



## Design and Development of Self Automated Drone

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### ABSTRACT

*The primary objective is to reduce the efforts and time consumed for delivery of products by making a self-automated Quadcopter (drone) i.e. the drone will work automatically without any remote control, we just need to specify the location to the drone and we can track the drone location at any instance of time by using GPS. Analysis: This paper provides a comprehensive investigation on self-automated drone with GPS and android application. Findings: This paper provides the novel methodology for providing ease of access to the customers and the providers to reduce their efforts for delivery of products by making a self-automated drone. Applications: The importance of this will be that there is no need to operate the drone using remote control, hence will be used by many industries for shipping or for other uses to reduce human efforts.*

### Keywords

Quadcopter, GPS, Android Studio, Google Map

### 1. INTRODUCTION

An unmanned aerial vehicle (UAV) is an aircraft without a human pilot on board and a type of unmanned vehicle. UAVs are a component of an unmanned aircraft system (UAS) which include a UAV, a ground based controller, and a system of communications between the two. But a drone requires remote to operate it, which has a large no of drawbacks like we can't use it for larger distance and there is a chance of accidents. Hence, we are building a self-automated drone that will be operated manually by providing the destination to it, the drone will work as a return to home i.e. it will return back to user, after delivery of its products.

Hence we are building a mission control drone which will return back to the user after completing its task. Mission control drone allows you to easily plan a surveying mission with your drone. It supports fully autonomous take-off and landing missions, automatic camera triggering, and terrain follow for multi-rotors and planes

The core components of Self Automated Drone are 1. Drone 2. Android App 3. GPS 4. Wi-Fi. As we know UAV is an aircraft without a human pilot on board but here the UAV used is a Quadcopter which in future can be assembled with the hardware.

Thus the solution will save the time and human efforts and reduce the amount of collision that earlier used to occur due to the remote control drone. The basic idea behind this drone is that the drone can move from one place to another without the human control. Here we are providing only the destination location to the drone and the drone will move to that location. To provide that location we are using a mobile application where we are having a map and we will give the destination location just by tapping on the map. The map will automatically get the location where the user will touched and find the corresponding location and set it as a destination location.

### 2. PROBLEM ANALYSIS AND MATHEMATICAL FORMULATION

Assume that we want to move a drone from one place to another for shipping of products or for some other commercial purposes. But we can't move the drone using remote control at a longer distance because it increases the chances of collision. And due to this reason shipping of products using drone has been banned in some of the countries. Even there is a restriction that you can't fly the drone in a particular area.

For delivery of products using drone we will require a pilot for every package, making it an expensive option. Not only pilots will navigate their way to destination, they will need to return the empty flight back as well. Eventually this will be automated but this is not a simple task.

Since electronic drones have very limited battery life and range, delivery drones will mostly likely be fuelled with gas or some other petrochemical. Gas powered drones have issues with noise and pollution that will cause many communities to start restricting their use.

With limited range and capacity, only a selected item will be eligible for this kind of delivery. When it comes to delivering food, companies will need to carefully monitor portion sizes because weight will become an increasingly important variable.

Hence for this purpose we will first connect our drone to our mobile app using Wi-Fi then the app will tell the current location of the user. Then the user will provide the destination address where it wants to move the drone for delivery purposes.

Then the Google API will find the shortest path through which the drone can move to the desired location. Then we will launch the drone so that the drone can move to its destination path, the drone will follow the path

provided by the Google API to reach to its destination address.

We can track the location of the drone through GPS, when the drone will reach to its destination address then after shipping the product, it will return back to the user.

Hence we are building a mission control drone which will return back to the user after completing its task.

Thus the solution will save the time and human efforts and reduce the amount of collision that earlier used to occur due to the remote control drone.

### 3. CHALLENGES IN SELF AUTOMATED DRONE

In recent days, technological improvements are happening frequently. So, manufacturer faces difficulties to integrate new technologies. Table 1 illustrates the major challenges in Self Automated Drone.

Sl. No	Challenges	Description
1	Scalability	Difficult to handle the dynamically changing number of vehicles
2	Height	Difficult to change the height to avoid collisions
3	Performance	Performance degradation because of traffic overhead and poor communication
4	Reliability	Communication is irregular when wifi connectivity is poor
5	Quality of Service	Much support needed to reduce the response time, improve availability and increase fault tolerance.
6	Security	Because of Lack of infrastructure, security and privacy is low.

Table 1. Challenges of Self Automated Drone

The major challenges for the manufacturers are to design the system that improves reliability, enhance the security and augment the user experience.

