Vanshil Shah

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EDUCATION

University of Pennsylvania Aug. 2021 - May 2023

M.S.E. Robotics GPA: 4/4

Courses: Machine Learning, Theoretical Deep Learning, Learning in Robotics, Geometric Computer Vision, Deep Learning for Vision, Advanced Robotics, Convex Optimization

Nirma University Aug 2015 - May 2019

B.E. in Mechanical Engineering GPA: 8.1/10

PUBLICATIONS

Prashant Kumar*, Sabyasachi Sahoo*, **Vanshil Shah**, Vineetha Kondameedi, Abhinav Jain, Akshaj Verma, Chiranjib Bhattacharyya, Vinay V. **"DSLR : Dynamic to Static LiDAR scan Reconstruction using adversarially trained autoencoder"**(*Proceedings of the AAAI Conference on Artificial Intelligence 2021*)

WORK EXPERIENCE

Ford Motors, Autonomous Vehicles LLC, Palo Alto May 2022 - August 2022

Localisation and Mapping intern, Perception Team Dr. Punarjay Chakravarthy

- Deployed a pipeline based on Neural Radiance fields for synthetic data generation.
- Experimented with slot attention based neural radiance fields for disentagling backgorund and foreground
- Achieved comparable performance of image reconstruction metrics like PSNR,LPIPS and SSIM on both real world and simulated dataset*[Project Report][Slides]*

Indian Institute of Science(IISc), Bangalore Nov 2019 - Sept 2020

Software engineer, Machine Learning Lab | Collaboration: Ati Motors Sabyasachi Sahoo

- Integrated Google Cartographer SLAM algorithm with our model DSLR for improving navigation in a dynamic setting.
- Devised a novel dataset generation pipeline to create a first of its kind LiDAR based static-dynamic frame dataset.
- Achieved *4 times better reconstruction* on Chamfer Distance over state of the art baselines.

Robert Bosch Center for Cyber Physical Studies(RBCCPS), Bangalore June 2019 - Nov 2019

Perception Team, MBZIRC 2020 | Collaboration: TCS Innovation Labs Dr. Raghu Krishanpuram

- Benchmarked visual SLAM algorithms for facilitating quad copter autonomy in degraded environments *[Video]*

PROJECTS

Segmentation and Object Detection

- **SOLO:** Implemented the network proposed in paper: *Segmenting Objects by Location* to predict instance segmentation masks over 3 categories(Vehicle, People and Animals) on COCO dataset *Github*
- **Faster RCNN:** Implemented a 2-stage RCNN based object classifier. This involved training the first stage Region Proposal Network and second stage regressor, and classifier. MAP achieved: 0.76 *Github*

Geometric computer vision

- **Multi view stereo reconstruction**: Implementation of two-view stereo and multi-view stereo algorithms for dense 3d reconstruction.Implemented the 2 view SFM algorithm using SIFT features and 8-point algorithm in tandem with RANSAC for robust camera pose estimation *Github*

Localization and Estimation

- **Particle filter based SLAM:** Integrated the inertial orientation and odometry with a 2D LIDAR scan to build the occupancy grid map of the environment while localising the robot using a particle filter *Github*
- **Orientation tracking with inertial data:** Implemented a Quaternion based Unscented Kalman Filter(UKF) to track 3D orientation from Gyroscope and Accelerometer data *Github*

Graphics rasterisation library

- Created a custom rasterizer for drawing scenes composed of 2D and 3D polygons in C++ *Github*

Video Resizer Multithreading

- Developed a modular library for resizing videos using multithreading in C++. *Github*

TECHNICAL SKILLS

Languages: Python, C/C++, MATLAB
Software Tools:ROS, Git, Docker, LaTex, OpenAI Gym, Gazebo,CARLA,Cmake
Libraries: PyTorch, Sklearn, NumPy, pandas, Matplotlib, OpenCV