Aniket Kumar Gupt

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Research Interests

Flight Control & Dynamics, System Modeling and Simulation, AI/ML for Aerial Autonomy, Aerodynamics

Key Skills

Software Skills: ROS/ROS2, Gazebo, X-Plane, Planemaker, QGroundControl, MATLAB & Simulink, XFLR5, CATIA, Ansys, OpenFoam Basics, VS Code, Arduino IDE
Programming Skills: C/C++, Python
Hardware: ESP32, Arduino, Raspberry Pi, Pixhawk, Sensor interfacing (DHT11, MQ135, IMUs, etc.)
Flight Control, Autonomy Frameworks & AI/ML: PX4, ArduPilot, MAVLink, PyTorch

Education

Bachelor's Degree in Aerospace Engineering, Pulchowk Campus 2024-2027
IOE, Tribhuvan University, Lalitpur, Nepal
Aggregate: 82.21% **(Academic Excellence Award - 2024)**

Work Experiences

Research Centre for Low Altitude Economy
Flight Control Intern June 2025 – Aug 2025

- Assisted in system modeling, propulsion optimization, and endurance enhancement for high endurance fixed wing unmanned aerial vehicles (UAVs).
- Performed Software-in-the-Loop (SITL) and Hardware-in-the-Loop (HITL) simulations in Gazebo using PX4, followed by real-world flight validation of control algorithms.

Mach24 Orbital
Avionics Intern Oct 2024 – Nov 2024

- Assembled a 200N hybrid engine static test setup integrated actuator systems for valve control.
- Developed a pneumatic control system to operate solenoid-actuated valves, enabling reliable flow testing.

The Squad of Changemakers
Mentor Aug 2024 – Sep 2024

- Taught foundational concepts of robotics and UAVs during the Book Free Friday initiative organized under KMC (Kathmandu Metropolitan City), promoting hands-on STEM learning.

Relevant Engagements

Flying Club, Pulchowk Campus
Founder & President May 2024- Present

- Founded campus's first student-led aerospace and UAV initiative. Organized workshops on RC planes, autonomous drones, and flight simulation. Led the "Student Can Fly" outreach program, mentoring school students and promoting aviation awareness. Guided 100+ members in aeromodelling and led participation in national competitions like IIT Bombay Techfest, AIAA DBF fostering a culture of innovation in UAV and aerospace systems.

AIAA Design/Build/Fly
Avionics and Flight Control Team Oct 2023 – Apr 2024
Avionics and Flight Control Lead Oct 2024 – Apr 2025
Team Lead and Pilot Oct 2025 – Present

- Contributed to the selection and testing of avionics and flight control systems for a competitive UAV project. Led the team in integrating sensors, autopilot software, and control algorithms for stable and autonomous flight. Conducted sensitivity analysis, constraint analysis, and UAV performance calculations. Managed team coordination, timelines, and technical problem-solving to achieve mission objectives under strict competition constraints.

Free Student Union, Pulchowk Campus (Extended Team)
Automation Team Aug 2025- Present

- I contribute to designing and implementing task automation systems to improve campus operations and technical efficiency. The team focuses on IoT-based automation projects that simplify routine processes and promote hands-on innovation.

Dronacharya, LOCUS IOE Pulchowk Feb 2025
1st Runner-up

- Secured 1st Runner-up position in Dronacharya competition organized under LOCUS IOE Pulchowk by designing and piloting a drone capable of performing mission tasks.

Academic Projects

Design, Fabrication, and Flight Testing of a Tricopter Tiltrotor UAV with VTOL and Fixed Wing Capabilities,

- Designed, fabricated, and tested a tricopter tiltrotor UAV with both VTOL and fixed-wing capabilities. Integrated tilt mechanisms, control systems, and conducted successful transition flight tests for hybrid operation.

Satellite Attitude Control Simulation

- Simulated satellite attitude control in MATLAB Simulink using data from a research paper, modeling reaction wheels as DC motors with yaw angle as the control variable. Implemented and tuned a PID controller to stabilize and maintain a fixed yaw angle under constant disturbances torque.

CubeSat Attitude Control Simulation (Python)

- Simulated 1U CubeSat attitude control using a PD controller with arbitrary gains, modeling reaction wheels and handling disturbances. Visualized angular position, velocity, torque, and wheel RPM, assuming rigid body dynamics, small-angle Euler rotations, and deterministic disturbances.

Autonomous Drone Navigation in GPS-Denied Environments using Optical Flow, LiDAR, and Visual Sensing

- Developed an autonomous drone navigation system for GPS-denied environments with optical flow, LiDAR for positioning and visual sensing for avoidance. Implemented real-time obstacle avoidance, localization, and terrain-following capabilities for safe and intelligent UAV operation.

Terrain-Following UAV using Digital Elevation Models (DEMs) in SITL

- Integrated DEMs in PX4 SITL to simulate real-time terrain-following, where the UAV autonomously adjusted altitude to maintain constant height above terrain in given waypoints.

Design and Development of a Low-Cost Mobile Microscope TOP 8

- Funded by Ministry of Education, Science and Technology (MoEST) Nepal, this project focuses on developing a compact, affordable, and smartphone-compatible microscope for use in educational purpose. Using 3D-printed parts and low-cost optics, the device brings accessible microscopy to remote and resource limited areas, supporting hands on science learning and real time sample analysis.

Design, Fabrication and Testing of Flying Wing

- Designed, fabricated, and tested a Flying Wing for improved aerodynamic efficiency. Focused on seamless wing-fuselage design, stability analysis, and flight testing for performance validation using Pixhawk 4.

References

Asst. Prof. Kamal Darlami, Deputy Head of Department, Department of Mechanical and Aerospace Engineering, Pulchowk Campus
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Asst. Prof. Biman Rimal, BE Project Coordinator, Department of Mechanical and Aerospace Engineering, Pulchowk Campus
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