SAIRAJ RAJENDRA LOKE

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EDUCATION

Degree/Certificate	Institute/Board	CGPA/Percentage	Year
B.Tech.	Indian Institute of Technology Indore	8.47 (Current)	2021-2025
Senior Secondary	HSC (grade 12)	94.67%	2021
Secondary	SSC (grade 10)	95.00%	2019

EXPERIENCE

- **Environmental Robotics Lab(ERL) - ETH Zurich** | *Computer Vision & Robotics Intern* **Aug.24 - Present**
  – Developed a Scene Flow(3D Optical Flow) based algorithm to estimate the rigidity of tree branches and associated uncertainty in the estimates, utilizing data from a downward-facing RGBD camera mounted on a hovering drone to be used for sensor deployment.
  – Paper, Presentation
- **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 datasets in rosbag format and integrating the vehicle control with existing ROS packages. Demo.
  – Worked on encoding depth information using beta-VAEs to be used for downstream underwater navigation tasks.
  – Achieved 500x compression ratio in depth representation with VAE's inference time of less than 1.6 milliseconds.
- **Big Data Lab - IIT Indore** | *Data Augmentation Intern* **Jul.23 - Sept.23**
  – Implemented traditional image augmentation techniques: rotations, blurring of different kinds, shadow, flares, and lot more, for 6 diseases + 1 healthy leaf class on existing 770 images to generate x9 times images to be used further.
  – Reviewed and used GANs for data augmentaion, custom as well as models like CycleGAN.
  – Quality of generated images were qualitatively evaluated using perceptual studies.

PROJECTS

- **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 Controlling 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 developed API.
- **Lidar Based Obstacle Avoiding Robot** **Jul. 22 – Aug. 22**
  Team Lead, IIT Indore Summer of Code Github
  – Led a team of four undergraduates to develop a static and dynamic obstacle-avoiding robot simulation in Gazebo, utilizing ROS as the middleware with a Jackal robot and Velodyne Lidar.
  – Used Time Elastic Band(TEB) local planner, after comparison with Dynamic Window Approach and ElasticBand.

TECHNICAL SKILLS

- **Programming Languages**: C++, Python, Bash, Dart*, SQL*
- **OS & Platforms**/**Embedded devices**: Linux, RaspberryPi, Arduino
- **Tools**/**Frameworks**/**Libraries**: Git, Github, PyTorch, OpenCV, ROS/ROS2, Singularity(HPC Containerization), Sockets, Flutter, Docker*, OpenMP*, Wireshark*, BOUML*, Gazebo(Classic + Ignition)* , HoloOcean
  * Elementary proficiency

KEY COURSES TAKEN

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

POSITIONS OF RESPONSIBILITY

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

ACHIEVEMENTS

- **ThinkSwiss Scholar 2024**, Scholarship for Fall 2024 internship at ETH Zurich 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) 2019