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DESIGN OF MEDICAL DRONE USING NEO-6M GPS WITH ARDUINO UNO

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ABSTRACT: Technological progressions in fields of savage activities just as in remote bundle conveying frameworks has driven us to the improvement of an automation. The automatic flight controller is an Arduino microcontroller and its flight developments can be controlled utilizing a transmitter-receiver arrangement. A GPS module would be connected which would give the directions of the spot wherein the client is found. These readings are being sent to drone utilizing a server-customer idea. For this, a Wi-Fi module has been utilized. Out of reach streets never again will forestall conveyance of blood, prescriptions or other medicinal services things. Ongoing developments have occurred in ramble explicit equipment, programming and systems. For instance, light composite materials and worldwide situating frameworks (GPS) empower effective flight. Automaton programming can utilize cell phone or tablet applications for following and route. The automation working framework deals with the system by checking climate information from all the ground stations and streamlining the courses of the automatons. The courses need to keep away from antagonistic climate conditions and evade other hazard factors. The main organizations right now their various methodologies are examined. Further we audit the most recent choice models that encourage the broad dynamic for working an automation model. The dropping system of servo based SG 90 is utilized to convey the meds. The NEO-6M GPS module with the Arduino to get the GPS information and can be utilized to decide the position. An Arduino Uno, Ethernet shield and LCD are associated with the system. Our commitment is to make a plan of an medicinal services conveyance system will encourage all the more convenient, effective and efficient social insurance conveyance to conceivably spare lives

Keywords: NEO-6M GPS Module, Wi-Fi Module, Arduino Uno, LCD, Ethernet Shield, Quadcopter.

1. INTRODUCTION

The more familiar public term "drone" was first coined because of the similarity of the loud and cadenced sound of old military unmanned target aircraft to that of a male bee. Despite its public popularity, the term has encountered strong opposition from aviation professionals and government regulators. The term unmanned aerial vehicle (UAV) was first coined in the 1980s to describe autonomous, or remotely controlled, multiuse aerial vehicles that are driven by aerodynamic forces and are capable of carrying a payload. This definition framed the distinction between UAVs from other aerial systems, such as ballistic vehicles, gliders, balloons, and cruise missiles. The more acknowledged term in proficient circles, unmanned aeronautical frameworks (UAS), alludes to at least one unmanned airborne vehicles related to an information terminal, with a tactile exhibit and an electronic information interface on the vehicle. Different terms used to reference the automaton incorporate remotely directed vehicle (RPV) and remotely guided airplane framework (RPAS). The Drone is a flying vehicle that utilizes four rotors for lift, directing, and adjustment. In contrast to other ethereal vehicles, the quadcopter can accomplish vertical trip in a progressively steady condition. The quadcopter isn't influenced by the torque gives that a helicopter encounters because of the fundamental rotor.

2. LITERATURE REVIEW

Many automation applications include reconnaissance utilizing an on board camera. In any case, rambles likewise are equipped for conveying gadgets other than cameras and fit for conveying little loads. Automatons have been utilized widely by the military in battle and for helpful guide. Helpful non-military automaton applications in various ventures incorporate horticulture Surveillance and yield splashing, shark reconnaissance at sea shores, observing natural life for preservation, checking fires, logical research and investigation, checking mobs and global fringes by police and governments, sports and diversion occasion inclusion, other media inclusion, crisis administrations and debacle reaction. A few analysts have taken a gander at different models for ramble use principally for package conveyance propelled by Google, Amazon and DHL who are investigating this alternative. build up a sole automaton based conveyance framework for urban territories by situating ramble reviving stations and steering conveyance ways around hindrances.

3. PROPOSED METHODOLOGY

Telecommunication drones are being utilized for determination and treatment, perioperative assessment, and telemetering in remote regions. Automatons can possibly be solid clinical conveyance stages for microbiological and research facility tests, pharmaceuticals, immunizations, crisis clinical hardware, and patient vehicle. UAV quadcopter is an unmanned aerial vehicle with four rotating rotors used for lift and movement. It uses an electronic control system and electronic sensors to help stabilize itself. Quadcopter parts have been decreasing in price over the past couple of years due to technological advances.
A drone's lift capabilities can be measured as shown below.

L = (1/2) d v2 s CL

Where:

•L = Lift, which must equal the airplane's weight in pounds •d = density of the air. This will change due to altitude. These values can be found in a I.C.A.O. Standard Atmosphere Table.

•v = velocity of an aircraft expressed in feet per second •s = the wing area of an aircraft in square feet

•CL = Coefficient of lift, which is determined by the type of air foil and angle of attack.

