Raghav Nandwani

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Education

- **Master of Engineering, Robotics** — College Park, MD
  University of Maryland; GPA: 3.8 — *Aug 2018 - May 2020*
  Relevant Coursework: Advanced Techniques in Visual Learning and Recognition, Artificial Intelligence and Deep Learning, Classical and Deep Learning Approaches for Geometric Computer Vision, Perception and Planning for Autonomous Robots

- **Bachelor of Technology, Mechatronics Engineering** — Jaipur, India
  Manipal University; GPA: 3.7 (7.8/10.0) — *Aug 2013 - May 2017*
  Relevant Coursework: Industrial Robotics, Computer Aided Manufacturing, Electronic Drives and Machines, Programmable Logic Controller, Mechatronics System Design

- **Sensor Fusion Nanodegree** — Online
  Udacity Nanodegree Programs — *April 2020 - June 2020*
  Relevant Projects: Obstacle detection on LIDAR point cloud, 2D tracking of Image features, Combine LIDAR and camera image to Track object in 3D, Unscented Kalman Filter for Sensor Fusion

Skills Summary

- **Programming Languages**: Python, C++, Octave
- **Libraries and Frameworks**: OpenCV, Pillow, TensorFlow, Keras, PyTorch, PCL, Pandas, Doxygen, GitHub
- **Tools and Software**: MATLAB, GCP, AutoCAD, ROS, Gazebo, Rviz, V-REP, PLC, SCADA, RoboDK
- **Operating System**: Linux, Windows, macOS

Academic Projects

- **RGB-D Fusion for Real Time Object Detection**: Optimally Fused depth data with normal RGB data to increase the AP by 3% on current state-of-the-art single-shot detection networks i.e. YOLOv3 enabling real-time processing on limited hardware Experimented with various fusion techniques such as Early, Mid and Late fusion in combination with the Learning techniques such as end-to-end or transfer learning.
- **Obstacle detection on point cloud data**: Implemented RANSAC for Planer segmentation and Voxel filtering to downsample the point cloud data, from PCL library functions. Then Implemented KD tree clustering to segment obstacles points from the roads point to have accurate 3D bounding box around the obstacles.
- **Traffic Sign Detection and Classification**: Detected Region of Interest (ROI), using HOG feature detector and Maximally Stable Extremal Regions (MSER) i.e. traffic signs in every frame of the video sequence. Trained a multi-class SVM classifier using the HOG features to classify the detected traffic signs.
- **Visual Odometry (SfM/SLAM)**: Implemented Visual Odometry pipeline to estimate the 3d motion of the camera and plot the feature points to create point cloud data of the world for a car dataset, performed Essential / Fundamental Matrix estimation using 8 point algorithm along with RANSAC and then implemented linear triangulation to estimate camera pose and PnP/RANSAC to generate point cloud data.
- **Auto-Calib**: Estimated Intrinsic and Extrinsic parameters of a Camera such as focal length, distortion coefficients and principle point, using chessboard corners. Applied Non-linear Geometric Error Minimization to tackle radial distortion.

Professional Experience

CNH Industrial — Noida, India
Graduate Trainee (Platform) — *Aug 2017 - July 2018*

- Trainee in Platform division for NAFTA and EMEA projects in the Product Development department
- Planned and budgeted the projects, in addition to that coordinated with other departments to make sure all the deliverables are achieved as planned For ex. Supervised the project that designed the Telematics solution for the tractor, harvester and construction equipments system
- Presented programs to senior management for approvals through GPD Process from PCR to OKTS

Automation Engineers A. B. — Noida, India
Internship (PLC Programmer) — *Jan 2017 - July 2017*

- Internship in the Automation Software section of the Engineering Department
- Automated the sequential operations of a Bottle filling plant and the testing of main PCB using Ladder Programming along with VXI instrumentation techniques that led to 30% reduction in testing time of each product

Certification

- "Machine Learning" by Stanford University on Coursera taught by Andrew Ng.
- "Convolutional Neural Networks" by deeplearning.ai on Coursera taught by Andrew Ng.
- "Industrial Automation with PLC and SCADA" by Automation Engineer A.B. Pvt. Ltd.
- "Embedded Systems and Robotics" by i3indya Technologies

Other Activities

- Co-founder / President of Foreign Language Society, the International Language Club at Manipal University, Jaipur (November 2015 - December 2016).
- Coordinated of "Line follower bot" event at 'Techideate - 2016', the annual technical fest of Manipal University, Jaipur (March 2016).
- Won First place in 'CodeWar', a C++ Coding competition and stood Second in 'Havoc' (Robo-War event) and 'Electro-mines', Electronics Quiz competition at the annual technical fest, 'Techideate - 2016' held at Manipal University, Jaipur (March 2016)
- Instructor in Samarpan Foundation Trust, which helps with healthcare and education facilities for the underprivileged sections of society (2014-2018).

Professional References

Dr. Chad Kessens
Adjunct Professor
University of Maryland

Mr. Mayank Mukharya
AGM, Platform
CNH Industrial

Dr. Princy Randhawa
Assistant Professor
Manipal University