Daksh Adhar

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Education

Carnegie Mellon University - School of Computer Science Aug. 2024 – May 2026
Master of Science in Robotic Systems Development | GPA: 4.15/4 Pittsburgh, PA
Coursework: Deep RL, Multimodal ML, Optimal Control, Robot Autonomy, Robot Mobility, Computer Vision
Teaching Experience: TA for 16642-Manipulation Estimation and Control

Indian Institute of Technology, Guwahati July 2020 – May 2024
Bachelor of Technology in Engineering Physics | GPA: 8.27 / 10.00 Guwahati, India
Coursework: Quantum Mechanics, Statistical Mechanics, Nuclear Science, Computational Physics, Simulation Techniques

Experience

1X Technologies | Website May 2025 – August 2025
AI Resident, Reinforcement Learning Team Palo Alto, California
- Trained RL policies for dexterous manipulation on NEO hand, and added randomization for sim-to-real transfer
- Designed metrics to benchmark RL policies in both Isaac Gym and MuJoCo, evaluating sim-to-sim robustness
- Developed a ROS 2 Humble C++ controller to deploy evaluated policies in real-time simulation and teleoperation
- Built Tkinter-based local and Streamlit-based browser app for object segmentation mask data collection using SAM2
- Integrated Cloudflare R2 and DBeaver SQL backend to load frames and store operator clicks on 1M+ frames

Biomimetic Robotics & Artificial Intelligence Laboratory, IIT Guwahati | Website Jan. 2023 – May 2024
Research Internship, Prof. Shyamanta M. Hazarika Guwahati, India
- Developed a testing framework on PyBullet and OpenAI Gym environment for training bionic hand grasp RL policies
- Formulated reward functions and used Soft Actor-Critic algorithm to enable grasp-and-lift of deformable objects
- Applied domain randomization for sim-to-sim transfer, achieving 38% slip reduction and 14% decrease in deformation
- Increased stability with adaptive sliding mode control, improving slippage by 103.35% and deformation by 197%

Projects

AR assisted Robotic Total Knee Arthroplasty | Website Jan. 2024 – Ongoing
- Collaborating with a team of four to develop a robotic system for knee surgery, achieving 2 mm and 2° accuracy
- Utilizing a RealSense depth camera for real-time bone tracking and registration, replacing invasive tracking methods
- Designing a planning subsystem that dynamically updates as surgical pins are drilled, adapting to anatomical changes
- Integrating a custom 3D-printed drill end effector with ROS, enabling drill activation based on trajectory position

Kalman Filter-Based Sensor Fusion for Multi Camera Hand Tracking | GitHub Feb. 2023 – April 2024
- Employed Kalman filters to fuse dual camera sensors, improving joint angle estimation for prosthetic hands
- Used MediaPipe for hand tracking to achieve accurate joint estimation without the need for camera calibration
- Integrated YOLO for real-time hand-object interaction tracking to evaluate fused model using Grasp Quality Index

Pluto Drone Control and Trajectory Planning | GitHub Dec. 2022 – Feb. 2023
- Developed a Python interface for the Pluto Drone, implementing MSP with ~40ms latency over a socket connection
- Engineered a RealSense Camera and an ArUco tag-based system, achieving 95% accuracy in drone localization
- Designed a PID controller utilizing real-time vision data as feedback, enabling trajectory following with ~7% overshoot

Publications

Robustifying a RL agent-based bionic reflex controller through an adaptive sliding mode control Nov. 2024
Journal Paper at Cambridge University Press, Robotica Cambridge/Robotica
Grasp force optimization as a Bilinear Matrix inequality problem: A Deep-learning approach Dec. 2023
6th National Conference on Multidisciplinary Design, Analysis and Optimization arXiv/2312.05034
Reinforcement Learning-Based Bionic Reflex Control for Anthropomorphic Robotic Grasping Sept. 2023
Arxiv Paper arXiv/2312.05023

Skills

Programming Languages: Python, C++, Matlab, Julia, SQL
Tools/Frameworks: PyTorch, Isaac Gym, OpenAI Gym, Mujoco, ROS2, MoveIt2, Gazebo, PyBullet, StableBaselines3
Miscellaneous: SolidWorks, Fusion 360, Arduino, Raspberry Pi, Intel 8085, PCB designing, Kinect, RealSense

Honors

Narotam Sekhsaria Foundation Scholar, 2024 - $25,000 merit-based scholarship awarded to 15 out of 5500 applicants
JN Tata Endowment, 2024 - $12,000 merit-based scholarship awarded to 50 out of 10,000 applicants
International Rover Challenge, 2023 - Finalists with 9 others for YUVAAN mars rover, Mars Society South Asia