Sagar Chotalia

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Objective

A disciplined and meticulous student with the ambition to work at the forefront of technology, expand my skills and perform world-class research in Robotics to help solve humanity's most pressing issues.

Education

Veermata 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.

Controllers for Cinematography using ASV's | *IISER Bhopal* | *Dr. P.B. Sujit* Apr 2023 – Present

- Held literature survey on the different strategies to design an MPC with FOV constraints.
- Understood research papers based on incremental Signed Distance Fields(iSDF), and held a Literature Survey on dynamic obstacle avoidance algorithms.

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.

Competitions

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.