Krishna Madhurkar

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EDUCATION

MS in Robotic Engineering, Worcester Polytechnic Institute (WPI) GPA 3.6 May 2022

B.Sc Robotic Engineering GPA | **B.Sc Electrical and Computer Engineering GPA**, WPI Major GPA 3.45 2019

Software Engineer | Robotics Engineer

- **Programming:** Python, C++, Matlab, C#, Java, JavaScript, Node.js, HTML5, CSS, XML, VHDL
- **Libraries/Data/Cloud:** Flask, React, MySQL, Amazon Web Services
- **Tools/Frameworks:** Git, Linux, OpenCV, Cuda, Autoware, Arduino, LaTeX, Simulink, Xilinx Vivado
- **Robotics:** ROS, Gazebo, RVIZ, SolidWorks, MoveIt, Robot Studio, AMBF

PROFESSIONAL EXPERIENCE

Research Assistant, Automation and Interventional Medicine (AIM) Lab, Worcester, MA May 2021 - Present

- Setup and programmed the Davinci Surgical Robot for teleoperation control of patient side surgical robotic arms with master manipulators using live surgical feed from the endoscope cameras; for the goal of automated suturing.
- Developed code for needle detection in python and C++ using OpenCV to detect needle pose and orientation in surgical plain for reach and grasp task using PSM arm. Accurately detected surgical needle with 94% proficiency.

Teaching Assistant, WPI, Worcester, MA August 2018 – October 2021

Tech stack: Python, Matlab, embedded C/C++, Verilog

- Instructed peer class sizes of 80 students on embedded programming. Graded assignments and conducted conferences and hands-on lab sessions to mentor students resulting in 15% increase in class grades on average.
- Programmed MSP430 microcontrollers in C to utilize timers, interrupts, various sensors and displays for teaching embedded programming concepts in the Lab.

Research Assistant, Dept. of Automation & Robotics, KLE Technological University, India Dec 2019 – July 2020

- Research on autonomous systems using ROS for special applications in robotics.
- Implemented mapping and object detection on a car for real time object recognition during self driving using the Autoware software on NVIDIA Xavier Drive running ROS with Velodyne VLP 16 LiDAR and cameras. Resulting in a Point cloud data map of a campus in Rviz and object detection using YOLO3.

PROJECTS

Vision based In-hand manipulation using 7-DOF arm and variable friction gripper, MER lab, WPI Link **2021**

- Developed algorithms using openCV in python to track and classify grasped objects on size and shape using generated object tracking trajectories. Increased tracking accuracy implementing optical flow to 95%
- Performed simulation in ROS using Franca arm to check the performance of the sliding, rotation tasks in task space.

Autonomous scale Car - Machine Learning, WPI, Worcester, MA Link **August 2018 – May 2019**

- Collaborated in an interdisciplinary team to build an autonomous scale car to compete with student driven RC cars.
- Programmed and trained machine learning models using python libraries such as openCV, numpy, sklearn etc. for computer vision, path planning and autonomous navigation. Model achieved accuracy of 96% and was able to navigate the indoor track 40% autonomously.

Simultaneous Localization and Mapping Link Stack: Python, ROS, Gazebo, Rviz, LiDAR **2019**

- Programmed a TurteBot3 robot using ROS, python to map and navigate autonomously through an unknown area.
- Implemented path planning using A* algorithm and developed a 25 % quicker and efficient exploration strategy by jumping waypoints.

Object Sorting System - Computer Vision, WPI Link **2018**

- Collaborated with a team of three to build an object sorting system which identifies differently colored spheres using a camera system and sorts them based on color and weight using a pick and place 3 DOF Robot arm.
- Implemented forward & inverse kinematics, trajectory generation and camera tracking, using MATLAB functions.

LEADERSHIP President of South Asian Student Association | Varsity Men's Rowing 17'| Club Soccer **2022**