SAIRAJ RAJENDRA LOKE

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EDUCATION

B.Tech. Computer Science and Engineering | 2021-2025
Indian Institute of Technology Indore | CGPA: **8.71**/10

EXPERIENCE

- **Samsung R&D Institute India-Noida** | Engineer   **Jul.25 - Present**

  - Built a real-time physics-based video to interactive-wallpaper solution for android devices based on fourier analysis of video and numerical simulation of the physics involved, achieving first response time < 200ms and 50fps rendering thereafter.
  - Contributed to the Torch to TFLite model conversions and TFLite based on-device inference (in C++) of Audio Denoiser model as a post processing step for existing Audio Eraser for Samsung S26 mobiles.
  - Collaborated with HQ team in Korea for Audio Denoiser solution.

- **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 end-to-end perception pipeline to estimate tree-branch load capacity and associated uncertainty, enabling safe sensor deployment.
  - Built a lab testbed emulating field conditions to capture RGB-D data from a downward-facing camera on a hovering drone, analyzing tree-branch oscillations induced by drone downwash.
  - 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 cues from stereo cameras using beta-VAEs for underwater navigation tasks.
  - Achieved 500x compression in depth representation with VAE's inference time of less than 1.6 msec.

PROJECTS

- **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(micro-controller) 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.
  - Contributed to architectural design, communication between the client computer and drone, altitude extraction using visual feedback of ArUco markers.
  - Demonstrated hovering, waypoint navigation, localization, & drone swarm control showcasing the intended functioning of the created API.

Technical Skills

- **Programming Languages**: C, C++, Python, Bash, Kotlin
- **OS & Platforms/Embedded devices**: Linux, RaspberryPi, Arduino
- **Tools/Frameworks/Libraries**: Git, Github, PyTorch, TFLite, OpenCV, ROS/ROS2, Docker, Singularity(HPC Containerization)

Key courses taken

- **Mathematics**: Statistics, Linear Algebra, Optimization, Numerical Approximations, 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, Computer Graphics, Automata Theory, Compilers
- **Online Courses**: Fundamentals of Reinforcement Learning, Neural Networks and Deep Learning, Hyperparameter Tuning, Regularization and Optimization, *other Course Certifications.*

Positions of Responsibility

- **Member: SIRC**, Students' International Relations Cell   *Dec.22 - Dec.24*
- **Chair: IEEE-RAS**, Student Branch Chapter, IITI. Advisor: Prof. Trapti Jain *Nov.22 - Apr.24*
  Discussions with industry professional on latest robotics developments, workshops.link
- **Head: Autonomy Division**, IVDC Club, IITI.   *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**, ranked in Top 0.81 % of 151,000 Students, JEE Advanced.   2021
- **KVPY Fellow | All India Rank (AIR) 165**, SX stream (12th Grade).   2021
- **NTS Scholar–NCERT**, among the top 0.67% students.   2019