Rakshith Ajetaravi

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GitHub profile | Portfolio website | Linkedin

Education

Indian Institute of Science (IISc) Bengaluru, India
M.Tech in Robotics and Autonomous Systems (CPS Department) *present*

- **Current Performance: 6.8 CGPA**
- **Relevant Courses:**
  - **Foundations:** Foundations of Robotics; Mathematical Techniques for Robotics Systems
  - **Control Systems (Minor/Specialization):** Applied Linear and Non-Linear Control; Non-linear Systems and Control; Sliding Mode Control and its Applications; Applied Optimal Control and State Estimation
  - **Robotics System:** Swarm Robotic Systems; Motion Planning for Autonomous Systems
  - **Machine Learning & AI:** Machine Learning for Cyber-Physical Systems; Reinforcement Learning; Generative and Agentic AI in Practice
  - **Embedded Systems:** Design of Cyber-Physical Systems
- **Teaching Assistant for the course E1241:Dynamics of Linear System(August term 2025)**.

The National Institute of Engineering(TNIE) Mysuru, India
Bachelor of Engineering in Mechanical Engineering *2022*

- **CGPA: 8.75 / 10**
- **Focus Areas:** Design and Manufacturing; Computational Fluid Dynamics; Aircraft Propulsion; Robotics and Numerical Control; Control Engineering; Operations Research.

Gopalaswamy Shishuvihara PU College(Sankalpa) Mysuru, India
Class 12th (Karnatak State Board) - PCMB *2018*

- **Percentage: 81.67%**

JSS Public School, JP nagar Mysuru, India
Class 10th(CBSE Board) *2016*

- **CGPA: 9.8 / 10**

Technical Skills

Robotics & Simulation: ROS2, Gazebo, RViz, NVIDIA ISAAC Sim, ArduPilot
Programming: Python, C++, C, MATLAB, Julia
Data Science & ML: PyTorch, TensorFlow, Keras, Gymnasium, Numpy, Pandas
Engineering Design: SolidWorks, Fusion 360, CATIA, Ansys, Qblade, Ultimaker Cura

Academic & Personal Projects

VidQuery: Agentic Multimodal Video RAG | *LangGraph, Qdrant, Llama-3.2-Vision*

Developing an **agentic RAG system** for video lectures that synthesizes multimodal data (video frames, audio, slide text) using local open-source models like **Llama-3.2-Vision** and **Whisper**.

Engineered the **Vector Database pipeline** using **Qdrant** to store and index multimodal embeddings (**CLIP** for vision, Nomic for text), optimizing retrieval for **complex temporal queries** (e.g., "what was said after this diagram?").

Implemented precise synchronization between visual embeddings and audio transcripts to enable **high-accuracy semantic search** across lecture content.

Machine Learning Research Applications | *Python, Scikit-Learn*

Utilized **Supervised Learning** techniques to classify earthquake-prone buildings based on structural data. Conducted hypothesis-driven research and exploratory data analysis of Australian suburbs using **Unsupervised Learning** methods.

Innovative Bi-Copter Drone Design & Control

Designed an innovative **bi-copter drone**, addressing mechanical complexities unique to dual-rotor aerial systems. Implemented a **custom control strategy** to ensure **optimal flight stability** and precise rotor synchronization.

Decentralized leader-follower formation control using RL

Implemented a decentralized leader-follower formation control using Reinforcement Learning, specifically utilizing two Double Deep Q-Network (DDQN) algorithms: one for reaching the formation and the other for maintaining it.

Vision-Based UAV Perception

Engineered a **vision-based pipeline** for autonomous UAVs to **estimate velocity** and detect obstacles in real-time. Integrated perception modules with **flight control loops** to enable autonomous navigation in dynamic environments.

Fixed Wing VTOL Development

Currently developing a **Fixed-Wing Vertical Take-Off and Landing (VTOL)** aircraft, advancing the prototype to **Technology Readiness Level (TRL) 2**.

4-DOF Manipulator (BE Project) | *SolidWorks, Embedded C*

Designed and fabricated a **4 Degrees of Freedom (DOF)** robotic manipulator, handling the **mechanical design** and actuation system.

Professional Experience & Leadership

Paraha Ventures Mysuru, India
Co-Founder *2022 – 2023*

Co-founded and actively operated a **freelance digital marketing startup** for 1.5 years following graduation.

Delivered **end-to-end digital solutions** for local businesses, managing projects across Website Development, **SEO**, and Social Media Marketing.

Gained hands-on **entrepreneurial experience** in client relations, project management, and technical implementation before transitioning to higher studies.

Agnie Racing (Student Motorsport Club)
Captain *2020 – 2021*

Led the team in two national-level events: **Go-kart Design Challenge 2020** and **Formula Green Concept Challenge 2021**.

Oversaw the **design and fabrication** of electric karts, managing team logistics and engineering timelines.

Make A Difference (MAD)
Transition Readiness Tutor *2 Years*

Served as a tutor focusing on **transition readiness**, providing mentorship and educational support to youth.

Hobbies & Interests

Sports: Basketball, Cricket, Chess, Frisbee
Creative: Filmmaking, Writing Stories
Reading: Fiction, Non-Fiction, History