

# Hariraj N G

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## Summary

B.E. Mechatronics Engineering student with expertise in robotics, automation, and design. Hands-on experience in ROV automation, electronics, and collaborative robotics. Passionate about RD, prototyping, and solving real-world engineering challenges. Eager to contribute to cutting-edge projects in robotics, AI, and automation systems. Seeking opportunities to innovate and grow in design and research roles.

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## Education

### B.E. Mechatronics Engineering

2022 – 2026

Agni College of Technology, Chennai — Affiliated to Anna University

*CGPA: 7.5/10 (Till 6th Semester)*

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## Experience

### TEKINOW Technologies India Pvt. Ltd., Chennai

Oct 2023 – Dec 2023

*RF Chamber Installation Technician*

Installed and calibrated RF test chambers at **VISTEON** and **VANTIVA**, ensuring EMI/EMC compliance. Troubleshoot shielding, cabling, and test setup validation with senior engineers. Gained hands-on exposure to EMI/EMC testing procedures and site protocols.

### Lucas TVS, Chennai

Jun 2024 – Jul 2024

*Manufacturing & Quality Control Intern*

Learned full workflow of automotive component manufacturing and assembly line process. Performed inspection of stator and rotor assemblies; documented quality observations. Suggested improvements to minimize rework and enhance process efficiency.

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## Projects

### MARVIS – Marine Autonomous Robotic Vehicle & Inspection System

Developed an autonomous underwater ROV for inspection of dams, bridges, and ports in GPS-denied environments. Integrated computer vision, IMU, and depth sensors. Focused on eliminating diver risk and enabling safer, faster inspections.

### Maze Solver Robot

Built a high-speed Teensy-based robot using flood-fill algorithm with PID tuning for shortest-path maze solving.

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## Achievements

### Winner – TechnoXian 2025, Innovation Open Category (International Level)

Developed an AI-powered Remotely Operated Vehicle (ROV) for marine exploration and automation. Recognized with First Place (International Level) in the Innovation Open category for advancing underwater robotics and real-world industrial applications.

### TechnoXian 2025 – Maze Solver Challenge

Developed and fine-tuned a high-speed maze solving robot utilizing PID control for precise motor management and efficient pathfinding. Successfully competed at the international level, demonstrating strong algorithm implementation and system design skills.

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## Professional Skills

### System Design (PCB and Electronics)

Experienced in designing printed circuit boards (PCBs) and electronic systems tailored for robotics applications. Developed custom PCB layouts for sensor integration and motor control circuits in projects such as the MARVIS underwater ROV and maze-solving robots, optimizing signal integrity and hardware compactness.

### 3D Design and Modeling

Proficient in 3D CAD modeling using Fusion 360, SolidWorks, and Onshape. Created detailed mechanical assemblies and enclosures for various robotic systems, including the MARVIS ROV frame and chassis designs for high-speed maze-solving robots, focusing on manufacturability, durability, and compactness.

### Embedded Systems Programming

Skilled in C/C++ programming for embedded platforms such as Arduino, ESP32, and Teensy microcontrollers. Developed efficient firmware for robot control, sensor interfacing, real-time data acquisition, and automation logic, demonstrated in the maze solver and obstacle avoidance robots.

### Sensor Integration and Control Systems

Hands-on experience integrating IMUs, ultrasonic sensors, depth sensors, and camera modules into robotic platforms. Designed and tuned PID control algorithms to achieve precise motor control and autonomous navigation, applied effectively in maze-solving and underwater inspection tasks.

### Documentation and Reporting

Proficient in creating comprehensive wiring diagrams, bill of materials (BOM), test plans, and detailed performance reports. Documented hardware and software development processes for seamless knowledge transfer and project reproducibility during collaborative robotics and automation projects.

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## Extra-Curricular Activities

### Member, Robotic Society, Agni College of Technology

2024 – Present

Active member participating in robotics workshops, events, and collaborative projects to enhance practical skills and teamwork.

### Participant, Inter-College Coding Competition

2023 / 2024

Competed in coding contests focusing on problem-solving, algorithm design, and programming under time constraints, strengthening analytical and coding skills.

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## **Training & Certifications**

<b>1) Manufacturing Excellence Training – TNASDC (Lucas TVS Sponsored)</b>	<b>JUL 2025</b>
Comprehensive training covering GD&T, engineering drawing, CNC machining, PLC programming, product costing methodologies, and fundamentals of pneumatics and hydraulics essential for manufacturing and quality control in automotive production.	
<b>2) NPTEL – Product Design and Manufacturing</b>	<b>JAN – APR 2025</b>
Focused on the systematic product design and development process that includes the deployment of quality functions, manufacturing and assembly design, rapid prototyping, computer-integrated manufacturing, and strategies for the realisation of sustainable, cost-effective products.	
<b>3) NPTEL – Mechatronics</b>	<b>FEB – APR 2024</b>
Physical system modelling, control system design, and automation integration for robotics and industrial applications.	
<b>4) Python Foundations – Great Learning</b>	<b>NOV 2023</b>
Acquired skills in Python programming emphasise fundamental data types, control structures, functions, and object-orientated programming to effectively build automation scripts and prototypes.	

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## **Mini Projects**

### **Obstacle Avoider Bot**

Developed an autonomous ESP32-based four-wheeled robot equipped with ultrasonic sensors for real-time obstacle detection and avoidance. This project enhanced my skills in sensor integration, real-time embedded programming, and control logic development.

### **Line Follower Robot**

Designed and built an Arduino-controlled robot with PID tuning to achieve precise path following on complex tracks. This project reinforced my understanding of control systems and sensor feedback loops, directly contributing to the maze-solving algorithms used in robotics competitions like TechnoXian.

### **Smart Door Lock**

Created a password-protected solenoid lock system using a keypad interface and Arduino microcontroller. This project refined my skills in user interface design, security protocols, and embedded system programming.

### **PCB Design Practice**

Designed and fabricated custom breakout boards using KiCad to support sensor modules and motor drivers for robotics projects. This hands-on experience with electronic design tools was critical for developing compact and efficient hardware architectures for the MARVIS ROV.

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