

ARJUN SADANANDA

Systems and Control Engineer | Robotics & Drone Developer

arjun-sadananda.com

@ arjun.sadananda@gmail.com

+91 99804 02770

Mumbai, IN



EXPERIENCE

Project Research Engineer (Autopilot)

Maharashtra Drone Mission - Aerospace Dept. IIT Bombay

11th July 2025 – Ongoing

Mumbai, IN

- Designing and developing autonomous flight controls algorithms and software for UAVs for various applications.
- Work with research scholars to implement theoretical advancements on hardware.

Research Assistant

Center for Systems and Control, IIT Bombay

1st March 2025 – 31st May 2025

Mumbai, IN

- Teaching Assistant for the postgraduate course SC651: Estimation on Lie Groups. Conducted tutorials, developed instructional material.
- Collaborated with Prof. Ravi Banavar on a research problem titled "Robust Attitude Estimation using TRIAD-aided Manifold EKF."

Project Engineer (Robotics and Embedded)

e-Yantra, IIT Bombay by Ministry of Education

11th June 2019 – 3rd Feb 2025

Mumbai, IN

- Developer, e-Yantra Robotics Competition (eYRC)**
Conceptualised 5+ **robotic system** challenges to facilitate *comprehension and application of various technologies and concepts*. Guided **1000s of engineering students nationwide** in tackling a variety of problems.
- Trained 100+ faculty and students** from 50+ engineering colleges around the country in domains like **embedded programming, ROS and control systems**, on platforms like differential drive robots, quadcopters and balancing bots.
- Managed, e-Yantra Summer Internship Program (e-YSIP)**
Scaled from 30 interns (10 projects) → 135 interns (40 projects) in 2021.

KEY PROJECTS

TeensyPilot - Flight Controller Firmware

M.Tech Thesis, SysCon IITB

June 2023 – June 2024

Mumbai, IN

- Built a fully functioning **barebones flight controller firmware** from scratch for the Teensy 4.0/4.1 board with some unique features like an on-board 2.4 inch display for visual feedback for developers.
- Runs a unique attitude estimator incorporating the magnetometer - **TRIAD aided Manifold Extended Kalman Filter**. SPI interfacing of MIMU.
- Runs a **geometric nonlinear attitude controller** at 9kHz! (originally intended harsh-initialization application is work-in-progress)

CSD Robocon NITK

Founder and Team Leader

June 2017 – May 2019

Surathkal, IN

- Established the first team from NITK Surathkal** to take part in the prestigious ABU Robocon. This involved everything from pitching to investors and acquiring the funds to designing and building a team, proof of concepts and the final robots.

ABOUT

Passionate about robotics, I've spent the past decade learning, building, and programming robots. I strive to bridge the gap between theory and real-world practice to build high-performance autonomous systems. As a self-motivated team player, I look forward to collaborating on challenging projects.

EDUCATION

M.Tech. in Systems and Control Engg.

Indian Institute of Technology (IIT) Bombay

July 2021 – August 2024

B.Tech. in Mechanical Engg.

National Institute of Technology (NIT) Karnataka

July 2015 – May 2019

CBSE Senior Secondary (XI-XII)

Indian Educational School (Bharatiya Vidya Bhavan), Kuwait

April 2013 – March 2015

PUBLICATIONS

- Arjun Sadananda, Ravi Banavar and Kavi Arya, "**Robust Orientation Estimation with TRIAD-aided Manifold EKF**", *European Control Conference*, 2025
- Shashank Rao Marpally, M S Nagarakshith, Arjun Sadananda, K. R. Guruprasad, "Geometrical Mapping of an Initially Unknown Region by a Mobile Robot" in *IEEE International Conference on Distributed Computing, VLSI, Electrical Circuits and Robotics*, 2019
- Narvekar, S., Gupta, V., Atar, S., Arjun Sadananda, Singh, S., Arya, K., "Learning Efficacy and Effect of Scaffolding in Online Engineering Education during COVID-19 Pandemic" in *Proceedings of the 16th International Conference of the Learning Sciences - ICLS*, 2022
- Saail Narvekar, Rucmenya Bessariya, Arjun Sadananda, Kavi Arya, "Learn, Build and Compete: An Aquatic Robot-Fish Challenge" in *3rd International Conference on Education Technology Management*, 2020

