PROJECT Autonomous Drone Navigation

END USER MANUAL

Project Description:-

This project focuses on developing an advanced Autonomous Drone Navigation System. Students will engage in creating a sophisticated flight computer, capable of interpreting depth images from lidar and Zed stereoscopic camera. This system will empower the drone to learn about its surrounding environment and formulate a flight path independent of GPS data.

Project Hardware requirements:-

Drone, Zed 2 camera , 2D lidar , Jetson nano , Pixhawk

Project Software requirements:-

Visual Studio Code, Zed SDK, ROS(Robot Operating System), Unreal engine, Q Ground Control

Installations:

ZED SDK Installation

Prerequisites:

- A compatible ZED stereo camera.
- Ensure your system meets the minimum hardware requirements specified by Stereolabs.

Installation Steps

- Download the SDK: Go to the ZED SDK download page and download the latest version compatible with your Windows system.
- Run the Installer: Execute the downloaded .exe file and follow the on-screen instructions. This will install the necessary drivers and the SDK.
- Restart Your Computer: After installation, reboot your computer to ensure all drivers are properly loaded.

Unreal Engine Setup

Prerequisites:

- A PC with Windows 10/11, macOS, or Linux.
- Adequate hardware specs to run the engine smoothly (refer to Unreal Engine's system requirements).
- A free Epic Games account to download Unreal Engine.

Installation Steps

- Download Epic Games Launcher: Visit the Epic Games Download Page and download the Epic Games Launcher.
- Install the Launcher: Run the downloaded installer and follow the on-screen instructions.

- Launch Epic Games Launcher: Sign in with your Epic Games account.
- Install Unreal Engine: Navigate to the ‘Unreal Engine’ tab, click on the ‘Library’ section, and then click the ‘+’ button to add a new engine version.
- Choose Version: Select the desired version of Unreal Engine and click ‘Install’.

QGroundControl Installation

Prerequisites :

- A compatible computer
- A UAV that communicates using the MAVLink protocol.
- A stable internet connection for downloading the software.

Installation Steps

- Download QGroundControl: Visit the QGroundControl download page and select the appropriate version for your operating system.
- Install the Application:
  -Windows: Run the downloaded.exe installer and follow the installation prompts.
  -macOS: Open the .dmg file and drag the QGroundControl app to your Applications folder

Post-Installation

- Connect to Your UAV: Connect your UAV to QGroundControl using USB, Telemetry Radio, or Wi-Fi, depending on your drone's setup.
- Firmware Setup: If needed, update your UAV's firmware through QGroundControl.
- Calibrate Sensors: Follow the on-screen instructions in QGroundControl to calibrate your UAV's sensors.