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DRONA

AN IOT AND MACHINE LEARNING BASED PROJECT

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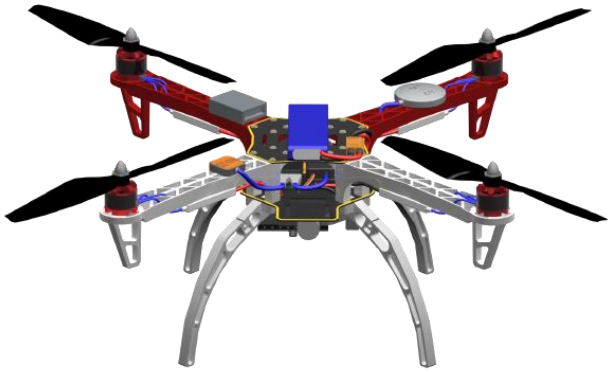
ABSTRACT: Explosive landmines have cost the lives of hundreds in several countries. The military has been the first to deploy machines as an attempt to overcome the risks involved when the landmine detection process is carried out by humans. It is a difficult task to identify the bomb by using bomb detectors that may lead to death of the person. So, these drones are used to detect bombs by travelling through air which is controlled from far away. It can also detect the obstacles and sense the temperature & humidity as well as detect the various types of bombs in most dense areas.

KEYWORDS:

1. Drones 2. Internet of Things 3. Artificial Intelligence
4. Arduino 5. Aerial Vehicle 6. Landmine Detection

1. INTRODUCTION

The military has been the first to deploy machines as an attempt to overcome the risks involved when the landmine detection process is carried out by humans. Currently, there are fully autonomous systems which do not require a human operator for monitoring both detection and deactivation of explosive landmines. Our goal is to integrate and evaluate a set of low-cost technologies that allow the detection of explosive landmines autonomously and without compromising the mission. The goal is not only to detect fully visible landmines but also those partially buried. The fully autonomous systems which do not require a human operator for monitoring both detection and deactivation of explosive landmines.



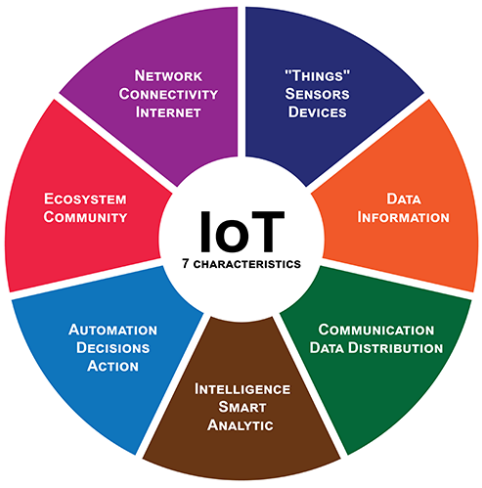
2. RELATED WORKS

- Harshwardhan Zala, aged 15, on an inventive path that resulted in the design for a drone that could detect and detonate landmines.
- The world's first drone-based explosive detection system, Spectro Drone, has been unveiled by Laser Detect Systems in Tel Aviv, Israel.
- The Défense Research and Development Organization (DRDO) and the Indian Institute of Science in Bangalore have developed a new bomb detection device called Raider-X.

3. TECHNOLOGIES TO BE USED

We are tending to make Drona 75% Autonomous using machine learning and deep learning models. So, the Technologies to be used are:

- Hardware level: Arduino and Raspberry Pi Model
- Software Level: Machine Learning and Deep Learning
- Database: MySQL Cloud Server



