Rajiv Bharadwaj

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Education

ETH Zürich, Switzerland Sep 2024 - Present

Master of Science in Robotics, Systems, and Control

Interests: Reinforcement Learning for Controls, Optimization Methods, Vision Algorithms, Simulation, Aerial Robots
Coursework: Winter 2025: Model Predictive Control, Computational Models of Motion, Convex Optimization Fall 2024: Optimal Control, Robot Dynamics, Motion Planning and Decision Making, Vision Algorithms

University of Michigan, Ann Arbor, USA Sep 2018 - May 2022

Bachelor of Science in Engineering, Computer Engineering; Minor in Music *summa cum laude*

Honors: Dean's List for 7 semesters, James B. Angell Scholar 2020, 2021 GPA: 3.9/4.0
Clubs and Societies: Men's Glee Club, Michigan Student AI Lab, UM Autonomous Robotic Vehicle, Michigan Sahana

Research

Semester Thesis: Multi-task Reinforcement Learning for Multi-Contact Plans Zürich, CH

Robotic Systems Lab; Supervisor: Mayank Mittal, Yuni Fuchioka, Chenhao Li, Marco Hutter May 2025 - Sep 2025

- Designed and trained various multi-task learning policies in Isaac Lab simulation environments, applying PPO and student teacher distillation methods.
- Defined various research directions and evaluation metrics based on literature review on multi-task reinforcement learning.
- Implemented new features on Isaac Lab for training multi-task policies to potentially release publicly.
- Authored and presented a thesis to the faculty, showing multi-task distillation as a promising research direction for multi-contact plans.

Wire Harnessing using Reachability based Trajectory Design Ann Arbor, MI, USA

University of Michigan ROAHM Lab, Advisor: Dr. Ram Vasudevan Jan 2022 - July 2022

- Implemented an RRT planner for Kinova Gen3 within Robosuite for high level planning.
- Implemented a Recursive Newton-Euler Algorithm low level controller to used to evaluate the performance of a novel robust controller approach.
- Performed system identification tasks to bridge the sim-to-real gap when performing tasks on the robot.

Work Experience

Amazon.com Seattle, WA, USA

Software Development Engineer II - Social Marketing Oct 2022 - Oct 2024

Software Development Engineer Intern May 2021 - Aug 2021

- Designed an implemented various fully managed systems to improve the quality of Amazon products advertised on social media using Spark, Alster Deequ, AWS Lambda; processing 50+ million records every day and improving long running job efficiencies by over 90%.
- Mentored a summer intern, leading to substantial improvements in backend system reliability. Oversaw project ideation, strategic planning, and performance evaluation to ensure an impactful outcome.
- Lead operational excellence and learning efforts within the team to improve best practices and manage technical debt.

Analog Garage - Analog Devices Inc. Boston, MA, USA

Systems & Applications Engineering Intern May 2020 - Sep 2020

University of Michigan Information and Technology Services Ann Arbor, MI, USA

Application Development Intern May 2019 - May 2021

Projects

Drone Control with RL using Vision Zürich, CH

ETH Course Project: Vision Based Drone Flight; Team of 5 students Sep 2025

- Trained a reinforcement learning control policy for a drone to follow another drone using vision using PPO
- Performed reward design based on tracking, bounding box estimation, smoothness, and safety constraints to achieve reliable tracking with camera input
- Utilized a ROS C++ and Python based software stack for training, simulation, and deployment

Imitation Learning using a Tendon Actuated Hand Zürich, CH

ETH Course Project: Real World Robotics; Team of 7 students Sep 2024 - Dec 2024

- Spearheaded the high-level architecture of a ROS 2 software stack for a tendon-actuated hand, including hardware communication, joint kinematics, teleoperation, and data collection. Awarded "Most Intuitive Software Design" for usability.
- Modeled the custom rolling-contact joint based hand in MuJoCo to enable software verification before hardware deployment
- Developed a UI with fail-safes, debugging tools, and visualizations to speed up data collection rate by 15 times and reduce hardware accidents.
- Trained an Action Chunking Transformer to grasp and sort objects by color, achieving accurate grasps but facing challenges in color-based sorting due to model limitations.

Vision Odometry Pipeline Zürich, CH

ETH Course Project: Vision Algorithms for Mobile Robotics; Team of 4 students Sep 2024 - Dec 2024

- Implemented a monocular visual odometry pipeline which uses 2D $\leftrightarrow$ 3D correspondences between frames to estimate the pose of the camera.
- Responsible for populating the main pipeline with new and high quality 2D keypoint and 3D landmark correspondences to ensure indefinite operation.
- Achieved locally accurate pose estimation, with scale ambiguity due to the limitations presented by purely camera based odometry methods.

Robotics Summer School Zürich, CH

RobotX Initiative, ETH Zurich June 2025

- Attended the Robotics Summer School, with 50 students from around the world. Deploying autonomous software on wheeled robots for search and rescue missions. Hands-on tutorials on key robot planning modules including state estimation, SLAM, exploratory path planning, motion planning, and object detection.

Skills

Programming:	C++; Python, Java, Scala (Apache Spark); Typescript, Javascript, Lua, Embedded C, Verilog
Robotics Tools:	Robot Operating System (ROS 1/2), NVIDIA Isaac Lab, MuJoCo, OpenCV, PyTorch, Linux
Other Technical:	AWS, Git, Slurm, FPGAs, STM32, Arduino, Raspberry Pi, Autodesk Eagle
Languages:	English (native), German (B1), Hindi (native), Tamil (native), Gujarati (conversational)