David Deng

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Education

UC Berkeley: Electrical Engineering and Computer Science **Expected Graduation:** May 2021
GPA: *3.99/4.00*
Technical Coursework: Data Structures, Circuits, Linear Algebra, Discrete Math, Probability, Computer Architecture, Algorithms, Signals and Systems, Artificial Intelligence, Machine Learning, Robotics, 3D Reconstruction and Recognition, Digital Signal Processing, Deep Reinforcement Learning, Information Theory
Extracurriculars: Space Technologies at Cal, Asian American Christian Fellowship, For Christ's Sake Acapella, Cal Running Club, IM Ultimate Frisbee

Research Experience

Video and Image Processing Lab **Aug 2019 – Present**
Doing computer vision research under Professor Avideh Zakhor. Designed and implemented neural networks for predicting future point clouds from sequential LiDAR data. Currently working on video representation learning for semantic forensics and self-supervised 3D object detection and scene flow estimation.

Computer Vision Undergraduate Research **Apr 2019 – Aug 2019**
Deep learning models for 3D human mesh reconstruction under Angjoo Kanazawa. Worked on rendering multiple humans in an image, incorporating improved 3D human body model, adding temporal smoothness priors.

Work Experience

Qualcomm Machine Learning Intern **May 2020 – Aug 2020**
Designed and implemented 4-bit neural network operations for the Tensilica HiFi5 Neural Network Library using C and custom TIE instructions, achieving 200x speedup from unoptimized C code. Designed neural networks to linearize speaker systems. Experimented with MLPs, LSTMs, causal CNNs in PyTorch.

Northrop Grumman Systems Engineering Intern **May 2019 – Aug 2019**
Worked on the BACN military radio. Configured and tested network connections between military message formats. Wrote a Python script to automate the testing process and created a GUI for the script using Tkinter.

Teaching Experience

Electrical Engineering 16A: Designing Information Devices and Systems I **Aug 2019 – Dec 2019**
Teaching assistant. Guided and evaluated students as they built cameras, touchscreens, and audio positioning systems. Covered topics in linear algebra, circuits and signal processing. Gave lectures on content, wrote and graded exams, prototyped new labs, mentored lab assistants.

Projects

Trajectory Based Model Based Reinforcement Learning
Deep reinforcement learning final project (in progress). Working on MBRL using trajectory models instead of one-step prediction models for more accurate long-term predictions. Experimenting with algorithms for selecting optimal control policy parameters for a trajectory.

3D Reconstruction with Soft Tactile Sensor
Robotics class final project. Used a soft tactile sensor to generate 3D point cloud reconstructions of objects. Objects are probed at distinct locations with the sensor, and the point cloud readings are transformed to a global coordinate frame using an AR tag. Implemented using Python, C++, PCL, and ROS. Website: calhwd15508.github.io/SoftTactileSensing/

Publications

[1] David Deng and Avideh Zakhor. Temporal LiDAR Frame Prediction for Autonomous Driving. *International Conference on 3D Vision (3DV)*, 2020.