Lizhi Yang

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EDUCATION

California Institute of Technology

PhD Student, Mechanical Engineering — Expected May 2027

University of California, Berkeley

B.S., Electrical Engineering and Computer Sciences — May 2022

- *GPA: 3.874*

SUMMARY OF RESEARCH SKILLS

ROS * python * C++ * PyTorch * Tensorflow * Docker * optimization (Casadi) * project management * data collection * data management

RESEARCH INTERESTS

Legged robotics * robot learning * robotic sensing & locomotion * multi-robot cooperation * computer vision * sensor fusion

AWARDS AND HONORS

- Arthur M. Hopkin Award — Spring 2022
  - Selected based on seriousness of purpose and high academic achievement.
- Honors to Date — Fall 2020
  - Selected based on semester GPA being top 20%.
- UC Berkeley, Bright Scholar Award — Fall 2018 – Spring 2020
  - Selected based on good academic standing.
- Dean's List — Spring 2019 – Fall 2019
  - Selected based on semester GPA being top 10%.

RESEARCH EXPERIENCE

Safe Parameter Learning for Bipedal Locomotion Control — Jan 2021 – Sept 2021

UC Berkeley Hybrid Robotics Group, Berkeley, CA

- Applied Bayesian optimization to safe automatic controller parameter learning for bipedal robots.
- Developed a safe automatic parameter learning framework for a variable-height, variable-speed walking controller on a bipedal robot, achieving superior command tracking performance over expert hand-tuned controllers with MATLAB and ROS.
- Deployed the framework and learned parameters on the Cassie robot and performed real-world experiments with good tracking performance.

Autonomous Navigation for Quadrupedal Robot — Dec 2020 – Feb 2021

UC Berkeley Hybrid Robotics Group, Berkeley, CA

- Developed an autonomous navigation framework capable of jumping through constrained obstacles.
- Developed the navigation stack, part of the decision-making stack and overall function integration with ROS.
- Deployed the framework on the MIT Mini Cheetah and performed real-world experiments successfully demonstrating the effectiveness of the proposed method.

Robotic Guide Dog — May 2020 – Oct 2020

UC Berkeley Hybrid Robotics Group, Berkeley, CA

- Developed a hybrid physical human-robot interaction framework capable of navigating a visually impaired human through narrow spaces using a soft leash.
- Implemented robot localization, human detection, and overall function integration with ROS.
- Deployed the physical human-robot interaction framework on the MIT Mini Cheetah and performed real-world experiments exhibiting success of the proposed method.

Sensor-aware SLAM-based Frontier Exploration and Mapping — Jan 2021 – May 2021

UC Berkeley Video and Image Processing Lab, Berkeley, CA

- Implemented a sensor-aware frontier exploration and mapping method via sensor-frontiers.
- Deployed and tested the algorithm on the LoCoBot.
- Extended exploration area from 49% coverage of conventional methods to 92.8%.

Drone Object Detection Using RGB/IR Fusion — June 2020 – Dec 2020

UC Berkeley Video and Image Processing Lab, Berkeley, CA

- Implemented an illumination aware RGB/IR fusion model for drone image object detection with Tensorflow-Keras.
- Deployed the fusion model on a Nvidia Xavier drone with Tensorflow-Lite.
- Developed synthetic IR data generation framework using Unreal Engine simulation and CycleGAN to overcome the scarcity of synchronized RGB/IR image pairs and attempt to reduce the sim-to-real gap.

Spatio-Temporal Action Detection with Multi-Object Interaction Feb 2020 – Dec 2020
Berkeley Artificial Intelligence Research, Berkeley, CA

- Assisted in the development of a spatio-temporal action detection model capable of understanding multi-object interaction.
- Pruned the TwentyBN video dataset to include only videos of significant action length and object relevance and produce a new dataset surpassing the number of action classes in the UCF101-24 action video dataset (47 vs. 24).

Indoor Query System for The Visually Impaired May 2019 – July 2020
UC Berkeley Video and Image Processing Lab, Berkeley, CA

- Developed an Android application that uses Tensorflow-Lite, a 360°camera and a depth camera to assist visually impaired people.
- Collected and trained a MobileNet-v2 object detection network to serve as the onboard inference model.
- Validated the accuracy of the system for the disjoint test set from the same buildings in the training set at 99%, and for the test set from new buildings not in the training set at 53%.

TEACHING & MENTORING EXPERIENCE

Academic Intern June 2019 – Aug 2019
CS 61A Structure and Interpretation of Computer Programs

- Scheduled weekly office hours to answer CS concept & program assignment implementation problems for undergraduate students.

PROFESSIONAL EXPERIENCE

Firmware Engineer Intern May 2021 – Aug 2021
Samsara Inc., San Francisco, CA

- Worked closely with a team of 4 with weekly meetings and sync-ups, communicating project needs.
- Developed new product feature according to customer feedback with Go.
- Developed internal machine learning model benchmarking tool for testing before rollout with great feedback from the team with C++.

PUBLICATIONS AND PRESENTATIONS

*Publications (Published) *: equal contribution*

- **Lizhi Yang***, Zhongyu Li*, Jun Zeng and Koushil Sreenath. "Bayesian Optimization Meets Hybrid Zero Dynamics: Safe Parameter Learning for Bipedal Locomotion Control" ICRA 2022 (2022).
- **Lizhi Yang**, Ruhang Ma and Avideh Zakhor. "Drone Object Detection Using RGB/IR Fusion" Electronic Imaging: Computational Imaging 2022 (2022).
- Zixian Zang, Haotian Shen, **Lizhi Yang** and Avideh Zakhor. "Sensor-aware SLAM-based Frontier Exploration and Mapping" Electronic Imaging: AVM 2022 (2022).
- Scott Gilroy*, Derek Lau*, **Lizhi Yang***, Ed Izaguirre, Kristen Biermayer, Anxing Xiao, Mengti Sun, Ayush Agrawal, Jun Zeng, Zhongyu Li and Koushil Sreenath. "Autonomous navigation for quadrupedal robots with optimized jumping through constrained obstacles." CASE 2021 (2021).
- Anxing Xiao*, Wenzhe Tong*, **Lizhi Yang***, Jun Zeng, Zhongyu Li, and Koushil Sreenath. "Robotic Guide Dog: Leading a Human with Leash-Guided Hybrid Physical Interaction." ICRA 2021 (2021). (ICRA Best Paper Award Finalist for Service Robotics)
- Huijuan Xu, **Lizhi Yang**, Stan Sclaroff, Kate Saenko, and Trevor Darrell. "Spatio-Temporal Action Detection with Multi-Object Interaction." EPIC@ECCV2020 (2020).
- **Lizhi Yang**, Ilian Herzi, Avideh Zakhor, Anup Hiremath, Sahm Bazargan, and Robert Tames-Gadam. "Indoor Query System for the Visually Impaired." Computers Helping People with Special Needs 12376: 517 (2020).

PROFESSIONAL AFFILIATIONS

Outreach Director May 2019 – Jan 2020
UC Berkeley IEEE

- Planned professional and educational outreach events for the society.
- Hosted STEM outreach events during university open day.

COMMUNITY SERVICE AND OTHER ACTIVITIES

Project Manager May 2019 – May 2020
Pioneers in Engineering PiSens

- Lead a team to develop new sensor kits for low-cost robot competitions.
- Participated in organizing annual robot competitions for the under-represented and low-income students in the Bay Area.