ADITYA VAISHAMPAYAN

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PROFESSONAL EXPERIENCE:

Robotics and Control Engineer - Intern (Tesla Inc., Fremont, CA) **June 2019 – August 2019**

- Investigated and implemented from scratch a Continuous Integration and Continuous Delivery (CI/CD) pipeline in Python for FANUC industrial robots, following software development cycle.
- Developed features such as trigger based code backup, remote code push, static analyzer, control flow tool.
- Initiated virtual commissioning for auto-trimming Tesla solar panels, using a FANUC robot in Process Simulate.
- Performed thorough market research for the project of teach pendent-less robot programming. Onboarded a new vendor and orchestrated the project with them for deployment

PROJECTS:

Building a building in Minutes | 3D reconstruction, Structure-from-motion, OpenCV

- 3D reconstruction of a structure from a given dataset of 2D images obtained through monocular camera.
- Used RANSAC based Outlier Rejection, PnP Estimation, Bundle Adjustment and Triangulation

AutoCalib | OpenCV, Python

- Implemented a pipeline based on Zhang's algorithm, which minimizes reprojection error to estimate the intrinsic camera matrix and the distortion coefficients.
- Performed initial parameter estimation and then refined them using non-linear geometric error minimization.

DepthSegNet - Monocular Depth estimation and Semantic Segmentation | GCP, TensorFlow, OpenCV

- Created CNN with parallel pipelines for depth estimation and semantic segmentation.
- Used Cityscape dataset, TensorFlow and Google cloud platform for training.
- Trained depth network using stereo images, and then separately trained segmentation decoder.

Deep Homography Net, Supervised and Unsupervised | OpenCV, Keras, TensorFlow

- Implemented a deep CNN to learn homography between two images using TensorFlow by training it on MS COCO dataset to generate a panorama using image stitching.
- Also, implemented an unsupervised Homography Net using TensorDLT and Spatial Transformer Network.

Tracking an Object in 3D Space | C++, OpenCV, PCL

- Developed a pipeline to match 3D objects over time by using key point correspondences and also computed time to collision based on Lidar measurements.
- Project lidar points backward onto a camera image in order to fuse sensor modalities. Used YOLO framework on the fused data for detecting and classifying objects and track vehicles.

Luckas Kanade Tracker | Python, OpenCV, Optical Flow

- Implemented an affineLKTracker to computer affine transformations from the template to every frame in the sequence and draw the bounding boxes of the rectangles warped from the first frame.
- Also made the tracker robust to illumination changes.

TECHNICAL SKILLS:

Programming:	Python, C++, KRL (Kuka Robot Language), IEC 61131 (Ladder Logic and STL)
Frameworks and Libraries:	OpenCV, TensorFlow, Keras, PCL, Sci Kit Learn, Pandas, Matplotlib, NumPy, ROS, Gazebo V-REP, Rviz, Siemens TIA & Process Simulate, JIRA, Bitbucket, Confluence

EDUCATION:

Master of Engineering in Robotics **Aug 2018 - May 2020**
University of Maryland, College Park, MD
Bachelors in Instrumentation and Control Engineering **Aug 2014 - May 2018**
L.D. College of Engineering, Ahmedabad, India
Coursework: Statistical Pattern Recognition, Pictorial Information Processing, Deep Learning, Advance

Techniques in Visual Learning and Recognition, Perception and Planning for Autonomous Robots