VRUSHABH DESAI

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EDUCATION

Worcester Polytechnic Institute, Worcester, MA ***May 2021***
Master of Science in Robotics Engineering ***GPA: 4/4***
Dwarkadas J. Sanghvi College of Engineering, Mumbai, India ***June 2018***
Bachelor of Engineering in Electronics Engineering ***CGPA: 8.7/10***

TECHNICAL SKILLS

- **Programming Language:** C, C++ *(Completed Udacity C++ Nano Degree Program)*, Python.
- **Software:** ROS, MATLAB, CARLA Simulator, Atmel Studio, SolidWorks, Altium Designer, LTspice, LabVIEW, Rapid Harness.
- **Libraries:** OpenCV, NumPy, TensorFlow, Scikit-learn, Pandas.
- **Relevant Coursework:** Object-Oriented Programming, Robot Control, Robot Dynamics, Motion Planning, Advance Robot Navigation, Machine Learning, Deep Learning.

WORK EXPERIENCE

Grushie Energy Private Limited, Mumbai, India. **June 2018 - June 2019**

Electronic Design Engineer

- Designed Electronic Control Unit on Altium Designer and developed its embedded firmware using C. ECU handles all communications with its peripherals and sensors on a customized Control Area Network (CAN) bus.
- Led the Controls team, created a lateral steering controller for the autonomous robot using Raspberry Pi 3 and Open CV.
- Designed electric wiring harness considering DFMEA for an electric motorbike using Rapid Harness.
- Designed and analyzed Level-2 Electric Smart charger using LTspice. It has Li-Key (Light-key) with photodetectors as a sensor.

DJS Racing (Formula Student Team) **Mar 2016 - May 2018**

Electronics Team Lead

- Developed a power distribution module for F-1 style race car and interfaced with a high-tech servo motor to actuate the clutch.
- Designed a data logger and 3G Telemetry system using Race Capture pro MK3 which collects data from various sensors on the car and store the real-time data on cloud. Effectively developed a closed loop Drag Reduction System for Aerodynamic package.

ACADEMIC PROJECTS

TurtleBot Path Tracking using PID Controller *(Tools: Turtlebot2, ROS, C++)* **May 2020 - Aug 2020**

- Designed point-to-point and multi-point PID controller for turtlebot and simulated its performance on ROS gazebo.
- Deployed PID controller on actual turtlebot hardware and compared simulation results with actual hardware performance.

3D Object Detection using Modified Frustum PointNets *(Tools: Python, TensorFlow, GCP)* **Mar 2020 - May 2020**

- Performed 3D object detection on the KITTI dataset with the goal of reduced computation time and memory.
- Experimented with using SqueezeDet in the Frustum PointNet architecture for 2D detection instead of a fine-tuned Fast R-CNN

Driver Activity Recognition *(Tools: Python, Scikit Learn, OpenCV, TensorFlow)* **Sept 2019 - Dec 2019**

- Implemented an API that identifies the distracted driver and triggers the onboard alarm which helps to focus on driving.
- Designed and trained a different multi-class classification algorithm and CNN's on 22.5k labelled images, capable of detecting 10 different human distractions based on driver's activity with an average accuracy of approx. 94%.

Detection and Recognition of Traffic Signals *(Tools: C++, Python)* **Sept 2019 - Dec 2019**

- Integrated Deep Neural Network based object detection method YOLOv3 for robust object detection in the current frame.
- Extracted image features using dynamic thresholding and OpenCV libraries to detect traffic signals in a defined bounding box.

Autonomous Robotic Arm **June 2017 - March 2018**

- Analyzed forward Kinematics of 3 DOF SARA robotic arm using DH parameters and designed the CAD model on SolidWorks studied the strength of the structure using FEA.
- Tuned the PID controller of the arm to reach the desired location and LabVIEW was used as backend software.

ACHIEVEMENTS

- Won a consecutive award for *Best Designed Formula Student Car Award* at Formula Bharat, India in 2017 and 2018.
- Was *Second Best Asian Team and Best Indian Team* at Formula Student Germany 2017 held in Hockenheim Ring, Germany.
- Won *Static Event (Cost)* at Formula Student Austria held in July 2018 at Red Bull Ring, Austria.