

# SHUBHANKAR MILIND POTDAR

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## EDUCATION

**Carnegie Mellon University, Pittsburgh, PA**

**May 2020**

*Masters in Electrical and Computer Engineering.*

Graduate Courses: Robot localization and mapping, Intro to ML, Computer Vision, Intermediate Deep Learning, ML for Structured Data, Advanced Probability and Statistics, Foundations of Computer Systems, Distributed Systems.

**Veermata Jijabai Technological Institute (VJTI), University of Mumbai, India**

**May 2016**

*Bachelor of Technology in Electrical Engineering.*

## PUBLICATIONS

- A Harley, Y Zuo, J Wen, A Mangal, **S. Potdar**, R. Chaudhry and K Fragkiadaki. "Track, Check, Repeat: An EM Approach to Unsupervised Tracking." **CVPR 2021**. [Paper Page](#)
- M Prabhudesai\*, S Lal\*, HYF Tung, A Harley, **S. Potdar**, and K Fragkiadaki. "3DQ-Nets: Visual Concepts Emerge in Pose Equivariant 3D Quantized Neural Scene Representations." **CVPR Workshops 2020**. [Paper Page](#)
- **S. Potdar**, S. Pund, S. Shende, S. Lote, K. Kanakgiri and F. Kazi. "Real-time localisation and path-planning in ackermann steering robot using a single RGB camera and 2D LIDAR". **IEEE ICIECS 2017** [Paper Page](#)
- **S. Potdar**, A. Sawarkar, and F. Kazi. "Learning from demonstration from multiple agents in humanoid robot." **IEEE SCECS 2016** [Paper Page](#)

## SKILLS AND PROGRAMMING LANGUAGES

- Programming Languages: Python (Level: Advance), Matlab (Level: Intermediate), C++(Level: Intermediate), C (Level: Beginner), Java(Level: Beginner), C# (Level: Beginner).
- Software Libraries: PyTorch, TensorFlow, Theano, Keras, OpenCV, Microsoft Kinect SDK, ROS, Intel RealSense SDK.

## RELEVANT PROFESSIONAL EXPERIENCE

*Research Intern (Advisor: Prof. Katerina Fragkiadaki), Machine Learning Department, CMU*

**July 2020 - Present**

**Project: Various projects in tracking and object recognition**

- Responsible for implementing models from research papers using pytorch, conducting experiments and contributing to new research papers.
- Track, Check, Repeat: Contributed in developing an EM based unsupervised technique to track 3D objects in videos and reported state-of-the-art accuracy in object discovery and tracking on CATER and KITTI.
- 3DQ-Net: Contributed in developing a model to detect objects in 3D without 3D supervision and outperform baselines
- Tracking Invisible Pixels: Developed a dense optical flow and voting based technique to track visible and occluded pixels in a video and achieved state of the art accuracy on modified versions of the SINTEL and Flyingthings3D datasets.

*Computer Vision Intern, Bossa Nova Robotics, CMU, Pittsburgh*

**May 2019 - August 2019**

Bossa Nova Robotics is a startup robotics company that manufactures inventory control robots for use in retail stores.

**Project: Product Image Classification**

- Deployed ResNet, VGGNet on board robots to perform classification of the products seen by the robots in the aisle.
- Overcame the problem of imbalanced dataset by using various losses like focal-loss, ring-loss and techniques like imbalanced sampling to achieve test accuracy of 97%.

*Research Fellow, Cerelabs Private Limited, Mumbai, India*

**July 2018-November 2018**

Cerelabs is a software services and products' company which utilizes AI to provide solutions for businesses. I was responsible for conducting research and developing novel solutions for the clients.

**Project: Electronic Information Extraction from Document. (Optical Character Recognition team)**

- Developed programs to correct text from the OCR using Noisy Channel Model and Bayesian Hypothesis estimation.

## COURSE PROJECTS

**Project: Extending ORB SLAM to a multi-camera setup (with Prof. Michael Kaess)** [Page Paper](#)

- Proposed the novel Unified Key Frame (UKF) approach for feature collection in ORB-SLAM on a multi-camera setup.
- Improved qualitative performance on KITTI dataset when compared to the baseline of single camera based ORB-SLAM.

**Project: Vehicle detection from point-cloud data (with Prof. Ruslan Salakhutdinov)**

- Utilized PointCNN architecture to improve feature extraction network for detection in PointRCNN architecture.
- Improved detection performance of PointRCNN by 9.33% in mIOU and 4% in mAP for the car class on KITTI dataset

**Project: 3D Dense Reconstruction Using ICP and Point-based Fusion using RGB-D images.** [Page](#)

- Implemented a tracking and mapping system that reconstructs a 3D dense model of a static indoor environment.
- Performed tracking using point-to-plane iterative closest point (ICP) and mapping using point-based fusion.