Kartik Madhira

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

Fields of Interests: 3D Vision, Object Detection/Segmentation/Tracking, Deep learning/CNN, Sensor fusion, Optical flow/depth estimation, camera calibration, SLAM, 3D registration, 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*

Experience

- **Research Assistant**
  RAAS Lab, University of Maryland — *Sept. 2019 - present*
  Deploying robust localization using sensor fusion for precise mapping of bridges from a UAV. The sensors module includes a 3D Lidar (VLP-16), ZED Camera and IMU.
- **Perception Intern**
  Aeva Inc., Mountain View — *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.
- **Research Assistant:**
  Computer Vision Lab, University of Maryland — *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.
- **Trainee Engineer**
  Mu Sigma Inc., India — *June 2017 – February 2018*
  Part of the machine learning team that implemented ARIMA 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.
- **Research Intern**
  Tethrbox Technologies — *April 2016 - July 2016*
  Pedestrian Flow Counter Contributed to research on effective traffic estimator by developing a people counter prototype using a downward facing camera.

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.
- **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)
- **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)
- **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, Windows XP/7/8/10
Softwares/Libraries/Soft.Dev: ROS, 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