# Atharva Pusalkar

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### **FDUCATION**

### DWARKADAS J. SANGHVI COLLEGE OF ENGINEERING

B.E. ELECTRONICS ENGINEERING May 2022 | 8.38/10.0

#### **SATHAYE COLLEGE**

HIGH SCHOOL May 2018 | 86.46%

### LINKS

GitHub:// atharva-18
LinkedIn:// Atharva Pusalkar

### DOMAINS

Autonomous Systems and Robotics. Self-Driving Cars. Applied Control. 3D Perception. Path Planning. Software Development. Embedded Systems.

### COURSEWORK

Linear Control Systems
Linear Integrated Circuits
Microprocessors and Micro-controllers
Engineering Electromagnetics
Database Management Systems
Digital Circuit Design

### **SKILLS**

### **PROGRAMMING**

C++ • C • Python • JavaScript 8086/ARM Assembly • Matlab • Bash

### FRAMEWORKS + TOOLS

Boost • Eigen • ROS/ROS2 • PyTorch • TensorFlow • CUDA • OpenCV • PCL

### **DESIGN SOFTWARE**

• Altium Designer • SolidWorks • Cura

### **AWARDS**

4th Highest Scored Worldwide Cost Analysis Formula Student Germany 2019

National Rank 4 Engineering Design Formula Bharat 2021

### **OPEN SOURCE**

Ignition Robotics (OSRF)
Ignition RViz - PR #69 & #67

### **EXPERIENCE**

#### **DJS RACING** | AUTONOMOUS SYSTEMS ENGINEER

March 2020 - Present | Mumbai, India | Report Link

- Worked in the Autonomous Systems division of DJS Racing, which is working for research in the field of robotics. As a part of the team, I worked on a driverless car for the Formula Student Driverless competition.
- Developed 3D obstacle detection using stereo vision and Ouster LiDAR.
- Worked on velocity estimation using multi-sensor EKFs (Visual Odometry, IMU, dual GPS, and wheel speed sensors).
- Designed EKF based FastSLAM algorithm with motion compensation and loop closure detection.
- Integrated a sampling-based motion planning using RRT and Delaunay triangulation to generate waypoints.
- Designed PID and geometric path controllers for track mapping and global race optimization.
- Implemented Model Predictive Control to take advantage of vehicle dynamics.

## DJS RACING | SOFTWARE DESIGN AND 3D PERCEPTION ENGINEER March 2019 - Feb 2020 | Mumbai, India

- Definition of interfaces between software modules, development of infrastructure to manage code, creating tools to improve software development experience and deciding on software conventions for the team.
- Built the interface for multi-sensor data acquisition and processing.
- Built an Ackermann drive model and PID control for simulation.
- Additional experience in CAN networks, computer networking and electronics.

#### **IEEE STUDENT BRANCH** | CHAIRPERSON

Jul 2020 - Present | Mumbai, India

• Spear-headed the IEEE Student Branch of my college to organize events in the domains of Programming, Robotics, and VLSI

### **PROJECTS**

#### MODEL PREDICTIVE CONTROL FOR RWD CARS | Nov 2020

Extension of Contouring Model Predictive Control for RWD cars with a differential, using the HPIPM NLP solver. Global race-trajectory optimization for shortest time was done using Time-Optimal Trajectory Planning (Christ et al., 2019).

### MONOCULAR DEPTH ESTIMATION USING CGANS | FEB 2020 | %

Monocular depth estimation and object detection pipeline that uses Image-to-Image Translation with Conditional GANs (Isola et al., 2017). The model learns the translation between an RGB image and its true stereo depth.

### DATA ACQUISITION FOR A FORMULA SAE CAR | MAY 2020 | %

Data acquisition and telemetry app for DJS Racing. It uses NodeJS as a backend framework and quaternion EKFs for sensor fusion. Sensor data from the car is received via an AWS EC2 instance.

#### PATHMAKER SMART CAP | ONGOING

A smart cap that guides blind people on streets by telling them of obstacles ahead making use of Computer Vision, NLP, and GPS. Technologies used - Google Cloud API, ROS, Object Recognition, Keras, and shell scripting.