HARDWARE REQUIREMENT

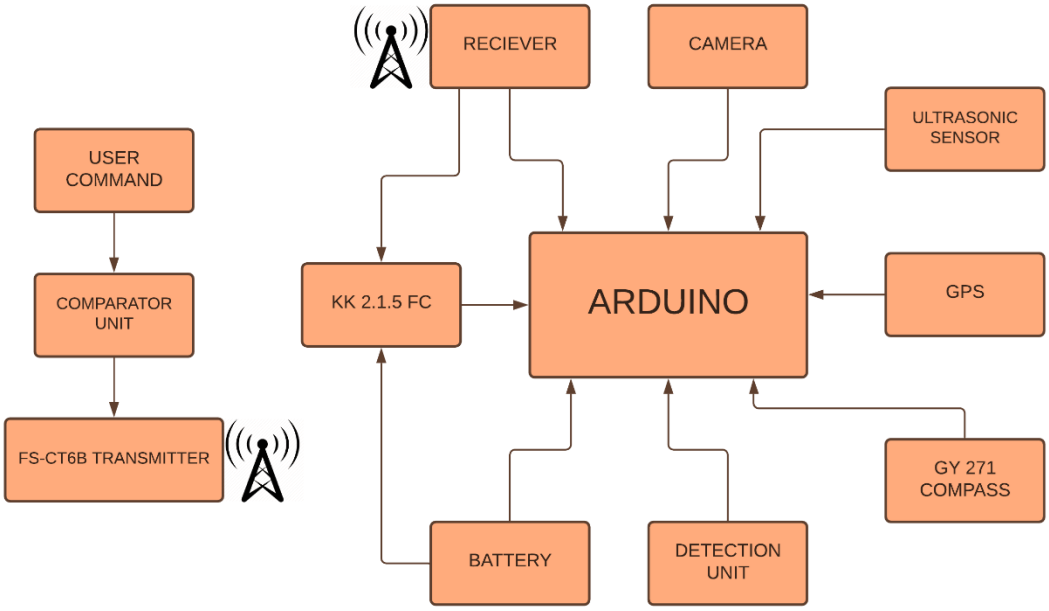
- Arduino Circuit
- Bluetooth Module HC-05
- Knock Sensor
- PIR Sensor
- IR Sensor
- ULTRASONIC SENSOR
- GPRS SENSOR

SOFTWARE REQUIREMENT

- Python IDLE
- MySQL Cloud Server
- Arduino Editor
- OPEN NEURAL NETWORK EXCHANGE (ONNEX)

4. PROPOSED METHOD

We are proposing a drone which has RADAR for the detection of various types of bombs. By using this we can also operate the drone up to 15 kms. The device is also waterproof to be able to operate in heavy rain, and equipped with 2 strong front IR LEDs to operate in the dark, and a GPS locator and hardware/software module to allow it to return to base automatically or recovered if lost. The goal is not only to detect fully visible landmines but also those partially buried. The fully autonomous systems which do not require a human operator for monitoring both detection and deactivation of explosive landmines. A wireless camera which consists of both transmitter and receiver. It is connected to the servo motor that can easily rotate the camera up to 180 degrees to cover the wide range of area. Radar can detect the bombs present in the underground and give the information to the operator that is the bomb is present in place as per the GPS location.



5. IMPLEMENTATION

For solving the problem of detecting landmines without human intervention, drone uses a ESP 32 camera module which is also connected to screen of mobile which can be monitored by a person controlling the drone from a wide distance.

5.1 TECHNIQUES USED

Drones body is made up of F450 frame which is carbon made frame because of the carbon the frame is light weighted and hard to be broke, the frame looks like a cross (“X” or “+”) which has a brushless motors attached to every end. Each brushless motor is of 1000kv and 30A, these brushless motors have propellers attached on the top of it which on rotating makes the drone fly. Drone is equipped with K.K. 2.1.5 flight controller which is further attached to the FS CT6B Transmitter and receiver, receiver is directly attached to the flight controller. When the transmitter gives the instructions to receiver it is passed on to the kk flight controller which is evaluated and latter passed on to motors which makes the drone successfully fly. The whole system is powered by a 10,000mah battery which let the drone to fly for over 30mins of time.

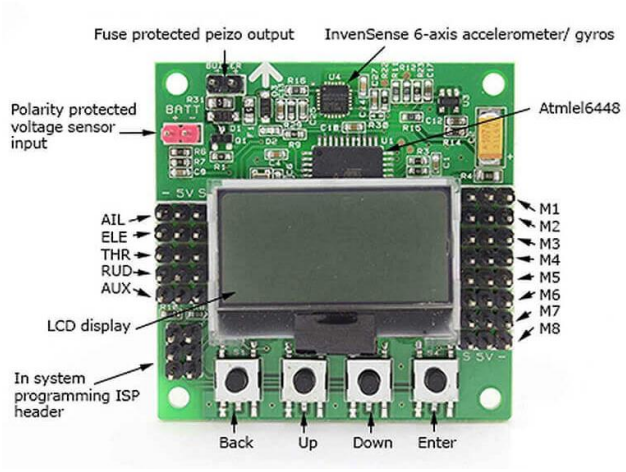
When the drone is hovered over the landmines the ESP 32 camera module which is attached to the bottom of the frame detects it or else the human monitoring the camera do, which marks the location of drone using GPS sensor equipped with the drone, GPS sensor takes the longitude and latitude which latter can be used to again locate the landmine and defuse or destroy it. The GPS sensor and the ESP 32 is connected to Arduino nano which powers both the sensors using the 10,000mah battery.

