Our Heritage

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ESP8266 Based Mini Drone Programmable with Arduino

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ABSTRACT:

The objective of this paper is to design and developed a drone using IOT. Drone technology have evolved a lot in the recent years and enhance its application in all domain such as army ,delivering packages and in several other application. Drone are not new they are just the advance version of early rc controlled plane .IOT is internet of things is technology of modern era in the recent years IOT have evolved a lot and have great potential ,iot is the technology of future IOT enable all device to communicate over internet thus make it a great technology for the development of modern equipment .In this paper we are controlling the drone with the help of IOT so by using it there is no boundation of range we can operate it from any location thus make it suitable for spy and delivering packages.IOT means enabling or connecting all the device over internet so that we can access these devices without being actually reach there. Drones are the technology of future and this technology is evolving day by day . To control all the process and computation ESP8266 MCU is used it is a controller with built in wifi module which provide the capability to connect the controller over the internet. In order to provide stability gyroscope sensor are used which compute data and orientation and thus make a stable lift in air. Drone which are using now are controlled by radio wave since radio wave have some limited range so these drone can be used up to a certain distance but in this paper we are using internet to establish a connection thus we don't need to concern about the range used to operate the drone we only require a fast internet connection. IOT is the leading technology and research in the domain of iot is still going scope of IOT is so vast that by the year 2025 almost 90% of all electronic device will become smart by IOT. Future is all about automation so advance drone with AI capability are the future of automation this will reduce human effort in large extent. Drone with intelligence will play a major role in army as well as in security so future is all about automation and IOT is the key ingredient of automation in the future almost all device are connected with each other and communicate with other and serve for the benefit of mankind.

KEYWORDS:

Node MCU (ESP8266), 3 Axis Gyroscope Sensor, Brushless Dc Motor, BLYNK Application, WIFI Module

INTRODUCTION:

The paper is drone develop over IOT which make it suitable for spy as well as to deliver packages. This paper has two major component that is hardware and software.

1) HARDWARE DESCRIPTION: In our paper we are using ESP8266 as a microcontroller unit which control all the process right from establishing connection over the internet ,controlling the thrust produced by the motor and maintaining stability by processing data received by gyroscope sensor. This microcontroller is operated at the voltage range from 12-20 volts due to the presence of wifi module it is suitable for remote access over internet. A gyroscope sensor is used

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which is used to maintain the orientation as well as angular velocity,it calculate the the coordinate of x,y,z axis in order to maintain stability these coordinate is then send over the controller which process the coordinate according to the predefined code and then produce the required spin in the motor as well as the direction of movement of propeller that is clockwise and anticlockwise. We are using 4 brushless dc motor to uplift our drone because these motor produce a very high thrust thus making suitable for drone moreover brushless motor are very efficient and have very low losses and hence consume less power and produce spin with high speed these motor operate at the voltage range of 10-20 volts. We are using 4 propeller which is mounted over the brushless dc motor the length of propeller is 8 centimeter and is made up of plastic . The design of propeller is very important it must be fully aerodynamic so that it produce desired pressure on the front and back side of propeller in order to attain stable flight state. In order the run the entire system we are using lithium ion battery which is rechargeable and produce the desired potential difference to run all the component of drone. The body of drone is of quad structure which have four corner on which motor are mounted in order to connect all the devices together we need jumper wire of male to male ,male to female, female to female ,male to male specification .

2) SOFTWARE DESCRIPTION: We are using esp8266 microcontroller on which instruction are written in c language so we need a software on which we can write code and then that code is upload to the controller the software is called AURDINO IDE . IDE stand for integrated development environment it provide a medium over which instruction written in c language are converted into machine language and then uploaded on the controller. We are developing drone on IOT so an application is needed which establish the connection between the device used to control drone and the drone itself this application is called as Blynk app we have to pair that application to the controller by entering the IP address of the controller and the application get paired to it after that we have to configure the user interface according to the operation performed by the drone a blink app have pick and drop facility so we just drag button over the main console and then the application is ready to controller apart from all the hardware and software it need a fast speed internet to make things work.

LITERATURE REVIEW:

1) A drone is an unmanned aerial vehicle which can fly in air just like any flying vehicle but the thing that make it different is that inside it no man will still instead it is operated by a man sitting in a remote location. The advancement in the technology of drone has increased in the recent years. This technology has enhance its application in all domain such as delivering package ,medical facilities and other goods.
2) Drones is one of the most dynamic and emerging technologies of the modern world., this technology has found many applications in the field of transport as well from traffic surveillance applications to the traffic network analysis for the improvement of the traffic flow and safety.However, in order to conduct a UAV-based traffic study, an extremely diligent planning and execution is required followed by an optimal data analysis and interpretation procedure. This paper presents a universal guiding framework for ensuring a safe and efficient execution of a UAV-based study. It also explores the analysis steps that follow the execution of a drone flight. The framework based on the existing studies, is classified into the following seven components: (i) scope definition, (ii) flight planning, (iii) flight implementation, (iv) data acquisition, (v) data processing and analysis, (vi) data interpretation and (vii) optimized traffic application. The proposed framework provides a comprehensive guideline for an efficient conduction and completion of a drone-based traffic study. It gives an overview of the management in the context of the hardware and the software entities involved in the process. In this paper, an extensive yet systematic review of the existing traffic-related UAV studies is presented by moulding them in a step-by-step framework.
3) Man is always fascinated by the sky they want to explore the vastness of sky this fascination lead the man to discover the hidden world of sky by developing technology which help them to explore the sky.In earlier time hot air balloon is used by army as a drone but now technology has evolved a lot there are vast variety of drones available now a days and still research is going on to make drone more advance.
4) A drone is basically a robot which can fly in air and can be remotely controlled by its operator it contain camera on as well as other component such as GPS, gyroscope

