote monitoring.

Tech: *Arduino, ESP8266, Soil Moisture Sensor, DHT Sensor, Relay, Blynk, IoT, Firebase*

Offline Voice Interactive System

- Offline **voice-controlled kiosk system** using SD card for local audio and display output; no internet required — ideal for museums and exhibitions.

Tech: *Arduino/ESP32, SD Card Module, DFPlayer, Speaker, Display*

ACHIEVEMENTS & COMPETITIONS

- **DD Robocon 2024** – IIT Delhi: Secured **13th Rank All India** among 65 national teams as Vice-Captain of Team Sphinx, Sanjivani College.
- **DD Robocon 2023** – IIT Delhi: Participated as core electronics & programming member of Team Sphinx.
- **Robo War 6KG – Excalibur 2K24** (National Level Technical Event), Amrutvahini College of Engineering, Sangamner – **1st runner-up** (18–20 Apr 2024).
- **Design Patent** – Robotic Arm Gripper (Design No: 416281-001, Indian Patent Office, 09 May 2024).

CERTIFICATIONS & TRAINING

- **Advanced Embedded Systems** – Emertxe Institute, Bangalore (Jan 2026 – Present): Embedded C, microcontrollers, IoT, real-time application development.
- **Ethical Hacking & Cyber Security** – Defence Guru Cyber Education Institute (Jan–May 2025).
- **Virtual Robotics Internship** – KODACY / SPACE (Oct–Nov 2023).
- **NPTEL – E-Business** | **NPTEL – Organisational Behaviour** | **NPTEL – Project Management**.

EDUCATION

B.Tech – Electronics and Computer Engineering | **Sanjivani College of Engineering** | Kopargaon, Maharashtra | *Dec 2021 – May 2025*