Prathamesh Bhamare

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EDUCATION

Worcester Polytechnic Institute (WPI), MA, USA **Aug 2021 – May 2023**
Master of Science, Robotics Engineering, 4.0/4.0 *Focus: Computer Vision, Deep Learning, SLAM*

Smt. Kashibai Navale College of Engineering (SKNCOE), India **Aug 2013 – July 2017**
Bachelor of Engineering, Mechanical Engineering, 74.8/100

RELEVANT COURSEWORK

- Computer Vision
- Foundation of Robotics
- Deep Learning
- Robot Dynamics
- Sensor Fusion
- *Reinforcement Learning
- Vision-based Robot Manipulation

TECHNICAL SKILLS

Programming Languages: C++, Python
Softwares: Tensorflow, Keras, Pytorch, OpenCV, ROS, MATLAB, CARLA, Gazebo, PCL, Autodesk Inventor, PTC Creo

WORK EXPERIENCE

Worcester Polytechnic Institute, MA **Aug 2021 – present**
Teaching Assistant, Mathematical Sciences Department

- Conducting Lectures, Discussion sessions, weekly office hours, and quiz grading.

Atlas Copco, India and Belgium **July 2017 – April 2021**
R&D Mechanical Design Engineer, Portable Compressors

- Designed 3D CAD models for compressors worth $1.5M using Design for Manufacturing and Assembly (DFMA) approach. Parameterized manufacturing drawings and Bill of Materials using GD&T-ASME Y14.5 to improve team efficiency by 15%. Handled DN approval flows, and optimized manufacturing timeline using Poka-Yoke mechanism.

RESEARCH EXPERIENCE

DigSafe Autonomous Cable Detection System, WPI **June 2022 – present**
Research Assistant, Adaptive and Intelligent Robotics Lab, Prof. Jing Xiao

- Estimated state of SDR HK-1500 mobile robot in an unstructured environment using Unscented Kalman Filter (UKF) to fuse data from GPS, IMU, Encoders, and 2D Lidar. Developed robot motion strategy fusing artificial GIS map data and detection signal strength information of underground utility cables.

Point cloud Semantic Segmentation and Benchmarking, WPI **Jan 2022 – present**
Graduate Researcher, Vision, Intelligence, and System Lab, Prof. Ziming Zhang

- Collected synchronized and spherically projected 3D lidar point cloud dataset in the Carla simulator. Trained state-of-the-art SqueezeSeg and SalsaNext architecture from scratch on simulated dataset. Analyzed domain shift adaptation capabilities and benchmarked results for 3-class segmentation - Car, Pedestrian, and background.

PROJECTS

Stereo Visual SLAM, WPI **June 2022 - Sept 2022**

- Used feature matching, Lucas-Kanade optical flow tracking, and Perspective-N-Point algorithm for 3D-2D motion estimation using ORB features. Obtained robust pose estimation by performing outlier rejection using the RANSAC algorithm. Implemented keyframe-based backend optimization using Bundle Adjustment for drift correction.

Sensor Fusion Nanodegree, Udacity **May 2022 - July 2022**

- Performed Lidar Obstacle detection using segmentation and clustering algorithms. Executed 3D object tracking fusing camera and lidar data. Estimated state of multiple cars on highway fusing noisy lidar & radar measurements using UKF.

Driver Activity Recognition, WPI **Jan 2022 – Mar 2022**

- Used Histograms of Gradients and SURF as feature representation for the images. Experimented with Mean-shift and K-means clustering for segmentation and PCA for dimensionality reduction. Classification using Gaussian kernel-based SVM, and CNN based on the VGG-16 architecture.

Vision-based Robot Manipulation, WPI **Sept 2021 – Oct 2021**

- Implemented visual servoing algorithm for 2 DOF robot using position and velocity controller. Used PCL RANSAC algorithm to fit a plane to the given object point cloud from YCB dataset. Calculated center of object point cloud and computed normals to detect grasp position for Panda manipulator.