

Harsh Dhruva

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EDUCATION

Carnegie Mellon University

Master of Science in Mechanical Engineering, Research - Robotics, GPA: 4.00/4.00

Rose-Hulman Institute of Technology

Bachelor of Science in Mechanical Engineering, Magna Cum Laude, GPA: 3.71/4.00

Pittsburgh, PA

Aug. 2020 – May 2022

Terre Haute, IN

Aug. 2016 – May 2020

EXPERIENCE

Robotics Systems Engineer

July 2024 – Present

Google (via Autoroboto)

Mountain View, CA

- Drive development of robotics lab automation for evaluation of Google Pixel biometric face authentication models
- Built a trajectory system that uses a robotic arm in combination with lighting and background to search a broad range of setups that expose model vulnerabilities
- Improved system precision by mapping robot position and velocity to exact camera capture frame which enabled deeper eval insights and higher precision attacks on models
- Measured human movements using IMU and integrated those motions on the robot, broadening the range of authentication modalities the system could evaluate
- Led ROS1 → ROS2 system-wide architecture migration - threading architecture rewrite and improved motion planning - deployed on 10 robot labs

Robotics Engineer

July. 2022 – April 2024

Peanut Robotics | [Website](#) , [Youtube](#)

San Francisco, CA

- Robotics engineer on a commercially deployed mobile manipulator for hotel bathroom cleaning - responsible for the arm software stack including TOPPRA trajectory generation, ros control, and synchronized tool control
- Built a computer vision pipeline for the robot to handle geometric variation between hotel bathrooms, utilizing ICP+RANSAC point cloud registration techniques
- Evaluated 6 depth camera systems to install on the robot; selected Orbbec Gemini2 and engineered C++ bringup layer with auto-recovery for 4 simultaneous cameras
- Deployed Optitrack motion tracking system; quantified arm droop profiles and validated calibration accuracy
- Identified operator training time as a critical bottleneck (2–4 hrs per surface) and designed, prototyped, and shipped a live trajectory recording system reduced training time to 15 mins per surface

Research Intern

Jun. 2021 – Sep. 2021

Autodesk Robotics Lab

San Francisco, CA

- Researched into Pixar's universal scene descriptor (USD) for robots, utilizing NVIDIA Omniverse and Isaac Sim
- Built and Programmed a Robot work-cell USD data importer into a robot simulator platform

Graduate Research Assistant

Aug. 2020 – May 2022

Carnegie Mellon University, CERLAB, Project Sponsor: NASA ULI : [News Link](#)

Pittsburgh, PA

- Developing a Robotic System for post processing of additive manufacturing parts for precise quality inspection that utilizes a 2D laser line scanner for precise measurement and depth cameras for fast object registration
- Developed motion planner module using Sampling based Probabilistic Road-map Algorithm for a 6-dof Robot arm and a discretized 1-dof turntable for achieving a set of end-effector way-points for object scanning

PROJECTS

MoonRanger - Software Perception Team

Feb. 2022 – May 2022

- Working on stereo re-constructor pipeline, added functionality and unit-tests for sending disparity map image data to disk for inspection. An attempt to build the first truly autonomous micro-rover on the lunar surface [Project](#)

Motion Planning | C++

Aug. 2021 – Dec. 2021

- Programmed 2D A* planner with backward Dijkstra heuristic that allows a point robot to catch a moving target
- Implemented sampling based planners (RRT, RRT-Connect, RRT*, PRM) for a high-dof planar robot arm

Tripawd - The Three-Legged Robotic Dog | Arduino, Dynamixel

Feb. 2021 – May 2021

- Designed and built a functional three-legged robotic dog to explore a research question comparing how optimized the cost of travel was between a three-legged dog's natural gait and an optimized gait via trajectory optimization [Youtube](#)

Computational Intelligence in Control Engineering | MATLAB, Simulink

Mar. 2019 – May 2019

- Supervised learning of inverse kinematics for a 3-DOF planar manipulator via the distal teacher method (learned forward model + backpropagated task-space error), with network weights optimized using Levenberg-Marquardt

SKILLS

Languages: Python, C++, MATLAB, C

AI / ML: PyTorch, Imitation Learning, Diffusion Policy, VLA, ACT, OpenCV, Open3D

Robot Frameworks: ROS2, ROS1, LeRobot, MoveIt, Isaac Sim, MuJoCo

Hardware: xArm, Peanut Mobile Manipulator, Sawyer, Denso, SO-101, XLeRobot, Depth/RGB Cameras, IMU

Domains: Robot Learning, Manipulation, Motion Planning, TOPPRA, Computer Vision, SLAM, State Estimation