Neet Mehulkumar Mehta

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EDUCATION

Worcester Polytechnic Institute (WPI) **Worcester, MA**
Master of Science- Robotics Engineering, GPA- 3.85/4.00 Dec 2022
Nirma University **Ahmedabad, India**
Bachelor's in mechanical engineering, GPA- 7.8/10.00 May 2020

KEY SKILLS

- **Programming Skills**: C++, Python, MATLAB
- **Tools and Libraries**: Pytorch, TensorFlow, TensorRT, CARLA simulator, Machine learning on cloud with AWS Sagemaker, Apache airflow, PCL (Point Cloud Library), OpenCV, ROS, Docker, Git, Blender 3D.

WORK EXPERIENCE

TORC Robotics **Blacksburg, VA**
Perception Engineer – Co-Op Jan 2022 – Aug 2022
C++, Python, Pytorch, AWS, TensorRT

- Developed a Multitask learning network to predict Instance and semantic masks and depth. Reduced combined inference time by 20 ms.
- Developed a novel self-supervised depth estimation network that can be used in multitask learning. Trained architecture without any Ground truth data.
- Worked on Data extraction and data postprocessing for deep learning architectures. Established extendable pipeline to generate detailed metrics report for each Deep learning model.
- Developed automated hyperparameter tuning stage in AWS Sagemaker. Used Bayesian search to find optimal hyperparameters.

Institute for Plasma Research (IPR) **Gandhinagar, India**
Research Intern Jan 2020 – May 2020

- Developed a fully working model 5-DOF serial manipulator on an omnidirectional platform for inspection of Tokamak reactor that can be controlled by VR setup.

RESEARCH EXPERIENCE

Cognitive Medical Technology (COMET) Lab, WPI *C++, python, MATLAB* **Worcester, MA**
Modeling the Kinematics and Dynamics of Continuum robot using Machine Learning Techniques Sept 2021 – Dec 2021

- Implemented an LWPR (Locally weighted projection regression) algorithm to model the complex and recursive kinematics and dynamics of continuum robots.
- Developed a deep neural network for the same and compared the time complexity of both algorithms.

PROJECTS

Vehicle Trajectory Prediction using Social GANs and LSTMs Aug 2022 – Present
Python, Pytorch

- Implementing Social GANs and LSTMs on the Argoverse Motion Forecasting dataset.
- Predict multiple socially plausible futures by training adversarially against a recurrent discriminator.

Self-driving car simulation in CARLA simulator Aug 2022 – Present
Python, Pytorch, CARLA

- Implementing perception stack using Deep learning.
- Implementing ADAS system from scratch in CARLA simulator.
- Implemented lattice planning algorithms with Bezier curve primitive for turning the vehicle and overtaking in low traffic scenarios in the CARLA simulator using python API.

Self-Supervised Monocular Depth Estimation (Monodepth2) from scratch June 2022 – July 2022
Python, Pytorch

- Implemented Deep CNN architecture that can predict Depth without any annotations on KITTI raw dataset.
- This architecture can be trained without any ground truth annotation.
- Able to achieve an absolute error of 0.151.

Multinet-2: A Multitask learning architecture for Semantic, Depth, and Normal prediction Feb 2022 – May 2022
Python, Pytorch

- Implemented Deep CNN architecture that can predict Semantic mask, estimate Depth, and normal simultaneously.
- Increased combined inference speed to 1.75x with a slight accuracy drop.

3D Object Detection in Point Cloud using Voxel-RCNN Sept 2021 – Dec 2021
Python, Pytorch, OpenCV

- Implement a 3D detection network (VoxelNet) on the KITTI vision (Point Cloud) benchmark dataset to unify feature extraction and bounding box prediction into a single-stage, end-to-end trainable deep network.

Real-time hand gesture recognition using SSD-MobileNet and Transfer Learning Oct 2021– Dec 2021
Python, Tensorflow, OpenCV

- Trained object detection model consisting of 5gestures by Transfer Learning to a pre-trained SSD-MobileNet model and TensorFlow object detection API on RTX 2060 MAX-Q GPU.
- Achieved 80% accuracy for a class.
- Trained lightweight model suitable for real-time hand gesture recognition.

Popular CNN architectures
Python, Pytorch
Jan 2022 - present

- Implementing popular Deep Learning architecture for 2D/3D object Detection, Semantic and Instance Segmentation, and Depth Estimation.
- The purpose of these projects is to develop a strong foundation of the theoretical and practical aspects of Deep Learning.
- You can find all the projects on my GitHub. Some of them might still be in development.

Implementation and Visualization of Autonomous Robot Path Planning Algorithms Feb 2021 – May 2021
Python

- Implemented discrete and sampling-based algorithms such as A*, Weighted A*, Dijkstra, Probabilistic Road Map (PRM), Rapidly exploring Random Tree (RRT), RRT*, and Informed RRT* to navigate through obstacles in a 2D environment.

EXTRACURRICULAR ACTIVITIES

- **Teaching Assistant:** Assisted professor in organizing two graduate-level courses in Summer ’21.
- **Publicity Volunteer:** Gathered the highest number of students from other universities for national level Tech-Fest ‘Praveg ’18.