Kartik Madhira

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Personal Website: https://kartikmadhira1.github.io/

Topics of Interests: Multiview geometry, Deep learning based Computer Vision, Visual odometry, Sensor calibration (lidar-camera, camera), Sensor fusion, Image and point cloud processing, Visual SLAM

Education

- **University of Maryland** — College Park, MD
  Masters in Robotics — *August 2018 –present*
- **Nirma University** — Ahmadabad, India
  Bachelors in Instrumentation and Control Engineering — *2013–2017*

Research Experience

- **RAAS Lab, University of Maryland**
  Research Assistant — *Sept. 2019 - **present***
  Currently working on deploying perception pipeline for UAV based bridge infrastructure inspection. The sensor module includes a 3D Lidar (VLP-16), ZED Camera and IMU.
- **Computer Vision Lab, University of Maryland**
  Research Assistant — *August 2018 – April 2019*
  Implementation of supervised deep learning model for optical flow for use on edge inference devices such as Intel Neural Compute Stick.

Professional Experience

- **Aeva Inc., Mountain View**
  Perception Intern — *May 2019 – August 2019*
  Quantifying object tracking and detection in the perception pipeline - Implemented and integrated end to end metrics to set benchmarks for tracker and classifier improvements.
- **Mu Sigma Inc., India**
  Trainee Engineer — *June 2017 – February 2018*
  Implemented ARIMA forecasting models for predictions of monthly and yearly sales using past inventory data. The client was an E-commerce major in the US specializing in footwear.

Publications

- **Self balancing robot using complementary filter: Implementation and analysis of complementary filter on SBR**: Kartik Madhira, Ammar Gandhi and Aneesha Gujral, 2016 International Conference on Electrical, Electronics, and Optimization Techniques (ICEEOT), Chennai, 2016, pp. 2950-2954. (Link)

Selected Projects

- **Collision Avoidance(CAS) using Lidar and Camera fusion**: Implemented Time To Collision (TTC) pipeline in a perception stack by fusing information from the lidar and camera.
- **Structure from Motion (SfM)**: A 3D reconstruction of a scene from a set of several snaps from a Quadrotor flying over a mat of AprilTags. (Link)
- **Supervised and Unsupervised HomographyNet**: Implementation of `supervised` and `unsupervised` deep learning approaches in estimating planar homography on TensorFlow. The trained network was used to create a panorama. (Link)
- **Human Detection Module - Software Development Project**: Followed Agile Iterative Process with Unit Testing and Pair Programming to write a software package in C++ (using OpenCV) to detect humans. Used Google Test framework. (Link)
- **SnapCut/Rotobrush**: Implemented Adobe After Effects segmentation pipeline SnapCut, a robust video object cutout using localized classifiers (Link)

Skills

Computer Languages: Python, C/C++, MATLAB, R, LaTeX
Operating System: Linux, Mac OSX
Softwares/Libraries/Soft.Dev: ROS, OpenCV, TensorFlow, PCL, Numpy, Matlplotlib, Keras, Agile Iterative Process(AIP)

References

Dr. Pratap Tokekar,
Professor,
University of Maryland

Dr. Hoang Nguyen,
Senior Perception Engineer,
Aeva Inc.,

Dr.Yiannis Aloimonos
Professor,
University of Maryland