Saketh Ram Madhuvarasu

3739 Miramer St, La Jolla, CA 92037
858-267-8170 saketh-mv sakethmvsaketh@gmail.com saketh-mv saketh-mv

Education

University of California, San Diego **Sept 2023 - present**
MS in Electrical and Computer Engineering(Intelligent Systems, Robotics and Control) ***GPA:3.8/4.00***
- **Key Coursework**: Advanced CV, Statistical Learning, Sensing and Estimation in Robotics, Robot Manipulation

Indian Institute of Technology, Tirupati **Aug. 2019 - May. 2023**
Bachelor of Technology in Electrical Engineering ***GPA:3.92/4.00***
- **Key Coursework & PoR**: Robotics, Computer Vision, DSA, IoT, Digital Systems, Vice-president of Robotics club

Experience

Vimaan Robotics | *San Jose, CA* **April 2024 – Sept 2024**
Geometric Computer Vision Intern *Python, C++, ROS*
- Built and deployed an **Object detection** and segmentation system from scratch using **YOLOv8**, trained on company data for ground and pallet detection, and utilized **Roboflow** for data annotation to enhance model performance.
- Developed and optimized an end-to-end calibration controller module, achieving camera pose estimation accuracy within **0.25 degrees** and **2 cm**, and implemented marker-based localization for company machines
- Designed an algorithm to segregate and compute the poses of multiple X-shaped markers in a single frame as part of the calibration process and performed an iterative optimization study to enhance camera pose estimation accuracy
- Performed **LiDAR** calibration and sensor fusion testing to improve system accuracy and integration

Pluto Drone Swarm Challenge | *Inter IIT Technical Meet 11.0, IIT Kanpur* **Jan 2023 – April 2023**
- Implemented advanced motion planning algorithms, including **RRT*** for global path planning and DWA for real-time obstacle avoidance, ensuring smooth, coordinated drone movement.
- Integrated real-time sensor feedback (**ArUco Tags**) for precise localization, enabling dynamic re-planning and collision avoidance in complex, dynamic environments.

Publications

- **MVS Sakethram**, PS Saikrishna "Fog-based Distributed Camera Network system for Surveillance Applications" **IEEE Robio-2023**

Research and Key Projects

Multi-Object Tracking | *Graduate Student Researcher under **Prof:** Nikolay Atanasov* **Sep 2024 - Present**
- Engineered an advanced Kalman filter-based multi-object tracking (**MOT**) system, leveraging probabilistic data association for superior tracking accuracy and robustness in dynamic environments.
- Integrating deep learning features into the tracking pipeline, inspired by StrongSORT, to improve robustness in real-time tracking under occlusions and cluttered scenes.

Vivid Dreamer: Text-to-3D Mesh Generation |*python* **April 2024 - June 2024**
- Developed a Text-to-3D pipeline integrating **Gaussian Splatting** and **Variational Score Distillation**, converting textual descriptions into detailed 3D meshes with enhanced fidelity and efficiency.
- Integrated **MV-Dream** for improved 2D-to-3D coherence and **SuGaR** for efficient mesh extraction, achieving faster generation times and superior model quality across views.

Semantic Odometry | *Pytorch* **Jan 2024 - June 2024**
- Developed a **semantic odometry** pipeline using RGBD images and combining **FPFH** features with **semantic cues** to enhance the precision of robot pose estimation and enable real-time activity recognition in dynamic environments.
- Integrated SE(3) transformations for continuous global registration and robot localization, while recognizing and categorizing robot activities (e.g., movement, interaction with objects) based on **spatial-temporal cues**.

Designing Roomba prototype | *ROS, python* **Sept 2023 - Dec 2023**
- Developed an integrated real-time motion planning and navigation system for an autonomous robot (**Roomba**) using the Qualcomm RB5 platform, incorporating a **LiDAR** and camera for environmental sensing.
- Designed and implemented path planning algorithms (**A*, RRT**) and integrated **SLAM** techniques (**EKF, ICP**) for **precise localization** and **mapping**, with real-time **Pose graph optimization** and **Loop closure** constraints

Other Projects
- **Multimodal Edge-to-RGB Image Translation**: Designed a **cVAE-GAN** architecture for edge-to-RGB image translation, enhancing scene interpretation and adaptability for **AR/VR** applications in dynamic environments.
- **6D Object Pose Estimation**: Developed a **PointNet**-based pipeline for 6D pose estimation from RGBD input, using **Roboflow** for data annotation and achieving **80% accuracy** with advanced point cloud processing.

Technical Skills

Languages: **Python**, Java, C, **C++**, CUDA
Developer Tools: Foxglove, iFogsim, Matlab, ROS, ROS2, GNU Octave, Eclipse, Git, **Docker**, OpenCV
Technologies/Frameworks: Amazon Sagemaker, **GTSAM**, SAPUI5, **Pytorch**, JAX