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Quad Copter Drone for Live Video Streaming

Jorvekar Rohit R.[1], Gund Payal R.[2], Zha Ranjankumar R.[3] Prof. R. N. Kadu.[4]
Department of Electronics and telecommunication[1, 2,3,4.]
Pravara Rural Engineering College Loni, [1, 2,3,4]
Maharashtra, India.
rohitjorvekar1995@gmail.com[1]
payalgund@gmail.com[2]
rnjnzha@gmail.com[3]
kadurahul24@gmail.com[4]

Abstract: In the earlier few decades Unmanned Aerial Vehicles (UAVs) has developanarea of research in many exploration institutions. UAV is able to demand in detection of unusual objects and they can perform their surveillance. Now-a-day's UAVs are used in poly sectors like rescue, coastguard etc.UAV is controlled to surveillance of the desired locality and the information of the location and the activities are send through mini camera built in the UAV. The prehension clips are exhibited in the connected computer accordingly command. The commands given to the UAV receiver is a human command instead of the machine command. The receiver used in the controller fetch the commands and they follow them. Quadcopter can be crub or they can peregrination automatically by encoding the map pattern. The quadcopter drone alter direction by manipulating the individual propeller or blade speed. The system is managed manually through computers and wireless Remote Control. The system can perform this action only within a limited distance. The quadcopter can perform their mission at any risk places and based on the risk factor. Using this technology no human casualties will be reported.

Keywords: Unmanned Aerial Vehicle (UAV), Quadcopter, *Video Streaming, Surveillance, wireless camera*

I. INTRODUCTION

A quad-copter is an airborne vehicle that uses four rotors for lift, steering, and stabilization. UnlikeOther aerial vehicles, the quad- copter can achieve vertical flight in a more stable condition. Thequad-copter is not affected by the torque issues that a helicopter experiences due to the core rotor Furthermore, due to the quad-copter's cyclic design, it is calmer to construct. Day by day the technology becomes more advanced and more accessible to the public, many engineers and researchers have started designing and implementing quad-copters for different uses. Various groups such as the military, engineers, researchers, and hobbyists have been developingquad-copters to understand different technical areas. For example, quad-copters can be used for investigation and collecting data. This could range from searching for survival victims in a disaster area to checking the state of electrical power lines. Some quadcopters which are in production process at present day can hold light payloads, such as food and medical supplies, and deliver them in emergency Monitoring areas where normal planes cannot reach. Many inexpert radio machinists have designed and built their own multi-copters. The objective of this development is to use the Steady aerial quad-copter Manufactureforreal-world uses by attributing a live camera to a small-scale, remote controlled, quad rotor, unmanned aerial vehicle (UAV). The video received will be transmitted by digital or analog signals according to availability. If the bagged video is acorrespondent signal format it must be converted to digital video after transmission. With a digital signal, the video can be effortlesslyhandled for investigation and storage. The quad copter is a distinctive type of UAV which has the capability of Vertical Take Off and Landing (VTOL). The quad copter has abenefit of maneuverability due to its essentialactiveenvironment. The quadcopter arrangement will also be capable of being remotely controlled to fly anexplicit pre-determined region.

The quad copter controller requires direction control or a remote controller to control it. But we use processor for controlling the quad copter. This monitoring process of video is also done by the computer instead of using separate display. Controlling of the quad copter using separate control is a tedious process and it requires more practice. But, the control by the computer is a very easy process as it requires less practice. The quadcopter can be organized by changing the speed of the four blades and no other mechanical linkages are required in varying the rotor blade pitch angles as compare to a conventional helicopter. The main applications include they can used for rescue missions, in military it can used for discovery of the mines by using confident metal indicator in the quadcopter and made them hover over the area, in flick making, in agriculture and many others.