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which help it in navigation. The man component of drone which make it able to fly is motor ,motors are the source of thrust that uplift the drone . A more advanced drone consist of gun and missile on it and is capable of destroying the target.

5) Earlier Drone is controlled by radiofrequence controller but due to advancement in technology they are being operated by satellite which increase the range of drone so that we cancan operate it from several kilometer .
6) Internet of thing (IOT) is the emerging technology and have a huge scope and application. IOT means enabling device to communicate with each other through internet so that they can serve **for the benefit of human. In IOT all the devices are connected to internet so inorder to access any** device we don't need to acess it physically we can acess it through internet while sitting several kilometer apart. Nowdays most of the electronics device come with iot enabled technology thus making human life easy.
7) In our paper we are developing a drone which work on IOT i,e . INTERNET OF THING by operating it with the help of iot we can control it from any location there is no boundation of range we can operate our drone from any remote location we can operate it from any other city or from any other country because it is using iot as plateform for communication.
8) NODE MCU ESP8266 is a microcontroller unit it is basically the brain of drone because it perform all the calculation such as the thrust generate by motors, the orientation and direction calculation is processed by it .A wifi module is inbuilt on it which help to establish a link from microcontroller to the internet.
9) Drones are not new Going back in early 90's and 70's the top RC plane and helicopter are the older version of drone as the time passes these toy have evolved in a brilliant technology which is now helping human in all domain. In order to uplift the drone brushless dc motor are used they are light weight and produce much larger uplift than any other motor because all the losses such as copper loss ,iron loss ,core loss are reduced to much larger extent which result in greater efficiency . Depending upon the type of drone it can have 4,5 or any number of propeller, propeller convert rotational force of motor in to thrust.
10) In order to create a right uplift a pressure difference is produced in the blades in quadcopter there are four propeller out of which to rotate in clockwise direction and two rotate in anticlockwise direction in order to attain a stable motion while flying. The structure of propeller must be in aerodynamic shape so as to cut the air and get uplift to fly in the sky .Gyroscope sensor is a device that maintain the orientation and angular velocity of any object thus make the drone stable while flying in the air in our paper we are using MPU 3 axis gyroscope sensor. NODE MCU is a microcontroller process instruction written in c programming language so to burn instruction inside microcontroller an IDE define as integrated development environment is used it a software on which code is written and then uploaded on the controller. Here we are controlling drone from internet so we don't need to worry about the range we can control it from any location thus make it suitable for spy as well as to deliver product to home . Since the drone is built over IOT so we can control it from any device such as phone, laptop by just configuring the user interface we need a working internet connection inorder to operate it.

METHODOLOGY:

1) The main component of drone is the processing unit that perform all the calculation so for this we are using node mcu ESP8266 which perform all the data apart from this there is a gyroscope sensor that help in maintaining the stability of drone by sensing all the coordinate firstly we have to connect gyroscope,ESP8266 and 4 dc brushless motor on a quadcopter base very accurately along with the power suppl after doing all the connection we have to connect the node mcu to the laptop in order to burn code inside it so that it can work properly.An IDE is required on the laptop which make a link between nodemcu and laptop in order to burn code inside it. 4 motor is placed at the four corner of drone to make the structure aerodynamic the center of mass is balance by placing the processing as well as power unit at the center of 4 corner this arrangement make the structure more aerodynamic and allow a greater uplift in the air the power supply is provided by lithium ion battery of 12 volt this battery will provide the enough potential difference to drive the microcontroller ESP8266 as well as 4 dc brushless motor.

