# 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 real indoor warehouse objects and scenes based on multiple view image captures and their interactions within the AirSim simulator.
- **Environmental Robotics Lab(ERL) - ETH Zurich** | *Computer Vision & Robotics Intern* **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* **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

- **Embedded Capture the Flag (eCTF), 2025, )** **Jan. 25 – Apr. 25**
  *International Competition by MITRE, team advised by Prof. Gourinath Banda, CSE, IIT Indore*
  - Collaborating in a team of 14 members, to Design and implement a Satellite TV system to securely encode and decode emulated satellite TV data streams while protecting against unauthorized access to protected tv channels.
  - Proposed channel-specific AES keys, leveraging AES Hardware Acceleration Engine on MAX78000FTHR.
  - As a member of the decoder (firmware) team, currently implementing decryption and robust error handling processes based on the various attack cases 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 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), Sockets, Flutter, OpenMP*, BOUML*, Gazebo(Classic + Ignition)*

*\* 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

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|---|---|
| **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 |