

# A Smart Human Detection Drone For Rescue

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## Abstract

Nowadays, the people's faces many natural calamities which occur due to the environmental changes like cyclones, underground eruption, collapsing of the buildings happened and due to these lot of peoples losing their lives. In such situations, the rescue teams were not able to show up on time. To overcome such problems, we developed a human detection rescue system. The system is equipped with drones, sensors, and controlling module. The system has a PIR sensor; ultrasonic sensor; and radio telemetry wave to communicate between android applications and drones.

## 1. INTRODUCTION

One of the major challenges for the rescue team in situations like earthquakes, tornados, collapsing of the buildings is to finding and locating the survivors in a specific time. But in such cases, these teams unable to get a clear idea of the peoples underneath the debris, which may cause people to lose their lives. It often results in segregating between human beings and materialistic things.

There are existing systems available for such situations, but they are programmed by the robots, which are inconsistent because it is not easy for the robots to march over the debris as well as finding the victims.

Due to all such problems, we developed 'A Smart Human Detection Rescue System,' which is equipped with the drone to sense the human radiations under the debris using the sensors, which can save people's lives under the debris. This system will work efficiently to search the peoples trapped under the rubble as well as sending alerts. After the situation takes place, the lives of the people are saved by the rescue team.

## 2. RELATED WORK

To solve this problem, many systems have been developed. The 'live human detection robot' [4] is the one system that contains the sensors like PIR, a temperature that indicates the status of the human. This system uses GSM technology to send an alert message to the rescue team using PLC logical programming [5].

'Post-disaster rescue facility: human detection and geolocation using aerial drone' [1] concentrate on the execution of detecting the humans along with its

geographical location. The human detection was done by the passive infrared sensor. Geographical location was achieved using bing maps data.

'Drone assisted disaster management: finding victims via infrared camera and lidar sensor fusion' [2] considers the fact to save humans in those situations. This system utilizes an infrared (IR) camera and lidar sensor in the blend. GPS location is not used to give the location of the victim.

'Design and implementation of UAV with flight data record' [3] offered the progress of unnamed aerial vehicle trained by a wireless unit. This structure has the ability to see flight data. As the task is running, the user was able to overrule the given task during real-time flight conditions.

## 3. METHODOLOGY

A smart human detection rescue system is a build-up of various segments mentioned as follows: 1. Arduiopilot unit, 2. Sensor unit, 3. Wifi unit, 4. Radio telemetry unit. The working of the system is shown below:

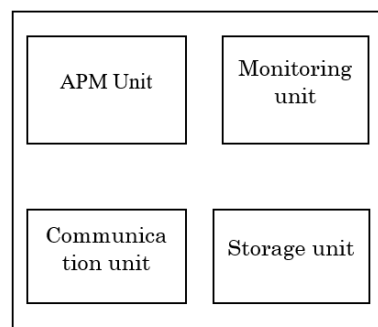


Figure 1: System units

### 3.1. APM unit

An APM is necessary to design the system model. Its function is:

- Accepting the signals from the sensors.
- Then processing them and sending signals to the firebase.

### 3.2. Monitoring unit

PIR sensor is a crucial and important aspect of the structure. The human body generates an infrared sensor on that this

