# DEVESH DATWANI

GRADUATE STUDENT, ROBOTICS ENGINEERING
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LINKS
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## PROGRAMMING LANGUAGES

- Python 3+
- C++ / C
- MATLAB

## SOFTWARE STACK

- ROS 1 & 2
- TensorFlow & PyTorch
- OpenCV
- Git
- Django, Flask & AWS
- Numpy, Pandas & Scikit Learn
- SolidWorks, AutoCad
- Linux

## INTERESTS / EXPERTISE

- Deep Learning & Computer Vision
- SLAM
- Robotic Perception

## EDUCATION

**MS IN ROBOTICS ENGINEERING**
WORCESTER POLYTECHNIC INSTITUTE
WORCESTER, MA | AUG 2021 - MAY 2023

**BE IN MECHANICAL ENGINEERING**
APSIT MUMBAI UNIVERSITY
MUMBAI, INDIA | AUG 2014 - MAY 2018

***Notable Achievement:*** Received the "Young Innovator" award for research on Plasma Actuators at the ICASTe conference, India

## WORK EXPERIENCE

**ADMATAZZ |** DATA ENGINEER
DEC 2019 - DEC 2020 | MUMBAI

- Worked in the data analysis team to improve marketing strategies through data acquisition & interpretation
- Built web applications for market analysis with Django, Python & AWS
- Deployed clustering algorithms for customer segmentation to carry out targeted marketing
- Built web crawling tools for real time data acquisition from social media platforms like Twitter, Reddit & Google

## ENGINEERING PROJECT

**AERIAL VEHICLE AUTONOMY** [DOC]
2011 - 2019 | MUMBAI, INDIA

- Designed & built scaled aerial vehicles
- Built aircraft powered by internal combustion engines & electric motors
- Implemented PD controller in C++ & Arduino for cruise control autonomy
- Built airframes with carbon fiber, composites, wood & 3D printed parts
- Flight tested 15+ configuration designs

## CAPSTONE EXPERIENCE

**FIRE SAFETY ASSISTANT ROBOT** [GITHUB]
AUG 2022 - DEC 2022 | WPI & WORCESTER - Capstone Project

- Engaged with stakeholders for problem statement identification in consultation with the Dy Chief of Worcester Fire Department
- Developed a scalable mobile robot solution with a novel approach to evaluate real time fire safety of floors in buildings
- Integrated a navigation stack for autonomous motion planning & frontier exploration & validated localization with particle filtering
- Constructed a fire safety score metric with informed RRT* algorithm on 2D grid maps generated by filtering LiDAR scans
- Built a finite state machine to automate robot task scheduling
- Implemented an obstacle recognition algorithm on cloud point data with PCA & KMeans originally intended for remote sensing

## ACADEMIC PROJECTS

**VISION BASED ROBOT TELEOPERATION** [GITHUB]
SEP 2022 - NOV 2022 | WPI - Human Robot Interaction

- Conducted user studies & analyzed quantitative & qualitative data on hand gesture & joystick based teleops in Gazebo & ROS 1
- Implemented an ML pipeline for real time hand pose estimation with CPU through multi-view bootstrapping using MediaPipe
- Integrated the ML pipeline with ROS 1 interface for mapping keypoint estimates with mobile robot teleoperation commands
- Built an intuitive human robot interface for high-latency teleops

**TRAFFIC SIGN DETECTION WITH MASK R-CNN** [GITHUB]
SEP 2021 - DEC 2021 | WPI - Machine Learning

- Built a training pipeline for fine tuning the Mask R-CNN model on a non-English traffic sign dataset with Tensorflow & Python
- Implemented sample re-distribution, sample weighting & region pass through adjustment adaptations on to the model
- Observed an increase in mAP scores by ~50% after training the adapted model on harsh-weather-condition synthetic dataset

**REMOTE SENSING FROM AERIAL IMAGERY** [GITHUB]
MAR 2022 - MAY 2022 | WPI - AI for Autonomous Vehicles

- Built & trained a U-Net model in PyTorch for segmentation & monocular depth estimation from aerial / satellite imagery
- Modified the network with Spatial Transformer Networks blocks
- Constructed 3D models from depth maps for topological analysis

## LAB EXPERIENCE

**SPACE GOAT**
SEP 2021 - JAN 2022 | WPI - Team Member (Design & Perception)

- Represented WPI in a team of 15 at the NASA Big Idea Challenge
- Designed & constructed a robot intended for Martian terrain powered by a multi clutch OTM power distribution mechanism
- Integrated & calibrated imu & ultrasonic sensors with the robot & developed complementary filter in C++ for attitude estimation

**PLASMA ACTUATORS** [DOC]
2017 - 2018 | MUMBAI UNIVERSITY, INDIAN INSTITUTE OF TECHNOLOGY
*PATENT APP NO. 201921038313*

- Spearheaded a team of 3 to design a research project on plasma actuators for airflow induction without any conventional devices
- Constructed a novel actuator design for airflow induction inside hollow pipes basing the pipe material as the dielectric medium
- Conducted experiments at the Aerospace Department of Indian Institute of Technology & recorded air flow of ~ 9000 liters / hour