Om Kulkarni

Bristol, UK | Om.Kulkarni.2024@bristol.ac.uk | 0788 725 59 36 | linkedin.com/in/om–kulkarni/

SUMMARY

MSc Robotics graduate with 2+ years of experience in software development, specializing in programming autonomous systems and processing multi-modal sensor data. Proven track record in developing and optimizing algorithms for robot perception and navigation using ROS and machine 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 and   Aug 2018 – May 2022
Electrical Engineering
- **Coursework:** Robotics, AI for Robotics, Control Systems, Mechatronics, Digital Image Processing.

EXPERIENCE

Robotics Developer, Miko.AI – Mumbai, IN   May 2022 – Mar 2024
- **Dynamic Obstacle Tracking:** Developed and deployed a real-time obstacle detection system in C++ for unstructured environments, leveraging sensor data from RGBD (Intel D455) Cameras and Time of Flight (ToF) Cameras, resulting in a 30% reduction in collision incidents. Collaborated with hardware and software teams on integration and testing.
- **3D Voxel-Based Mapping:** Researched and implemented mapping algorithms usng RGBD Cameras, enhancing the mapping accuracy by 25%.
- **Navigation Planning:** Implemented local and global planners for autonomous mobile robots, improving navigation efficiency by 40%.
- **Runtime Optimization:**Runtime Optimization: Optimized embedded system performance by implementing multithreading and parallel computing in C++, reducing processing time by 80% and improving cross-team software delivery efficiency. Utilized version control (Git) and agile methodologies for efficient development and deployment.
- **Cross-functional Teamwork:** Collaborated with hardware teams to integrate software with embedded platforms.
- **Simulation Accuracy:** Fine-tuned parameters, increasing simulation accuracy by 20%.
- **Global Planning:** Enhanced algorithms, cutting recomputation time by 150%.
- **Dataset Creation:** Built scalable datasets for motion planning algorithms using Python, increasing test coverage by 50% and enabling robust validation across distributed teams. This involved designing data pipelines and storage solutions for efficient access and processing in a distributed environment.
- **Sensor Evaluation:** Tested TOF and depth cameras, refining sensor selection process efficiency by 35%.
- **Tools Used:** C++, Python, ROS, Gazebo.

PAPERS

Eye Tracking for VR Robot Teleoperation in Nuclear Decommissioning,   **Dr. Paul Bremner,**
Master's Thesis, Ongoing   **Bristol Robotics Laboratory**
Description: Master's Thesis Project focused on testing eye tracking in VR as a control input for teleoperated robots. The project involves comparing eye tracking control with conventional joystick control using human

participants to evaluate efficiency and effectiveness in nuclear decommissioning tasks.

PROJECTS

Multi Robot RL Agents with Realistic FOV   **Prof. Alivelu Manga Parimi**

- **Trained Multi-Robot RL Agents:** Built agents in a 2D grid world with partial visibility, achieving a 90% task completion rate.
- **Ray-Casting Algorithm:** Created an algorithm to simulate a LIDAR scan of the grid environment, upgrading environmental mapping accuracy by 30%.
- **Observation Testing:** Tested observations acquired from the partial grid map, ensuring data reliability with a 95% confidence level.
- **RL Reward Function Tuning:** Tuned the reward function to achieve only a 4% accuracy loss with a limited 120-degree field of view.
- **Tools Used:** Python.

RL Controller for Lunar-Module Simulation   **Prof. Alivelu Manga Parimi**

- **Simulated Lunar Lander:** Developed a Python-based simulation for a lunar lander using Deep Reinforcement Learning, achieving 95% landing success. Integrated PyBullet physics engine and optimized reward functions, demonstrating adaptability in algorithm design.
- **CAD Model Development:** Built the Lunar Lander CAD model, elevating design accuracy by 40%.
- **Deep RL Agent Testing:** Researched and tested various Deep Reinforcement Learning agents, optimizing performance and cutting error rates by 50%.
- **Reward Function Tuning:** Tweaked the reward function, increasing accuracy by 60%.
- **Tools Used:** Python, PyBullet, Fusion 360.

Predicting and Analyzing COVID-19 cases   **Digital Image Processing**
Course Project

- **Project Focus:** Built a data pipeline to analyze 1M+ COVID-19 data points using Python, achieving 85% prediction accuracy with Facebook Prophet. Highlighted data-driven decision-making for health applications.
- **Data Collection:** Gathered and pre-processed data on COVID-19 rates, patients, and hospitals, covering over 1 million data points.
- **Correlation Analysis:** Created a correlation matrix and graphed parameters with maximum correlation, identifying key factors contributing to the spread.
- **Time Series Prediction:** Applied Facebook's Prophet library to predict the growth of viral infections over a month, attaining a prediction accuracy of 85%.

TECHNOLOGIES

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

Technologies: Robotics, Reinforcement Learning, Machine/Deep Learning, Data Analysis, Parrallel Computing

EXTRA-CURRICULARS

STEM Outreach Initiatives

- Conducted hands-on **drone-building workshops** for 50+ high school students, teaching embedded systems programming and aerodynamics fundamentals
- Developed and delivered **home automation curriculum** demonstrating IoT integration to 30+ participants, featuring Raspberry Pi and sensor networks