Glen Chou

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EDUCATION

University of California, Berkeley — Berkeley, CA
B.S., Dual Major in Electrical Engineering and Computer Science, Mechanical Engineering — 2013-2017
Overall GPA: 3.87 — Expected Graduation: May 2017
Upper Division and Graduate Level GPA: 3.97

RESEARCH EXPERIENCE

InterACT Lab: Characterizing and improving trajectory optimization for human-robot interaction. Sept. 2016 -

The current state-of-the-art trajectory optimization based robot motion planner is TrajOpt. However, it is unclear which kinds of environments and combinations of start and goal states cause TrajOpt to fail.

- Implementing a random, realistic environment generator to serve as a testbed for characterizing hard problems for TrajOpt
- Designing and implementing framework to learn optimizer initializations that improve convergence to a feasible trajectory,
- Designing and implementing a framework to learn trajectories from experience to improve the success rate, especially when humans are present in the environment.

Hybrid Systems Lab: Control for multi-vehicle collision avoidance via Hamilton-Jacobi reachability. May 2016 -

Prior work has been done to ensure collision avoidance between up to three vehicles using mixed integer optimization, though the method does not generalize to more vehicles. Using reachability techniques, it is possible to guarantee safety for four vehicles.

- Worked on development of centralized collision-avoidance algorithm
- Implemented numerical simulations of algorithm

Hybrid Systems Lab: Neural networks for fast reachable set computations. Feb. 2016 -

Traditionally, computation of reachable sets involves a brute force method that scales exponentially with state space dimensionality. Using machine learning techniques, it is possible to formulate a method that scales better in time and spatial complexity by localizing the reachable set computation.

- Worked on the design of a recurrent neural network
- Developed and optimized a method for training data generation as well as a dynamic training strategy for the neural network
- Developed and implemented methods for synthesizing control from the output of the neural network

SWARM Lab: Acousto-optic modulation of brain activity. Jan. 2015 – May 2016

Neurons can be controlled by light, but shining a simple light beam into the brain is ineffective as the beam dissipates and damages the tissue. We can use ultrasonic transducers to steer the beam in the tissue to minimize beam spread.

- Developed an optics testbed
- Tested and characterized electrical properties of the transducers
- Designed and fabricated PCBs.

Micro-Mechanical Methods for Biology Lab Summer 2014

We want to find the precision limits of 3D-printing when using polydimethylsiloxane as a printer medium.

- Used SolidWorks to design "edge-case" test models for 3D-printing
- Created and treated printed models with silane, followed by a mixing and curing procedure.

Mechanical Systems Control Lab Summer 2012

- Performed some design and construction work on a brain-machine interface project.

PUBLICATIONS

- Frank Jiang*, Glen Chou*, Mo Chen*, Claire Tomlin. Using neural networks for fast reachable set computations. Submitted to HSCC 2017, in review. https://arxiv.org/abs/1611.03158

TEACHING EXPERIENCE

Linear System Theory (EE 221A) Fall 2016

- Provided weekly one-on-one tutoring for a student who desired extra help with EE 221A, an introductory graduate course concerning the modern state space theory of linear systems and relevant methods for control.

Introduction to Artificial Intelligence (CS 188) Spring 2017

- Undergraduate student instructor.

PROJECTS

Control for Vehicle Docking (ME 107 Final Project) Fall 2016

- Inspired by the midair refueling control problem. This project involves a system of two cars, where one car is teleoperated and another car is autonomously controlled, moving on a bumpy, nonlinear track. The autonomous car is controlled to dock and deliver a payload to the teleoperated car. An overhead vision system and an ultrasonic sensor are used to provide position and velocity data for a PID controller. Techniques in control, computer vision, and mechatronics were used to complete this project.

Optimal Path Planning using Small Mobile Robots (EE 106A Final Project) Fall 2015

- In the event of a natural disaster, the amount of manpower and money required to find survivors and rebuild is staggering. We proposed to instead use cheap, small, mobile robots (Zumy) to navigate cluttered, unsafe environments. To do so, we used techniques in artificial intelligence (Bellman-Ford path planning), computer vision (homographies), and control.

Engineering Design (E 28 Final Project) Fall 2014

- Designed and constructed a mechanism to move three different sized balls into a box 50 feet away as quickly as possible under heavy restrictions: only rubber bands for power, no metal parts.

AWARDS/HONORS

Semester Dean's List Fall 2014 -

Semester Honors Fall 2013 -

Member of the UC Berkeley EECS Honors Program Spring 2016 -

Member of Eta Kappa Nu (HKN), EECS Honor Society Spring 2015 -

- Eligibility for top fourth of the undergraduate EECS student body

Invitation to Tau Beta Pi (TBP), Engineering Honor Society Fall 2015 -

- Eligibility for top fifth of the undergraduate engineering student body

Invitation to Pi Tau Sigma (PTS), Mechanical Engineering Honor Society Spring 2015 -

- Eligibility for top fourth of the undergraduate ME student body

Invitation to Phi Beta Kappa (PBK), Science and Liberal Arts Honor Society Spring 2016 -

- Eligibility for top tenth of the undergraduate student body

RESEARCH INTERESTS

- Controls
- Optimization
- Machine Learning
- Robotics

SKILLS

- MATLAB
- Simulink
- Python
- Java
- C
- ROS
- OpenRAVE
- AutoCAD
- SolidWorks
- LabVIEW
- NI Multisim