Prabhman Dhaliwal

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Education

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

- Relevant Coursework: Computer Vision, Artificial Intelligence and Machine Learning, Controls, Signal Processing, Linear Algebra, Graphics, Mechatronics, Data Structures and Algorithms, Operating Systems

Work Experiences

UC Davis Medical Center **Davis, CA**
Volunteer Researcher *September 2023 - Present*

- Experimented with applications of Generative Neural Nets in converting pathology images
- Helped in reducing time for disease analysis from potentially a day to a few hours

Amazon Astro **Sunnyvale, CA**
SDE - Computer Vision and Deep Learning *July 2022 - Janurary 2023*

- Developed ML infra (ROS/TFLite) 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)
- Used CNN knowledge to improve Astro's ability to generalize data, such as if an object is rotated or scaled.

Projects

Custom Compiler in C++ *March 2024*

- Designed simple compiler in C++, with floating/int arithmetic, if-else, variables, pointers, function scopes
- Implemented precedence climbing for arithmetic ops. which is significantly faster (but also not as flexible) than base C++ precedence algorithm

Custom Raytracer *August 2023*

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

RL Controlled Bipedal Robot *Spring 2021*

- Improved the stability/power efficiency in an under-actuated three-link bipedal robot using 3-DOF reaction wheels
- Experimented with RL controllers and comapred with PID and LQR controllers
- ***Won course robotics competition of 11 teams***

Custom Video Compression Scheme *Spring 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 *Fall 2021 - Spring 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)
- 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