Ajay Narasimha Mopidevi

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Education

University of Colorado Boulder — Boulder, CO
Masters of Science in Computer Science — GPA: 4.0/4.0 — *Aug. 2022 – Dec 2023*

Indian Institute of Technology, Guwahati (IITG) — Guwahati, India
Bachelors of Technology in Electronics and Communication Engineering — *Aug. 2013 – May 2017*

Publications

- "Tell Me Where to Go: A Composable Framework for Context-Aware Embodied Robot Navigation", Conference on Robot Learning, 2023 *(under review)*
- "MultiNavCon: A Multi-Agent Framework for Landmark-Guided, Language-Based Navigation", International Symposium on Experimental Robotics, 2023 *(under review)*
- "Grouped BERT for Multi-Label classification to reason the human values behind the arguments", Proceedings of the The 17th International Workshop on Semantic Evaluation (SemEval-2023)

Experience

Autonomous Robotics and Perception Group — Boulder, CO
Research Assistant — *Sep 2022 - Present*

- Designed NavCon, a low bandwidth robot navigation framework using Large Language Models(**LLM**s), achieving a **71.3%** success rate in guiding a **Spot** robot through intricate human commands in various environments
- Utilized only the radar data, sparse pointclouds compared to Lidar data, to overcome the challenges in visually degraded scenarios and improved the odometry estimation by **8%** , using **transformer** and DeepVO architectures
- Developed generative transformer architecture for denoising radar pointclouds and generating the incomplete sections in them. Used transformed pointclouds to provide more spatial information in localization and mapping

Vignesh Kasinath Lab — Boulder, CO
Research Assistant — *Apr 2023 - Present*

- Achieved 92% accuracy in segmenting cellular structures like ribosomes and membranes using $< 1\%$ of the entire tomogram for training
- Designed U-NeXt architectures, combining the ConvNeXt and U-Net, specifically tailored for tomograms captured at different scales, resulting in a f1 score of 85% for segmentation

Samsung Semiconductors India R&D — Bangalore, India
Computer Vision Research Engineer, Advanced Multimedia Solutions Team — *July 2020 – July 2022*

- Developed **3D scene reconstruction** algorithm, exclusively leveraging depth from ToF sensors, achieving a real-time processing speed of **20fps**
- Improved the **accuracy by 5%** by detecting and removing outliers and also automated the pose alignment of output 3D scene with groundtruth to eliminate the manual alignment in MeshLab
- Reduced the latency of Remosaic deep learning models for 200M pixel camera sensor using **quantization** and **pruning** techniques by 10 % with an unnoticeable degradation of 0.1% in perceptual quality

Qualcomm — Bangalore, India
Software Engineer, Audio Quality Validation Team — *Aug. 2017 – June 2020*

- Spearheaded the development and maintenance of python audio library to evaluate both the objective and perceptual audio quality of Bluetooth headsets
- Enhanced python automated test framework with new features that populate test vectors and visualize audio output signals, leading to a 10%-15% reduction in both the validation and development teams' efforts

Eagle Eye Networks — Bangalore, India
Research Intern — *May 2017 – July 2017*

- Leveraged YOLO for object localization, optical flow for trajectory estimation, achieving 83% accuracy in detecting location and trajectory anomalies through Incremental Spherical Clustering and frequency heatmap

Technical Skills

Languages: Python, C/C++, Matlab
Machine Learning Frameworks: Keras, Pytorch, Tensorflow
Libraries: OpenCV, ROS, Open3D, OpenCL, OpenGL, OpenMP, scikit-learn, pandas, NumPy, Matplotlib
Tools: Git, Meshlab, CloudCompare, Visual Studio, PyCharm, Eclipse