For Drone one of the major challenges is its height, that what should be the height of the drone while flying so that it will avoid collisions.

One of the major things to consider is to reduce the operational costs. While developing it, designers are in a position to consider following key factors:

- Better Efficiency.
- Enhances Safety.
- Ease of Use.
- High Reliability.
- Low Cost.

### 4. WORKING OF SELF AUTOMATED DRONE

We are building a mission control drone which will return back to the user after completing its task. Mission control drone allows you to easily plan a surveying mission with your drone. It supports fully autonomous take-off and landing missions, automatic camera triggering, and terrain follow for multi-rotors and planes.

Quadcopters are commonly controlled by RC method. The vehicle is navigated according to the input from the user transmitter by giving appropriate location in the map. In some situations, even by using the camera we are not able to find the path which leads to accidents and to avoid this problem we are creating a system which will provide the path so that it will follow the shortest path in accurate manner.

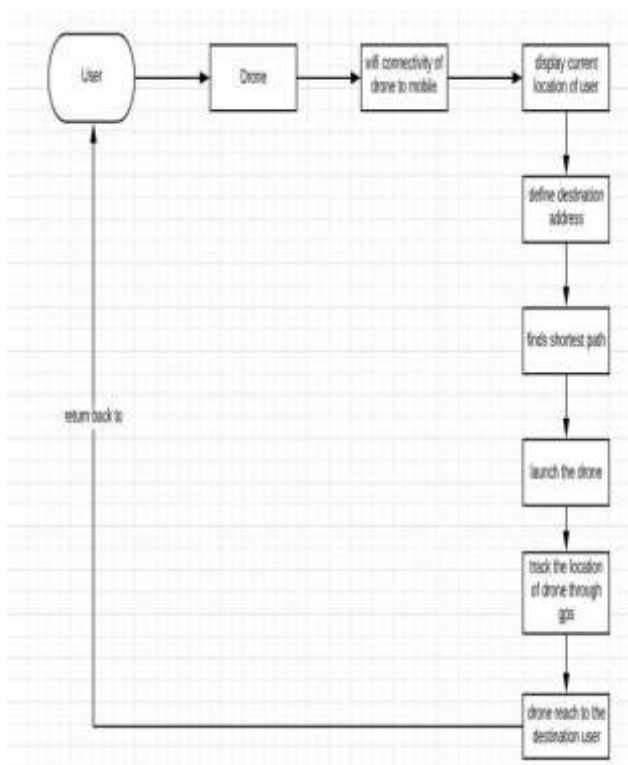
Hence, we will make an application by which we can instruct the drone to move in a particular direction. We are going to make a combination of Mission Controlled drone and Logistics drone. By this we can provide a specific path to our drone and after reaching the destination it can come back to the user.

Suppose a user want to move the drone from one place to another for shipping of products or for other purposes then we will first connect our drone to our mobile app using Wi-Fi then the app will tell the current location of the user. Then the user will provide the destination address where it wants to move the drone for delivery purposes.

Then we will provide waypoints in the Google maps and then we will launch the drone so that the drone can move to its destination path, the drone will follow the path provided by the Google API to reach to its destination address

We can track the location of the drone through GPS, when the drone will reach to its destination address then after shipping the product, it will return back to the user.

The Global Positioning System (GPS)/Global System for Mobile communication (GSM)/General Packet Radio Service (GPRS) Technology is used to prevent from the theft of any vehicle which is connected with this technology and to track the level of movement of vehicle from any location at any time. The working of self-automated drone is shown in the figure below.



**Figure:** Functionalities of Self Automated Drone

## 5. CONCLUSION

This paper has reviewed and analyzed the current research literature on the various methods for reducing the efforts and time by using the drone which doesn't require any remote control to operate it and avoids collisions. In this dissertation, we have developed an approach for making the drone that can find the shortest path between two points and can move across it. The proposed approach facilitates the system which can help the user by finding the shortest and the accurate path between two locations which in result reduces the chances of collision. Such an approach can be used for several applications where a human can never reach like extreme height or flood area where humans cannot move easily but a drone can. Once we have given the location it can move and perform its task.

As we are using the GPS the system will communicate continuously so that it will provide the accurate path which will reduce the rate of the collision that can be possible with the manual control by using the camera and the RC controller, as watching the footage and then controlling the drone accurately needs a good skill. But as we are using the GPS the system becomes very precise as it is now working on the coordinates in the Google map. Hence it reduces the time for moving the drone from one place to another and it also reduces the human efforts. This type of drone is very useful in the future for emergency or for delivery of products.

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