ARJUN SADANANDA

Systems and Control Engineer | Robotics & Drone Developer

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in arjun-sadananda

EXPERIENCE

Robotics and Embedded Engineer
e-Yantra, IIT Bombay by Ministry of Education

📅 June 2019 – Ongoing 📍 Mumbai, IN

- **Developer, e-Yantra Robotics Competition (eYRC)**
  Conceptualized technical challenges or **Gamified Real World Problems** to facilitate *comprehension and application* of *technologies and concepts* from **multiple disciplines**. Mentored **1000s of engineering students nationwide** in tackling a variety of problem statements (some listed in Projects section).
- **Trainer, Faculty Training Workshops**
  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)**
  Developed a structure to increase the intake from 30 interns in 10 projects to 135 interns in 40 projects in e-YSIP 2021.
  Worked with 20+ summer interns on 10+ projects across 5 years.
- **Mechanical designer for a variety of platforms/projects @ e-Yantra**
  Chassis for the Collaborative Robot to marry a UR5 robotic arm to a UGV. Components mounts for 7kg payload drone platform, etc.

MAJOR HIGHLIGHTS

TeensyPilot
M.Tech Thesis, SysCon IITB

📅 June 2023 – June 2024 📍 Mumbai, IN

- Built a **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** running at 9̃kHz! (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.
- 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.

ABOUT

Passionate about robotics, I've spent the past decade learning, building, and programming robots. I believe true mastery lies in bridging the gap between theory and real-world practice—and it's fun! I also apply my soft skills through intrapreneurship and teaching, striving to make a positive impact. As a self-motivated team player, I look forward to tackling challenging projects and collaborative endeavours.

EDUCATION

M.Tech. in Systems and Control Engg.
Indian Institute of Technology (IIT) Bombay

📅 July 2021 – June 2024

B.Tech. in Mechanical Engg.
National Institute of Technology (NIT) Karnataka

📅 July 2015 – June 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**", Submitted to *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

eYantra Robotics Competition Themes
Developer

📅 June 2019 – May 2024 📍 Mumbai, IN

- **Holo-glyph Bots & HolA Bots Themes** *(e-YRC 2023-24)*
  Build and program a **trio of holonomic drive robots** to plot images and functions on an 8ft x 8ft arena using ArUco markers and an overhead camera for localization. Tech Stack: ROS2, Gazebo, OpenCV, micro-controller programming, μROS. YouTube Link
- **Intrepid Explorer and Game Inventor** *(School e-YSRC 2021-22)*
  Two themes; one to explore the sense-think-act of robotics in the We-bots simulator, and the other to learn Python by building games using the turtle library.
- **Patrol Fish Theme** *(e-YRC 2019-20)*
  Design, build and program an underwater robot with fish-like motion to complete an obstacle course.

OTHER HIGHLIGHTS

Conducted Lectures and Experiments for an IITB Course
📅 Dec 2024

- Covering *Kalman Filter in Practice* for the course "Estimation on Lie Groups" - Prof. Ravi Banavar.

eYantra Summer Internship
📅 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**.

Mini 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

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

AllenBradley PLC Programming 📅 December 2016

- Winter Internship, Ladder Logic Programming Training on AllenBradley Training Kit and Allen Bradley ControlLogix555.

LabView Experiments in VirtualLabs-NITK

- Implemented simple experiments using LabView.

STRENGTHS

Problem Solving   Design Thinking
Product Development and Prototyping

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Team Work   Leadership   Public Speaking
...

LANGUAGES

C++
Python
English
Hindi
Tulu
Kannada

TOOLS USED

Matlab   ROS   CAD softwares
OpenCV; PCL   PCB CAD softwares
Android Studio   ...

HOBBIES

Endurance Sports   Ultimate Frisbee
FPV Piloting   Badminton
Dancing   Coffee and Music