Sairaj Rajendra Loke

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Education

Degree/Certificate	Institute/Board	CGPA/Percentage	Year
B.Tech.	Indian Institute of Technology Indore	8.67 (Current)	2021-2025
Senior Secondary	HSC (grade 12)	94.67%	2021
Secondary	SSC (grade 10)	95.00%	2019

Experience

- **Siemens, India** | 3D Reconstruction Intern **Dec.24 - Present**
  - Working on 3D reconstruction of indoor objects and scenes based on multiple view image captures.
  - Deployed reconstruction models as endpoints (Hunyuan-3D and TRELLIS) on Siemens server to enable seamless reconstruction queries for downstream tasks.
  - Currently working on Automatic Assembly and 3D segmentation of components of reconstructed electronic equipments to create Virtual Manuals for the equipments.
- **Environmental Robotics Lab(ERL)-ETH Zurich** | Bachelor's Thesis | Prof.Stefano Mintchev **Aug.24 - Nov.24**
  - Designed a novel Scene Flow(3D Optical Flow) based algorithm to estimate the loading capacity score of tree branches and associated uncertainty in the estimates.
  - Captured observed oscillations using data from a downward-facing RGBD camera mounted on a hovering drone to be used for sensor deployment.
  - Paper, Presentation, showcasing results on 3 reference branches
- **Autonomous Robots Lab(ARL)-NTNU** | Robotics Research Intern | Prof. Kostas Alexis **Oct.23 - Jul.24**
  - Developed a custom ROS wrapper for the HoloOcean simulator. This is being used for generating data in rosbag format and integrating the vehicle control with existing ROS packages. Demo.
  - Worked on encoding depth information using beta-VAEs for downstream underwater navigation tasks.
  - Achieved 500x compression ratio in depth representation with VAE's inference time of less than 1.6 milliseconds.

Projects

- **Image Retrieval** **Mar. 25 – May. 25**
  Computer Vision Course - Semester Project Github
  - Developing an image retrieval system in C++ that can search and rank visually similar images from a database with selected type of features.
- **Embedded Capture the Flag (eCTF), 2025** **Jan. 25 – Apr. 25**
  International Competition by MITRE, advised by Prof. Gourinath Banda, CSE, IIT Indore Design Doc. - Github
  - Collaborated in a team of 14 members, to design and implement a Satellite-TV system that can securely encode and decode TV data streams while protecting against unauthorized access to protected channels.
  - Proposed and implemented 9 channel-specific AES key based encryption(in Python), and Decryption(in C) for individual channel specific content security.
  - As a member of the decoder team, implemented decoder functionalities robust against various attacks on the MAX78000FTHR board in C.
- **IITIHub- Institute App** **Jan. 23 – Apr. 23**
  Software Course Project, under Prof. Puneet Gupta, CSE, IIT Indore Github
  - Applied principles of incremental software development process, to design and build flutter and firebase-based mobile application from scratch targetted for IIT Indore community.
  - Features: student-professor project collaboration platform, automatic email categorization, campus news & map.
- **Python API for Drona Aviation's Pluto Drone (Bronze Medal)** **Dec. 22 – Feb. 23**
  Inter IIT TechMeet 11.0, IIT Kanpur Presentation - Certificate - Github
  - Developed a comprehensive Python API based on multithreading and multiprocessing to achieve real-time performance for simultaneous vision and control processes. Established socket communication between the client computer and drone. Implemented waypoint navigation algorithm with visual feedback using ArUco markers.
  - Demonstrated hovering, waypoint navigation,localization, and drone swarm control utilizing the created API.

Technical Skills

- **Programming Languages**: C, C++, Python, Bash, Dart*, SQL*
- **OS & Platforms/Embedded devices**: Linux, RaspberryPi, Arduino
- **Tools/Frameworks/Libraries**: Git, Github, PyTorch, OpenCV, ROS/ROS2, Docker, Singularity(HPC Containerization), GDB, Sockets, Flutter, OpenMP*, Unreal Engine*

** Elementary proficiency*

Key courses taken

- **Mathematics**: Probability and Statistics*, Linear Algebra, Optimization, Numerical Approximations, Basic Calculus
- **Computer Science and Engineering**: Machine Learning*, Computer Vision*, Cryptography*, Cyber Physical Systems*, Computer Networks, Operating Systems, Data Structures and Algorithms, Software Engineering, Parallel Computing, Database and Information System, Automata Theory & Logic, Compiler Techniques
- **Online Courses**: Fundamentals of Reinforcement Learning, Neural Networks and Deep Learning, Hyperparameter Tuning, Regularization and Optimization, *other Course Certifications.*

**Present Semester courses*

Positions of Responsibility

- **Member, SIRC**,International Relations Team (Students' International Relations Cell) *Dec. 22 - Present*
- **Chair IEEE- RAS**, Student Branch Chapter , IIT Indore- Prof. Trapti Jain (Advisor)*Nov. 22 - Apr. 24*
  Discussions with industry professional on latest robotics developments, ROS workshops.link
- **Head- Autonomy Division**, IVDC Club, IIT Indore, IGVC team - Autonomy lead. *Apr. 23 - Apr. 24*

Achievements

- **ThinkSwiss Scholar 2024**,Selected for a fully funded, semester-long research visit at ETH Zurich. Amongst the 20 scholars selected from over 150 applicants. 2024
- **Bronze Medal**, Inter IIT Tech Meet 11.0, IIT Kanpur 2023
- **Ranked 12th Internationally** , Team NotABot - CoderOne 2022
- **Gold Medal**, IIT Indore Summer of Code-Lidar Based Obstacle Avoiding Robot 2022
- **All India Rank 1219**, out of 151,000 Students, Ranked in Top 0.81 % Students, JEE Advanced 2021
- **KVPY Fellow | All India Rank (AIR) 165**,SX stream (12th Grade) 2021
- **NTS Scholar–NCERT**,National Council of Education Research & Training, awarded to top 0.67% 2019