

Sanil Pande

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Education

Carnegie Mellon University

Pittsburgh, PA

MASTER OF SCIENCE IN ROBOTIC SYSTEMS DEVELOPMENT

May 2021

QPA: 4.25/4.33

Coursework: Visual Learning & Recognition*, Robot Autonomy*, Computer Vision, Robot Mobility

Vellore Institute of Technology

Vellore, India

BACHELOR OF TECHNOLOGY IN MECHANICAL ENGINEERING

April 2019

CGPA: 9.16/10.00

Projects

Docking, Navigation and Safety Behavior for an Autonomous Vehicle

Jan '20 - Present

CMU MRSD CAPSTONE PROJECT - SPONSORED BY PIX MOVING | [WEBSITE](#)

- Developing behaviours for an autonomous vehicle intended to dock with modular pods, and integrating into Autoware.
- Mapped indoors using a Velodyne lidar and simulated localization in Autoware using the point cloud data.
- Implemented ROS nodes to detect Apriltags and measure relative pose to facilitate docking in simulation.
- Working on using single-shot networks for obstacle detection & classification to facilitate safe navigation.

Online Low-Shot Learning

Feb '20 - Present

CMU - VISUAL LEARNING & RECOGNITION PROJECT

- Working to incorporate low-shot learning of new faces, while maintaining accuracy on previously learned data.
- Used an implementation of cascaded neural networks to crop and align faces from the VGGFace2 dataset.

Weakly Supervised Object Localization

March '20

- Trained a fully convolutional network to perform localization using image level annotations, and visualized heatmaps.
- Defined and trained a weakly supervised deep detection network based on the Faster-RCNN architecture.

Object Classification with Pytorch

February '20

- Defined and trained CaffeNet and ResNet-18 architectures for classification on the PASCAL-VOC 2007 dataset.
- Finetuned a pre-trained Resnet-18 model and incorporated mixup for data augmentation.
- Monitored training performance using TensorBoard and analyzed the feature embeddings using KNN and t-SNE visualization.

Quadcopter Control

Sep '20 - Nov '20

- Designed a state machine for a quadcopter and implemented PID and LQR feedback control.
- Simulated by generating time-parametrized, piecewise-continuous constrained trajectories.

Optical Character Recognition and Style Transfer

November '19

- Developed OCR pipeline to recognize handwritten alphabets and spatial information such as spaces and new lines.
- Implemented a convolutional network in Pytorch and consistently obtained an accuracy of >90% using OCR on test images.
- Performed image style transfer on a video sequence using Pytorch and OpenCV.

Measurement of Spindle Error in a Lathe using Laser Spot Detection and Tracking

Dec '18 - April '19

VIT - BACHELOR'S THESIS | PRESENTED AT CPIE '19

- Detected a projected laser spot using morphological operations.
- Calculated synchronous and asynchronous spindle error using Fourier Series curve fitting.
- Measured spindle radial error using tracking algorithms in OpenCV.

Skills

Programming C++, Python, MATLAB

Tools Pytorch, Robot Operating System (ROS), Autoware, OpenCV, Git, AWS, SolidWorks

Experience

Treknocom Engineering

Pune, India

ENGINEERING DESIGN INTERN

May 2018 - June 2018

- Utilized SolidWorks for surface modelling of fixtures, piping and sheet modelling.
- Generated CNC toolpaths for roughing, semi and finishing using WorkNC.

JCB India

Pune, India

DESIGN INTERN

June 2017

- Worked on the design of Backhoe Loader models using Siemens NX.
- Contributed to part optimization by collecting part data for standardization.