

# Sahil Tibrewal

📞 9660028539 — ✉ satvik.tibrewal27@gmail.com — 🔗 [linkedin.com/in/sahil-tibrewal-35ab50140](https://www.linkedin.com/in/sahil-tibrewal-35ab50140) — 📍 Ahmedabad

## Summary

Results-driven Mechatronics Engineer specializing in robotics, automation, and hardware prototyping. Proven expertise in designing and optimizing real-world robotic systems, including drone platforms, autonomous rovers, and AI-integrated tools. Adept in NVIDIA Isaac Sim, Reinforcement Learning (RL), ROS2, embedded systems, and full-stack development for intelligent automation solutions.

## Skills

**Programming:** C, Python, AVR

**Design and Prototyping:** Fusion 360, AutoCAD, Blender, 3D Printing

**Hardware:** Drones, ESCs, BLDC/Stepper/Servo Motors, Motor Drivers, Raspberry Pi, Arduino, IMUs, Sensors

**Robotics & Simulation:** NVIDIA Isaac Sim (Omniverse), ROS2, PyBullet, URDF, Gazebo


**AI and Perception:** Reinforcement Learning (RL), YOLOv8, Hailo-8 (HailoRT, HEF), GStreamer, Sensor Fusion (Odometry/IMU), LLMs, RAG

**Control Systems:** PID Tuning, Path Tracking, Localization, Basic SLAM & Planning

## Experience

### Fx31 Labs Pvt Ltd (Ahmedabad)

Sep 2024 – Present

**Robotics Engineer** (AI based Autonomous Tennis Ball Collection Robot)  Video



- Initially prototyped the digital twin in PyBullet, but migrated to NVIDIA Isaac Sim due to CPU limitations, utilizing GPU-accelerated environments and Reinforcement Learning (RL) with custom court.usdc and robot.urdf assets.
- Developed a multi-sensor pose estimation pipeline combining wheel encoder odometry and IMU fusion via Raspberry Pi and Arduino for court-relative localization.
- Trained and deployed a custom YOLOv8 model for multi-class detection (ball and net), compiling to HEF format and accelerating inference via Hailo-8 on Raspberry Pi 5.
- Created fabrication-ready engineering drawings with proper tolerances, bridging CAD models to manufacturing documentation for chassis and mechanical assemblies.

### Fractal31 Pvt Ltd (Ahmedabad)

Aug 2023 – June 2024

**Robotics Intern** (Autonomous Wall-Climbing Rover Development)  Github  Video

- Designed and deployed a wall-climbing rover for surface tasks (painting, cleaning), using vacuum-based adhesion achieving 90% grip reliability.
- Engineered a mechanism producing 7kg downforce at 40% throttle, decreasing slippage incidents by 75% and increasing efficiency by 60%.

**Drone/Python Intern** (Autonomous Banner Placement Drone)  Github  Video

- Developed a drone with robotic arm for autonomous sticker/banner placement, enhancing stability by 40%.
- Achieved 95% placement precision by integrating lightweight actuator systems with real-time balancing feedback.

## Projects

### BuyEasy: RAG + LLM based Enhanced E-Commerce AI

 Website  Video

- Created a dynamic product recommendation system using FastAPI + React.js and custom RAG architecture.
- Used vector embeddings to filter phones, gadgets, and appliances based on user profile, achieving 1.3s response latency.
- Integrated affiliate marketing and automated daily price tracking to maintain real-time accuracy.

### Real-Time Metro Crowd Estimation System using FPGA

- Engineered an FPGA-based person detection pipeline processing CCTV feeds to estimate real-time passenger density in individual metro coaches.
- Designed a system architecture to transmit coach occupancy metrics to upcoming stations, enabling optimized crowd management and boarding efficiency.
- Utilized hardware-accelerated computer vision techniques to achieve low-latency, edge-based inference suitable for high-traffic transit environments.

### Real-time Tennis-ball tracker and motor control with YOLOv8

 Video

- Built a real-time tennis ball tracker using YOLOv8 integrated with motor control reducing latency by 40%.
- Achieved 95% detection accuracy across diverse weather and lighting conditions.

## Education

### Dr. A. P. J. Abdul Kalam Technical University (Greater Noida)

2020-2024

B.Tech in Electronics and Communication Engineering

CGPA 6.7 - Certificates: Huawei (HCSA, HClA), Mortgage Underwriter

### Delhi Public School

2018-2020