

Siddharth Singh

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🐙 Github

🌐 Website

EDUCATION

University of Pennsylvania

M.S. Electrical Engineering CGPA:3.7

Philadelphia, PA

August 2018 - May 2020

JSS Academy of Technical Education

B.S. Mechanical and Automotive Engineering CGPA:3.8

Noida, India

August 2013 - May 2017

KEY SKILLS & RELEVANT COURSES

- **Programming and Scripting Languages :** Python, C/C++, Java
- **Platforms and Libraries :** MATLAB, ROS, Pytorch/Numpy/Scipy/Scikit/, OpenCV
- **Courses:** Advanced topics in Machine Perception, Advanced Robotics, Autonomous Vehicles, Control In Robots, Applied Machine Learning, Introduction to Machine Learning, Statistics for Data Science, C++ for C Programmers, Algorithms and Data Structures, Numerical Optimization

EXPERIENCE

Amazon, Minneapolis

Software Development Engineer

August 2020 - Present

- **Project: Optimized and automated software applications for package routing**
- Designed an automated data vending system to provide data to consumers based on user filters and business requirements.
- Designed system proved capable of scaling under constraints of database and communication systems. Involved logical breakdown of data upstream and assimilation downstream.
- Conducted and set up automated load tests in the pipeline for AZ failure testing on hosts.

GRASP Laboratory, University of Pennsylvania

Research Assistant, Guide: Professor Kostas Daniilidis, Funding Organization : Honda Research Institute

April 2019 - August 2020

- **Project: Embodied AI for active semantic goal navigation for indoor environments.**
- Implemented a semantic mapper for creating ground truth for generative adversarial network based ensembles.
- Experimented with shape embedding and RGB embedding for predicting spatial distribution of object semantics.
- Achieved state of the art results in object goal navigation for Habitat-AI datasets(MP3d & Gibson). Submitted to RSS-2021.
- **Project : Curious reinforcement learning for exploration of multi-agent systems[Link]**
- Implemented curiosity motivated Q-learning algorithms over multi-agents for exploration and foraging experiments.
- Proved that curious agents lead to a more equitable society with more equally distributed payoffs.
- **Project: RoboNet: Visual foresight based learning for action prediction and planning (colab: RAIL, UC Berkley)[Link].**
- Demonstrated generalization capabilities of video prediction algorithms across varied and unseen robots and environments.
- Applied state space augmentation during training to help generalize across robots for zero shot and few shot learning.

PRECISE Center, University of Pennsylvania

Research Assistant, Guide: Professor Rahul Mangharam

November 2018 - August 2020

- **Project : Development of 1/10th scale autonomous vehicles using Jetson TX2 and multimodal sensor suit.[Link]**
- Developed a perception pipeline with RGBD cameras to creating semantic depth maps & perform video predictions[Link]
- Use of hourglass deep learning models and novel loss functions using temporal and gradient deltas across frames.
- Achieved safe obstacle avoidance using MPC for trajectory generation and tracking via IPOPT optimization techniques.[Link]

Robotics Research Center, Hyderabad

Research Associate

June 2017 - July 2018

- **Project : Autonomous Vehicles Development in collab. with Mathworks and Intel.[Link]**
- Developed software stack for realtime Model Predictive Speed Control framework coupled with a RRT* based planner.
- Demonstrated better performance on varying surface gradient & friction along with lateral dynamic approximation.[Link]

Publications

- S. Singh, B. Bucher, et al. **Curiosity Increases Equality in Competitive Resource Allocation**
- S. Singh, A. Modh, et al. **Gradient Aware-Shrinking Domain based Control Design for Reactive Planning Frameworks used in Autonomous Vehicles.** Advances in Robotics 2019 [LINK]
- S. Dasari, F. Ebert, S. Tian, S. Nair, A. Xie, B. Bucher, S. Singh, K. Schmeckpeper, S. Levine, C. Finn. **RoboNet: Learning and Generalizing across Robots through Large-Scale Visual Prediction and Planning.** CoRL, 2019.
- M. O' Kelly, D. Kartik, H. Zheng, J. Auckly, S. Singh, et al. **F1/10: An open-source 1/10th scale platform for autonomous racing and reinforcement learning.**