Manas Jyoti Buragohain

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Education

University of Michigan — Ann Arbor, MI
Master of Sciences in Robotics, GPA : 3.93/4.0 — *Aug. 2019 – Present*

Delhi Technological University — Delhi, India
Bachelor of Technology in Electronics and Communications Engineering — *Aug. 2013 – May 2017*

Work Experience

NXP Semiconductors — August 2017 – February 2019
Design Engineer — *Noida, UP, India*

- Developed C++ applications for Advanced Driver Assistance System (ADAS) system to perform Lane and Pedestrian Detection using SqueezeNet architecture optimized for embedded systems.
- Executed continuous testing and integration of Low Light Noise Reduction and Histogram of Gradients Generation modules for accelerating hardware computation on ADAS system.
- Formulated and streamlined C++ unit tests of FlexCAN and LINFlex protocol modules for intra vehicular communication.

Research Experience

Graduate Student Research Assistant — January 2020 – Present
University of Michigan — *Ann Arbor, MI*

- Developed a grid based point cloud prediction network using ResNet-50 backbone using PyTorch.
- Developed a novel approach for point cloud refinement using local context and attention-based supervision through a modified Transformer Architecture.
- Implemented differentiable top K selection through Reparameterizable Subset Sampling using CUDA Kernels.

Projects

SICGAN | *Python, Pytorch, PyTorch3D* — January 2020 – May 2020

- Implemented an end-to-end conditional Generative Adverserial Network with a Shallow Graph Neural Network Discriminator for predicting 3D objects from single RGB image.
- Achieved better qualitative 3D reconstructions as compared to baseline methods.

Probabilistic Data Association for Semantic SLAM | *PyTorch, MATLAB, Git* — January 2020 – May 2020

- Recreated the work Bowman et. al. with augmentations to object detection framework along with incorporation of loop closure for better offline map generation.

Mobile Inverted Pendulum System | *C++, Robot Control Library, Git* — August 2019 – December 2019

- Developed a cascaded PID control architecture to balance the robot and to autonomously drive in user as well as pre-defined trajectories.

6-DOF Serial Link Robotic Manipulator | *Python, OpenCV, Git* — August 2019 – December 2019

- Developed a codebase in Python to drive serially connected motors autonomously for generating smooth and safe paths by integrating obstacle avoidance with path-smoothing.
- Implemented object detection using Kinect camera suite (3D depth sensor and RGB camera) for pick-n-place operation.

Occupancy-Grid SLAM for Autonomous Ground Robot | *Python, C++, Git* — August 2019 – December 2019

- Implemented Monte-Carlo localization using 2D-LiDAR sensor and an occupancy-based mapping algorithm on a grid cell.
- Incorporated an exploration strategy to search and navigate through new frontiers in an unknown environment using A* path planning.

Technical Skills

Languages: Python, C/C++, JavaScript, HTML/CSS
Developer Tools: Git, VS Code, Visual Studio, Jupyter Lab, Eclipse
Libraries: PyTorch, Pytorch3D, OpenCV, Caffe, NumPy, Matplotlib, CUDA