Siddharth Girdhar

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Education

Carnegie Mellon University   *Pittsburgh, PA*

B.S. IN COMPUTER SCIENCE   *Dec. 2022*

- Concentration in Machine Learning
- GPA: 3.95/4.00
- Relevant Coursework: Intro to Machine Learning, Algorithm Design and Analysis, Parallel and Sequential Data Structures, Artificial Intelligence
- Teaching: Fundamentals of Programming , Functional Programming

Work Experience

Intelligent Automation Lab, Carnegie Mellon University   *Pittsburgh, PA*

RESEARCH INTERN   *Jan. 2021 - Now*

- Implemented a graph neural network based forward dynamics model in PyTorch to make predictions about objects future states from image data
- Investigated the use of causal models to aid reinforcement learning for robot manipulation tasks to make robot learning more sample efficient and generalize better to other tasks
- Developed a matrix-based toy environment in OpenAI Gym to stress test causal reasoning algorithms

Omnipresent Tech   *Pune, India*

SOFTWARE ENGINEERING INTERN   *Sept. 2020 - Jan. 2021*

- Led a team of three to design and implement a fault tolerant controller for a quadcopter that prevents crashing after single motor failure. Tested successfully in a Gazebo simulation
- Implemented safety compliance software in the PX4 firmware to satisfy government regulations such as avoiding no-fly zones and verifying digital certificates

Uber Advanced Technologies Group   *Bellevue, WA*

SOFTWARE ENGINEERING INTERN   *May. 2020 - Aug. 2020*

- Developed an efficient tool in C++ that provides statistical and visual analysis of differences between two different topographies of ground
- Improved and optimized data pipeline which generates topography of ground from lidar data by identifying and eliminating unnecessary steps to increase runtime and quality of output from pipeline

Human and Robot Partners Lab, Carnegie Mellon University   *Pittsburgh, PA*

RESEARCH INTERN   *Oct. 2018 - Oct. 2019*

- Built a restaurant simulator using tkinter and V-REP to visualize data collected from analyzing customers satisfaction and neediness from their facial expressions and creating a testing platform for robot food delivery systems
- Designed and ran a Human-Robot Interaction study that used eye gaze information to allow the robot to predict intent of the participant. Analyzed data from the study using machine learning models to find how well people comply with the robot's suggestions

Projects

We Have A Car (WHAC)   *Pittsburgh, PA*

C++, PYTHON, ROS   *Oct. 2019 - Jan. 2020*

- Built an autonomous indoor vehicle that can map an environment and then autonomously navigate between any two points in that environment
- Utilized data from the ZED mini camera and lidar data to create an occupancy grid of the environment using ORB-SLAM
- Wrote a global and local path-planner to generate an optimal path between two points and avoid obstacles

Human Imitating Robot   *Pittsburgh, PA*

PYTHON, C   *Oct. 2018 - Dec. 2018*

- Created an inverse kinematics solver that implements the Gauss-Newton algorithm to solve for angles required to make a humanoid robot reach the desired pose
- Project was selected as top 10 from a class of 500

Publications

- T. E. Lee, J. A. Zhao, A. S. Sawhney, S. Girdhar, and O. Kroemer, (2021) Causal Reasoning in Simulation for Structure and Transfer Learning of Robot Manipulation Policies. International Conference on Robotics and Automation (ICRA)
- BA. Newman, A. Biswas, S. Ahuja, S. Girdhar, KK. Kitani, H. Admoni, (2020) Examining the Effects of Anticipatory Robot Assistance on Human Decision Making. In Proceedings of International Conference of Social Robotics (ICSR)
- A. Taylor, R. Kaufman, S. Girdhar, H. Admoni, (2019) Modeling Human Need for Attention and Interruptibility in Restaurant Scenarios. In Proceedings of the "AIxFood" Workshop at IJCAI

Skills

Programming Languages: C/C++, Python, SML, MATLAB, x86 Assembly

Technologies   Linux, ROS, Gazebo, PyTorch, Functional Programming