Tools Used:

I. K.K 2.1.5

It is a flight controller that is used to evaluate the instructions given by transmitter indirectly to it after evaluating the instruction it outputs each motor their speed to rotate, each motor upon receiving the inputs together fly the drone and makes the flight successful. Flight controller is also used to make the drone stably fly.

Flight Controller Board

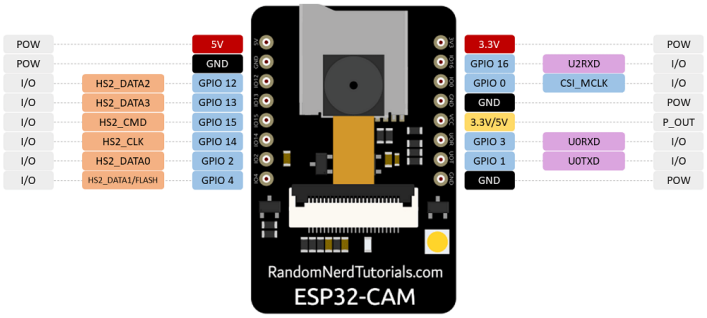


II. FS CT6B

Flight sky CT6B is a set of transmitter and receiver, transmitter is handled by the person controlling the drone. Transmitter is used to control the whole drone it is like a remote to the drone. Transmitter forwards the instructions to the receiver (which is in sync with transmitter), receiver upon receiving the instructions forwards it to flight controller

III. ESP 32, GPS Sensor

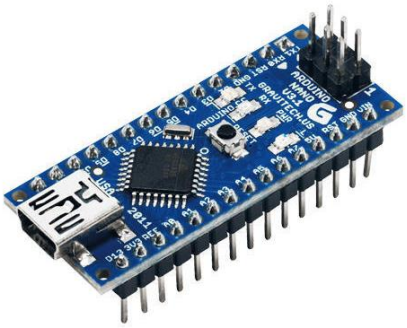
ESP 32 is a camera module which is used to monitor the ground and detects the landmines partially buried under the ground. GPS sensor is used to mark the location of the landmine in the form of longitude and latitude.



IV. Arduino Nano

It is used to produce a clock of precise frequency using constant voltage. There is one limitation of using Arduino Nano i.e., it doesn't come with a DC power jack, which means you cannot supply an external power source through a battery. Arduino nano is used to code the ESP 32 camera module and GPS sensor, the

language used to code the sensors is python. It also directs correct amount of power to the sensors using the 10,00omah battery



6. EXPECTING RESULTS

By using this method, we are aimed to reduce the death of people and protect them from bombs. We can easily detect the bomb by controlling the drone up to range of 15 kms. It can also detect the enemies from the long distance and can release the arrows to give protection from enemies. If drones replace mans in detection of landmines that would save the lives of many people who are living in war zone. Man based searching has a certain error percentage which would be reduced and might help in saving many more lives. Drones are a revolutionary change in landmines detection which can further be utilize in other different ways too.

7. CONCLUSION

These days bomb attacks are increasing to protect people without disturbing them is major problem. By observing the density of people, the bomb detectors can detect the bomb. When drone is activated, it can be controlled by using flight controller. Our results demonstrate that the integration of several low-cost out-of-the-box technologies can be used to improve the efficiency of detecting man-made thermal anomalies.

- **LIMITATIONS**

1. Limited Frequency Range
2. Non-Real-Time Isolation
3. Sometimes Issues with Detection and Detonation Procedure

- **FUTURE ENHANCEMENTS**

1. Can be Full Autonomous
2. Enhanced Data Set
3. Improvisation in Design

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