Suraj Dayma

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Suraj Dayma | suraj1102 | Website

EDUCATION

BTech - Robotics and Autonomous Systems	Plaksha University, Mohali	8.93	2027
12th - CBSE	Global Indian Intl. School, Abu Dhabi	95%	2023
10th - CBSE	Global Indian Intl. School, Abu Dhabi	92.4%	2021

RELEVANT COURSEWORK

- **Robotics:** System Dynamics and Control, Sensing and Actuation, Engineering Mechanics, Signals and Systems, Design and Engineering of Lighter than Air Systems.
- **AI/ML:** Machine Learning and Pattern Recognition, Deep Learning.
- **Core CS:** Programming and Data Structures, Computer Networks, Foundations of Computer Systems.

RESEARCH EXPERIENCE

High-Resolution Air Quality Mapping for Smart Cities *Aug 2025 – Present*

Dixon IoT Lab, Plaksha University (Supervisor: Prof. Srikant Srinivasan) .

- Contributed to a smart city initiative by developing low-cost, weatherproof sensor nodes for dense urban air quality monitoring.
- Calibrating 10+ gas and particulate matter sensors against industry-grade modules to ensure measurement accuracy.
- Developed an efficient sensor management library to interface with large number of sensors, and experiment with different polling techniques, sampling methods, and sensor settings.
- Designed robust data acquisition and communication pipeline using MQTT, enabling scalable, real-time monitoring across multiple nodes.
- Engineering outdoor weather and temperature resilient casings for field deployment.
- Research aims to integrate air quality data with existing traffic monitoring networks at Dixon IoT Lab to enable pollution source localization and inform urban planning for improved quality of life.

Low Altitude Remote Sensing (LARS) for Precision Agriculture *Jun 2025 – Aug 2025*

Summer Intern, Plaksha University (Supervisor: Prof. Sunita Chauhan) .

- Contributed to a multi-agent robotics project for precision agriculture, developing the autonomous Unmanned Ground Vehicle (UGV) component of a collaborative UAV-UGV ecosystem.
- Developed a digital twin of the UGV and a 4-DoF manipulator in ROS2/Gazebo, creating a foundational testbed for validating navigation and control strategies prior to hardware deployment.
- Engineered and deployed a complete navigation stack (SLAM, localization, path planning) on a physical prototype, bridging the sim-to-real gap by fine-tuning algorithms and validating robust, real-time communication.
- Led the design, fabrication, and control of the 4-DoF manipulator, implementing a PID position controller to enable precise, targeted interventions based on aerial data.
- The research goal is for the UGV to autonomously act on coordinates provided by a UAV, enabling on-ground inspection and intervention that closes the loop in the remote sensing and response pipeline.

An LSTM-based Approach for Real-Time Score Prediction in ODI Cricket *Mar 2025 – May 2025*

Machine Learning Course (Mentors: Prof. Siddharth, Prof. Brainerd Prince) .

Status: Manuscript in preparation for submission to the Journal of Sports Analytics.
Authors: Arnav Kapoor, Avantika Bansal, Suraj Dayma

- Proposed a novel LSTM-based model that incorporates pitch and weather conditions to predict final scores in real-time for ODI cricket matches.
- Achieved a state-of-the-art Root Mean Square Error (RMSE) of 15.2 runs, outperforming existing models on a dataset of all ODI matches since 2006.
- Conducted a comparative study validating the statistical significance of meteorological and pitch data as predictive features, a key contribution to sports analytics in this area.

PROJECTS

Balancing Bot | **System Dynamics and Control Course**. *Apr 2025 – May 2025*

- Designed a balancing bot based on a cart-pole model.
- Calculated optimal COM using system model to minimize rise time.
- Used Kalman filter to get accurate tilt estimation from accelerometer and gyroscope readings. Characterized stepper motors to find appropriate dead-bands.
- Implemented PID control to balance the bot and used Ziegler-Nichole PID tuning method to reduce oscillations; robot was able to balance for 2+ minutes while being subjected to external forces.

Lighter Than Air Systems | **Prof. Rajkumar Pant**. *Jan 2025 – May 2025*

- Designed and fabricated a number of lighter than air systems such as aerostat, airship envelopes, recovery devices, and launchers.
- Engineered and deployed a glider and a launch mechanism for the glider on an aerostat, achieving a 30m glide from a 10m altitude.
- Designed and validated an emergency rapid deflation system for airships which quickly deflated the envelope in emergency, recovering both the payload and envelope material.

Stern-Gerlach Experiment Animations and Simulation | **Prof. Nitin Upadhyay**. *Jun 2024 – July 2024*

- Created animations to illustrate the Stern-Gerlach (SG) experiment for a course on quantum computing.
- Used Manim (animation framework) to programatically generate animations for different mangnetic field configurations in the SG experiment.
- Made an interactive simulation in Unity for the same.

TEACHING

Student Tutor | **Mechatronics Course, Plaksha University**. *Aug 2025 – Present*

- Assisting in teaching a semester 3 introductory robotics for a class of 180+ students.
- Created demonstration circuits to teach voltage dividers, diodes, potentiometer, and ADCs in class while conducting labs and tutorials.

LEADERSHIP

Content Lead | GeekRoom, Plaksha University. *Aug – Dec 2024*

- Content Team Lead at GeekRoom, involved in curating educational content.
- Created an educational video on simulating flock behavior (boids) in Unity.
- Organized introductory Python programming workshops for first-year students.

Co-organizer | TEDxPlakshaUniversity. *Jan – Apr 2024*

- Led a team of 10+ people to organize the first TEDx event at Plaksha University.
- Hosted 5 speakers from various fields; event videos have gained over 100k views on YouTube.

SKILLS

- **Programming Languages:** C, C++, C#, Python (Pandas, Torch), Bash, MATLAB
- **Tools:** ROS2, Gazebo Simulator, Unity
- **Other Skills:** Git, Latex, CAD (Fusion 360, Onshape), Simscale, Control Systems

ACHIEVEMENTS

- **Abu Dhabi Student Golden Visa:** Long-term UAE residence visa awarded for academic excellence.
- **Merit Scholarship, Plaksha University:** Recognized for academic excellence with a GPA above 8 and extracurricular contributions.
- **Academic Excellence Award, Rochester Institute of Technology Dubai:** Recognized for academic excellence by RIT Dubai.