APOORV SINGH

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EDUCATION

Carnegie Mellon University – School of Computer Science – Robotics Institute *Pittsburgh, PA*
Masters of Science, Robotic Systems Development *Aug 2018 – May 2020*
Relevant Coursework: Computer Vision; Deep Learning; Visual learning and Recognition; SLAM; Machine Learning; Multimodal ML
Capstone Project: Object detection and tracking, lane marking detection, trajectory prediction for on-coming vehicles for Daimler truck

Delhi Technological University (DTU) *New Delhi, India*
Bachelor of Technology in Mechanical Engineering – GPA: 8.56/10 (95 percentile) *Aug 2011 – June 2015*

PROFESSIONAL EXPERIENCES

Aptiv – Autonomous Mobility *Pittsburgh, PA*
Perception Intern *May 2019– Aug 2019*

- Developed segmentation algorithm for detecting road intersection to auto-annotate HD Maps by fusing images and LiDAR intensity
- Successfully developed algorithm in Python3 using PyTorch. Achieved targeted accuracy result of 0.7 IOU for Intersection class
- Got used to perception and mapping pipeline and software stack for complete autonomous car in C++ language
- Currently working on patent application and then after will be publishing my method on arXiv

Maruti Suzuki India Limited, Gurgaon *Haryana, India*
Assistant Manager, Research and Development *July 2015 – July 2018*

- Implemented Autonomous Level 2 features -Lane keeping, emergency braking, adaptive cruise control for Suzuki's first electric car
- Worked on camera-RADAR sensor fusion and tracking of vehicles and lane marking detection using classical vision methods
- Developed obstacle detection algorithm from 3D point cloud for parts carrier bot of assembly line using LiDAR sensor using PCL
- Leadership: Coordinated SAE national level events – SAE-Efficycle, SAE conferences etc. Took part in various organizational trainings

Switch Mobility *New Delhi, India*
Co-Founder *Oct 2016 – March 2018*

- Founded a Smart and Green mobility solutions provider venture: www.switch-mobility.com

SOS Children's Village and Rashtriya Vidhyalaya Sangathan: *Delhi, India*

- Tutored and motivated children. Guided on topics like Computer skills and career paths *May 2013 – July 2018*

PROJECTS

Detection and Response to On-coming Vehicles in Potential Crashes – Daimler Trucks and CMU *Pittsburgh, PA*

- Developing a reliable high speed on-coming collision prevention software for Trucks on countryside roads Sep 2018 – Present
- Perception Subdivision – Achieved 95% accuracy for Lane Detection using LaneNet and custom filters. Achieved 0.75 mAP for vehicle detection using YOLOv3. Worked on Inverse Perspective Mapping to get 3D information from monocular camera on Occupancy grid
- Currently working on tracking and fusion subsystem using custom made Unscented Kalman Filter and tracker. Link

Human Activity Recognition for Autonomous Cars – Carnegie Mellon University *Pittsburgh, PA*

- Worked on Spatial and Temporal learning based methods like OpenPose, Graph Convolutional networks, LSTMs etc. Spring'19
- Achieved 88.8% accuracy. Algorithm was developed in Python using PyTorch. Link

Social Robot for serving Drinks Autonomously – Carnegie Mellon University *Pittsburgh, PA*

- Worked on Camera Calibration, ARTags detection, Point Cloud Library, Person Detector, ROS on Python and C++. Link

DTU Supermileage (Delhi Technological University) *Delhi, India*

- Led a College-team of 26 students for designing and manufacturing of fuel efficient 3 wheeled vehicle *Oct 2011 – June 2015*
- Deployed & programmed Electronic Fuel Injection (EFI) and designed outer shell of vehicle on SolidWorks and ANSYS
- Achieved outstanding positions in Shell Eco-marathon, Manila, Philippines (Fuel efficient vehicle building competition)

Pipeline Crack Detection Robot, Capstone project, DTU *Delhi, India*

- Developed a robot for detecting internal cracks (Edge detection algorithm) in inaccessible pipelines *July 2014 – June 2015*

PATENTS

Filed following patents as a Co-Founder of Switch Mobility *Oct 2016 – March 2018*

- Patent application no.: 201711041591, titled "Artificial intelligence powered smart traffic lights" *New Delhi, India*
- Patent application no.: 201711041579, titled "Potholes detection mechanism"
- Patent application no.: 201711041590, titled "Artificial intelligence-based vehicle insurance score provider"

SKILLS

Programming Languages: C++, Python, C, MATLAB, Bash
Application Softwares: OpenCV, PyTorch, TensorFlow, Keras, PCL, AWS, Linux, ROS, GitHub, Docker, TensorRT, QGIS, CUDA, TensorBoard, vim