

Surya GS Chitti

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Preferred locations: Bangalore, Hyderabad

TL;DR

Machine Perception Engineer with a mathematics core—building robust autonomy stacks across sensor modalities (vision, LiDAR, DVL), debugging perception-planning failures in ViNT/GNM agents, and deploying dual-stage estimation under DRDO constraints. Focused on bridging synthetic-to-real gaps and pushing beyond benchmarks toward real-world field robustness.

Experience

AI & Robotics Lab, IISc Bangalore – Research Assistant Intern *Jan 2025 – Present*

- **Precision Navigation:** Built dual-stage ML pipelines using multiple neural network variants for DVL beam and velocity estimation. Achieved RMSE of 0.05 m/s on deployment sets; production-ready and field-tested.
 - **Deployment:** Sole author of the full codebase delivered to DRDO; designed with modular instrumentation and internal log tracing for maintainability.
- **Monocular Depth Estimation:** Created turbidity-robust models using synthetic data from Unreal Engine 5.2 + USOD10K dataset.
- **Visual Navigation Agent Debugging:** Diagnosed transformer-based failures in ViNT/GNM navigation agents; traced planning errors to goal occlusion and unstable attention heads.

GVCL, IIIT Bangalore – Research Intern *Jul 2024 – Dec 2024*

- **UAV Localization and Mapping:** Implemented KPConv and PointNet++ pipelines for 3D segmentation using LiDAR and RGB imagery. Benchmarked across KITTI, NuScenes, and SemanticKITTI datasets.
 - Designed an RGB-LiDAR alignment module with SIFT + FLANN; optimized for matching accuracy and runtime using calibration matrices.

AI4Bharat, IIT Madras – Student Intern *Aug 2023 – Sept 2023*

- **Anuvaad:** Contributed to the multilingual LLM initiative, aimed at enabling conversations across 13 Indian languages.
 - Automated extraction of 2,000+ YouTube videos and 3,000+ websites using Google Developer API + Trafilatura; created multilingual corpora with no manual intervention.
 - Developed Streamlit UI for structured prompt collection; deployed and used by 40+ researchers in lab.

Exploratory Work

- **Adaptive Loss Benchmarking:** Experimenting with GradNorm-style dynamic weighting for multi-task learning.

Independent Projects

Lex Fridman Podcast QA system with HyDE + RAG

2024

- Designed a QA system with BERT as the base embedding model using RAG, HyDE, Llama2-13B and OpenAI API for content fetching and generation.
- Built a fully deployable system with Streamlit UI enabling config controls, and around 3s response time on RTX 3070.

Deformation Tracker – Civil Structures

2024

- Built a tool to extract displacement vectors from video footage of material compression in a Universal Testing Machine.
- UI supports multi-point selection and generation of displacement, velocity and acceleration graphs of the selected points.
- Accuracy benchmarked at 0.2 mm across 7 video samples.

Overspeed Vehicle Detection – YOLOv8

2023

- Trained YOLOv8 on custom-labeled traffic video; achieved 70%+ license plate recall at 30 FPS.
- Designed custom augmentation pipeline (skew, flip, light degradation).

Education

BITS Pilani, Hyderabad Campus

2020 – 2025

M.Sc. Mathematics + B.E. Civil Engineering

Minor: Computing & Intelligence

Relevant Courses: Machine Learning, Artificial Intelligence, Numerical Methods, Probability and Statistics, Operating Systems, Graph Theory

IIT Madras (Online)

2020 – 2025

Diploma in Data Science and Programming

Relevant Courses: Deep Learning, DBMS, ML Foundations, Linux Systems, Statistics

Key Links and Documentations

- [Velocity Estimation Project @ IISc](#)
- [Thesis @IISc on AI Enabled Precision Navigation](#)
- [Thesis @IIITb exploring UAV Localization and Mapping](#)
- [QA System – Lex Fridman + HyDE](#)
- [Structural Deformation Tracker – GitHub](#)
- [YOLO Overspeed Vehicle Report](#)

Technical Skills

Languages: Python, C/C++, SQL (Postgres)

Libraries & Frameworks: PyTorch, NumPy, Pandas, Scikit-learn, OpenCV, Open3D, Open3D-ML, Matplotlib, Streamlit, SciPy, BeautifulSoup

Developer Tools: Git, VS Code, Jupyter, LM Studio

Visualization Tools: CloudCompare, .PLY viewers

Other Tools: Bash, Linux CLI, Trafilatura, Google Developer API, Whisper