A quadcopter consists of four motors evenly dispersed along the drone frame. The circles represent the spinning rotors of the drone and the arrows represent the rotation direction. Motors one and three rotate in a clockwise direction using pusher rotors. Motor two and four rotate in a counterclockwise direction using 23 puller rotors. Each motor produces a thrust and torque about the center of the drone. Due to the opposite spinning directions of the motors, the net torque about the center of the quadcopter is ideally zero, producing zero angular acceleration. It eliminates the need for the yaw stabilization. The speed of all the motors increased by the same amount of throttle to create a vertical force. As the vertical forces overcome the gravitational forces of the earth, the drone begins to rise in altitude. Figure-1 shows the vertical movement of the drone. As above, the circles represent the spinning rotors, the larger arrows represent the direction the rotors are spinning, and the black arrows represent the forces caused by the spinning rotors.

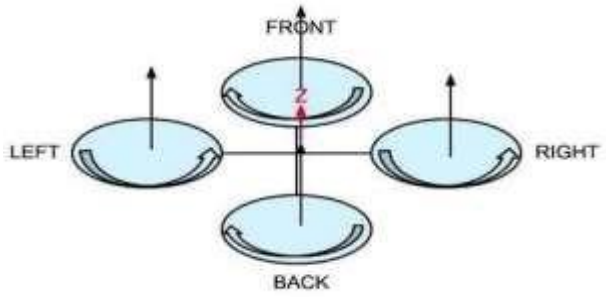

Fig - 1 Vertical thrust movement

Pitch is provided by increasing (or decreasing) the speed of the front or rear motors. This causes the quadcopter to turn along the x axis. The overall vertical thrust is the same as hovering due to the left and right motors; hence only pitch angle acceleration is changed. Figure 2 shows an example of pitch movement of a quadcopter. As the front motor slows down, the forces created by the corresponding rotor are less than the forces created by the back rotor. These forces are represented by the blue arrows. These forces cause the quadcopter to tip forward and this movement is represented by the red arrow.

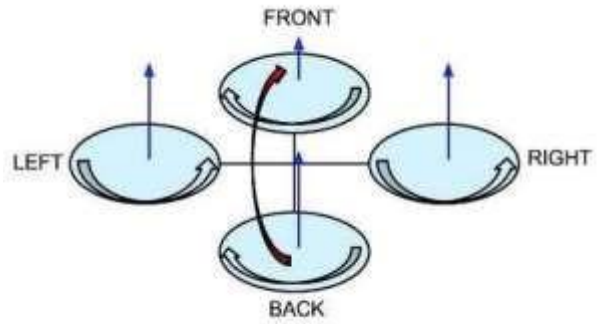

Fig – 2 Pitch movement

Roll is provided by increasing (or decreasing) the speed of the left rotor speed and right motors. This causes the quadcopter to turn along the y axis. The overall vertical thrust is the same as hovering due to the front and back motors; hence only roll angle acceleration is changed. Figure 3 shows an example of roll movement of a quadcopter. As the right motor slows down, the forces created by the corresponding rotor are less than the forces created by the left rotor. These forces are represented by the blue arrows. This causes the quadcopter to tip to the right and this movement is represented by the red arrow. Yaw is provided by increasing (or decreasing) the speed of the front and rear motors or by increasing (or decreasing) the speed of the left and right motors. This causes the quadcopter

to turn along its vertical axis in the direction of the stronger spinning rotors.

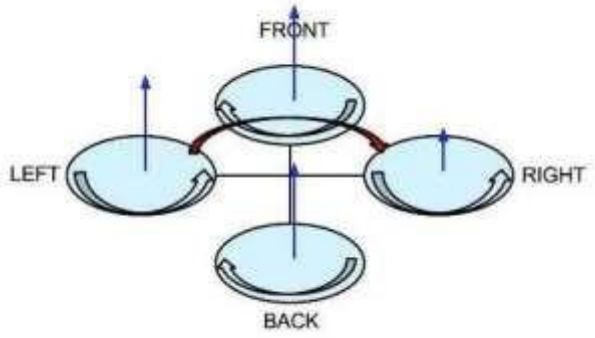

Fig-3 Roll movement.

As the front and back motor slows down, the forces created by the corresponding rotors are less than the forces created by the left and right rotors. The quadcopter will begin to rotate in the same direction as the faster spinning rotors due to them difference in torque forces. This movement is represented by the red arrow. These actions are controlled by the remote control.

