(A Report of a project facilitated by)

PX4 SITL With Gazebo

BACHELOR OF TECHNOLOGY IN COMPUTERSCIENCE & ENGINEERING

(ARTIFICIAL INTELLIGENCE& MACHINE LEARNING)

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PX4 Simulation Project Documentation Proposal

1. Introduction

- The PX4 Simulation Project seeks to apply and test a GPS failure failsafe mechanism for a quadrotor. The project uses PX4 SITL with Gazebo Classic and ROS 2 to simulate actual GPS failure conditions and establish strong recovery techniques.

2. Objectives

- Create a GPS failure detection and recovery system for a PX4-based quadrotor.
- Simulate GPS failure conditions using PX4 SITL in Gazebo Classic.
- Implement control measures to provide safe quadrotor flight for GPS loss.
- Evaluate the performance of the failsafe mechanism through flight logs and telemetry.

3. Feasibility

- The project is viable because of PX4 SITL, Gazebo Classic, and ROS 2, which provide thorough simulation without the need for actual hardware. Moreover, available GPS failure handling methods will be used to implement and test the failsafe mechanism.

4. Timeline

Week	**Task**
Week1	Review and analyze required tools
Week2	Environment setup
Week3	Implementing the Failsafe in SITL
Week4	Evaluating the results

5. Resource Estimation

- **Software**: PX4 Autopilot, Gazebo Classic (Gazebo 11), ROS 2, QGroundControl
- **Hardware**: Cpu based performance computer or laptop with Ubuntu for simulation

6. Conclusion

- This proposal defines a systematic process for creating a GPS failure failsafe system for a PX4-based quadrotor. With a realistic schedule and resource estimation, this project will improve quadrotor reliability in GPS-denied environments using solid simulation and testing.