Autonomous Drone Delivery System

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Abstract - *Consider a scenario, where many Hospitals are in need of vaccines, blood samples, etc. They use roadways as an option for transporting these items. Due to which traffic, vehicle's petrol consumption, air pollution and delay in delivery may arise. Our system takes this situation as an opportunity to tackle the above stated problems. Delivering items through drone, makes transportation a lot easier. No source of air pollution, no noise pollution, comparatively faster delivery, no petrol consumption. The word 'Autonomous' in this context refers to managing drone travels automatically. User's source and destination GPS co-ordinates are used for mapping waypoints on the map and drone takes off from source and follows the waypoints generated by our desktop application. In addition, we have simulated multiple drone scenario where drones are assigned as per their capacity to take that journey. This proposed system is not only applicable to the Hospitals, but also food delivery, product delivery, or a one-to-one user's delivery which replaces traditional business method of delivery (via vehicles).*

***Key Words*: Drone, Autonomous Delivery, Android App, Mission Planner, ArduCopter**

1. INTRODUCTION

The drones are helpful in delivery because they don't need to follow the road they directly go to the hospital from the blood banks with shortest distance between them which saves lot of time in case of emergencies. They drone will have carrying capacity limit of about 900 -1.2 kg . As there will be multiple drones so the routing algorithm will calculate which drone will used to deliver the package from source to destination with shortest possible distance and time among other drones. Also it will take care that system as a whole performs effectively and efficiently so the there is less delay in deliveries of these packages in case of emergencies .Hospital staff will be able to request the medicines and blood packs from the app which will be processed then the routing algorithm takes the location of the hospital and it will the location of multiple drones some might be in delivery process some might be available to deliver and there can multiple orders at same time so the algorithm will route the drones to minimize the time for delivery.

1.1 Purpose of Project

This research aims to develop an autonomous drone system. By using this system, it is expected that drones can be used to deliver parcel. The drone will be completely autonomous. The drone travel autonomously from the receiving point to delivery destination point. The shortest path between receiving point & delivery point will be decided with help of algorithm. This system will help delivering items fast. It will be extremely beneficial in case of emergency delivery. This will also help in reducing the traffic as it is not using vehicle to transport.

1.2 Problem Statement

The current method of delivery system using manual delivery. The vehicle traffic makes it more time-consuming task. The delivery is completed manually thus its cost is high. The item delivery is getting more time consuming because of increasing traffic day by day. This also effects on incrementing the cost of delivery. The difficulty is to deliver the item in less amount of time & in low cost. The proposed system uses drones in order to deliver items. By using drones, the delivery time can be reduced as they are not transporting as vehicle on ground. The drone will be autonomous i.e. they'll travel on its own without controlling it manually. This will also reduce the cost of transportation. Thus, it will also reduce the traffic caused by vehicle transport. This solution can be applied for urgent medical access to needy person/hospitals.

2. SYSTEM DESIGN

2.1 Problem Statement

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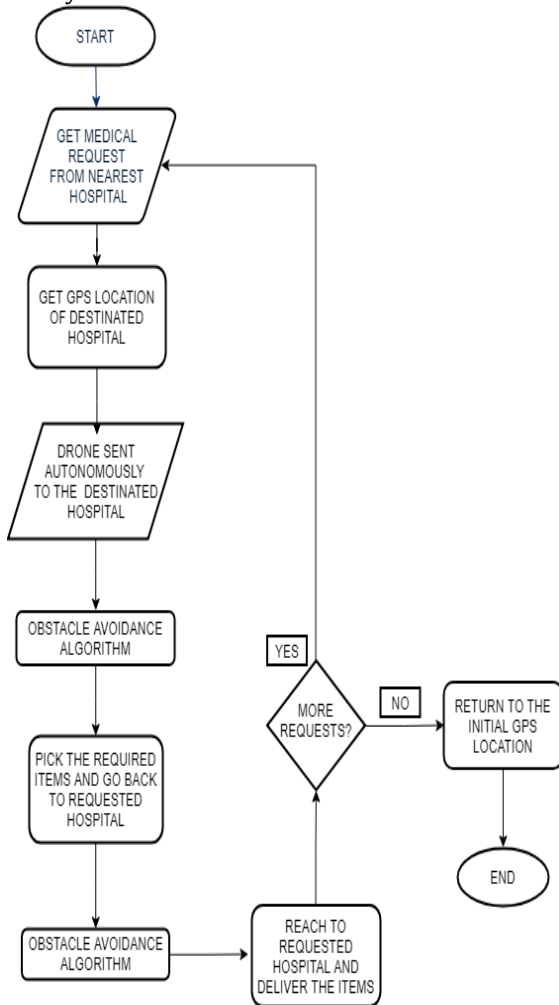
it manually.

