

# Sairaj Rajendra Loke

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## EDUCATION

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- **Indian Institute of Technology Indore**
  - **Major:** Computer Science & Engineering
  - **Additional Learning:** IoT for Space Applications

Nov. 2021 - July 2025  
CGPA: 8.28/10

## EXPERIENCE

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- **Undergraduate Research Intern- Autonomous Underwater Vehicle** Aug. 2023- Present  
*under guidance of [Prof.Konstantinos Alexis](#) along with [Mihir Dharmadhikari](#) , [Mohit Singh](#). [ARL - NTNU - Norway](#)*
  - Transferring Aerial Autonomy Stack to Autonomous Underwater Vehicle and additionally tackling Uncertainties in Underwater Environment's settings
  - Currently successfully developed a ROS wrapper for the HoloOcean Simulator. [Demo1](#). [Demo2](#).
  - Working on Depth Estimation using Stereo Vision.
- **Soyabean Leaf Disease Classification - under RuTAG- Govt. of India** Jul. 2023 - Sept. 2023  
*under guidance of [Prof.Aruna Tiwari](#) [Certificate - Kaggle](#) - IIT Indore*
  - 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 tried out GANs for Data-Augmentaion, especially models like CycleGAN, LeafGAN, and FWDGAN.
  - The Diagnostic Performance of Classifiers is yet to be tested completely on these images.

## PROJECTS

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- **IITHub- Institute App** Jan. 23 – Apr. 23  
*Software Course Project, under Prof. Puneet Gupta, CSE, IIT Indore, CS258* [Github](#)
  - Followed principles of Incremental software development process, to develop flutter and firebase-based android application from scratch for IIT Indore community.
  - Features: Student-Professor project collaboration, Automatic Email Categorization, Campus news & Campus 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](#)
  - Features: Implemented Multithreading and Multiprocessing.(2 simultaneous vision and control processes).
  - Communication using Socket programming.
  - Used OOPs concept to support simultaneous control of multiple drones(atleast 2). PID for Trajectory Control.
  - 4 Tasks included: Hovering, Rectangular motion, Localisation using OpenCV and ArUco marker, Drone Swarm Control, all using the API we built. Worked in a group of 10 undergraduates.
  - Special Appreciation for our waypoint sampling for better trajectory control.
- **GestureGo- Gesture Controlled Car** Feb. 23  
[Github](#)
  - 21 Hand landmarks were extracted using Mediapipe's Hand Landmark Detection model.
  - Developed a light Neural network using TensorFlow Framework to classify gestures based on 21 key points recognized from Mediapipe's inferences, achieved high fps (approx. 30).
  - Commands were sent to ESP32 to control the car appropriately.
- **Dementia Severity Prediction (CDT based) (NHATS) / IIT Dhanbad** Nov. 22  
[Github](#)
  - To predict the severity of Dementia using Clock Drawing Test(CDT).
  - Entire Pipeline was written using PyTorch.
  - Used DenseNET, VGGNet, ResNet and then made an ensemble for classifying the given CDT images.
  - Ranked 10th with accuracy over 53%
- **Lidar Based Obstacle Avoiding Robot IIT Indore Summer of Code** Jul. 22 – Aug. 22  
*Team Lead* [Github](#)
  - Developed a Robot (Simulation in Gazebo) which can move in its environment from the start point to a destination, avoiding STATIC (walls, tables, etc.) and DYNAMIC (moving people) obstacles using a Lidar (No vision camera involved). Used ROS as the middleware, Jackal robot along with Velodyne Lidar.
  - Used local planners like TEB, after comparison with DWA, ElasticBand, etc.

## KEY COURSES TAKEN

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- **Mathematics:** Optimization Algorithms and Techniques\*, Numerical Approximations, Complex Analysis, Differential Equations, Linear Algebra, Basic Calculus,
- **Computer Science and Engineering:** Operating Systems\*, Parallel Computing\*, Discrete Mathematical Structures, Automata Theory & Logic, Data Structures and Algorithms, Software Engineering
- **Robotics & AI/ML:** Fundamentals of Reinforcement Learning, Neural Networks and Deep Learning, Hyperparameter Tuning, Regularization and Optimization., *check other Course Certifications.*

\* Semester Courses to be completed in Nov.2023

## TECHNICAL SKILLS

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- **Programming Languages:** C++, Python, bash, SQL, Dart, MATLAB \*
- **OS & Platforms/Embedded devices:** Linux, RaspberryPi, Arduino, Nvidia Jetson Nano \*
- **Robotics & AI Frameworks/Libraries:** ROS, ROS2 \*, OpenCV, OpenMP, PyTorch, TensorRT \*
- **Other Frameworks/Libraries:** Git, Docker, Socket, Flutter, Astrometrica, BOUML
- **Simulators and Other Softwares:** Gazebo(Classic + Ignition)\* , HoloOcean

\* Elementary proficiency

## POSITIONS OF RESPONSIBILITIES

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- **Chair IEEE- RAS**, Student Branch Chapter, IIT Indore- [Prof. Trapti Jain \(Advisor\)](#) Nov. 22 - Present  
Discussing latest robotics developments, series of ROS workshops beginner to advanced ([link](#))
- **Head- Autonomy Division**, IVDC Club, IIT Indore, IGVC team - Autonomy lead. Apr. 23 - Present
- **Member**, Cynaptics Club, IIT Indore Feb. 22 - Present
- **Member**, SIRC, International Relations Team (Students' International Relations Cell) Dec. 22 - Present

## ACHIEVEMENTS

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Year	Achievement	Associated With
2023	<b>Bronze Medal</b> , Inter IIT Tech Meet 11.0	IIT Kanpur
2022	<b>Coder One</b> , Team NotABot – ranked 12th Internationally	Coder One (Company)
2022	<b>1st Place</b> , IIT Indore Summer of Code-Lidar Based Obstacle Avoiding Robot	IIT Indore SoC
2021	<b>All India Rank 1219</b> , out of 250,000 Students, Top 5 % Students	Jee Advanced
2021	<b>Ranked in Top 0.21%</b> , out of 1 million candidates	Jee Mains
2021	<b>KVPY Fellow   All India Rank (AIR) 165</b> , SX stream (12th Grade)	IISc, Bangalore.
2020	<b>KVPY Fellow   All India Rank (AIR) 534</b> , SA stream (11th Grade )	IISc Bangalore
2019	<b>NTS Scholar–NCERT</b> , (National Council of Education Research & Training)	New Delhi
2019	<b>Silver Medalist</b> , Dr.Homi Bhabha Young Scientist Exam	HBCSE/TIFR

## VOLUNTEERING

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- **MENTOR - Lane Detection using Limited Computation Power** Jun. 2023 - Jul. 2023  
[IIT Indore Summer of Code](#) [Demonstration - Github](#)- IIT Indore  
– Mentored 4 Juniors to Develop a robust lane detection pipeline that consumes meager computational resources.  
– Will be integrated in our [IGVC's Autonomous Vehicle](#).
- **AVANA** Jun. 2022 - present  
[Social Welfare Students' Club](#) IIT Indore  
– Social welfare initiative taken up by students of IIT Indore for the welfare of underprivileged people nearby Indore.  
– Conducting teaching sessions, and providing basic clothing, sweets, and stationery through donations for rural children/elderly.  
– Visiting Orphanages, nursing homes and celebrating events with them- [\[LINK\]](#)