An Intelligent Flying Car for Rescue Operation

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Abstract-*Many areas of world are getting affected due to natural calamities. Disasters are exceptional and unstoppable events that are either man made or natural, such as earthquake, wildfires and floods etc. Disasters create emergency situations to provide basic services to the victims must be coordinated quickly. Many times we observe that many people dies by trapping in these disasters but the people also die on large scale just because they didn't get help at instant time or the help provided to them is late. This project propose a flying car which is designed for flying as well as roving on the land, it can detect living being presence in an unmanned area and inform the same to the control station. The proposed system is used for monitoring the living beings using sensor unit (infrared thermopile sensor), camera module and transmit data wirelessly. The main objective of the project is to rescue more and more number of people and wildlife from the adverse conditions.*

Keywords: Life detection, Natural calamities, Flying car.

I. INTRODUCTION:

Natural disaster occurs frequently now a days, natural disasters like flood, earthquake, wildfires etc. Due to which there is a huge loss of life just because they didn't get help at instant time or help provided to them is late. The conventional method/Traditional method to protect these living beings was performed by human and trained dogs.

In existing system a robotic system is used in which a PIR Sensor is connected, which will detect the living beings. This system will sense the radiation of human being and their condition is transmitted to the control section. Drawback of this system [1,2,3] is PIR Sensor senses the motion of the body and it can't move further inside the collapsed building or water flooded area or in fire and sometimes get struck in disaster area.

In order to overcome this drawback of the existing system we propose a flying car system so that it can fly and rove on the ground as well. This system uses ***D6T Infrared Sensor*** in order to detect the existence of living beings even if they are unconscious. It also incorporates digital camera which is used in order to capture live video of the scene as needed.

Figure 1.1.1 Picture of disaster affected area

Figure 1.1.2 Traditional or conventional method of rescue operation

II. PROBLEM STATEMENT:

In Existing system that is Mobile Robot system, which can move in disaster area[1] if any obstacles found it will struck in disaster area and which is connected with PIR sensor for detecting the living being[1][2], Here this sensor can detect the living being only if they are in motion not motionless living being. So in order to avoid these drawbacks we have an ideal that instead of using mobile robot system we can make a flying car which can rove as well as fly if any obstacles found and this system is consist of d6t infrared sensor which is used to detect conscious as well as unconscious living being.

III. OBJECTIVES

The objectives of the proposed idea are:

1. Rescue system for the human and animals during earthquake, floods and wildfire etc.
2. D6T Infrared Thermopile Sensor is used to detect the conscious as well as unconscious living being.
3. Continuous monitoring the disaster area using HD camera.
4. Bluetooth Arduino control application is used to control the movement of the car.
5. Transmitter and Receiver module is used to control the flying car.

IV. METHODOLOGY

The idea proposes a flying car that can rove as well as fly in the disaster areas like, earthquake, floods, wildfire etc and helps in identifying the living beings, location and continuous monitor the disaster area by Digital camera which interfacing with the P2PLiveCam application which works on wifi network. Hence due to the on timely detection in natural calamities this can save precious life & great loss even without the help of large number of rescue operators.

Block diagram

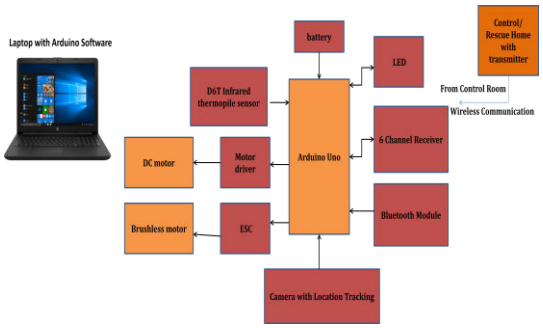

Figure 3.1.1 Block diagram of flying car

The idea proposes a flying car that can rove as well as fly in the disaster areas like, earthquake, floods, wildfire etc and helps in identifying the living beings, location and continuous monitor the disaster area by Digital camera which interfacing with the P2PLiveCam application which works on wifi network. Hence due to the on timely detection in natural calamities this can save precious life & great loss even without the help of large number of rescue operators.

The proposed idea consists of a Flying car, Mobile application like Arduino Bluetooth control and P2PLiveCam, and RC model. The flying car model consists of five units that are namely Sensor unit, Arduino UNO unit, Camera unit, Motor driver, and RC model unit for flight control.

The Sensor unit consists of D6T Infrared sensor must be directly

interfaced to the Arduino UNO kit. The sensor devices monitor current readings and sends data to the Arduino Serial Monitor. L2D93 Motor drive is used to control the 2 DC motors simultaneously in any direction through the "Arduino Bluetooth Control" Application.

A Digital Camera is interfaced with mobile application called "P2PLiveCam", which is used to continuous monitor the disaster area. A RC model is used to control the brushless DC motor that is used for flying purpose of the model, connected over a Wifi network.

C. HARDWARE REQUIREMENTS

Hardware requirements for the flying car model are listed below:

a. Arduino UNO
b. Bluetooth Module
c. DC Motor
d. Brushless DC Motor
e. L2d93 Motor Drive
f. Flysky RC Model
g. Electronic Speed Controller (ESC)
h. HD Camera
i. D6T Infrared Sensor

a. Arduino UNO

The Arduino UNO is an open-source microcontroller board based on the Microchip Atmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output pins that may be interfaced to various expansion boards and other circuits. The board has 14 digital pins, 6 analog pins, and programmable with the Arduino IDE(Integrated Development Environment) via a type B USB cable.

