Sairaj Rajendra Loke

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Education

- **Indian Institute of Technology Indore** *Nov. 2021 - July 2025*
  - **Major:** Computer Science & Engineering *CGPA:* 8.37/10
  - **Additional Learning:** IoT for Space Applications

Experience

- **Undergraduate Research Intern- Autonomous Underwater Vehicle** *Aug. 2023- Present*
  under guidance of Prof.Konstantinos Alexis along with Mihir Dharmadhikari , Mohit Singh. ARL - NTNU - Norway
  - Developed a ROS wrapper for the HoloOcean Simulator.This is being used for generating datasets in rosbag format and handling the vehicle using existing ros packages 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.
  - Quality of Generated images were analysed using perceptual study.

Projects

- **IITIHub- 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 (interpolation of targets) for better trajectory control.
- **GestureGo- Gesture Controlled Car** *Feb. 23*
  - 21 Hand landmarks were extracted using Mediapipe's Hand Landmark Detection model. Github
  - 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.
  - Experienced a latency of about 0.5 sec
- **Dementia Severity Prediction (CDT based) (NHATS) / IIT Dhanbad** *Nov. 22*
  - To predict the severity of Dementia using Clock Drawing Test(CDT). Github
  - Entire Pipeline was written using PyTorch.
  - Used DenseNET, VGGNet, ResNet and then made an ensemble for classifying the given CDT images.
- **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

- **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.*

Technical Skills

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

** Elementary proficiency*

Positions of Responsitbilities

- **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

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

Volunteering

- **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]