VAISHNAVI VIVEK GEJJI

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EDUCATION

Worcester Polytechnic Institute, MA **Aug 2021 - Jun 2023**
MS in Robotics Engineering (CGPA: 4.0)

TECHNICAL SKILLS

- **Programming & Tools:** Python 3.10+, modern C++ (14/17), ROS, ROS2, Bash, Git, Docker, Blender
- **Perception & Robotics:** Structure-from-Motion (SfM), SLAM, Visual-Inertial Odometry (VIO), multi-view geometry, sensor fusion, 3D reconstruction and surface reconstruction, localization, camera and multi-sensor calibration, Gaussian Splatting, NeRFs, 3D point cloud and mesh processing, COLMAP, GLOMAP+
- **ML & Deep Learning:** PyTorch, TensorFlow, scikit-learn, OpenCV, Open3D, PCL, NerfStudio, image segmentation, object detection, classification, tracking, defect detection, differentiable rendering

WORK EXPERIENCE

Computer Vision Engineer | Smartapp.com | Oct 2023 - Present

- Lead the development of a phone-based 3D reconstruction pipeline using custom Structure-from-Motion (SfM) and 3D Gaussian Splatting to build VR-consumable digital-twin 3D tours of construction sites.
- Designed core features in Python to update Gaussians only in changed regions (without rerunning SfM), perform 3D stitching of multiple rooms and floor-level fragments, and scale reconstructions to real-world dimensions, improving fidelity and user experience.
- Integrated on-device Visual-Inertial Odometry (VIO) in C++17 to provide initial camera pose estimates, accelerating SfM and improving reconstruction quality in scenes with repeating geometry.
- Implemented dynamic object detection, occlusion detection, and masking to suppress noisy Gaussians and misplaced SfM feature points, increasing reconstruction stability in cluttered environments.
- Containerized the full pipeline (Docker) to enable scalable deployment and reproducible environments.
- Collaborated cross-functionally with the GCP infrastructure, app development, and 3D viewer teams to integrate the reconstruction pipeline into the production stack and prepare it for release.

Computer Vision Intern | Smartapp.com | Oct 2022 - Sept 2023

- Built camera intrinsic calibration and LiDAR-camera extrinsic calibration pipelines in Python to align sensor data and generate colorized point clouds for downstream 3D reconstruction and visualization.
- Developed a 2D fisheye image stitching pipeline to create a wider FOV input and analyze COLMAP performance and failure modes under extreme wide-angle conditions.
- Worked on mesh generation from 3D point clouds using Trimesh, Open3D, and deep learning models to produce higher-fidelity surface reconstructions.
- Implemented 3D segmentation from 2D images by leveraging 3D-2D correspondences obtained from multi-view geometry, enabling structure and object-level understanding of reconstructed scenes.

Deep Learning Research Assistant | Jacob Whitehill's Research Group, WPI | Apr 2022 - Dec 2022

- Designed an end-to-end dataset generation and training workflow in Python, producing 10,000+ auto-labeled facial-expression samples with controlled variation in pose, expression, facial features.
- Implemented an augmentation and training pipeline in TensorFlow for ResNet, ViT and ConvNeXt, improving generalization to viewpoint changes and simulated sensor noise.
- Built detailed evaluation and error analysis using scikit-learn to quantify improvements and pinpoint remaining failure modes.

Computer Vision Research Assistant | Automation & Interventional Medicine Lab | Nov 2021 - Dec 2022

- Built a real-time ROS-based video processing pipeline in Python and PyTorch for face detection and identification using FaceNet, and human keypoint detection with MediaPipe.
- Pioneered the creation of LSTM algorithms for posture and attention analysis on time-series keypoint data, leading to insights that fixed the top three causes of user disengagement.
- Built automated visualization dashboards to generate progress analytics and actionable insights for end users.