Development of Drone that Follows GPS Enabled Devices

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Abstract

An experimental drone which is a autonomous flight was developed by equipping the microcomputer of Arduinonano for flight control GPS sensor, and bluetooth for tracking the object which have to be followed. The GPS coordinates from the object is acquired and it is transmitted to bluetooth device in drone and the arduino collects them and make the drone to follow the object using gps.

Keywords: *Drone Autonomous Flight , GPS, Follow me*

1. Introduction

Drones are also called UAVs(Unmannedaerial vehicle). UAV is a autonomous machine which iscapable of flying by its own orcontrolled remotely by flight controlling software. These drones are controlled by embedded systems. Drones use sensors and GPS modules to do some certain tasks for whichthey are programmed for. Drones where 1st used for military purposefor spying and anti-aircraft targeting. Now-a-days drones are used by civilians for traffic monitoring, agriculture, firefighting, monitoring.

UAVs are mostly used for recording and Uploading real-time video. HD video cam is used to record videos and output in common format. Aerial video, by visible video camsfixed on UAV, is becoming low cost and uptodate source to bring solution to many difficult challenges. Now-a-days, the most used navigation systems for the UAVs are GPS modules. So to take videography to next level weintroduce GPS enabled drone that follows you. This Follow me drone needs no manual control. This follow me drone is capable to record or take picture by following you, so you can have good experience of admiring the nature as well as get it recorded by the side and no need to worry of controlling it as it is autonomous.

2. Composition of Drone

A. Hardware Used

1. Arduinonano(Fig3)-

Arduinonano is a board based on the ATmega328P (Arduino Nano 3.x). Arduino boards are used embedded

systems, electronic projects, robotics. Here Arduinonano is programmed for flight mode.

2. HC-05 Bluetooth Module(Fig1)-

The HC-05 is a bluetooth module. It can be used to send signals between two microcontrollers like Arduino or any other Bluetooth enabled devices like a Phone or Laptop. The module establishes communication using the USART at 9600 baud rate. The default values can be configured by the command mode.

3. NEO-6M-GPS(Fig2)-

The NEO-6M GPS has high response for indoor devices. And also there is a MS621FE-compatible rechargeable battery as backup power and EEPROM for having config settings get stored. There is a configurable interface for continuous communication, but the baud rate of UART (TTL) by default is 9600. Patch antenna are used the most. These are flat, generally have a ceramic and metal body, and are fitted on a metal base plate.

The orientation of the antenna mounting is very important for best output of the GPS receiver. While using the patch antenna, it should be placed parallel to the geographic horizon. The antenna should have a clear line of sight to sun light and visible satellites.

4. Motors-

Drone needs more thrust to float in air so we should use some powerful motors. The lightweight, low-cost, small in size and powerful motors used in drones are Brushless DC motors (BLDC). Speed of the motor is controlled by a

8bit low power type microcontroller along with 10 bit ADC.

5. Lithium Battery-

Lithium polymer or LiPo batteries has many advantages so that it can be used for drones. They can store more power in small area and weigh less, volt typically 3.7 volts -- so more power with less number of cells LiPos discharge at a slow rate too, so they can hold a charge longer when not in use.

6. Camera-

Small lightweight camera is used to record the candid moments, while flying.

Figure 1: HC 05 Bluetooth module
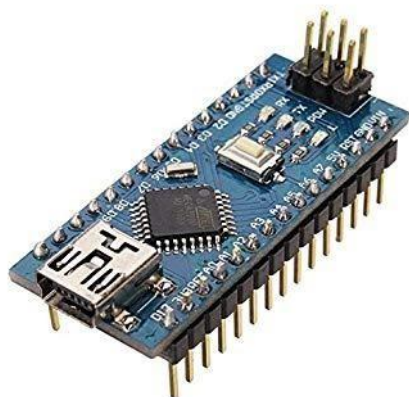

Figure 2: Neo-6M-GPS
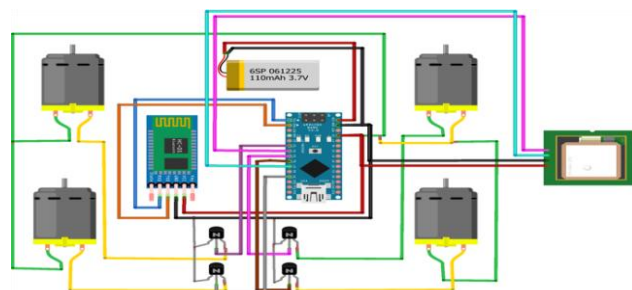

Figure 3: Ardunionano

Figure 4:Drone Circuit

B. Software Used

1. ARDUINO 1.8.11-
The open-source Arduino Software (IDE) is used to write program and upload it to the board. Mostly all popular platforms like Windows, Linux, Mac support this IDE. Java programming language is used to develop the working environment

2. SensoDunio-
It checks the sensors present on your device and sends the values of different sensors to the Arduino. These values are then sent to the drone through the bluetooth module.

3. Setting up GPS and Bluetooth

Connect the Arduino Nano to your computer. Select the correct Board and Port when uploading the code.
Open the application and pair your cell phone's Bluetooth with the HC-05 module. Scan for devices, and pair with HC-05 module, Check ON in front of the sensor and then check TX to transmit data to your Arduino.

4. Conclusion

Our project is totally to do a fun based follow drone using GPS that will be used tofollow and captures one's movement x. Having a drone that follows one along with having a 4k camera so that it will make sure it captures every awesome and adventurous moment one goes through.

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