

Audio Controlled Quadcopter with Stereo Camera

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Abstract- This paper presented by me deals with the formation of audio controlled quadcopters fitted with stereo camera. A **quadcopter**, also called a **quadrotor helicopter** or **quadrotor**, is a multirotor helicopter that is lifted and propelled by four rotors. Quadcopters are classified as rotorcraft, as opposed to fixed-wing aircraft, because their lift is generated by a set of rotors (vertically oriented propellers). The audio frequency provides instructions to the quadcopter regarding flightists operations. The stereo camera captures 3D images, a process known as stereo photography. Stereo cameras may be used for making stereo views and 3D pictures for movies, or for range imaging.

I. INTRODUCTION

A **quadcopter**, also called a **quadrotor helicopter** or **quadrotor**, is a multirotor helicopter that is lifted and propelled by four rotors. Quadcopters are classified as rotorcraft, as opposed to fixed-wing aircraft, because their lift is generated by a set of rotors (vertically oriented propellers).

Unlike most helicopters, quadcopters use four rotors. It uses four identical fixed pitched propellers showing opposite motions- two propellers move in clockwise direction (CW) and two other propellers move counter-clockwise (CCW). Each rotor produces an upward thrust and total thrust produced is equal to the sum of individual thrusts. This way each rotor lifts one fourth of the total weight. Variation of rotations per minute (RPM) control lift and torque. Vehicle motion can be controlled in two ways-

- (i) By changing the torque load
- (ii) By changing the thrust or lift characteristics
- (iii) By changing one or more rotor discs.

In actual practice these are very costly, but in order to make it cost efficient, cheaper rotors and propellers are used.

II. CONSTRUCTION OF A QUADCOPTER

It's main components are: A quadcopter uses four rotors. It uses four identical fixed pitched propellers showing opposite motions- two propellers move in clockwise direction (CW) and two other propellers move counter-clockwise (CCW). Each rotor produces an upward thrust and total thrust is the sum of individual thrust. This way each rotor lifts one fourth of the total weight.

III. COMPONENTS OF QUADCOPTER

- 1) Frame
- 2) Propellers
- 3) Electric motors
- 4) Battery – Power unit
- 5) ESC- Electronic Speed Controller
- 6) Radio Transmitter and Receiver
- 7) Flight Controller Components of a Quadcopter
- 8) Micro Controller
- 9) Inertial Measuring Unit,
- 10) LiPo (Lithium Polymer) batteries and.

IV. WORKING OF THE QUADCOPTER

Three lines running through the quadcopter intersect at right angles around its centre of gravity. These three axes of rotation are Roll , Pitch and Yaw which denote the rotation around the front to back axis, side to side axis and vertical axis respectively.

Thrust is the force which helps quadcopter to fly. This force is given by the propulsion system of the quadcopter. Generally, the thrust is in the opposite direction of the lift or flight.

V. ADVANTAGES OF QUADCOPTERS

1. While spinning, rotor blade pitch angles can vary even without the mechanical linkages.
2. The use of four rotors allows them to possess less kinetic energy during the flight.
3. Using framed rotors have lesser risk of damaging the vehicle or surroundings.
4. Simplified design
5. Easy maintenance
6. Less damage even if the rotors hit something.
7. They provide versatile test platforms.
8. They are relatively cheap,
9. These can be made in a variety of sizes .
10. They can be used in different situations or environments such as for aerial imagery, **Military and law enforcement** ,surveillance etc.

Audio-frequency signal generators are used to generate signals in the audio-frequency range and above. An audio signal from the receiver is fed into an audio voltage amplifier, and then into a cathode follower audio amplifier. Its output is fed to the 20 audio filters in parallel, which in turn feed relay amplifiers. When suitable audio frequency signal is received , the

corresponding delay operates that controls the external circuit in the quadcopter.



Stereo camera is a camera that uses multiple lenses (may be 2 or more). Each lens has an image sensor. 3D images can be taken by this camera. An image taken by this camera can be edited. This method works well with still life but fails with moving objects. A quadcopter fitted with such a camera is a boon for surveillance.

VI. FUTURE PROSPECTS OF QUADCOPTERS

Panoptes UAV, which is a Cambridge, Massachusetts-based startup have developed a system that will help quadcopters avoid collisions. Currently, it is the only technology available for the DJI Phantom range of Remote Control quadcopters. Similarly, the eBumper contains acoustics sensors that uses echolocation and works in all weather conditions. The eBumper replaces the Phantom's existing top frame and can be easily connected to the electronic system, will be available shortly and can be pre-ordered.

VII. CONCLUSION

A quadcopter works on four rotors. This can be constructed and operated easily and economically . This kind of quadcopter has many advantages. Audio frequency signals can be used to control the operation of external circuit of quadcopter . When a stereo camera is fitted with a quadcopter, it becomes capable of taking 3D images .

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