KARTIK MADHIRA

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EXPERIENCE

Software Engineer, Computer Vision, Innovasea Systems *Jan 2021 - Present*
- Designing and implementing underwater perception (stereo) solution for accurate biomass estimation of fish.
- Also worked on improving air and underwater camera calibration of stereo cameras.

Software Engineer, Computer Vision, Vecna Robotics, Boston *Aug 2020 - Dec 2020*
- Implemented perception pipeline protoype for robustly detecting pose of payloads from a forklift robot equipped with a lidar and a camera.
- Implemented detection model experiments tracker and increased detection mAP by 17%.

Research Assistant, RAAS Lab, University of Maryland *Jan 2020 - Aug 2020*
- Implemented end-to-end perception pipeline (Gazebo ROS environment) for UAV based autonomous infrastructure inspection. The sensor module includes a 3D Lidar (VLP-16) and a a monocular camera.
- Perception pipeline involves semantic understanding of the environment where the infrastructure is present and catering as the input to the planning pipeline.

Perception Intern, Aeva Inc., Mountain View *May 2019 - Aug 2019*
- Implemented object tracking and detection feedback tracker for the perception pipeline.
- Worked on end to end metrics to set benchmarks for tracker and classifier improvements.

PROJECTS

Visual - SLAM
- Fun re-implementation of the ORB-SLAM paper by Raul et al. for monocular camera.
- Mapping and tracking implemented by simplifying some of the methods in the paper. All implemented in C++.

SnapCut/Rotobrush
- Implemented Adobe After Effects segmentation pipeline SnapCut, a robust video object cutout using localized classifiers.

Structure from Motion (SfM)
- 3D reconstruction of floor structure from multiple snaps taken from a flying quadrotor. To simplify the textureless problem, AprilTags were used on the floor.

KF, EKF and UKF sensor fusion of Lidar and Radar data
- Implemented for CV and CTRV process model of the ego-vehicle equipped with Lidar and Radar sensors.
- Implementation done using simulated data.

EDUCATION

Master of Engineering, Robotics *Aug 2018 - May 2020*
University of Maryland : 3.96
Bachelors in Technology, Instrumentation and Control Engineering *Jul 2013 - Aug 2017*
Nirma University : 3.8

SKILLS

Computer Vision: Visual odometry, Object segmentation, Object detection, Visual SLAM, Structure from Motion (SfM), Camera calibration, Image processing, 3D computer vision
Lidar & Radar: Point Cloud Processing, Sparse Mapping, Sensor Fusion, Radar based tracking
Softwares/Libraries: OpenCV, TensorFlow, PCL, Keras, Boost, Agile Iterative Process (AIP), Robot Operating System (ROS), NumPy, Eigen, TensorRT, g2o
Computer Languages: C++, Python, MATLAB

Recommendations

- **Srikanth Parupati**, Machine Learning Head, Innovasea Systems
- **Dr. Pratap Tokekar**, Associate Professor at UMD CS