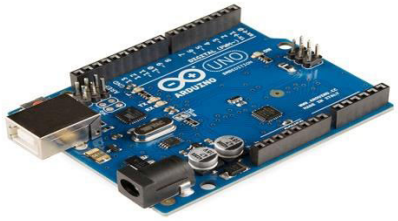

Figure 4.1.1 Arduino UNO kit

b. Bluetooth model

Bluetooth is a wireless technology standard for exchanging data between fixed and mobile devices over short distances using short-wavelength UHF radio waves in the industrial, scientific and medical radio bands, from 2.4 to 2.485 GHz, and building personal area networks (PANs). It was originally conceived as a wireless alternative to RS-232 data cables.

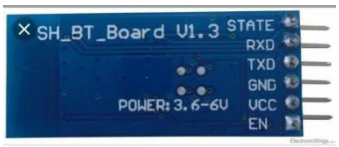

Figure 4.2.1 Bluetooth model

c. DC motor

A motor is an electrical machine which converts electrical energy into mechanical energy. The principle of working of a DC motor is that "Whenever a current carrying conductor is placed in a magnetic field, ix experience a mechanical force".

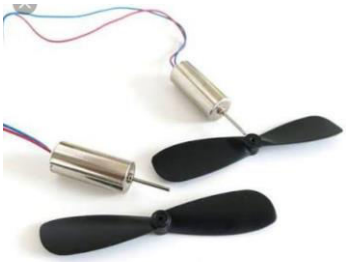

Figure 4.3.1 DC motor with blades

a. Brushless DC motor

Brushless DC electric motors are synchronous motors powered by DC electricity via an inverter or switching power supply which produces an AC

electric current to drive each phase of the motors via a closed loop controller. The controller provides pulses of current to the motor windings that control the speed and torque of the motor.

Figure 4.4.1 Brushless DC motor

b. Motor drive

Compatible with Arduino, raspberry pi, arm, avr, pic, 8051, etc - can provide bidirectional drive currents of up to 600-ma at voltages from 4.5 v to 36 v. With terminal blocks for connecting motors and power supply and berg sticks for control signals from microcontroller. It can control 2 dc motors, their direction using control lines and their speed using PWM.

Figure 4.5.1 L293D Motor drive

c. Flysky RC model

It provides the reliability of 2.4GHz signal technology. It is ideal for quad-copters and multi-copters that require 6CH operation.

Figure 4.6.1 Flysky receiver and transmitter kit

d. Electronic Speed Controller (ESC)

The term ESC stands for an electronic speed control is an electronic circuit used to change the speed of an electric motor, its route and also to perform as a dynamic brake.

Figure 4.7.1 electronic speed controller

e. HD camera

It is wireless camera which can be rechargeable. And it will interfaces with mobile application for continuous monitoring.

Figure 4.8.1 HD digital camera model

f. Infrared D6T sensor

It will detect the temperature by absorbing IR waves emitted. The sensor works with 3-5V logic.

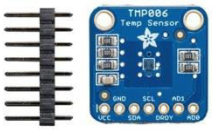

Figure 4.9.1 Infrared D6T sensor model

D. SOFTWARE REQUIREMTNS

The software requirements for the flying car model are:

- Arduino Uno
- P2PLiveCam
- Arduino Bluetooth controller

V. APPLICATIONS

The flying car model finds applications in:

- Earthquake rescue system.

- Flood rescue system.
- Wildfire rescue system.

VI. RESULT

This system consists of a flying car control section and video coverage section. This Furthermore flying car section consists of a movable unit, which has Bluetooth module, camera, DT60 Infrared sensor, mount on it and connected to Arduino UNO board. The movable section is manually controlled using mobile application called Arduino Bluetooth Control application, with the help of Visual Basics. The flying unit, which has receiver, MPU 6050 sensor, which is connected to Arduino UNO board and is manually controlled by RC transmitter model. The user interface has options to control the motion of the flying car and also displays the sensor details. Visual analysis of the affected area is made possible by a wireless camera placed on the flying car which captures live video of the scene. The live video enables the operator to control the flying car movement by observing the scene and avoiding obstacles.

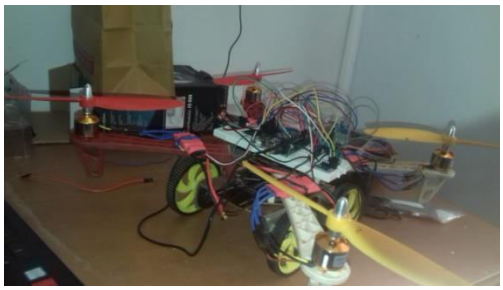

Figure 9.1.1 Flying car model

Once an alive human is identified, the details from sensors are observed before manual rescue operation. This enables us to ensure safety of the rescue operators and hence take the required precautions before entering the scene. This system consists of a flying car control section and video coverage section.

VII. CONCLUSION AND FUTURE SCOPE

The proposed system is flying car model which can fly as well as rove on the ground. Digital camera and D6T Infrared sensor are connected to it. Digital camera is used for continuous monitoring of disaster area and sends the information to the control station. D6T infrared sensor is used to detect the presence of human beings and send the information to control station.

FUTURE SCOPE

This project can further improved by adding solar system instead of using LIPO battery.

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