Atharva Ghotavadekar

Goa, India

Mobile Email LinkedIn Github

Objective

I am Atharva, a pre-final year undergraduate student deeply interested in robotics, autonomous cyberphysical systems and artificial intelligence. I am interested in development and implementation of autonomous behaviour on hardware platforms.

My major research interests lie in the intersection of **perception and control of mobile robots.** I am actively looking for an opportunity to pursue my bachelor's thesis on-site at a robotics research lab. I am keen on developing myself as a good robotics researcher, and hope to make meaningful contributions to the rapidly growing field of autonomous robots.

Education

BITS Pilani University **2020 – Present**

Bachelor of Engineering in Electronics and Instrumentation *Goa, India*

Dr. Kalmadi Shamarao Junior College **2018 – 2020**

Class XII (89.38%) *Pune, India*

Abhinava Vidyalaya High School **2008 – 2018**

Class X (95.60%) *Pune, India*

Relevant Coursework

- Probability and Statistics
- Control Systems
- Differential Equations
- Modern Control Systems
- Calculus
- Digital Design
- Computer Programming
- Microprocessors

Technical Skills

Programming: C/C++, Python, Java, MATLAB, Bash, LaTeX
Tools and Frameworks: ROS, Gazebo, CoppeliaSim, Simulink, rViz, Logisim, Labview, Autocad, Fusion360, Solidworks
Hardware: ESP32, Arduino, STM32, MOCAP(Optitrack), UWB RTLS(pozyx), Pixhawk, Parrot Bebop, DJI Mavic, DJI Phantom
Technologies: Linux, Git/GitHub, Android

Experience

Robotics Research Center, IIIT-Hyderabad **June 2022 – September 2022**

Research Intern *Hyderabad, India*

- Worked as a research intern at the Robotics Research Center under the guidance of Dr. Harikumar Kandath
- Worked on developing algorithms for navigation of a MAV in cluttered GPS-denied indoor environments
- Worked with a UWB based indoor Real Time Location System for fusion with IMU for state estimation
- Used Optitrack motion capture system for ground truth and performance analysis
- Implemented navigation algorithms for entry into constrained spaces for indoor inspection

Project Kratos **August 2021 – Present**

Controls Subsystem Engineer *Goa, India*

- Implemented a PID controller and geometric path tracking Stanley controller for smooth traversal of continuous curved paths for autonomous traversal of the student team rover(Project Kratos)
- Worked on low level control and interfacing of an Arduino over rosserial from an NVidia Jetson Xavier AGX
- The student team stood 1st in India in the University Rover Challenge 2022, and 2nd Worldwide in the Anatolian Rover Challenge 2022

Flying Ad hoc Networks for disaster rescue operations **September 2022 – Present**

Project Member *Goa, India*

- Working with Dr. Sarang Dhongdi on the development of an integrated bridge framework to co-simulate the coverage planning of a swarm of disaster-deployed UAV swarms using PX4 SITL (in Gazebo, ROS) and the communication network between them using the NS3 simulator.

Projects

Trotbot | *Motion Planning* **October 2021 – December 2021**

- Trotbot is an autonomous omni-directional ground robot.
- Worked on implementing obstacle avoidance and a low level controller for an omni-wheeled robot and integrating an A* planner with 2D Occupancy Grid
- Developed a ROS Action based interface for motion plannning, dynamic obstacle avoidance and replanning
- Working on reliable odometry using sensor fusion(2D Lidar, Wheel Encoders, RGB-D Camera).

Geometric Path Tracking "Stanley" Controller | *Control* **January 2022 – March 2022**

- Implemented a path tracking controller for traversal of smooth continuous curved trajectories.
- The controller tracks the closest point on the desired trajectory uses lateral error from the target point (crosstrack error) as well as heading error to compute the control output
- The Stanley controller was implemented on Project Kratos' Mars Rover

Spiderbot | *Legged Robotics, Modelling, Control* **October 2022 – Present**

- Spiderbot is a custom designed and manufactured symmetrical hexapod. Each leg has 3DoF.
- Worked on interfacing 18 high-torque servo motors over rosserial via a Raspberry Pi 4.
- Working on implementation of various gait patterns (3-3 tripod gait, 4-2 gait) using a bio-inspired Central Pattern Generator based controller for smooth motion.

Strikebot | *Modelling and Control* **March 2022 – April 2022**

- Strikebot is a spherical ground robot controlled by an internal pendulum and DC motors
- Interfaced with an IMU (MPU 6050 and MPU 9250) to achieve active damping for stabilizing the spherical bot

ROS Hackathon | *Planning and Control* **May 2021 – June 2021**

- Developed a software stack for an omni-wheeled ground robot to traverse through a field of obstacles autonomously
- Motion planning uses a modified variant of RRT for path planning and closed loop PID control for navigation

Leadership / Extracurricular

Electronics and Robotics Club **May 2022 – Present**

Chief Coordinator *BITS Pilani University*

- Leading a team of 50+ undergraduate students working on multiple technical projects across domains in robotics including ground robots, legged robots, swarms robots, robotic manipulators, etc.
- Responsible for managing funding from multiple sources, organizing discussion sessions, display events, media and outreach of the club

Center for Technical Education **Jan 2022 – May 2022**

Course Instructor: Intro to Robotics *BITS Pilani University*

- Taught concepts of robotics including interfacing with microcontrollers, basics of control theory and path planning to a group of 30+ undergraduate students
- Designed multiple milestone assignments for progress tracking.

Robotics Hackathon 2022 **July 2022 – August 2022**

Hackathon Mentor *BITS Pilani University*

- Designed a robotics hackathon for 100+ undergraduate students, involving development of an autonomous cleaning robot. Conducted a session covering basics of ROS, OpenCV, Control Theory and Path Planning.

Peer Mentorship Program **August 2021 – May 2022**

Student Mentor *BITS Pilani University*

- Mentored a group of freshmen in getting accustomed with various aspects of the college life at BITS Pilani.

Languages

- English: Bilingual Proficiency
- German: Elementary Proficiency
- Hindi: Bilingual Proficiency
- Marathi: Bilingual Proficiency