

VISHNU MANDALA

College Park, MD | 301-602-9485 | vishnum@terpmail.umd.edu | [LinkedIn](#) | [GitHub](#)

EDUCATION

University of Maryland, College Park, MD

Jan 2023 - Dec 2024

Master of Engineering in Robotics

GPA: 3.93/4.0

Coursework: Perception and Planning for Robots, Robot Modeling and Controls, AI and Deep Learning, Reinforcement Learning

Mahatma Gandhi Institute of Technology, India

Jul 2018 - Jul 2022

Bachelor of Technology in Mechatronics

GPA: 7.84/10

SKILLS

Programming Languages: Python, C, C++, CUDA, Bash, MATLAB

Robotics & Control: ROS1/ROS2 (MoveIt, RViz, Gazebo, URDF), SLAM, PID, Kalman Filtering, System Modeling, CARLA

AI & ML: YOLO, Reinforcement/Transfer Learning, CNN/RNN, Supervised/Unsupervised Learning, Transformers

Frameworks & Libraries: PyTorch, TensorFlow, Keras, OpenCV, scikit-learn, NumPy, pandas, Matplotlib, Eigen

Development & Platforms: Git, GitHub, Linux, Docker, CI/CD, Jupyter Notebook, CMake, Raspberry Pi, Arduino IDE, Windows

Sensor & Embedded Systems: LIDAR, Depth Cameras, IMU, Encoders, Ultrasonic Sensors, PCB Design

Software: Microsoft Office (Excel, Word, PowerPoint), Google Workspace (Docs, Sheets, Slides), Adobe Photoshop

WORK EXPERIENCE

Graduate Teaching Assistant

College Park, MD

Department of Mechanical Engineering, University of Maryland

Aug 2023 – Dec 2024

- Delivered hands-on instruction in SolidWorks and Autodesk Inventor to over 600 students, improving design accuracy by 25% through advanced CAD lectures, targeted feedback, and collaboration with faculty on grading and assessments.

PROJECTS

RC-NFQ Algorithm for Autonomous Navigation | *PyTorch, Keras, CNN, DQN, Path Planning, Reinforcement Learning*

- Engineered an enhanced RC-NFQ (Regularized Convolutional Neural Fitted Q-Iteration) leveraging CNNs with dropout regularization in PyTorch, reducing collision rates by 15% and training latency by 30%, outperforming NFQ/DQN baselines.
- Streamlined the training pipeline in the HighwayEnv environment using 2D state inputs and custom reward shaping techniques, boosting navigation efficiency by 10% and ensuring robust performance in dynamic traffic simulations.

Integrated Obstacle Recognition and Autonomous Navigation System | *SLAM, YOLOv8, OpenCV, Raspberry Pi, Embedded Control*

- Led a 5-person team to design an autonomous differential drive robot with real-time pick-and-place capabilities, achieving 92% detection accuracy and a 15% reduction in YOLOv8 training time through mosaic augmentation and tailored datasets.
- Improved navigation precision by 30% using multi-sensor fusion (RGB camera, IMU, encoders, ultrasonic) integrated with landmark-based SLAM, enabling real-time trajectory adjustments in complex environments.
- Designed a multi-threaded Raspberry Pi system for concurrent sensor processing and motor control, maintaining stable 10 FPS obstacle recognition and reducing task execution time by 25% through optimized path planning and autonomous recalibration.

Agile Robotics for Industrial Automation Competition (ARIAC) | *ROS2, C++, YOLOv8, Gazebo, RViz, UR10e, AGV*

- Managed a 5-member team in developing a NIST-compliant control system for six UR10e robots and AGVs, increasing kitting and assembly efficiency by 20% through strategic task prioritization.
- Developed a YOLOv8-based part detection and localization system with 98% accuracy, resolving dynamic challenges such as conveyor tracking and precision assembly through innovative sensor configurations.

Mobile Manipulator Robot Design & Control | *ROS2, MATLAB, SolidWorks, UR10, LIDAR, URDF, Kinematics, Dynamics*

- Engineered a 6-DOF mobile manipulator (UR10 arm + differential drive) with optimized chassis design and steerable L-joints, enhancing load stability by 20% using ROS2-based navigation with LIDAR fusion, validated at 20ms control latency in Gazebo.
- Attained 98% pick-and-place accuracy (± 1 mm) and a 30% stability improvement in challenging industrial environments using high-precision motion control with Denavit-Hartenberg parameters and Jacobian-based trajectory planning.

MyDerma: Mobile Deep Learning for Skin Cancer Detection | *TensorFlow Lite, ResNet-50, InceptionV3, DenseNet201, Flutter*

- Architected an ensemble model (ResNet-50, InceptionV3, DenseNet201, MobileNetV2) for multi-class lesion classification, achieving 97.15% test and 98.46% validation accuracy on HAM10000 through advanced augmentation and weighted sampling.
- Deployed a TensorFlow Lite solution with a Flutter-based UI, reducing latency by 30% through model compression and quantization while maintaining real-time diagnostic accuracy for on-device skin cancer detection.

Automated Vertical Glass Cleaning Robot | *SolidWorks, ANSYS, Arduino, PID, PCB Design, Machining, C++*

- Designed a 2-DOF cleaning robot with pulley/leadscrew motion and a custom-machined glass holder, improving alignment stability by 20% and achieving 95% vacuum adhesion on variable glass inclinations through ANSYS-based force analysis.
- Programmed a PID-controlled zigzag cleaning algorithm on Arduino UNO, incorporating boundary detection and infrared sensors for obstacle avoidance, increasing cleaning path coverage efficiency by 25%.

ACTIVITIES

Vehicle Prototype Developer

Hyderabad, India

QUADTEK RACING, Mahatma Gandhi Institute of Technology

FMAE BAJA 2021

- Designed an off-road prototype vehicle in SolidWorks and ANSYS, reinforcing safety and durability through stress analysis, load distribution, and performance testing, ensuring compliance with FMAE and SAE BAJA standards.