

# JALAJ MAHESHWARI

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## EDUCATION

### University of Pennsylvania, USA

Master of Science in Engineering, 3.31/4.00

Mechanical Engineering and Applied Mechanics

May 2017

### Birla Institute of Technology & Science – Pilani, INDIA

Bachelor of Engineering (Hons.), 7.49/10.00

Mechanical Engineering

July 2015

## PROFESSIONAL EXPERIENCE

### Research Assistant

Sep 2017 - Present

#### mLab, University of Pennsylvania, PA, USA

*Development of a 1/10<sup>th</sup> size autonomous racecar for perception, planning, and control algorithm implementation.*

- Integrating localization, sensor fusion, path planning, and control using ROS.
- Working on localization and speed control for racecar to get estimate of vehicle position in coordinate space.

### Research Assistant

May 2016 – Present

#### Center for Injury Research and Prevention, Children's Hospital of Philadelphia, PA, USA

- Involved in projects dealing with crash analysis using finite element software.
- Conducting FE analysis of anthropomorphic test dummies (ATDs) in child restraining seats (CRSs).

### Summer Intern – Product Development

Jun 2017 – Sep 2017

#### The Ford Motor Company, MI, USA

*3D modeling of child restraining seat to use in vehicle crash test simulations.*

- 3D scanned a high-back booster child restraining seat (CRS) to generate 3D CAD model.
- Fixed generated model in CAD software, and validated full working model against physical crash test data.

## PROJECTS

### Real-Time Object Detection (Self Project)

Nov 2017 – Present

- Integrating a webcam with a GPU to detect objects in real time through ROS.
- Utilizing a pre-trained object detection machine learning algorithm to classify generic objects into different classes.

### Localization of Lost Vehicle using a Particle Filter

Jul 2017 – Aug 2017

- Implemented a 2D particle filter capable of localizing a vehicle within desired accuracy and time.
- Utilized noisy initial location, sensor and control data to make estimate of position.

### Unscented Kalman Filter (UKF) for Sensor Fusion

Jun 2017 – Jul 2017

- Incorporated a constant turn rate and velocity model to detect bicycle moving around vehicle.
- Combined LIDAR and RADAR data inputs to determine absolute position; Calculated error with respect to ground truth.

### Vehicle Detection and Tracking using Computer Vision and Machine Learning

Apr 2017 – May 2017

- Created a vehicle detection and tracking pipeline using OpenCV and support vector machines (SVM).
- Optimized and evaluated the model on video data from an automotive camera taken during highway driving.

### Advanced Lane Detection on Roads using Computer Vision

Apr 2017 – May 2017

- Built a lane-finding algorithm using distortion correction, image rectification, color transforms, and gradient thresholding.
- Identified lane curvature and vehicle displacement; Overcame environmental challenges like shadows and pavement changes.

### Using Deep Learning to Clone Driving Behavior

Mar 2017 – Apr 2017

- Programmed and trained a convolutional neural network for end-to-end driving in a simulator.
- Used optimization techniques to generalize the network for driving on multiple tracks.

### Design of Autonomous Hockey Playing Robots

Nov 2016 – Dec 2016

- Designed, built, and programmed three autonomous hockey playing robots.
- Localized robot using infrared Wii remote cameras; Implemented PID control for path control.
- Added wireless controls to receive play commands during the game.

## SKILLS

*Programming:* Python, C, C++, Matlab

*OS:* Linux, Windows

*Other:* ROS, Arduino, OpenCV, Solidworks, Tensorflow, Keras