Fig – 4 Drone Model

To set up an Arduino and Ethernet shield as a web server that has a HTML website page on the SD card. The site page permits content to be gone into two inputs. At the point when the catch on the website page is clicked, the content is sent to the LCD that is associated with the Arduino. For executing an Arduino Uno, Ethernet shield and 2 × 16 LCD show are required. Content is gone into the two content sources of info – every content information compares to one line of the LCD. We have planned the contribution as first line for GPS area and second line for the Patient Requirements. The record ought to be in the HTML group. With the Arduino associated with the Ethernet arrange, first open the Serial Monitor window, at that point open an internet browser and surf to the IP address set in the sketch. Content can be composed into the content box on the website page and sent to the Arduino. The Arduino will show the content in the Serial Monitor window

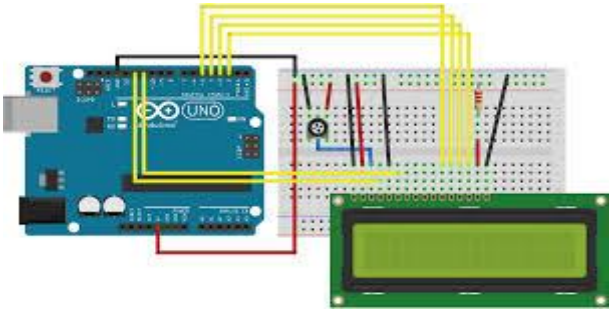

Fig –5 LCD Connection

The NEO-6M GPS module is appeared in the figure beneath. It accompanies an antenna in outside. This module has an outer receiving antenna and implicit EEPROM. To get crude GPS information it simply need to begin a sequential correspondence with the GPS module utilizing Software Serial. When Arduino or any microcontroller and GSM module on first Stage. Subsequently, we need to utilize just the C language adversary inserted programming. The following stage is arrange preparing. You ought to get a lot of data in the GPS standard language, NMEA. Each line you get in the sequential screen is a NMEA sentence. NMEA represents National Marine Electronics Association, and in the realm of GPS, it is a standard information group upheld by GPS producers.

Fig – 6 GPS Module with Arduino

4. RESULTS OBTAINED

The delivery box is placed under the drone with balanced conditions. The medical requirements of the patients are packed in the box. The drone is driven to the location tracked by using the GPS in the circuit. By making use of dropping mechanism the box is dropped at the location by controlling the thrust through the remote controller.

Fig –7 Drone with DROP MECHANISM

A program was designed and coded using the Arduino IDE to test the GPS receiver and SD card adaptor. Two libraries were used in this program. The Tiny GPS library developed by Mikal Hart was used to decode the NMEA data received by the GPS receiver. The SD card library was used to help read and write information to SD cards. The Arduino Uno was connected to a 9-volt battery and the SD code was added to the test program. Then the test bench was used to collect GPS information. The information about the patient was tracked and the latitude and longitude of the location was displayed in the first line of the LCD and the input of the user in the web page was displayed in the second line of the LCD. The new GPS module could get readings from 10 different satellites and the latitude and longitude readings from the testing location were found to be 11.3006, 77.6568. When these coordinates were entered into Google maps, the coordinates matched the address of the testing location.

Fig – 8 LCD Display

5. FUTURE SCOPE

We are at currently expanding these models in various ways. Here we have utilized an exactly inferred type of a separation metric for truck conveyance. A superior portrayal might be to expressly show the genuine street arrange. Future research can likewise examine what number of automatons are required at a specific automaton home and how well a system gives inclusion to a locale. Another issue is to represent the impact of deterrents, for example, a high mountain on an automaton way and coordinate it into the area model. For ramble conveyance in a metropolitan territory, ways should be steered around tall structures and air terminals, for instance. Automaton human services conveyance is another field with numerous open doors for effective future research. The up and coming age of automatons, Generation 7, is as of now in progress, as 3D Robotics reported the world's first across the board Smart Drone called Solo. Brilliant automatons with worked in shields and consistence tech, savvy exact sensors, and self-checking are the following enormous insurgency in ramble innovation that would give new open doors in transport, military, coordination, and business parts.

6. CONCLUSION

Automatons alongside portable innovation, are empowering creating nations to jump ahead with social insurance conveyance to remote areas even with a temperamental street framework. Indeed, even in created nations, calamities, for example, tremors and flames, can render streets out of reach. Besides, extraordinary climate and city clog can be an obstruction to crisis clinical conveyance. Automaton innovation and its segments, for example, GPS and lithium batteries, are accessible and improving at a fast pace. Automatons are utilized for observation of catastrophe locales and zones with natural dangers, just as in the study of disease transmission for research and following sickness spread. Media transmission rambles are being utilized for determination and treatment, perioperative assessment, and tele-tutoring in remote territories. Automatons can possibly be solid clinical conveyance stages for microbiological and research center examples, pharmaceuticals, immunizations, crisis clinical gear, and patient vehicle. Government offices have put ramble use on the national motivation. The subsequent stages remember forceful research activities for the territories of security, industry extension, expanded open mindfulness, and interest.

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