Prabhman Dhaliwal

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Education

University of California, Berkeley **Berkeley, CA**
BA: Data Science, Robotics Emphasis *2017 - 2021*
Minor: Electrical Engineering & Computer Science

- Relevant Coursework: Computer Vision, Artificial Intelligence and Machine Learning, Grasping, Control Theory and Probability, Digital Signal Processing, Linear Algebra and Optimization Theory, Computer Graphics, Mechatronic Design, Theoretical Robotics, Data Structures and Algorithms, Operating Systems

Work Experiences

Amazon Astro **Sunnyvale, CA**
SDE - Computer Vision and Deep Learning *2021 - 2023*

- Developed ML infrastructure to run models on x86, Android, ARM-NEON, and Linux platforms
- Constructed tests to analyze visual perception and mobility models on Astro (C++ and Python)
- Created ROS nodes to pass sensor data as input for TensorFlow models
- Added capabilities on existing ML detection/segmentation models to identify and process new objects
- Used CMake to ensure code worked with internal build systems

BL Healthcare/Veteran's Association **Mansfield, MA**
Software Engineer Intern *2018 - 2019*

- Implemented backend infrastructure using Django web framework for company website and database logging for medical patients at the VA

Projects

Custom Raytracer *2023*

- Designed and created a ray tracer in C++ from scratch. Implements basic materials (dielectric, metal, matte, etc).
- Implemented acceleration DS (BVH), thread parallelism, shaders, and additional features.

RL Controlled Bipedal Robot *2021*

- Improved the stability/power efficiency in an under-actuated three-link bipedal robot using 3-DOF reaction wheels
- Using OpenAI, fashioned an RL controller for the motor torques and compared to baseline PID and LQR controllers
- ***Won course robotics competition of 11 teams***

Custom Video Compression Scheme *2021*

- Implemented custom image compression algorithm to send best possible quality GIF in no more than 10 kB while optimizing signal-to-noise ratio ***(3rd place in competition of 50 people, 66x compression)***
- Sparsified image with SVD/DCT, downsampled color based on eigen information using LZMA compression, and finally blurred image before sending packets with APRS; recovery was done by interpolating each frame

Trajectory Tracking and Nonholonomic Controllers *2021 - 2022*

- Implemented closed-loop controllers for kinematic path planning on Baxter/Sawyer robots using 3 methods: Jointspace PD Velocity Control, Jointspace PD Torque Control, and Workspace Control
- Implemented path planner for Turtlebots using various techniques, such as RRT and Nonlinear Optimization

Additional Projects *2022*

- Classified data sets on Kaggle (CIFAR-10, MNIST, SPAM) using ML techniques such as GDA, (C)NN, Logistic Regression, Decision Trees, and SVD from scratch and using common python libraries
- Implemented multi view 3D reconstruction algorithms to match corresponding images (RANSAC, SIFT, Wireframe Matching)
- Created image processing client/server architectures using protobuf with TCP and gRPC

Technical Skills

- Python, C++, ROS, CMake, TensorFlow, Linux, C, Java, Gazebo, OpenCV, gRPC, TCP, protobuf, German