International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 09 Issue: 04 | Apr 2022 www.irjet.net p-ISSN: 2395-0072

DRONE FOR FIRE FIGHTING OPERATION

Anusha Bhosale[2], Vaishnavi Hole[3], Rutuja Jagdale[4], Anuja Jadhav[5]

***Prof. Nazish Fatima[1]**, dept. of Electronics and Telecommunication Engineering, KSE Pune, India*
[2345] UG Student, dept. of Electronics and Telecommunication Engineering, KSE Pune, India

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Abstract - *Fire accidents can cause serious injuries and damage. When fire service responders arrive on the fire scene, it is very difficult to predict the situation inside the closed room or building So, drones as firefighters be a better solution. We have developed a fire-fighting drone. It provides great moveable's and doesn't risk any personals. The drone can be controlled by a transmitter. The requirements of the project are Arduino BLDC, Esc's, Transmitter, Receiver, Li-po battery, propeller, MPU6050, etc. The base of the firefighting drone is Arduino. For sense and control objects in the physical world, Arduino UNO is used. ESC is used to control and adjust the speed of the aircraft, and electric motor. Transmitter and receiver are used here for transmitting and receiving the signals for measuring velocity, acceleration, and displacement, MPU6050 is used. For firefighters, this system feels like protection for them. when they are facing difficult situations the drone as a firefighter is the best solution*.

Key Words: **Arduino, Fire, Drone.**

1. INTRODUCTION

Currently, the firefighting is done by peoples and equipment, which is done manually and put human lives at great risk. Our brave firefighters put their lives in danger to save the victims, but locating the victim can be only done by clearing the path and manually looking for the victim which is a waste of precious time when it comes to the life of people. So, Fire Fighting Drone is a very good option in this case because it can be managed remotely without putting lives in danger. Drones are flying unmanned robots that can be remotely controlled. Drones are used in different applications like Photography, spying, mail delivery, etc. These drones are also developed for fighting the fire. Firefighting drone is in development, if drones are used in firefighting, they will be more helpful to put off the fire. Fighting a raging fire is always one of the toughest uphill battles in the public – safety world. Firefighters try to put off the fire with very little information, having no idea of the size and scope of the fire and never knowing how many potential victims may be cut off from rescue. Fire departments are seeing a greater prospect of using drones during structure fires and rescue missions at high buildings and congested places. Drones allow firefighters to quickly and effectively scout out dangerous fires, Observe and monitor a large blazes in the forests. This project aims to develop a drone capable of performing both surveillance and firefighting operations.

1.1 Objective

The purpose of this project is to build a UAV and attach to it a release mechanism for the firefighting drone. This mechanism will be designed and manufactured by the members of this team. The UAV is going to be built using parts already in existence and this team is going to put them together to construct a vehicle that can comply with all requirements to extinguish, prevent and inspect the fire on the spot. The UAV will be capable of sprinkling water in an area that is hard to approach by conventional methods or is more expensive to do in other ways.

1.2 Scope

It involves developing the swarm platforms for the remote sensing and fire-fighting components, upgrading the dropping mechanism, and developing wind trajectory models to experiment with optimal dropping methods over timber litter, short needle litter, and chaparral vegetation models.

2. METHODOLOGY

This system uses a flight controller and Arduino Uno. The whole firefighting system will work on Arduino Uno and Drone will work on a flight controller. Here we also used sensors such as an Ultrasonic sensor for detecting obstacles and a Flame sensor for detecting fire.

2.1 Block Diagram

In this block diagram, you will see the motherboard which is our Arduino UNO. This Arduino UNO is connected to the ESCs (Electronic Speed Controller), Sensors, and the receiver. Further ESCs are connected to BLDC motors and these motors are used to rotate the propeller.

Here, the Flame sensor will detect the fire and the ultrasonic sensor will detect the obstacles.

This is the way our drone will work.

