

Vaibhav Raheja

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WORK EXPERIENCE

EarthSense, Inc

Aug 2024 – Present
Champaign, USA

Robotics Integration Engineer / Project Lead

- **Led Solarbot project as Project Lead** and Hardware DRI, managing cross-functional integration of multiple autonomous robots and coordinating 8+ team members, by driving technical decisions for multi-sensor integration architecture and serving as **primary liaison between engineering, operations, and customer stakeholders**.
- Enabled autonomous solar panel inspection capabilities by integrating Hesai LiDAR, SIYI PTZ cameras, and Seek thermal imaging systems across robotic platforms, achieving 95%+ system uptime through systematic **ROS2 node development**, hardware bring-up, sensor calibration, and end-to-end validation testing.
- Maintained zero collision incidents across 2 distributed solar farm field sites by directing on-site deployment operations, troubleshooting hardware failures in real-time, and validating sensor performance under extreme conditions (43-46°C ambient temperatures) to ensure mission-critical operational reliability.
- Reduced on-site personnel requirements for robot fleet management by developing an **AWS Kinesis WebRTC-based teleoperation system** POC with low-latency remote control and real-time video streaming.

Intelligent Motion Laboratory

Aug 2023 – Dec 2023
Champaign, USA

Robotics Research Developer

- Implemented advanced facial detection algorithms (FaceMesh) for **robotic eye examinations**, improving head pose estimation accuracy by 30%.
- Designed a custom camera mount for a UR5 robotic arm, enhancing eye and head tracking precision by 20% with **ZED depth cameras**.

All India Institute of Medical Sciences (AIIMS) Hospital

Feb 2021 – May 2023
Mumbai, India

Robotics Research Assistant

- ICMR is the Indian equivalent of the **US National Institute of health**.
- Developed a novel **robot-assisted intubation system**, enhancing procedural safety and efficiency, resulting in a 30% reduction in operator dependency during critical care intubation procedures.
- Designed a **custom catheter and mouthpiece** integrated with a high-resolution camera, boosting patient safety and real-time visualization.

EDUCATION

University of Illinois Urbana-Champaign

Aug 2023 – Dec 2024
Champaign, USA

Master's of Engineering **Autonomy and Robotics** GPA: 3.66/4

Mukesh Patel School of Technology Management & Engineering

Jul 2019 – Jun 2023
Mumbai, India

Bachelor of Technology in Computer Engineering GPA: 3.66/4

PROJECTS

Intelligent Ground Vehicle Competition (IGVC)

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

- Led a team as captain in an international robotics competition, developing SOCRATES 2.0 with a central drivetrain design achieving an average speed of 2.4 km/h.
- **Secured 2nd and 3rd place in Cyber and Auto-Nav Challenge** categories, implementing autonomous navigation with lane and object detection along with GPS Navigation, achieving over 95% navigation accuracy.

Benchmarking Control Algorithms for Unitree Go1 Robot

Python, ISAAC Sim, Reinforcement learning

- Implemented a benchmarking framework for evaluating Factory Controller and Reinforcement Learning (RL) algorithms on the Unitree Go1 robot, **improving adaptability and efficiency by 25% in varied terrains**.
- Conducted performance analysis of "Walk These Ways" RL-based control algorithm, achieving a 30% improvement in velocity tracking and robustness over factory settings in challenging outdoor environments.

Autonomous Race Car

Python, Path Planning, Vehicle Control, CARLA Simulator, PID Control

- Integrated **path planning algorithms for autonomous navigation** on a Formula 1 racetrack in the CARLA simulator, utilizing Hybrid A*, Spline Interpolation, and BFS, achieving a maximum score of 92.4 on the Shanghai track.
- **Optimized a PID controller for steering and throttle**, leading to smoother trajectory following and a 25% reduction in lateral error during high-speed cornering maneuvers.

SKILLS

Programming: Python, C++, OpenCV, PyTorch, Machine Learning (ML), Convolutional Neural Networks (CNN)

Robotics Frameworks and Tools: Robot Operating System (ROS/ROS2), Gazebo, Path Planning, Vehicle Control, Reinforcement Learning, Control Algorithms, Simultaneous Localization and Mapping (SLAM), Docker

Tools: Autodesk Fusion 360, Computer-Aided Design (CAD), Linux, Git, Arduino, Raspberry Pi, 3D Printing