Chart-1: Flowchart of Delivery Mechanism

2.2 Implementation

User logs in into the Android Application 'AutoDrone' and Clicks on Add Order button, which redirects to enter product details. Product details includes name of product and quantity. User then selects pick-up location and drop location from Google Maps. Delivery Charges are estimated based on distance to cover. Check status of delivery:

Active: Product is being delivered.
Pending: Delivery is requested to server. Based on limitations, delivery is approved.
Waiting: if no drones are available, status is set to waiting.
Cancelled: If wait time is greater than 30 minutes or user explicitly cancels the delivery. Product is delivered and drone is returned to launch location. If status is cancelled, then amount is refunded to user.
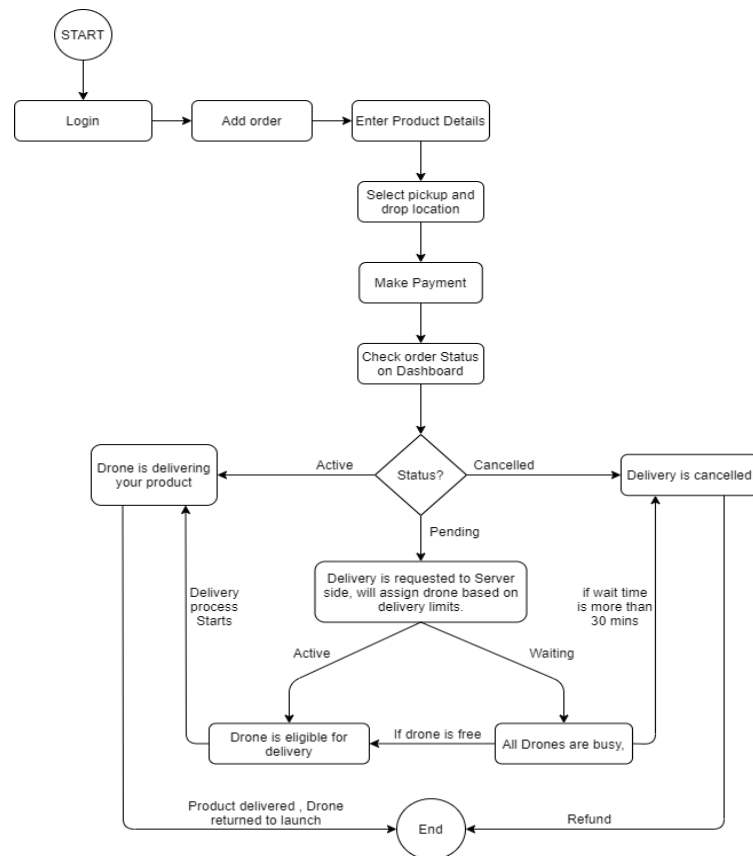

Chart-2: Flowchart of Android App

3. CONCLUSION

Getting emergency packages on time is the most critical factor nowadays especially in healthcare logistics. But difficult terrain, poor road conditions, bad weather and the unpredictability have always crippled logistics. In this existing system hospitals or individuals can get the packages delivered to them quickly. It will save a lot time and money because it is faster than regular traffic as the UAV travels through aerial path which traffic free and it can follow a straight line to the destination.

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