Om Kulkarni

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SUMMARY

MSc Robotics candidate with 2+ years of experience developing autonomous systems and sensor data processing. Researching robot control via eye-tracking in VR with a focus on Visual Language Action models. Proficient in developing perception and navigation algorithms using ROS and reinforcement learning techniques. Have the right to work in UK.

EDUCATION

University of Bristol, MSc in Robotics — Sept 2024 – Current

- **Coursework:** Robotics Fundamentals, Advanced Control Systems, Machine Vision, Human-Robot Interaction.

Birla Institute of Technology and Science - Pilani, BTech in Electronics Engineering — Aug 2018 – May 2022

- **Coursework:** Robotics, AI for Robotics, Control Systems, Mechatronics, Digital Image Processing.

EXPERIENCE

Robotics Developer, Miko.AI – Mumbai, IN — May 2022 – Mar 2024

- **Autonomous Navigation System:** Developed a complete navigation stack using C++ and ROS, integrating real-time obstacle detection from RGBD/ToF cameras and 3D voxel-based mapping. Achieved a 30% reduction in collisions and a 40% improvement in navigation efficiency.
- **Performance Optimization:** Enhanced embedded system performance by implementing multithreading and parallel computing, reducing algorithm processing time by 80% and global planning recomputation time by 150%.
- **System Integration & Testing:** Collaborated with hardware teams to integrate software on embedded platforms, fine-tuning simulation parameters to increase accuracy by 20% and refining the sensor selection process.
- **Data Pipeline Development:** Built scalable datasets for motion planning algorithms using Python, increasing test coverage by 50% and enabling robust validation across distributed teams.

PROJECTS

Plastic and Paper Segregation Robot — **LeRobot Global Competition 2025**

- **Real-Time Segregation:** Successfully developed and implemented a system for segregating paper from mixed plastic-paper waste on a moving conveyor belt in real-time.
- **Vision and Control:** Utilized a dual-camera setup for comprehensive object detection and controlled an SO101 robot arm with a fine-tuned GROOTN1.5 VLA model for precise grasping.
- **Data Collection:** Created a unique dataset of 124 training episodes using a leader-follower setup, integrating camera feeds with robot joint angles for robust model training.
- **Award-Winning Performance:** Won the Technical Experts Award and secured 2nd place overall at the Hugging Face LeRobot Global Hackathon 2025 in London.

Eye Tracking Control for Robot Arm Manipulation in VR — **MSc Dissertation Research, University of Bristol**

- **Intuitive Control System:** Developed a novel system for robotic pick-and-place operations using eye-tracking for target selection within an immersive Unity VR environment.
- **System Integration:** Integrated a Franka Emika Panda robot with Unity via a custom ROS 1 Noetic TCP bridge, enabling seamless, real-time data transfer and control.
- **Motion Planning:** Utilized MoveIt for advanced motion planning, enabling real-time trajectory execution, dynamic obstacle avoidance, and precise gripper control.
- **Containerized Development:** Built and managed the entire project within a Docker-based environment to ensure a reliable and reproducible ROS workspace.

TECHNOLOGIES

Software and Tools: C++, Python, Linux, PyTorch, Git, GitHub, MATLAB, ROS/Gazebo, Unity, Docker, VLA

Technologies: Robotics, Reinforcement Learning, Machine/Deep Learning, Imitation Learning, Virtual Reality, Eye Tracking