

# Karan Nair

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## EDUCATION

### BITS Pilani, Hyderabad Campus

B.E., Electronics and Instrumentation | GPA: 8.51/10.0

Minor: Robotics and Automation | GPA: 9.67/10.0

Aug 2023 – Jul 2027

Hyderabad, India

## INTERNSHIPS

### Research Intern, CSIR-CEERI, Pilani

May 2025 – Jul 2025

- Implemented and tuned a ROS-based dynamic obstacle avoidance algorithm on an NVIDIA Jetson Orin NX to improve autonomous navigation.
- Integrated and tested stereo cameras (ZED 2i, Intel RealSense) to select the optimal sensor for the perception pipeline.
- Conducted flight tests and used telemetry data to troubleshoot and refine key algorithm parameters.

## PROJECTS

### Autonomous 4WD Robot – SLAM and Path Planning

Oct 2024 – Nov 2024

- Deployed a navigation software stack using Docker on Jetson Xavier AGX; integrated Intel T265/D435 and 2D LiDAR for onboard computation.
- Implemented 2D LiDAR and RGB-D SLAM pipelines in C++/Python to generate maps and enable point-to-point navigation.
- Presented system architecture and real-time mapping capabilities at the ATMOS 2024 TechExpo.

### Model Predictive Control

Jan 2025 – May 2025

- Developed and simulated a linear dynamics model for a mobile robot; implemented MPC for trajectory tracking.
- Implemented an Extended Kalman Filter to fuse IMU data for robust state estimation and localization.
- Simulated and analyzed an LQR controller for the classic cart-pole system.

### Project Vanguard – Mars Rover (Electrical Subsystem)

Aug 2024 – Jan 2025

- Designed the rover's electrical architecture and power distribution plan for motors, sensors, and onboard compute.
- Assembled and tested the electrical harness, integrating electronic subsystems for the functional prototype.

## POSITIONS OF RESPONSIBILITY

### Secretary – Automation and Robotics Club

May 2025 – Present

- Co-leading a 30+ member technical club focused on robotics, control systems, and autonomous systems.
- Driving club strategy through project advising, resource allocation, and event planning.
- Managing cross-divisional project coordination and documentation to improve team accountability.

### Joint Secretary – Automation and Robotics Club

May 2024 – May 2025

- Oversaw key operations of a 50+ member club, including induction and daily coordination across teams.
- Led the end-to-end execution of a Robotic Arm Workshop in ATMOS 2024 for 50+ participants.

## LANGUAGES

English, Hindi, Tamil, Malayalam