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II. BLOCK DIAGRAM:

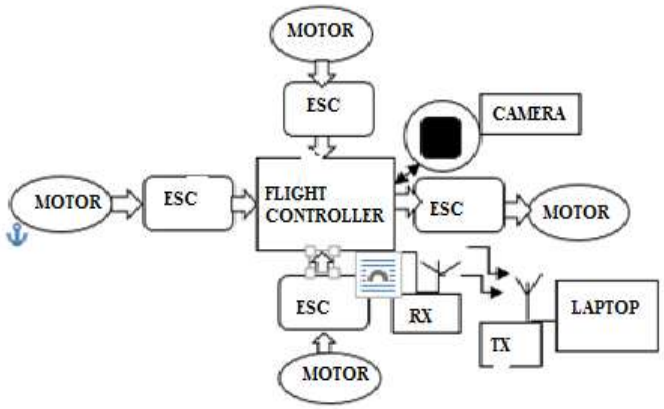

Fig. Block diagram of Quad copter

Working Principle:

- **Controller:**

The heart of the Quad copter is the controller. Here we are using 8-bit AVR ATmega48PAmicrocontroller. The ATmega48PA is a low-power consumption CMOS 8-bit microcontroller based on the AVR boosted RISC construction. By employinginfluential instructions in a solotimepiece cycle, the ATmega48PA accomplishesamounts approaching 1 MIPS (million instructions per second) psSer MHz permitting the arrangementconsidered to improve power feeding versus processing speed.The AVR core syndicates a rich instruction set with 32 universal purpose working registers. All the32 registers are openlylinked to the Arithmetic Logic Unit (ALU), allowing two self-governing registers to be retrieved in one solo instruction executed in one clock cycle. The ATmega48PA AVR is reinforced with a full suite of package and system development tools including: C Compilers, Macro Assemblers, and Program Debugger/Simulators, In-CircuitEmulators, and Evaluation kits.

- **Electronics Speed Controller:**

An electronic speed control or ESC is an electronic circuit with the resolution to fluctuate an electric motor's rapidity, its track and perhaps act as a dynamic brake. Brushless ESC organizations basically initiative tri-phase brushless motors by distributionaarrangement of signs for rotation.

Unrelatedly of the type used, an ESC deduces control data not as motorizedgesture as would be the instance of a servo, but relatively in a scheme that diverges the swapping rate of a linkage of field effect transistors, or FETs. The speedy switching of the transistors is what origins the motorizedthe aforementioned to emit its distinguishing high-pitched wail, particularlyperceptible at lower speeds. It also permitsgreatlyslicker and additionalaccuratedisparity of motor speed in a distant more well-organizedway than the mechanical type with a resistive coil and moving arm once in common use.

- **Flight Control:**

A quad copter consists of four motors evenly distributed along the quad copter frame as can be. The circles represent the spinning rotors of the quad copter 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 counter-clockwise direction using puller rotors. Each motor produces a thrust and torque about the midpoint of the quad copter. Due to the opposite spinning directions of the motors, the net torque about the center of the quad copter is ideally zero, producing zero angular acceleration. This eliminates the need for yaw stabilization. Anuprightpotency is created by increasing the speed of all the motors by the similarquantity of throttle. As the vertical forces overcome the gravitational forces of the earth, the quad copter begins toRise in altitude. Pitch is provided by increasing (or decreasing) the rapidity of the front or rear motors. This causes the quad copter to turn along the x axis. The wholeerect thrust is the same as hovering owed to the left and right motors; hence only pitch angle quickening is changed.

- **Video Recording and Transmission:**

The selection of video scheme is one of the most decisivechoices for the development of system. The camera desires to be light adequate so that the UAV can fly unabated and compact enough so that it does not interfere with the landing gear and rotors. The video system necessity also be intelligent to transmit a suitable distance over open space without interference or losing signal. For our archetype design we will consider 100m to be a suitable range, though many of the products we researched can transmit up to 1000m.

- **Camera:**

There are many altered options for the camera. One of the initialkeys is to mount an IP or raspberry pi camera to the fuselage of the quad copter which would be able to produce a high resolution image with its own transmitter. The doenside to using such a camera is the necessity to be connected to a network; the system would not be able to function without an internet connection and would not be useful in wilderness areas.

Digital cameras and helmet cameras with Wi-Fi connectivity like the Samsung SMART and Go Pro series were investigated. The cameras were designed to have a separate device, such as a smartphone, act as a viewfinder for the camera. Potentially, our viewfinder could display the live video to the operator while the camera records. One detriment to this method is not being able to easily transmit the video to a computer for post analysis.

