

Tanishq

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SUMMARY

Robotics-focused Electronics and Computer Science undergraduate with experience in embedded systems, real-time control, and AI-integrated robotic platforms. Interested in autonomous systems, human-robot interaction, and system-level robotics research.

EDUCATION

2023 – Present **Thapar Institute of Engineering and Technology**, Patiala, India
Bachelor of Engineering (B.E.) in Electronics and Computer Science **CGPA: 9.81 / 10.0**
Honors: Gold Medalist (First Year, Mechanical Branch); Merit Rank 1 (Second Year)
Relevant Coursework: Data Centre Vision, AI/ML, OS, Digital and Analog Systems, Embedded Systems, DBMS, OOPS, Computer & Communication Networks

WORK EXPERIENCE

Summer ELC Intern (Experiential Learning Centre) – On Site June 2025 – July 2025

- Worked on the project “XAI-Driven Rover with Robotic Arm for Smart Pest and Disease Detection in Small-Scale Farming.”
- Integrated computer vision with embedded control for real-time inference on a mobile robotic platform.
- Developed an autonomous rover with a robotic arm for pest and crop disease detection.
- Applied Explainable AI (XAI) techniques to interpret and validate vision-based predictions.
- Enabled precision agriculture by supporting targeted intervention to reduce pesticide usage.

PROJECTS

Pico: Emotion-Responsive Personal AI Assistant Robot (7 DOF)

- Developing a 7-DOF interactive robot integrating embedded control, wireless communication, and AI-driven behavior.
- Implemented ESP32-based control with ESP-NOW for low-latency communication between the robot and a laptop-side AI system.
- Designed expressive OLED-based facial feedback and capacitive touch sensing for human-robot interaction.

ESP-NOW Mobile Rover with Vision and Custom Control

- Built a mobile robotic rover using ESP32-CAM for real-time visual feedback.
- Implemented low-latency wireless control and telemetry using ESP-NOW protocol.
- Developed a custom handheld controller enabling bidirectional command and data exchange.
- Designed the platform to serve as a foundation for future autonomous navigation and perception.

Sage.AI: Embedded Sensor-Controlled Smart Watering System

- Designed an embedded control system using ESP32 for sensor-driven water delivery in solar panel installations.
- Implemented MQTT-based communication and a Python backend for real-time monitoring and control.
- Simulated system behavior in Unity to analyze performance and generate sensor data for system validation.

SKILLS

Robotics & Systems	ROS 2 (basics), sensor integration
Machine Learning & Deep Learning	PyTorch, CNNs, Computer vision fundamentals, U-Net architectures, Graph Neural Networks (GNNs), Generative Adversarial Networks (GANs)
Embedded Systems	Embedded C/C++, ESP32, microcontroller-based system development
Electronics & Hardware	Working with Sensors, actuators, motor control basics, KiCad (schematic design basics)
Tools & Platforms	Linux, Git, VS Code, Arduino IDE, MATLAB, Unity (basic simulation)