

# Vaibhav Raheja

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## WORK EXPERIENCE

### EarthSense, Inc [↗](#)

Robotics Integration Engineer / Project Lead

Aug 2024 – Present  
Champaign, USA

- **Led Solarbot project team of 8+ engineers as Project Lead**, coordinating sensor integration architecture and cross-functional alignment between engineering, operations, and customers
- Contributed 35+ merged PRs across **robotics stack in C++ and Python**, including safety-critical motion control, AWS Kinesis teleoperation system, multi-camera integration, and telemetry infrastructure
- **Integrated multi-sensor perception stack** (Hesai LiDAR, PTZ cameras, thermal imaging) using ROS2 with Docker-based deployment pipeline
- **Directed field deployments across 2 solar farm sites**, troubleshooting hardware failures and validating sensor performance in extreme conditions (43-46°C)

### Intelligent Motion Laboratory

Robotics Research Developer

Aug 2023 – Dec 2023  
Champaign, USA

- Built a vision-based head pose estimation system for **autonomous robotic eye examinations**, achieving sub-2mm tracking accuracy using MediaPipe FaceMesh and ZED depth cameras on UR5

### All India Institute of Medical Sciences (AIIMS) Hospital

Robotics Research Developer - NMIMS

Feb 2021 – May 2023  
Mumbai, India

- Engineered **robot-assisted intubation system on xArm5** with HOTAS-based teleoperation and real-time camera feedback for critical care procedures
- Fabricated custom catheter end-effector with integrated miniature camera for real-time airway visualization

## EDUCATION

### University of Illinois Urbana-Champaign

Master's of Engineering **Autonomy and Robotics**

Aug 2023 – Dec 2024  
Champaign, USA

### Mukesh Patel School of Technology Management & Engineering

Bachelor of Technology in **Computer Engineering**

Jul 2019 – Jun 2023  
Mumbai, India

## PUBLICATIONS

V. Raheja, V. Shah, M. Shetty, P. Patel, and M. Tiwari, "Multi-Disease Prediction System using Machine Learning," 2022 International Conference on Futuristic Technologies (INCOFT), Belgaum, India, 2022, pp. 1-6, doi: 10.1109/INCOFT55651.2022.10094382 [↗](#).

## PROJECTS

### Benchmarking Control Algorithms for Unitree Go1 Robot [↗](#)

Python, ISAAC Sim, Reinforcement learning

- Implemented benchmarking framework to evaluate factory controller vs. RL-based locomotion algorithms on Unitree Go1 quadruped in ISAAC Sim
- Deployed and tested "Walk These Ways" RL controller on physical Go1 robot across varied terrain (grass, gravel, inclines)
- Compared velocity tracking, stability, and terrain adaptability between RL and model-based control approaches

### Intelligent Ground Vehicle Competition (IGVC) [↗](#)

Python, ROS, OpenCV, PID Control, Path Planning, CAD

- Led team to 2nd and 3rd place finishes in Cyber and Auto-Nav challenges with an autonomous ground vehicle featuring end-to-end path planning and obstacle avoidance
- Implemented a multi-sensor perception pipeline (cameras, GPS, IMU) with lane detection, object avoidance, and GPS waypoint navigation, achieving 90% navigation accuracy
- Designed and fabricated robot chassis with integrated sensor mounts using CAD and 3D printing, implementing low-level motor control via Arduino/Raspberry Pi

### GRAIC Autonomous Racing [↗](#)

Python, Hybrid A, Path Planning, PD Control, Vehicle Dynamics

- Designed a Hybrid A\* path planner for autonomous racing at 70+ km/h, incorporating vehicle kinematics, turning radius constraints, and non-holonomic dynamics for real-time trajectory generation
- Tuned PD controller for steering and velocity control, achieving 40.8% lap time improvement over baseline on the Shanghai circuit with dynamic obstacle avoidance
- Compared three path planning algorithms (Hybrid A\*, Dynamic Programming, Spline Interpolation) to optimize racing line and lap time performance

## SKILLS

**Programming:** Python, C++, ROS/ROS2, OpenCV, PyTorch, Machine Learning (ML), CNNs

**Robotics & Perception::** LiDAR Integration (Hesai), Multi-Sensor Fusion, Camera Calibration, Path Planning, Motion Planning, Control Algorithms, Reinforcement Learning, Gazebo, SLAM, Docker

**Tools:** Linux, Git, Fusion 360, CAD, Arduino, Raspberry Pi, 3D Printing