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- **Video Receiver & Transmitter:**

There are two methods to transmit video wirelessly: using analog transmission or digital transmission .Analog transmitters are able to accommodate numerous receivers while digital transmitters can only be paired to a single receiver. Having several receivers could be valuable to distinct the quad copter controller screen from the video analysis performed by our computer. The drawback of analog transmission is that it is more susceptive to interference from common household technologies such as wireless routers, cordless land lines, and microwave ovens which basisstatic on the video feed. Digital wireless is a much more robust system that does not suffer from interference induced static. Advancedexcellence video can be transmitted by means of a digital signal and can transmit over farther distances than analog. The digital systems are also larger and heavier than their analog counterparts, making them less ideal for mounting on a quad copter.

- **PC Master:**

Here making Wi-Fi based network for environment application System has master and slave structure for the Application .The range of Wi-Fi is about 30 meters. So, the whole area cannot be covered by a single Master slave combination.

System has a main PC master terminal which has the VB software on it .The PC master terminal is used to monitor the status of all the slaves which covers the whole area.

VB Software:

VISUAL BASIC is a high level programming language that Evolved from the earlier DOS version called BASIC. The code looks a lot like English language. Now, there are many versions of visual basic available in the market , the latest being visual basic 2015 that is bundled with other programming languages such as C#.However the most popular one and still widely used by many VB programmers is none other than visual basic.

III. FLOW CHART

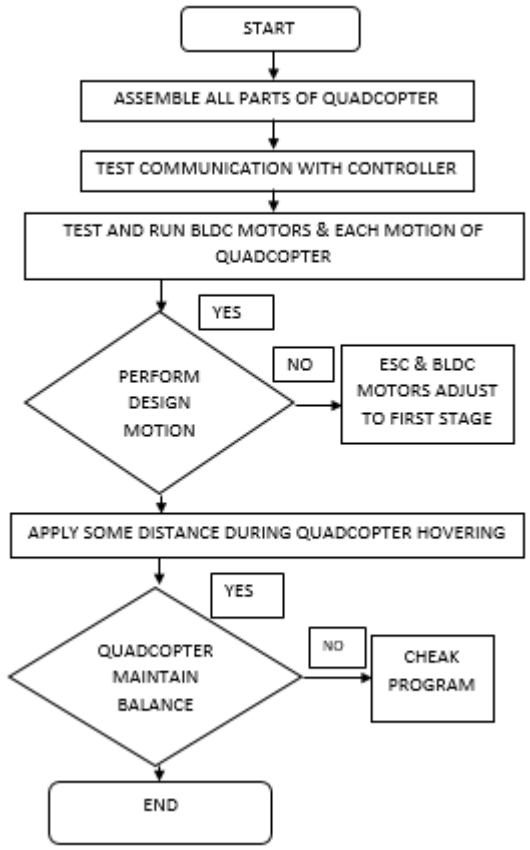

Fig. Flow Chart

ALGORITHM:

1-Start

2-Initialize the transmitter receiver connections and supply voltages from battery.

3-check if transmitted signals are received properly.

3-Check the motions of BLDC motors like forward, backward, upward, downward and sideways.

4-If motions are not proper go to step 3 and repeat.

5-Quadcopter can perform the desired motions.

6- Take quadcopter to certain level where it can maintain its balance.

7-the interfaced camera can take the video and can observe the actual scenario.

8-The temp sensor used to sense the temp.

9- It is shown on pc.

10-.End

IV. CONCLUSION

In this article quadcopter capture the video using Unmanned Aerial Vehicle and transmit the video to receiver side. The system will be assemble the IP camera for capturing the video and transmitting towards the receiver side wirelessly using IP camera transmitter and receive this video signal by using audio video receiver.It can control the quad copter using remote control. The system can also be easily extended with ZigBee wireless image transmission facility in future. It will improve scalability of industrial alerting and monitoring and extend environmental accurate position of workers safety. In future, with the help of ZigBee module and GUI, we can avoid accidents.

Quadcopter will be able to do surveillance by live recording the video and provide security for selected areas. System work is do implement the wireless camera in that quadcopter to record the video and dual antenna to transmit the acquired video signal to the control room. The future work consists of developing a prototype that controls the quadcopter by using computer instead of Remote to reduce the complexity in flying control.

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