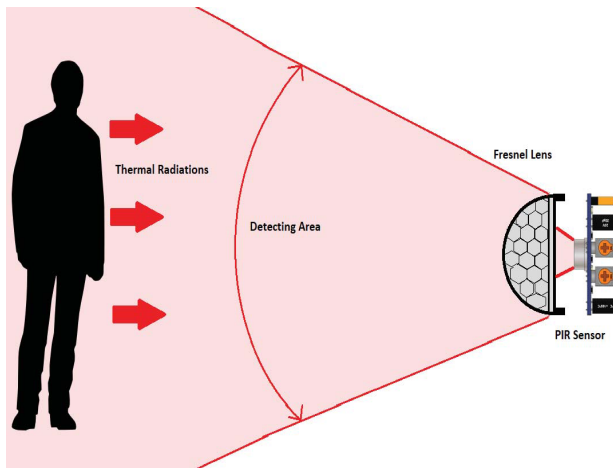


Figure 2: PIR sensor working

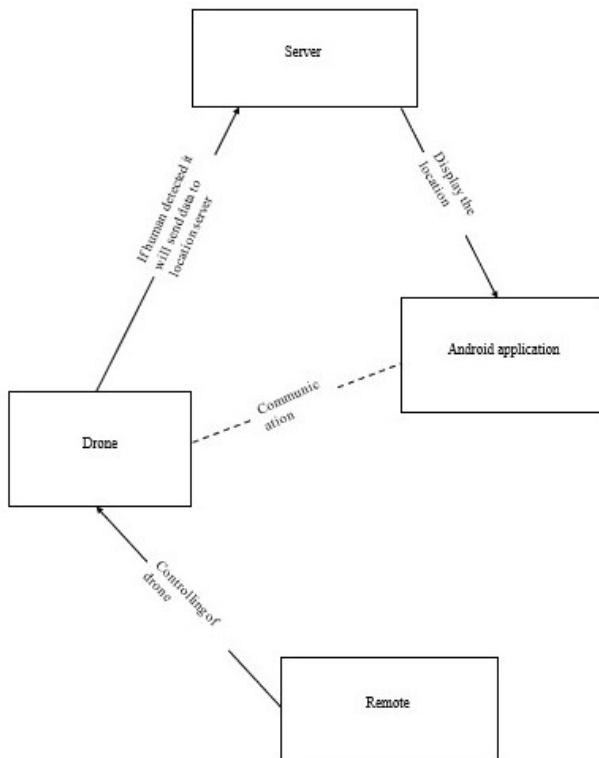


Figure 4: Proposed system

system functions. The wavelength range lies between 0.7 to 300 mm for the infra sensor. The human radiates infrared radiations at the wavelength of 10 to 12 mm. By sensing the infrared fluctuation, the PIR sensor detects the motion. Drain, gate, and source are three pins for the PIR sensor. As the PIR sensor recognizes the radiation of IR, the alert pin set to 1 (high). The ultrasonic sensor is used to detect the obstacle coming in front of the drone.

### 3.3. Communication unit

We use WI-FI as a connecting unit to catch the interactions between firebase and cell phone devices.

### 3.4. Storage unit

In the storage unit, data will be retrieved from pusher (using pycharm) to firebase. In the firebase, the status signals will be stored.

To develop a steady multi-rotor copter, we focus its assembly and dynamics. We construct a firmware which

