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 – May 2024*

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

Publications

- "RMap: Millimiter-Wave Radar Mapping through Volumetric Upsampling" *(under review at ICRA 2024)*
- "Tell Me Where to Go: A Composable Framework for Context-Aware Embodied Robot Navigation" *(**Accepted** at CoRL 2023)*
- "MultiNavCon: An Architecture for Language-Directed Navigation of Multiple Robots" *(under review at ICRA 2024)*
- "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*

- Developed the state-of-the-art generative transformer, **UpPoinTr**, for enhancing volumetric maps from sparse and noisy radar scans, surpassing the prior models by **8%** in performance and generate lidar-like navigable maps
- 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
- Improved the odometry estimation with only the noisy and radar scans by **8%** , using **transformer** and DeepVO architectures

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

- Devised Multi-UNet architecture, seamlessly integrating the segmentation of multiple structures, resulting in a substantial 13% boost in F1-score
- 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, only leveraging depth from ToF sensors, optimized to **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