Koushik Alapati

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Education

University of Maryland — **College Park, MD**
Master of Engineering, Robotics — *GPA 4.0/4*

Osmania University, Vasavi College of Engineering — **Hyderabad, India**
Bachelor of Engineering, Mechanical Engineering — *GPA 8.07/10*

Skills

Programming Languages	Python, C++, Java, MATLAB, Simulink
CAE & Design Tools	SolidWorks, Siemens NX, Catia V5, ANSYS (Static Structural, Fluent, APDL)
Frameworks & Libraries	PyTorch, TensorFlow, OpenCV, NumPy, RTDE
Software & Tools	ROS 1/2, Gazebo, RViz, Nav2, Git, GitHub, VSCode, Jupyter, CMake, Linux
Areas of Expertise	Robot modelling, Perception, Path Planning, Finite Element Analysis, Controls

Experience

Robotics Software Intern — **Sep 2024 – Present**
Onki Robotics - Smart Carrier Inc — *New York, New York*

- Transferring the simulation setup from Gazebo to Isaac Sim and deploying it to a cloud-based environment for enhanced accessibility and performance.
- Developed and integrated **SLAM algorithms** in **ROS2**-based simulation environments, achieving a **20% increase in navigation accuracy** and **30% improvement in simulation performance** This is used to provide the necessary equipment for perception.
- Designed a 3D robot model and simulation environment using **SolidWorks**, enabling comprehensive testing in **Gazebo**. Improved system robustness by identifying deployment issues early, reducing debugging time by **25%**.
- Collaborated with cross-functional teams to deploy Unmanned Ground Vehicles systems efficiently and to perform a risk assessment.

Research Assistant — **Mar 2024 – Sep 2024**
Perception & Robotics Group — *College Park, Maryland*

- Designed and calibrated tactile sensors mounts for the UR5e robotic arm, leveraging **Python and RTDE** to enhance robot motion
- Conducted data acquisition and analysis using **3D-printed** prototypes to simulate real-world scenarios, improving learning algorithm accuracy by **8%**.
- Motion Planned with the results obtained from the sensors for precise force control in holding the objects using the gripper.

Systems Engineer — **Oct 2021 – Jul 2023**
Infosys Private Limited — *Mysuru, India*

- Automated UI performance testing using Selenium WebDriver and Java, increasing test coverage by **60%** and reducing manual effort by **30 hours/week**.
- Optimized data infrastructure, improving system efficiency by **30%** and enabling faster data retrieval by **2 seconds/query** in different testing levels.

Research & Publications

[1] Amir Hossein Shahidzadeh, Gabriele Mario Caddeo, **Koushik Alapati**, Cornelia Fermuller, Lorenzo Natale, Yiannis Aloimonos. *"FeelAnyForce: Estimating Contact Force Feedback from Tactile Sensation Vision-Based Tactile Sensors,"* in *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, 2025. (Accepted). Submitted on Sep 15, 2024.

Projects

ARIAC- Agile Robotics for Industrial Automation Competition(Gazebo, Moveit, CPP, Python)

- Developed a perception-driven motion planning system leveraging ROS2 publishers/subscribers, RViz for visualization, and multi-threaded C++ nodes, reducing task completion time by 30% through optimized sensor-driven decision-making.

Modeling and Simulation of Emergency Evacuation Robot(SolidWorks, Gazebo, Python)

- Designed and simulated a 4WD mobile robot with a UR10 arm, implementing 6D pose estimation using inverse kinematics for precise artifact retrieval and survivor detection in emergency situations.

Real-Time Depth Sensing for Robotic Navigation(OpenCV, Python)

- Optimized a self-supervised depth estimation model by incorporating a MobileNetV2 encoder and applying post-training quantization, enabling real-time inference at 258.4 FPS while maintaining accuracy through efficient feature extraction and reduced latency.

Leader Follower Network Control for Robots(Matlab)

- Developed a MATLAB script for a leader-follower robot network using the Lloyd Algorithm to optimize robot positions within their respective Voronoi cells. Enabled efficient waypoint navigation with minimal communication, implementing swarm intelligence for coordinated movement. Implemented the entire setup in the Robotarium simulator.

Visual Odometry(OpenCV, Python)

- Engineered a visual odometry algorithm using stereo cameras, enhancing accuracy and reliability, validated on the KITTI dataset and real-world scenarios.