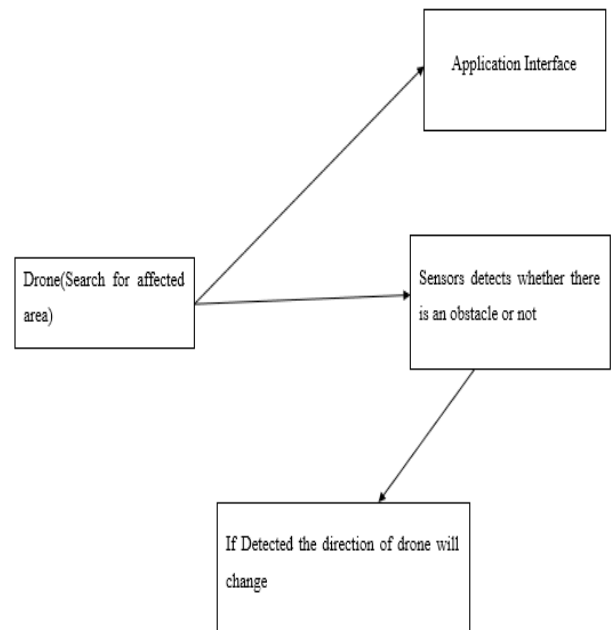


Figure 3: Working of drone



Figure 5: Actual drone image

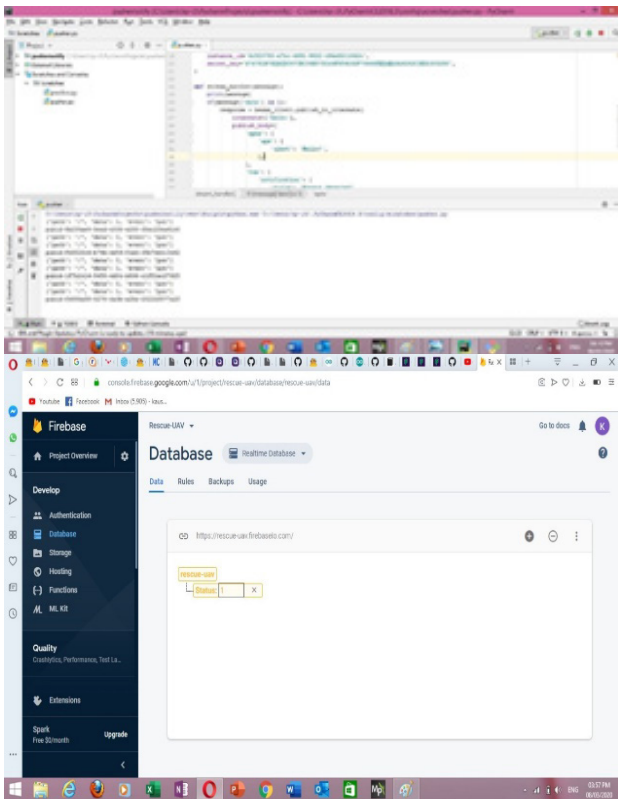


Figure 6: Communication using firebase

consists of various control techniques. 1. Mode of operation, and 2. Data evaluation.

The drone will advance at a speed of 0.25 m/s. The PIR sensor has a human detection range of 8 meters.

#### 4. SYSTEM DEVELOPMENT AND RESULTS

The system we designed is implemented and executed, containing the test results. In this way found the solution to the desired problem. All of the executed operations depicted the successful geographical location of the human being on the map.

#### 5. CONCLUSION

This system is useful for search and rescue teams to search human beings in less time and also keeping the health of people into consideration. This system hereby tries to solve problems faced by the rescue team. This system composed of a sensor-based monitoring unit. Data communication is handled, which is a long-range and power-efficient technology. The system forwards the data further to emergency execution teams for taking considerable actions and performing investigations.

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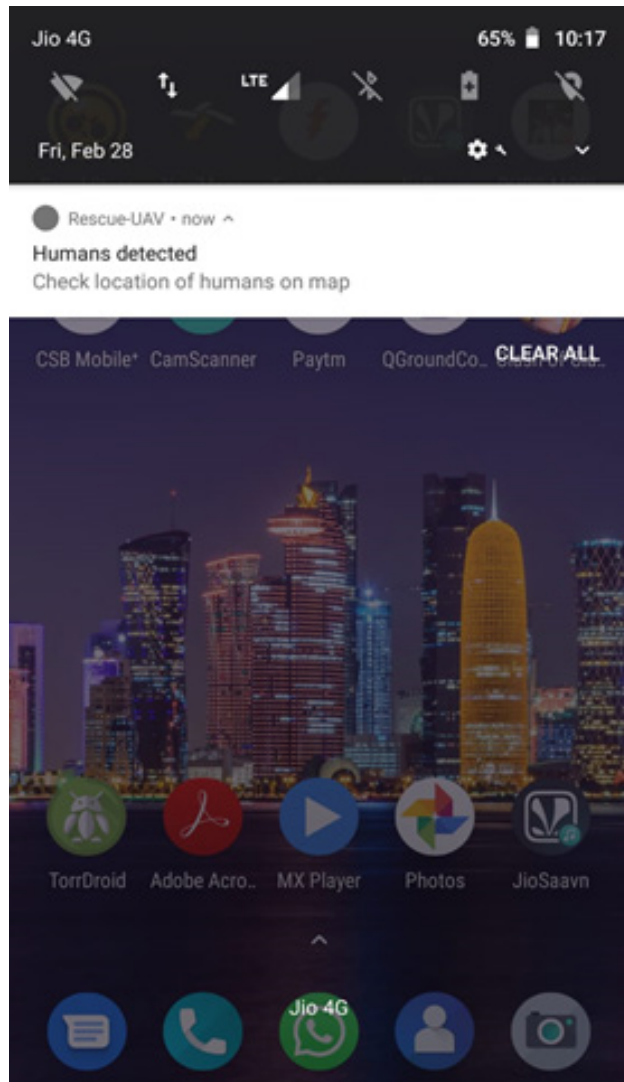


Figure 7: Location notification on mobile

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