N V Sai Gangadhar

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Education

Carnegie Mellon University, School of Computer Science — Pittsburgh, PA
Master of Science in Robotic Systems Development (MRSD) — *Jul 2023 - May 2025*

- Achievement: J. N. Tata Endowment Scholarship, among the 100 scholars out of 1700+ applicants
- Courses Ongoing: Computer Vision, Systems Engineering, Manipulation, Robot Mobility

Indian Institute of Technology Bombay — Mumbai, India
Bachelor of Technology with Honors in Mechanical Engineering; ***GPA: 8.66/10.0*** — *Jul 2019 - May 2023*

- Minor Degree: Machine Intelligence and Data Science
- Courses Undertaken: Deep learning, Statistics, Reinforcement Learning, Linear and Non-linear Control Systems, Algebra

Experience

System Identification | Undergraduate Thesis | Prof. Mayank Baranwal | IIT Bombay — Aug 2022 - May 2023

- Developed a data-driven **parameter estimation** framework using Physics-Informed **Neural Networks** for System ID for control
- Devised a novel method for **adaptive sampling** of training points; improved accuracy by **10x** compared to uniform sampling

Fleet Route Optimisation | A.R.M.S Lab | IIT Bombay — Jan 2022 - June 2022

- Applied **Linear Programming** to optimize **multi-vehicle** routing with application in lifelong mapping and road networks
- Enhanced start and terminal node selection through a hybrid approach by integrating **Q-learning** and heuristic Techniques

Technical Projects

Wildland Fire Safety Monitoring | MRSD Capstone | AirLab CMU — Carnegie Mellon
Developing Unmanned Aerial Systems to aid in the hazardous, dynamic, and visually degraded environment of wildfires — *Sep'23 - Present*

- Working on **stereo vision** for depth estimation using **thermal** and **Fisheye** Images in visually degraded environments
- Designing systems architecture based on the functional requirements elicited through needs analysis and concept exploration

Intelligent Ground Vehicle Competition — IIT Bombay
A Student technical team, aiming to develop self-driving car for Indian traffic infrastructure — *May'21 - Nov'21*

- Sr. Controls engineer in a team of 22; implemented non-linear **Model Predictive Control** using Kinematic Bicycle model
- Designed an ego vehicle **decision-making** architecture for various road semantics and traffic signs using **Finite State Machines**

International Aerial Robotics Competition (IARC) - Mission 9 — IIT Bombay
World Champions *of the most premier and longest-running aerial robotics competition* — *Sep'20 - Mar'21*

- Developed **ROS Control** for **custom-built manipulator** on an autonomous drone; simulated the entire mission in Gazebo
- Implemented PID controller for grasping and developed algorithms for sequencing of end-effector maneuvers

Object Tracking | Carnegie Mellon University — Sept'23 - Oct'23

- Implemented **Kanade-Lucas Tomasi** (KLT) Tracker from scratch; improved fps using inverse compositional algorithm
- Extended to multi-object tracking using **DeepSORT** tracker and **YOLOv8** object detector; tested on KITTI road dataset

3D Object Detection from LiDAR | Self Project — May'23 - July'23

- Performed road plane segmentation using RANSAC; implemented **VoxelNet** for object detection and evaluated on KITTI

Computer Vision | Carnegie Mellon University — Sept'23 - Oct'23

- Implemented **Inverse Perspective Mapping** (IPM) using homography to obtain a birds-eye view from scratch in python
- Developed code for spatio-temporal **3D reconstruction** of dynamic vehicle from multi-view images using eight-point algorithm

Technical Skills

Programming Languages	: C/C++, Python, LATEX, MATLAB/OCTAVE
Robotics and ML	: ROS, Gazebo, OpenCV, PyTorch, TensorFlow, Keras, OpenAI Gym, scikit-learn
Software and Libraries	: AutoCAD, SolidWorks, Git, OpenMP, MPI

Positions of Responsibility

- Mentor, Guided a student team of 10 sophomores in DRDO's Inter-IIT project; Ranked among **top three** among 13 IITs
- Team coordinator of a 40+ membered student technical team, involved in recruitment, organizing, and marketing
- Managed 50+ College Ambassadors across India to conduct competitions, workshops events for India's largest technical festival, **Techfest'20**; Lead a team of 50+ CAs to coordinate with 4K+ Schools to bring in participation in Techfest