

# TARANG SHAH

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## EDUCATION

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

Pittsburgh, PA

MASTER OF SCIENCE IN ROBOTIC SYSTEMS DEVELOPMENT

Aug 2019 - May 2021

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

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

Pilani, India

BACHELOR OF ENGINEERING IN ELECTRONICS AND INSTRUMENTATION

Aug 2011 - May 2015

## WORK EXPERIENCE

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

Pittsburgh, PA

RESEARCH ASSISTANT

Sep 2020 - Present

- Building datasets and prototyping modeling approaches for scenario level anomaly detection
- Developing 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)

### CMU – General Motor Autonomous Driving Collaborative Research Labs

Pittsburgh, PA

RESEARCH ASSISTANT

Nov 2019 - May 2020

- Worked on curb detection using ultrasonic sensors and road boundary detection to improve LIDAR based methods

### 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, detection model 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

- Developed tools and systems for building image datasets, used for annotation and training, including design for active learning with feedback
- Designed, built, and deployed a service for highway sign parsing (OCR, scene text and icon extraction) and reduced human effort by 5X per user

### Octolop Systems

Gurgaon, India

CO FOUNDER

Apr 2016 – Mar 2017

- Octolop 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
- Managing and tracking the project progress as project manager for 5-member team. Project 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

### Multi Label Classification and Weakly Supervised Object Detection on PASCAL VOC Images

Visual Learning&Recog (CMU)

- Built a multi label classifier with different base models (CaffeNet, ResNet) and implemented Mixup augmentation
- Implemented Weakly Supervised detection for predicting boxes where the training data only has class labels and no boxes

## 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

2019 - **Significant Development IP Award**, Award from Patent board for POC on map and image hybrid deep learning models. [Here Technologies](#)

2018 - **Innovation Award**, For successful approval of mobile vision deep learning POC to production [Here Technologies](#)

## SKILLS

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

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

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

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