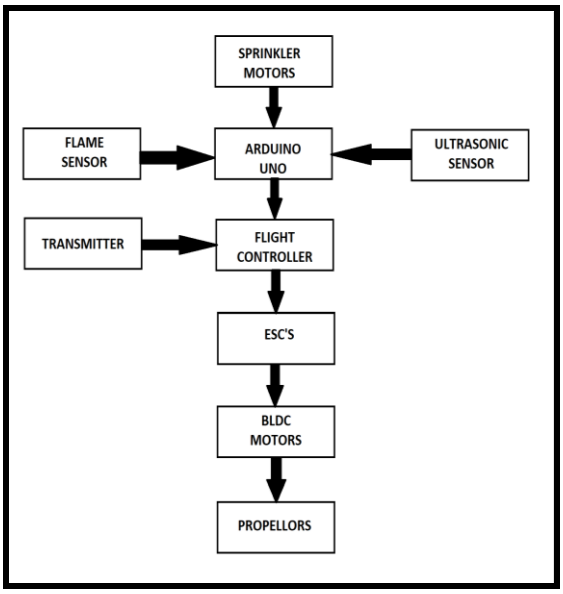

Fig -1: Block diagram of Drone

2.1 Flow Chart

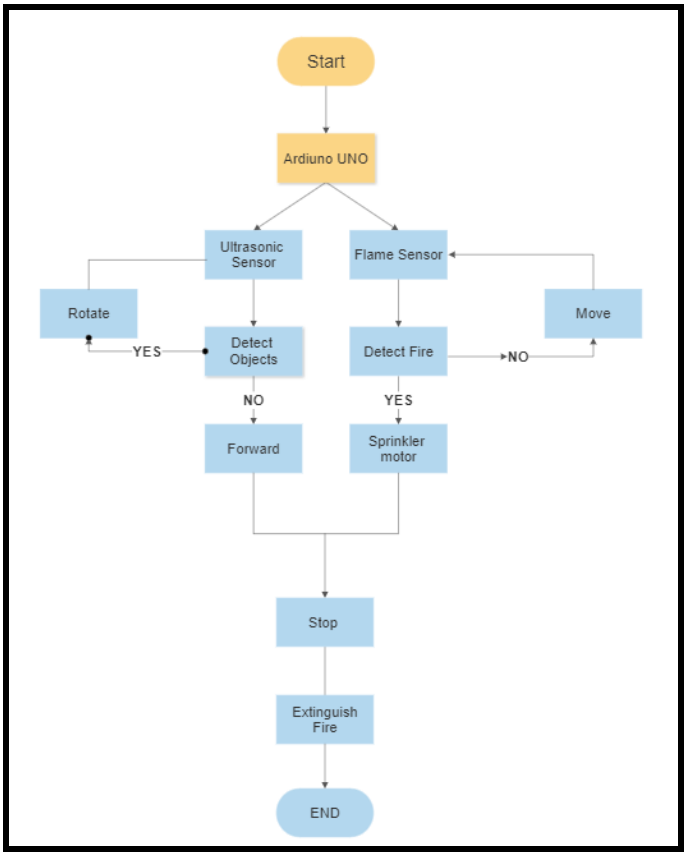

Fig -2: Flow Chart

Hardware Requirement

- Arduino UNO
- Flight Controller
- Propellor
- Ultrasonic Sensor
- BLDC Motors
- Transmitter
- ESCs (Electronic Speed Controller)
- Li-Po Battery
- Drone Frame

Software Requirement

- Arduino IDE

3. CONCLUSIONS

Our research work yielded a successful development of Quadcopter at a cheaper and affordable amount. It can be used as a low-cost alternative to various applications which include pesticide sprinkling, end-to-end delivery within the transmitter's RF range, surveillance in defense and other sensitive places like national borders, mapping through remote sensing, etc. with a very high level of precision. For further implementation, we are working on determining which is the minimum distance required between the drone and the fire. This information can be obtained by monitoring the temperature of the fire and the one supported by the UAV. In addition, we are considering a second iteration of the prototype to ensure control stability.

4. ACKNOWLEDGEMENT

We would like to thank our Head of the Electronics and Telecommunication department of Keystone School Of Engineering, Pune for inspiring us and providing us with all lab facilities with the internet, which helped us with the project work.

We would also like to express our appreciation and thanks to all those who knowingly or unknowingly have assisted us & encouraged us with our project. Excellent Guidance of guides, Staff Members, and the cooperation of non-teaching staff is also valuable for us to make this project successful.

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BIOGRAPHIES

ANUSHA V BHOSALE
Student of Keystone School of Engineering, Pune.

VAISHNAVI B HOLE
Student of Keystone School of Engineering, Pune.

RUTUJA M JAGDALE
Student of Keystone School of Engineering, Pune.

ANUJA H JADHAV
Student of Keystone School of Engineering, Pune.