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 1/10th size autonomous racecar.
- Incorporating algorithms for perception, planning, and control.
- Integrating localization, sensor fusion, path planning, and control using ROS.
- Currently working on localization and speed control for racecar.

Summer Intern – Product Development   Jun 2017 – Sep 2017
The Ford Motor Company, MI, USA
3D modeling of child restraining seat.
- 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.

Traffic Sign Classification using Deep Learning   Feb 2017 – Mar 2017
- Coded and trained a deep neural network to classify traffic signs.
- Experimented with different network architectures; Performed image pre-processing and validation to guard against overfitting.

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