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STEP 1	Power switch on the drone is “PRESS”
STEP 2	Microcontroller will be “ON” and all the module will get power supply
STEP 3	Wifi module will get “ON” and a connection is establish between drone and “SERVER”
STEP 4	Connection will be establish between drone and mobile phone by “Blynk app”
STEP 5	Instruction is send to the ESP8266 MCU and “gyroscope sensor” will get “ON”
STEP 6	Data send by gyroscope is processed by the controller and uplift is produced through motors

2) When the microcontroller gets power from the dc power supply it gets on and start all its peripheral devices after that it provide power to the wifi module and establish connection between microcontroller and the device by just entering some code on both to paired them easily. Device which is used to control the drone, when the device is paired with the drone is Blynk application installed on the user device an instruction is send on the server about the IP address of microcontroller so as to established the connection when the instruction is given by the user it first converted in to the format which is suitable to get upload in the server and then processed by the microcontroller there is a Gyroscope sensor when it get turn on it senses the x –coordinate, y –coordinate, z –coordinate and make drone stable by calculating the orientation in all direction and allow a easy uplift. It send coordinate of x ,y, z direction to the microcontroller which process the data send by the sensor and stable the drone flight the internet is provided to the microcontroller by wifi module where an active internet connection is required which is fulfill by any external wifi device or by an inbuilt sim slot.There are 4 dc brushless motor which get power from the source when the microcontroller gets instruction from the user through internet the motor rotate in a particular direction for any specific movement the coordinate send by the gyroscope sensor also control the rotation of motor to make it stable and to move in any particular direction because of gyroscope sensor drone is able to maintain a stable uplift.

3) Esp8266 have inbuilt sim slot so we can just put a sim with internet data on it inside that slot in order to provide connectivity between controller and the device through which user will operate.

4) The remote of this IOT based drone can be a mobile phone , Laptop, I pad or any other device with active internet connection to operate it several application are available on internet we have to download that application and then configure that application according to the motion and application of drone.

ALGORITHMS:

EXPERIMENT AND RESULT:

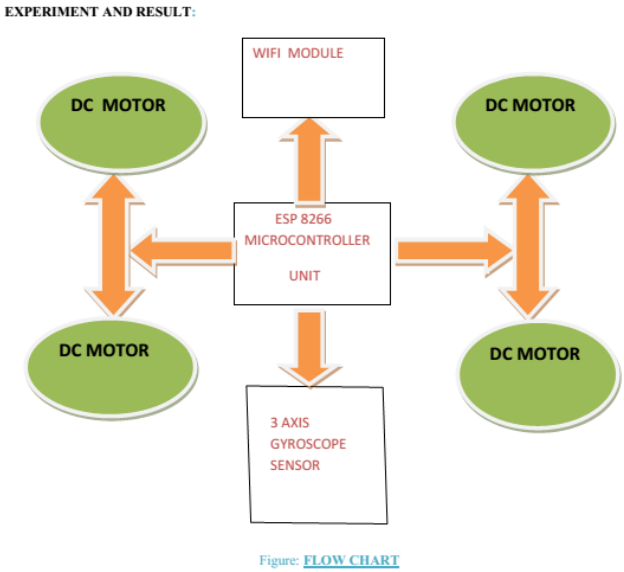

Figure: FLOW CHART

CONCLUSION: The main objective of this paper is to make a drone which can be controlled over the internet by using IOT technology as the base for communication. By using IOT technology drone can be controlled by any remote location and

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there is no boundation of range while working with IOT thus makes it suitable for spy, delivering product and other

useful application in army and intelligence. This paper is developed over IoT so we don't need any special device or console to control it we can control it with any phone or laptop the only requirement is fast working internet because iot means internet so in order to make drone work internet is required moreover it does not required any professional person to operate it can be controlled by any common people in order to establish the connection between drone and device only an application is needed which can be downloaded over the internet and then the pairing of both devices is very easy and take almost second to connect thus make it efficient for any sudden emergence case .In case of any defect and damage all the component can be easily change without creating much trouble since the structure of this drone is based on aerodynamic so we don't need to worry about the fast blowing
wind the structure of this drone is capable of flying with greater stability in case of fast blowing wind .The size of the drone is compact and tough thus make it suitable for spy without being in notice by any other person the compact and tough deign prevent any kind of damage in the drone in case drone will fall down. The use of brushless motor provide high thrust and high speed.

FUTURE SCOPE: In the recent years the technology used in drone evolved a lot now drone are getting smarter day by day thus increasing their application in all field such as army, product delivery and in other area as well due to advancement in technology now drones are coming with higher stability and capable of lifting heavy weight, engineer are working on drone which look like bird thus make them suitable for spy without being notice by anyone. By doing some modification in drone we can integrate all the equipment which is integrate on army tank and thus make it suitable for military to fight against terrorist without losing the life of any military man . Drone with high resolution camera and AI can be used to secure any place they can fly in sky and took an eye on every event going on the surface because of AI we don't need any person to operate it they will operate by its own. Drone with AI have capability to return to their initial position thus suitable for delivering . In future drone with AI and advance defiance equipment can be a deadly combination for terrorist without losing the life of innocent army people Moreover technology in drone is evolving according to the applivcation. In future we can see drone in every field with smarter AI in it and enhance its application in all domain. In future drone can be used to carry people from one place to another by using AI so people have to enter the location and the drone will carry you also drone with bird like appearance are now in trend and work is still going on that type of drone because they are the first choice my army for spy because they can not be recognize by any one and thus can be used to take information from any place in future drone with high stability and thrust will be developed thus make them suitable to lift heavy goods .

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