ADAM DAI

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EDUCATION

Stanford University **2019 - Present**
PhD Candidate in Electrical Engineering
M.S. in Electrical Engineering

California Institute of Technology **2015 - 2019**
B.S. in Electrical Engineering
Minor in Computer Science

EXPERIENCE

Stanford Navigation and Autonomous Vehicles Lab **March 2019 - Present**
PhD Candidate *Stanford, CA*

- Reachability analysis for safety of robot motion planning and neural networks.
- Geometric and plane-based methods for lightweight LiDAR simultaneous localization and mapping.

Stanford Computer Graphics Lab **Summer 2018**
Undergraduate Researcher *Stanford, CA*

- Under Prof. Pat Hanrahan, developed an FPGA image processing pipeline with the Magma HDL to capture, process, and classify an image with a binarized neural network.

Caltech Biodevices Lab **Nov 2017 - June 2019**
Undergraduate Researcher *Pasadena, CA*

- Under Prof. Wei Gao, designed and tested embedded electronics and software for a novel energy-harvesting sweat-based biosensor wristband as well as an ingestible health-monitoring capsule.

Toyon Research Corporation **Summer 2017, Summer 2019**
Autonomy Engineering Intern *Santa Barbara, CA*

- Developed networking communications interface and designed and ran simulations for the Decentralized Asset Manager project, a system for coordinating teams of UAVs to track vehicles.
- Created network impairment emulator which simulates latency and packet loss between assets.
- Implemented SSD Object Detector to identify targets in synthetically generated simulation video and system for auto-labeling training data based on simulation ground truth.

Caltech Robotics Team **Sept 2015 - June 2017**
Programmer and Electrical Engineer *Pasadena, CA*

- Design, build, and test a fully autonomous vehicle to compete in an underwater obstacle course.
- Worked with programming subteam on mobility and navigation code, vision and image processing, and high-level task management, electrical subteam on board design, and assisted with pool testing.
- 1st place at 2016 International RoboSub Competition.

Summer Undergraduate Research Fellowship **Summer 2016**
Undergraduate Researcher *Pasadena, CA*

- Under Prof. John Doyle in Control and Dynamical Systems, developed an experimental platform for studying human sensorimotor control and multiplexing capability.

TECHNICAL SKILLS

Sensors	LiDAR, Camera, GPS, IMU
Languages	Python, MATLAB, C/C++
Libraries	PyTorch, Tensorflow, GTSAM
Design tools	Altium, KiCad, Cadence Virtuoso, SolidWorks
Skills	Soldering, machining (mill and lathe), 3D printing

PUBLICATIONS

PlaneSLAM: Plane-based LiDAR SLAM for Motion Planning in Structured 3D Environments
Adam Dai*, Greg Lund, Grace Gao*
IEEE Conference on Robotics and Automation (ICRA) 2023 (Submitted)

Safeguarding Learning-Based Planners Under Motion and Sensing Uncertainties Using Reachability Analysis
Akshay Shetty, ***Adam Dai****, Alexandros Tzikas, Grace Gao*
IEEE Conference on Robotics and Automation (ICRA) 2023 (Submitted)

Ellipsotopes: Uniting Ellipsoids and Zonotopes for Reachability Analysis and Fault Detection
Shreyas Kousik, ***Adam Dai****, Grace Gao*
IEEE Transactions on Automatic Control (TAC) 2022

Constrained Feedforward Neural Network Training via Reachability Analysis
Adam Dai*, Long Kiu Chung, Derek Knowles, Shreyas Kousik, Grace Gao*
Robotics: Science and Systems (RSS) 2021 Robotics for People (R4P) Workshop

Biofuel-powered soft electronic skin with multiplexed and wireless sensing for human-machine interfaces
You Yu, Joanna Nassar, Changhao Xu, Jihong Min, Yiran Yang, ***Adam Dai****, Rohan Doshi Adrian Huang, Yu Song, Rachel Gehlhar, Aaron D. Ames, Wei Gao*
Science Robotics 2020

Experimental and educational platforms for studying architecture and tradeoffs in human sensorimotor control
Quanying Liu, Yorie Nakahira, Ahkeel Mohideen, ***Adam Dai****, Sunghoon Choi, Angelina Pan, Dimitar M. Ho and John C. Doyle*
2019 American Control Conference

TEACHING

Teaching Assistant **Fall 2022**
AA 275 - Navigation for Autonomous Systems