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Role of UAV in Life Saving

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ABSTRACT

Nowadays, Research and development of UAV's and MAV's are increasing alarmingly. In this, "Quad copter" an UAV which is having four rotors can able to serve society by doing search and rescue, reconnaissance, film making, agriculture, surveillance, traffic monitoring, and providing security systems etc., This paper mainly focuses on Quad copter which can be used for emergency medicine transferring from one place to other place especially for rural areas where people may suffer from snake or insect bites, forest fire extinguishing system ,search and rescue during flood, also helps in storming etc.,. Mostly Quad copters are controlled using a transmitter, our objective is also to replace computer instead of using transmitter (Tx). A computer with special GUI (Graphical user interface) which can be designed using visual basic programming software will control Quad copter. Communication between computer (GUI) and Quad copter can be done by using wireless communication system a radio telemetry kit. The function of it to transmit control signal from base (ground) and it also gives real time video transmission which ease the user to control and identify position of quad copter. Thus Quad's can be implemented in any disaster circumstances in order to save lives.

KEYWORDS : UAV, Quad copter, GUI

INTRODUCTION:

An UAV (Unmanned Aerial Vehicle) commonly known as unpiloted aerial vehicle or an aerial vehicle controlled by radio transmitter. It can be used for various applications such as rescue mission, film making, military purpose, agriculture and others. The UAV's are classified into many types according to its operational techniques, they are

- RC Planes
- RC Helicopters
- Tri copters
- Quad copters
- Hexa copters
- Octa copters

From the above types, "Quad copter"- a simplest UAV which can attain more stability than other UAV's. **Etienne Oehmichen** was a French Engineer, who invents the first Quad copter in 11 November 1922. That Quad copter was bigger in size and required more power for its operation. Many Researches and developments were made to reduce the power consumption and to ease the operation of Quad copter.

PRINICIPLE AND COMPONENTS OF QAUD COPTER:

The Physical Principle behind the Quad copter is **Newton's Third Law of motion** which states that, "Every action has an equal and opposite reaction". The following are basic components of the Quad copter.

- Transmitter(Tx)
- Receiver(Rx)
- ESC(Electronic Speed Controller)
- MRSC(Multi Rotor Stabilization Controller)
- Motors
- Propellers

Quad copter, which is having four rotors running at same speed (rpm) which makes it to fly stably in air. The movement can be achieved by altering its rotor speed. The motors can utilise electric power from 2100mAh Lipo battery to run. Here two motors can be rotate in the direction of clockwise and remaining two are in anti-clockwise, which will make the Quad copter very stable in the air. Similarly, four symmetrical pitched blades (propellers) are used in that, two in clockwise direction and other two in anti-clockwise direction.

OPERATION OF QUAD COPTER WITH TRANSMITTER:

- The Quad copter works based on the signals, which can be transmitted from transmitter (Tx) and thus received by receiver (Rx).
- The signal is then passed to the MRSC (Multi Rotor Stabilisation Controller) which is said to be the brain of Quad copter to stabilize it.
- The processed signal from MRSC will be sent to ESC (Electronic Speed Controller) which controls the speed of each motors as shown in fig(1).
- Motor attached with propeller to produce thrust the force required to lift Quad copter in air.
- Here all the motors should belongs to the same KV ratings and similarly, all the propellers should be at same dimensions

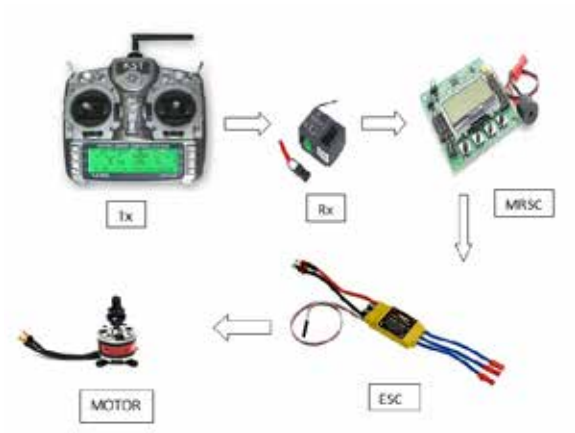

fig (1) Operation with transmitter

Our objective is to use Quad copter for transferring medicine from one place to another in case of emergency purposes like snake bites, insect bites, etc., This paper deals with replace GUI instead of using transmitter (Tx) .So that the medicines will be transferred quickly than other methods. Mostly Quad copters are controlled using a transmitter. Instead of transmitter, Graphical user interface (GUI) can be designed by using available software's like visual basic to control Quad copter. Controlling a quad copter with Tx is not an easy process which may need lots of piloting skills to fly it stably in correct path. So it's given importance to develop a GUI which will make the piloting process easier.

OPERATION OF QUAD COPTER WITH GUI:

- The Quad copter is controlled through special graphical user interface (GUI) which can be developed using visual basic (programming software especially for beginners).

- GUI designed as like to give a real time video transmission, GPS location, status of battery ,air speed, distance from ground etc.,

- Communication between GUI and Quad copter can be done by using wireless communication system a radio telemetry kit as shown in fig (2).

- Function of radio telemetry kit is to transmit control signal from base (ground) and it also gives real time video transmission which makes user to control and identify position of quad copter.



fig (2) Telemetry kit.

The GUI when command given it will send the command to radio telemetry kit attached with computer through USB port, then it will send the signal to receiver which is connected with quad copter, and it will process the signal and changes it position or orientation according to it with the help of MRSC board as shown in fig (3).

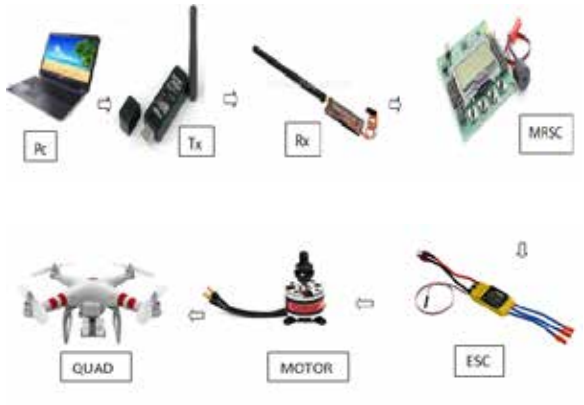

fig (3) Operation with GUI

When GPS and camera are fixed with quad copter this can be used for medicine transfer, traffic monitoring. When additional servo motor in quad and a joystick which can interface with GUI added it can be used for dropping chemicals in extinguishing forest fire, cloud seeding. When fixed with camera and joystick combination it can be used for spying, surveillance, reconnaissance, search and rescue operations during any natural disaster like flood, earthquake, tsunami etc., For night operations thermal or night vision camera can be replace normal camera.

VARIOUS COMBINATIONS OF QUAD COPTER:

- The Quad copter can be used for surveillance or any other rescue missions by placing a camera with it.

- When the ordinary camera gets replace with thermal camera, it can be used for night vision which can be used for security systems.

- And it can also be used to drop the fire extinguisher balls in to the forest fire, and to drop seeds in agricultural fields.

CONCLUSION:

The advantage of this GUI system is that, it will take lesser time to operate the Quad copter. So that transfer of Anti Venom and other medicines from one place other is possible. Since there will be no traffic in air which will make this process as reliable one. When it gets installed in main hospitals of every city or hospitals at every 50 km, it can able to supply medicines within 15-20 min's. The great difference between life and death can be achieved with a Quad copter which is simpler, time and cost effective too. Thus the human life's can be saved using an UAV.

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