

# TARANG SHAH

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## EDUCATION

### Carnegie Mellon University - School of Computer Science (Robotics Institute)

MASTER OF SCIENCE IN ROBOTIC SYSTEMS DEVELOPMENT

Electives: Computer Vision, Deep Learning, Visual Learning & Rec, Computer Graphics, SLAM, Image Synthesis; 4.05 GPA

Pittsburgh, PA

Aug 2019 - May 2021

### BITS Pilani (Birla Institute of Technology & Science, Pilani)

BACHELOR OF ENGINEERING IN ELECTRONICS AND INSTRUMENTATION

Pilani, India

Aug 2011 - May 2015

## WORK EXPERIENCE

### Aurora Innovation

Pittsburgh, PA

SENIOR SOFTWARE ENGINEER

Jan 2023 – Present

- Software Engineer in the Map Content Creation team. Building software pipelines, tools and services to help create and update map content faster.
- Working on various map data elements and algorithms to automate generation and validation of map data.
- Led development of tooling to process, validate and convert map data from tooling friendly HD Map formats to robot friendly AV Map formats.

### Argo AI

Pittsburgh, PA

SOFTWARE ENGINEER

Jul 2021 – Dec 2022

- Working on running workloads of the core vehicle autonomy software on cloud based infra for evaluation and testing
- Building scripts and tools for developers to run cloud jobs on large datasets and optimize various aspects including compute, storage and time

### CMU – Argo AI Center for Autonomous Vehicle Research– Prof. John Dolan

Pittsburgh, PA

RESEARCH ASSISTANT

Sep 2020 – May 2021

- Built datasets and prototyped modeling approaches for scenario level anomaly detection ([ITSC 2021](#))
- Developed pipelines for data collection, visualization in the CARLA Simulator. Including custom controllers and scenarios.

### Argo AI

Pittsburgh, PA

SOFTWARE ENGINEER INTERN

Jun 2020 - Aug 2020

- Developed pipeline for associating external map data with internal HD Map format at the Data Science team (geospatial matching)
- Enhanced object-detection pipeline to extract raw results on unlabeled data to estimate data importance (cloud data retrieval and inference)

### HERE Technologies

Mumbai, India

SENIOR DATA SCIENTIST

Jul 2019 - Aug 2019

SENIOR SOFTWARE ENGINEER

Oct 2018 - Jun 2019

- Built deep learning based vision models and tools to automate extraction of map data from street images at the Map Creation team
- Trained and deployed object detection models for detecting 300+ traffic signs in street images using TensorFlow Object Detection framework (based on Faster-RCNN, SSD). Helped increase Recall and Precision to 80%+.
- Designed and built cloud-based pipelines for data sampling, annotation, training and evaluation, using cost optimized cloud infra (AWS)
- Developed mobile object detection models for hazard detection as 20%-Time project, now launched as a new product [HERE LiveSense SDK](#)

SOFTWARE ENGINEER II

Apr 2017 - Sep 2018

- Designed, built, and deployed a service for highway sign parsing (OCR, scene text and icon extraction) and reduced human effort by 5X per user

### Octoloo Systems

Gurgaon, India

CO FOUNDER

Apr 2016 – Mar 2017

- Octoloo Systems built robots for industries and warehouses. Involved in all aspects of an early-stage technology startup.
- Built an industrial robotic arm for automated Pick and Place tasks in factories and warehouses. Y-Combinator W2017 onsite interviewee

## PROJECTS

### Extracting behavior from Traffic Videos & Simulation of Realistic Behavior for Traffic Agents

CMU Capstone Project

SOFTWARE ENGINEERING & PROJECT MANAGER

Jan 2020 - Dec 2020

- Extracting visual parameters for learning behaviors from real world video data and simulation in the Carla Simulator
- Built computer vision pipeline for detecting and tracking vehicles from traffic camera videos to bird's eye view. Sponsored by [Auro by Ridecell Inc.](#)

### Resnets for Classification Networks from Scratch in PyTorch with Ensemble Selection

Intro to Deep Learning (CMU)

- Implemented ResNet from scratch and trained multiple models with varying parameters

Sep 2020 - Nov 2020

- Stood in top 10 amongst 250+ students by building an ensemble selector for choosing the best set of models

## PUBLICATIONS & AWARDS

**Robust gesture recognition using Kinect: A comparison between DTW and HMM**, Optik - International Journal for Light and Electron Optics – 2015

**CurbScan: Curb Detection and Tracking Using Multi-Sensor Fusion**, IEEE Conference on Intelligent Transportation Systems (ITSC) - 2020

**Simulation-Based Benchmark for Behavioral Anomaly Detection in Autonomous Vehicles**, IEEE ITSC - 2021

## SKILLS

**Vision/ML/Data Science:** Pandas, PyTorch, Jupyter, SQL, OpenCV, Carla Simulator, TensorFlow

**Cloud:** Compute, Storage, Autoscaling infra (EC2, EC2 Spot, S3, Lambda, ECS), Docker **Tools:** Git, Jira

**Programming:** Python, C++, C, JavaScript, Java

**Web:** HTML, CSS, NodeJS, Express