Dhruv Sharma

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Education

University of Maryland College Park, MD
Master of Engineering, Robotics *Expected May 2024*

Courses: *Computer Vision, Robotics Perception, Robotics Planning, Cognitive Robotics, AI and Deep Learning*

Guru Gobind Singh Indraprastha University Delhi, India
Bachelor of Technology, Electronics and Communication *Aug 2021*

Experience

Graduate Research Assistant Feb 2023 – May 2023
University of Maryland *College Park, MD*

- Optimized task efficacy of imitation learning-based multi-modal robot by 20% by creating ROS service nodes
- Collaborated cross-functionally to integrate the LTL and PDDL outputs from speech, gesture, and demonstration databases for computing task plans

Automation Engineer Intern June 2020 – Sept 2020
G1ANT *Remote*

- Scaled the add-ons marketplace for the Robotic Process Automation software (G1ANT studio) by 10% by proposing and developing new add-ons
- Improved user's travel booking efficiency by 40% by creating a travel bot to automate the process

Projects

Industrial automation | *Python, C++, Object-oriented programming, Git version control, MoveIt, ROS2*

- Designed ARIAC industrial automation software system for kitting tasks using ROS services and MoveIt motion planning

Semantic Segmenter | *Python, PyTorch, Raspberry Pi, Camera (PiCam), OpenCV*

- Created a vision transformer (ViT) based semantic segmentation pipeline, resulting in a significant decrease in false positives, achieving an F1 score of 0.83; conducted a hardware-in-the-loop test with Raspberry Pi and PiCam

Cyber Shopper | *Solidworks, ROS, 3D CAD, Robot Kinematics*

- Designed a shopping robot with 6 DOF UR5 arm using Solidworks and implemented inverse kinematics solution to achieve 80% success rate for pick-place action using ROS and Python

Robot Path planner | *Python, Git version control, Data Structures, Gazebo*

- Programmed and simulated path planning algorithms like BFS, Dijkstra, A* on Turtlebot3 robot in gazebo
- Implemented Informed RRT* with ellipsoid heuristic, optimizing dynamic obstacle avoidance by reducing planning time from 90 seconds to 23 seconds

NeRPix | *Python, PyTorch, Image processing, CNN*

- Developed a neural network-based image processing pipeline for implicit neural representation (INR) to reconstruct and outpaint the image, attaining PSNR value of 25.3

SpheroVoice | *Arduino, Raspberry Pi, C++, Circuit schematics, Hardware*

- Led a collaborative project to model a spherical robot prototype using CAD, with designed circuit schematics
- Implemented the movement mechanism using Arduino and integrated an open-source voice assistant using Raspberry Pi; achieving voice-based interactions

Skills

Languages: Python, C++, SQL, MATLAB
Libraries and Tools: OpenCV, NumPy, PyTorch, Docker, SciPy, Matplotlib, Git, Azure, UML, Microsoft Office
Robotics and Automation: ROS, Gazebo, RViz, MoveIt | **Design Software**: Solidworks, Altium Designer
Platforms and Protocols: Linux, Micro-controller (ESP32, Arduino), Raspberry Pi, MQTT, UART, SPI, I2C