

Sagar Chotalia

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OBJECTIVE

A diligent and meticulous student with the ambition to work at the forefront of technology, expand my skills and solve problems in the field of Robotics by performing world-class research and contributing to the industry.

EDUCATION

Veerмата Jijabai Technological Institute(VJTI) 2021 - 2024
Bachelor of Technology in Electronics and Telecommunications Engineering Mumbai, India

- Cumulative GPA: 8.56/10

Arya Gurukul International Junior College 2019 - 2020
Maharashtra State Board Navi Mumbai, India

- HSC (Grade 12): 83.84%

D.A.V. Public School, Airoli 2012 - 2018
CBSE Board Mumbai, India

- SSC (Grade 10): 95.8%

RESEARCH EXPERIENCE

Research Intern | *CSIR-NAL* | *Dr. Omkar Halbe* June 2023 – Aug 2023

- Performed research under the CSIR-National Aerospace Laboratories in the **Flight Mechanics and Control Division** under the guidance of Dr. Omkar Halbe.
- Studied the extensive ArduPilot architecture and code base in depth. Replicated the logical flow in **Simulink**.
- Created a custom controller for a **high-altitude glider in Simulink**, complete with **FBWA** and **Manual modes**.
- Implemented a **Robust PID controller** for stabilization of roll, pitch and yaw.

Research Intern | *IISER Bhopal* | *Dr. P.B. Sujit* Oct 2022 – Nov 2022

- Read research material and delivered presentations based on NeRFs, incremental Signed Distance Fields(iSDF), Obstacle Avoidance algorithms and Potential Fields. Coded a Model Predictive Controller for a mobile robot in MATLAB.

EXPERIENCE

Google Summer of Code | *OpenAstronomy* | *Mentor: Erwan Pannier* Apr 2022 – Sep 2022

- Tasked with tweaking and **improving the performance** of the RADIS codebase(Now in NumFOCUS).
- Worked on the existing memory bottlenecks and reduced calculation times by **caching various parameters to improve performance**. Set up memory-performance benchmarks for debugging and maintenance.
- Implemented a **"chunk" feature in the code**, allowing a **drastic reduction in RAM usage during large computations, over 75% in some cases**.

Summer Intern, e-Yantra Labs | *IIT Bombay* | *Dr. Kavi Arya* June 2022 – July 2022

- Built an **open-source, off-the-shelf** Autonomous Nano Drone from scratch.
- Designed a custom autonomous control system using PID, used an **on-board flight computer** (Raspberry Pi 0).
- Localised the drone in an indoor environment using **Optical Flow** sensors and **WhyCon** (a cheaper alternative to VICON). Our work was crucial for conducting the **eYRC competition in 2022**.

PROJECTS

- Synchropter UAV Designing** | *ROS, Gazebo, Redhawk Linux* February 2023 – Present
- Developing a Terrain Collision Avoidance System(TCAS) and onboard vision system with Object Detection and autonomous landing capabilities, integrating with the electronic onboard components, such as a Flight Computer(NVIDIA Jetson) and ruggedized sensors.
- SLAM(Simultaneous Localisation and Mapping)** | *ROS Gazebo, Turtlebot3* April 2022 – October 2022
- Studied various SLAM concepts and techniques, including Occupancy Grid Maps, Locomotion and Navigation.
 - Coded the **Kalman Filter** and **EKF-SLAM** on a mobile robot.
- Pick and Place Bot using Bin Packing** | *CoppeliaSim* September 2021 – October 2021
- Simulated a gantry system that would detect boxes placed on a conveyor, pick and place them in a container of known dimensions according to a 3D Bin Packing algorithm using Python API in CoppeliaSim.
 - Got familiar with **Inverse Kinematics** and **OpenCV** to detect the object size.
- e-Yantra Robotics Competition** | *IIT-Bombay* October 2021 – March 2022
- Won the **4th Prize** in our Theme, "Functional Weeder", out of **250+ teams globally**.
 - Designed and constructed a **robotic 3-DOF manipulator**, using it to pick and place plant stalks.
 - Ideated a **novel mechanism** to drop "seeds" accurately from a specific height and distance, and worked with **Raspberry Pi 3** and various other hardware components and helped in accurate line-following and debugging.

TECHNICAL SKILLS

Languages: C++, C, Python
Developer Tools: Linux, Git, Bash
Libraries: OpenCV, NumPy, Matplotlib, Pandas, Vaex
Simulators: CoppeliaSim, Gazebo, RViz, MATLAB, Simulink

POSITIONS OF RESPONSIBILITY

- Society of Robotics and Automation** | *Core Member and Lecturer* September 2021 – Present
- Mentored four students on two different projects on Control Systems and SLAM to completion.
 - Involved in the organization and overseeing of various key events. Attended various workshops conducted by the club in FY, on various different domains including **Computer Vision, Robotics and Embedded Systems**.
 - Taught functions in Python to 150+ attendees of SRA's **PIXELS** workshop.
 - Helped in the design and conducted assembly of a robotic manipulator in SRA's flagship **MARIO** workshop.

COMMUNITY

- Project Mumbai** | *Volunteer* August 2023 – Present
- Volunteered at Jallosh, which is a monthly beach-cleaning initiative that takes place all over Mumbai. The collected plastic waste is recycled.