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 for IROS 2024)*
- "Tell Me Where to Go: A Composable Framework for Context-Aware Embodied Robot Navigation" *(**Accepted** for CoRL 2023)*
- "CryoSegment: Simultaneous Segmentation of diverse cellualr structures from Cryo-ET images" *(under review for Nature Methods)*

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 to generate lidar-like navigable maps
- Improved the odometry estimation with only the 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 simultaneous segmentation of multiple cellular structures from Cryo-ET images, resulting in a substantial **13%** boost in F1-score

Samsung Semiconductors India R&D — Bangalore, India
Computer Vision Engineer, Advanced Multimedia Solution Team — *July 2020 - July 2022*

- Developed real-time **3D scene reconstruction** algorithm, only using depth from ToF sensors, optimized to **20fps**. Improved the accuracy by 5% of the reconstructed scene by removing outliers using gaussian smoothing
- 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 - Jun 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 developments efforts

Technical Skills

Languages: Python, C/C++, JavaScript, Matlab
Machine Learning Frameworks: PyTorch, Keras, Tensorflow
Libraries: OpenCV, ROS, Open3D, NumPy, Matplotlib, pandas, OpenCL, OpenGL
Developer Tools: Git, Docker, Google Cloud Platform, VS Code, Visual Studio, PyCharm, IntelliJ, Eclipse, MeshLab

Projects

LLM Guided Robot Navigation | *Python, ROS, C++, LLM*

- Developed NavCon, a low bandwidth framework for human-instructed robot navigation leveraging the vast contextual insights from Large Language Models(LLMs)
- Evaluated NavCon in diverse environments to guide Spot robot through intricate human-guided commands, achieving a success rate of 71.3%

ToneTrack - Real-Time Emotion Detection | *Python, Tensorflow, Javascript, Docker, Kubernetes, Git*

- Developed a real-time emotion detection application to capture the real-time audio conversations through audio streaming service and identify individual speakers and track their emotions over the entire conversation
- Deployed the application on the Google Cloud platform on a custom Kubernetes cluster with REST-based APIs to facilitate scaling and load balancing for optimal performance