- Lead role in designing and building Mechanical systems and the Control Systems of the Robots for Robocon 2018 and 2019.
- **Winners of First Time Best Use of MATLAB 2018.**
Created MATLAB Simulink Simulation that was recognized by Math-Works team for adeptly modelling the forward and inverse kinematics of a holonomic drive robot and line tracking controller.

eYantra Robotics Competition Themes (2019-2024)

Developer

📅 June 2019 – May 2024

📍 Mumbai, IN

- **Holo-glyph Bots & HoIA Bots Themes** (e-YRC 2022-24)
Build a **trio of holonomic drive robots** to plot images and functions using ArUco markers and an overhead camera for localisation. Tech Stack: ROS2, Gazebo, OpenCV, micro-controller programming, μ ROS. Vid-Link
- **Sahayak Bot - Stage 1** (e-YRC 2021-22)
Designed Trajectory Tracking Control Tasks for AGVs in ROS+Gazebo.
- **Intrepid Explorer and Game Inventor** (School e-YSRC 2021-22)
One theme to explore the sense-think-act of robotics in the Webots simulator, and another to learn Python by building games using turtle.
- **Patrol Fish Theme** (e-YRC 2019-20)
Design, build and program an underwater robot with fish-like motion to complete an obstacle course.

ADDITIONAL PROJECTS

Projects

Unitree go2-nav2-ros2

📅 June 2024

- Created a ROS2 Simulation Stack for simulating Unitree Go2 in Gazebo ROS2 and navigating the robot to a desired goal using Nav2. Github Link

2DOF-Heli

📅 December 2024

- Designed, built and programmed an experimental setup for testing LQR and Kalman Filtering algorithm on a strongly coupled system.

3D SLAM & Fuzzy Control on tricycle robot 📅 June 2018

- Implemented SLAM in an indoor environment on a Tricycle Drive Robot using a RGBD sensor and ROS packages. Also implemented a basic fuzzy logic for avoiding dynamic obstacles. YouTube Link

Industrial Automation Experience

📅 December 2016

- **AllenBradley PLC - Winter Internship**, Ladder Logic Programming Training on AllenBradley Training Kit and Allen Bradley ControlLogix555.
- **LabView Experiments in VirtualLabs-NITK** Implemented simple experiments using LabView.

eYantra Summer Intern

📅 May 2017 – June 2017

- Designed and fabricated a **6 DOF Robotic Arm** taking inspiration from the mechanics of the human arm
- Implemented object detection on **point cloud data** stream from a Kinect sensor using **Point Cloud Library**.

LANGUAGES

C++
Python
English
Hindi
Tulu
Kannada



HANDS-ON EXPLORATION

Matlab ROS Gazebo; Coppeliasim

Mechanical and PCB CAD softwares

OpenCV PCL Android Studio

Embedded C Flight Control Firmwares

Various Estimation and Control Algorithms

Path Planning Localisation and Mapping

STRENGTHS

Problem Solving through Critical Thinking

Product Development and Prototyping
And Overcoming the Integration Nightmare

Team Work Leadership Public Speaking

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HOBBIES

Endurance Sports Ultimate Frisbee

FPV Piloting Badminton

Dance Coffee and Music

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Other Achievements

- **Runner Up e-Yantra Robotics Competition 2016**
Used OpenCV for Localisation, Dijkstra's algorithm for Path Planning and PID + behaviour-based controller. YouTube Link
- **Winner of Automata Competition in Engineer 2016 (NITK TechFest)** State-level competition with similar techstack as above. YouTube Link
- **Country Topper (Kuwait 2015) in Computer Science** in CBSE Senior Secondary Curriculum