IMAGE PROCESSING SYSTEM USING DRONE

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INTRODUCTION:

Over the last few years we have seen a massive growth in the manufacture and sales of remote control airborne vehicles known as Quadcopters. These Unmanned Aerial Vehicles have four arms and fixed pitch propellers which are set in an X configuration. They are sometimes referred to as Drones, Quadrotors or Quadcopters. In the standard format two propellers will spin in a clockwise direction with the other two spinning in an anticlockwise direction allowing the craft to move vertically. The Quadcopter is a simple format with very few moving parts and has rapidly become a favorite vehicle for remote control enthusiasts and is widely being used as an effective Aerial photographic platform.

Now we are going to make the similar drone with the application of image processing and image recognition in specific. Here we are attaching a camera as an additional component to the drone which is controlled and processed by a Wi-Fi enabled network system for a range of Local Area Network (LAN). One may think this technology process has already been established, but we are implementing a new idea of mobile surveillance by image recognition system. Drones are capable of air transportation; by this application we can monitor each and every activity inside a geographical area. This process can be used for high security buildings, college campus, school campus, Police stations, Shopping Malls, Family and Festival occasions, social gatherings, meetings, etc. Nowadays unwanted incidents are happening at all places, so we are in need of a better security system, for which we shall use drones to monitor the particular geographical places.

PROJECT OBJECTIVES:

The main objective is to make this drone as a complete solution for security surveillance in all sectors. Because of easy operation mechanism and simplicity this shall be used even for the surveillance in remote areas, agricultural fields for monitoring the crop growth rate and soil fertility rate shall be monitored by the technical person in distant places like in city and shall contact the farmers for better cultivation and other purposes.

The technical objective is to design the quad-copter that can be controlled wirelessly, mainly by a mobile phone through an android application. In addition to that image processing system is added with the quadcopter as an advantage. A wireless camera is fitted with the quadcopter. The camera not only just observes the actions but also does image processing, by which we can retrieve the particular person's data by recognizing the face and by comparing the facial features with the database in the Wi-Fi server system. By this we shall even identify strangers, notorious people and suspects easily.

METHODOLOGY:

The drone is designed by adding four motors and four propellers to a lightweight X frame constructed of carbon fiber or fiberglass with a remote control transmitter via a small control board, a gyroscopic stabilization system and a Lipo battery. The brushless motor is placed in all corners with the propellers. From that two motors will rotates in clockwise direction and other two motor will rotates in anticlockwise. All the motor operations were controlled by Electronic Speed Controller (ESC). The Gyroscopic stabilization system can be achieved by using Gyro sensor. The direction of the motor rotation, ESC, Wi-Fi transceiver and camera can be controlled by Arduino Nano as a microcontroller. In addition to gyro sensor, we are including the ultrasonic sensor to detect and overcome the obstacles while flying.

The Wi-Fi module is placed on the quadcopter which can be connected with the router and also accessed through mobile phones for controlling of the unit. We are adding advantage to our project by placing the camera on the quadcopter which can be used for recording the video, capturing the images and sent through Wi-Fi transceiver module. This data are processed by the MATLAB software to do facial recognition and comparing with the database; suspicious activities also can be identified and monitored by video processing techniques.

WORK PLAN:

Our estimation to complete this project is approximately six months. The complete schedule and work plan for our project is described below.

First month:
- ❖ Planning and Purchasing materials and components.
- ❖ Detail study about the mechanism of quadcopter.
- ❖ Designing the rough model.

Second month:
- ❖ Constructing frame and basement of the quadcopter.
- ❖ Detail study about the MATLAB and Arduino programming.
- ❖ Designing an algorithm for Hardware programming.
- ❖ Testing and manipulation.
- ❖ Coding for initialization.

Third month:
- ❖ Designing and Soldering works.
- ❖ Testing with Bluetooth module for flight and Coding for gyroscopic stabilization.

Fourth month:
- ❖ Attaching ultrasonic sensor for collision avoidance.
- ❖ Coding for Electronic Speed Controller and ultrasonic sensor.

Fifth month:
- ❖ Attaching camera on quadcopter.
- ❖ Designing an algorithm for image processing.

Sixth month:
- ❖ Assembling and final testing.
- ❖ Fault detection and correction.
- ❖ Code debugging and optimization.