

Raghu Dharahas Reddy Kotla

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📍 College Park, MD

SUMMARY

- Robotics Software Engineer with **3+ years** of experience developing autonomous systems, **real-time perception pipelines**, and AI-driven **decision-making** for agriculture, healthcare, and HRI applications.
- Advanced proficiency in **ROS2, C++, Python, and computer vision (OpenCV, YOLO)**, with deployments on TurtleBot3/4, UR10 manipulators, and custom robotic platforms.
- Skilled in **SLAM, motion planning (A*, RRT*, PRM), multi-sensor fusion**, and deep learning (**PyTorch, TensorFlow**), enabling scalable solutions for navigation, mapping, and object detection.
- Strong background in software engineering practices: containerization (**Docker**), version control (**Git**), **CI/CD**, and modular system design for production-ready robotics.

TECHNICAL SKILLS

Programming Languages: Python, C++, MATLAB, C#, SQL

Robotics & AI Frameworks: ROS, ROS2, Gazebo, RViz, Nav2, OpenCV, PyTorch, TensorFlow

Machine Learning & AI: Deep Learning, Neural Networks, Computer Vision, Natural Language Processing(NLP)

CAD & Simulation Tools: SolidWorks, ANSYS, CURA, PTC Creo

Development Tools & Platforms: Ubuntu/Linux, Windows, GitHub, Docker, VS Code, PyCharm, Agile/Scrum

WORK EXPERIENCE

University of Maryland

Sep 2025 – Dec 2025

Graduate Teaching Assistant, Motion Planning for Autonomous Systems

College Park, MD

- Designed and taught end-to-end robotics motion planning labs covering **Bug algorithms, configuration space (C-space) via Minkowski sums, Halton sampling, A*, Dijkstra, and RRT/Bi-RRT**, bridging theory with deployable implementations.
- Developed hands-on **Python** and **ROS2** lab pipelines using **OpenCV, NumPy, occupancy grids, YAML/PGM maps, and Gazebo/Webots**, enabling students to build full navigation stacks from scratch.
- Led **TurtleBot3 (Waffle/Burger)** navigation labs, guiding students through **non-holonomic differential-drive kinematics, obstacle inflation, collision checking, and trajectory execution** in simulation.

AgriEtern Technologies Pvt Ltd.

Aug 2020 – Jul 2023

Founder & Robotics Engineer

Hyderabad, India

- Designed and deployed a **ROS2-based computer vision system** using **OpenCV, NumPy, Pandas, and Raspberry Pi** for autonomous crop health monitoring, reducing pesticide usage by 50% and **improving yields by 25%**.
- Developed and optimized lightweight **CNN models** for fruit ripeness detection, yield forecasting, and price prediction, cutting post-harvest losses by 25%.
- Designed and containerized an **IoT farm management dashboard** integrating **edge AI devices** for smart irrigation, real-time alerts, and predictive analytics.
- Led a **10-member cross-functional team** through 3 field deployments, overseeing **robotics R&D, hardware-software integration, and reliability testing**.
- Founded and scaled the “FutureKrop” brand, launching last-mile delivery systems (dark store + retail outlet) and expanding direct-to-consumer sales reach by 40%.

Institute For Industrial Interdisciplinary Research And Product Development Mar 2020 – Jul 2020

Robotics Research Assistant Intern

Hyderabad, India

- Designed and developed an autonomous hand-sanitizer robot using **Raspberry Pi, ultrasonic sensors, and embedded Python** control during the COVID-19 pandemic, including **CAD design, 3D printed prototypes, and actuator integration**.
- Performed hardware bring-up, calibration, and troubleshooting across multiple robotics projects, ensuring reliable performance of power circuits and mechanical subsystems.

PROJECTS

Brain Lesion Detection and Robotic Path Planning in Neurosurgical Applications

- Conducted a comprehensive survey of 26 peer-reviewed studies on AI-driven lesion segmentation and **robotic path planning** for **epilepsy and autoimmune encephalitis surgery**.
- Proposed a structured taxonomy covering CNN, transformer, and self-supervised models for lesion detection, and **robotic planners such as MDP-LQR-RRT*, tractography-aware, and bio-inspired methods**.
- Evaluated toolchains like ROS2, MONAI, and **3D Slicer** for clinical readiness, highlighting their integration challenges and potential for real-time, explainable neurosurgical systems.

Real-Time Visual Perception and Navigation on TurtleBot4

- Designed and implemented a ROS2-based perception stack using only an onboard **RGB-D camera**, integrating **ArUco** marker tracking, **YOLOv8n** stop sign detection, optical flow for dynamic obstacle avoidance, and **real-time 3D reconstruction** with **6D pose** estimation for enhanced object localization and navigation using OpenCV and **Open3D**.
- Deployed and tested the full system on physical TurtleBot4 hardware, enabling real-time autonomous navigation and visual feedback **without LiDAR**; validated performance in Gazebo simulation and real-world lab environments.

Ashwatthama Lunar Light Utility Vehicle (LLUV)

- Designed a six-wheeled lunar rover featuring a **3-bogie suspension** system, **hybrid Ackermann-Crab steering**, and a **6-DOF robotic arm** for payload handling up to **1000 kg**.
- Developed energy-efficient systems with solar-powered batteries enabling 8-hour continuous operation, and implemented **SLAM-based navigation for autonomous obstacle avoidance**.
- Conducted stress simulations and optimized rover components for extreme lunar conditions, including 30° inclines, 30 cm obstacles, and thermal management.

AURA: AI-Driven Human-Robot Interaction System for Autoimmune Care (Concept Design)

- Designed a **system-level architecture** for a human-robot interaction (HRI) platform integrating **EEG**, wearable sensors, and a service robot for personalized neurorehabilitation.
- Defined a modular **AI and decision-making pipeline** for seizure monitoring and rehabilitation, evaluating models such as **LSTM**, **autoencoders**, and **PoseNet** under safety and latency constraints.
- Proposed a **human-in-the-loop shared autonomy framework** and **ROS2-compatible integration pathway**, enabling future transition from concept to simulation or hardware deployment.

Modeling and Gazebo Simulation of Agrobot for Fruit Picking

- Designed an agricultural robot with **LiDAR and RGB camera modules**, implementing **SLAM** for real-time mapping and autonomous navigation.
- Integrated a **UR10 manipulator** with forward and inverse kinematics for precise fruit-picking tasks.
- Developed **OpenCV**-based fruit ripeness detection pipeline in **ROS2 Galactic** using **Python**, optimizing harvesting efficiency in **Gazebo** simulation.

EDUCATION

University of Maryland, College Park, USA

Aug 2023 – Dec 2025

Master of Engineering in Robotics

GPA: 3.7/4.0

Relevant Coursework: Robot Modeling & Controls (kinematics, dynamics, PID, impedance/admittance control), Rehabilitation Robotics (compliance control, HRI, actuator modeling), Perception & Planning (SLAM, motion planning, trajectory optimization), AI & Deep Learning (CNNs, Transformers, reinforcement learning)

Jawaharlal Nehru Technological University, Hyderabad, India

Aug 2015 – Aug 2019

Bachelor of Technology in Mechanical Engineering

GPA: 8.1/10