Tianshuang (Ethan) Qiu

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Education

University of California, Berkeley August 2020 - May 2024

Bachelor of Arts, Computer Science *Current GPA: 4.0/4.0*

- **Relavent Courses**: Structure and Interpretation of Computer Programs, Data Structures, Designing Information Devices and Systems I& II, Discrete Mathematics, Artificial Intelligence, Machine Structures, Multivariable Calculus, Real Analysis, Computer Security, Machine Learning, Deep Neural Networks, Reinforcement Learning

Publications

- **Bin-Optimized Motion Planning:** Zachary Tam, Karthik Dharmarajan, **Tianshuang Qiu**, Yahav Avigal, Jeffrey Ichnowski, Ken Goldberg. *Submitted to ICRA 2024*
- **The Teenager's Problem: Efficient Garment Decluttering With Grasp Optimization:** Aviv Adler, Ayah Ahmad, Shengyin Wang, Wisdom C. Agboh, Edith Llontop, **Tianshuang Qiu**, Jeffrey Ichnowski, Mehmet Dogar, Thomas Kollar, Richard Cheng, Ken Goldberg. *Submitted to ICRA 2024*
- **Learning to Efficiently Plan Robust Frictional Multi-Object Grasps:** Wisdom C. Agboh, Satvik Sharma, Kishore Srinivas, Mallika Parulekar, Gaurav Datta, **Tianshuang Qiu**, Jeffrey Ichnowski, Eugen Solowjow, Mehmet Dogar, Ken Goldberg. *Accepted for IROS 2024*
- **Efficient High-Fidelity Simulation for Estimating Grasp Robustness: Tianshuang Qiu**, Letian Fu, Chungmin Kim, Ken Goldberg. *In preparation*

Work Experience

Machine Learning Engineer Intern May 2023 - August 2023

Apple Inc. *Cupertino, CA*

- Analyzed battery data from over 1500 devices to help Cell Engineers for design improvement
- Migrated previous pipeline from MATLAB to Python, modularized the code to facilitate further developments
- Developed an internal graphical tool to apply ML algorithms and create data visualizations automatically which was adopted by the team; streamlined process to visualize new features, saved labor cost by over 50%
- Designed neural net model to process raw time series data from users over 2 years and analyzed results with the internal tool above. The model has been recommended for further investigation by relevant teams

Associate Automation Engineer Intern May 2021 - August 2021

Hitachi Rail STS. *Oakton, VA*

- Conducted performance analysis of hundreds of on-site trains running data of several global metro lines
- Improved the graphical tool used to compare theoretical data with actual data, and optimized algorithm and added several new features in order to analyze the speed curve of vehicles to improve user experiences

Research Experience

Undergraduate Student Researcher January 2022 - Present

Berkeley Artificial Intelligence Research, AUTOLAB, Advised by Prof. Ken Goldberg *Berkeley, CA*

Physics Simulator and Multi-object Grasping

- Updated lab's code-base; ported an Affine-Body (almost-rigid) Physics Simulator from Windows to Ubuntu
- Designed grasping experiments where a robot executes preplanned grasping actions on 10 different objects
- Analyzed differences between simulated and real physical experiments. Applied previous simulator to a multi-object setting, paper is accepted for IROS 2024; currently preparing paper for Real2Sim2Real grasping

Grasp Optimized Motion-Planning

- Designed simulated environments to model cluttered bins in IsaacGym
- Created synthetic depth images for use of training a neural network to predict optimization steps
- Devised and implemented pipeline using RANSAC and Segment Anything to detect and segment boxes
- The Multi-Object Grasping paper is accepted for IROS 2024

Expressive Robotics

- Programmed graphical tool by applied signal processing techniques (gaussian and fourier filters) and DL models to track a dancer from videos, in order to quickly visualize and test robot movements
- Designed mappings from the dancer's movements onto robotic joints to mimic the dancer
- The project is accepted for an 8 hour performance in National Sawdust in December 2023

Personal Projects

Additive Parts | *EECS 182: Deep Neural Networks* March 2023 – May 2023

- Designed models to predict the success of additive manufacturing (3D printing) based on the part orientation
- Explored a variety of deep neural net architectures and data representations; worked with cloud-based clusters to accelerate data processing and training; achieved an accuracy of over 90% in classification

iBox | *CS 161: Computer Security* February 2023 – April 2023

- Collaborated with a teammate to devise security schemes for end to end encryption
- Implemented previous scheme in Go with functionalities to detect intrusion and tampering
- Identified potential weaknesses and designed diagnostic tests which achieved all available flags for this project

Technical Skills

Languages: Python, Java, LaTeX, Go, C, C#, C++

Libraries: Numpy, PyTorch, Pandas, Matplotlib/ Plotly, Trimesh

Miscellaneous: Ubuntu, Docker, Teaching (Lab Tutor for EECS 16A)