

Manas Jyoti Buragohain

Website: manasburagohain.github.io

Github: github.com/manasburagohain

Email: manasjb@umich.edu

Mobile: 734-881-5295

LinkedIn: linkedin.com/in/manas-jyoti

WORK EXPERIENCE

- Magic Leap. Inc.** Sunnyvale, CA, USA
Software Engineer, Perception Aug 2021 - Present
 - Implemented a python based 3D object rendering pipeline for generating synthetic data to lower reliance on gathering real world data by 25%.
 - Designed real time object pose estimation pipeline using RGB and Depth data at 5 FPS with 95% accuracy.
 - Conceptualized and deployed communication pipeline for sending sensor and mesh data between AR device and cloud server using Protocol Buffers from GRPC library.
 - Optimized the pipeline's performance by decreasing the latency by 50% through custom data compression and elimination of unnecessary data copy operations freeing up 15% CPU capacity.
 - Evaluated and rectified shift sensitivity of predictions from Hand Keypoint prediction network due to input jitter, reducing prediction error 30% to subpixel accuracy.
- NXP Semiconductors** Noida, India
ADAS Engineer, Functional Validation Aug 2017 - Feb 2019
 - Coded C++ programs for Advanced Driver Assistance System (ADAS) system to perform Lane and Pedestrian Detection using SSD 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

- Johnson AI Lab, University of Michigan** Ann Arbor, MI, USA
Graduate Research Assistant | Advisor: Justin Johnson Jan 2020 - April 2021
 - Designed a grid based point cloud prediction network using ResNet-50 backbone achieving state of the art performance.
 - Developed a novel approach for point cloud refinement using local context and attention-based supervision through an augmented Transformer Architecture.
 - Implemented differentiable Top-K selection through Reparameterizable Subset Sampling for face selection using customized CUDA Kernels.

EDUCATION

- University of Michigan** Ann Arbor, MI, USA
Master of Science in Robotics Sept 2019 - April 2021

SKILLS SUMMARY

- Concentration Areas:** Computer Vision, Deep Learning, 3D Reconstruction
- Programming Languages:** Python, C, C++, JavaScript, HTML, Bash
- Tools:** PyTorch, PyTorch3D, OpenCV, CUDA, Caffe, NumPy, Matplotlib

SELECTED PROJECTS

- Sparse Neural Generative Inference Based Pose Estimation:** Attempted to build a particle filter based pose estimator where each particle learns latent embedding to infer pose, object likelihood, and re-sampling objective iteratively. Key: Particle Filter, PyTorch, Pose Estimation, RGB-D (December '20)
- Single Image 3D Reconstruction based on Conditional Generative Adversarial Networks:** An end-to-end conditional GAN framework for generating 3D objects from single RGB image. We achieve improved qualitative 3D reconstructions compared to the Pixel2Mesh baseline. Key: 3D Reconstruction, PyTorch, Deep Learning, GAN (May '20)
- Probabilistic Data Association for Semantic SLAM with Loop Closure Detection:** Replicate and improve upon the work of Bowman et al with augmentations to object detection framework along with incorporation of loop closure for better offline map generation. Key: SLAM, Object Detection, Stereo Vision, Depth Estimation, PyTorch, MATLAB (May '20)
- Robot Middle-ware Development:** Developed a web-based dynamic simulator and set-point controller for mobile manipulators like Fetch, Baxter and Sawyer. Implemented motion planners like A*, Bi-directional RRT-connect and RRT* in the simulator for any obstacle environment. Key: JavaScript, Path Planning, Manipulator Modelling (December '20)
- Slam and Path Planning for MBot:** Explored and implemented various mapping, path planning and motion control algorithms on a simulation model for a differential drive robot. Key: LIDAR, SLAM, A-Star, Path Planning (December '19)
- 6-DOF Serial Link Robotic Manipulator:** Produced a codebase in Python to drive serially connected motors autonomously, employing object detection using a kinect camera suite for pick-n-place operation. Key: Python, Manipulator Modelling, Object Detection, OpenCV, Path Planning - Smoothing, State Machines (December '19)

PUBLICATIONS

- Fish species classification using graph embedding discriminant analysis:** Conference on Machine Vision and Information Technology, 2017. Authors: **Manas Jyoti Buragohain***, Snigdhaa Hasija*, and S. Indu