Package Delivery System Using GPS Drones

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Abstract - **Drone Delivery system will track live location of consumer and hence provide assured delivery of package to the correct place and correct person. GPS Drone delivery system will locate the consumer through GPS and detect the live location and deliver the package accurately and within a stipulated time as per the date of delivery.GPS will be inbuilt in the drone and live tracking device will detect the location of users device which will currently be handled by the customer using OTP provided during generation of package to avoid fraud. There will be a main warehouse and some sub-warehouses, the drone will pick up the package from the nearest warehouse of the delivery location. It will behave like any home delivery app where both the customer and the dispatcher will be able to trace the live location of the package.**

Keywords - Drone, GPS, OTP

I. INTRODUCTION

Courier delivery system in the recent time is still not 100% efficient. Several times it does not reach the consumer because of incorrect delivery details or wrong address detection. Sometimes it reaches late, that is after its requirement day and the other times it does not reach. After it returns, customers have to go and collect it themselves. GPS Drone delivery system will locate the consumer through GPS of the tracking device and detect the live location to deliver the package accurately within a stipulated time as per scheduled delivery. It will ensure that the package reaches the customer and he does not have to hassle for collecting the package.

II. DRONES

Figure 1 shows the pictorial view of Multi-rotor drones. These kinds of drones have strong robotic arms and more pickup capacity than other kinds of drones. These can be used for longer range delivery and heavy package delivery. The arms will extend and carry the package. The control ensures that the load is properly attached and the right route is followed. These can carry the load over longer distances.

Figure 1: Multi-rotor drones

Figure 2: Quadcopter Drones

Figure 3: Fixed Wing Drones

Figure 2 shows the pictorial view of Quadcopter Drones. These drones have little less carrying capacity than heavy weight carrying drones. None the less, it can also fly over great distances to deliver the package. the body is lighter and can fly up to greater altitude to avoid disturbances and obstacles. Extra arms can be modified into these types of drones.

Figure 3 shows the pictorial view of Fixed Wing Drones. These drones can cover a stipulated distance with immense speed and in a very short time. The delivery time is short and fast. It can deliver intracity. The only drawback is that the package has to be lightweight and it cannot carry much weight.

III. ORGAN USED IN TRACKING SYSTEM

The important organ used in tracking system are-
- GSM Provider
- Vehicle or person with suitable device
- Location tracking server
- GPS Satellite
- Client System

The GPS satellite sends the radio signal to the device which temporarily stores our data in their system, the device is stored in both the vehicle we drive as well as GPS compatible device we carry with us that is phone. The device is also provided with the panic button in case of emergency tracking. The tracking devices are consist of a SIM Card which is used to communicate with the nearest GSM network and thus the tracking system works with the help of both GSM networks and GPS. The tracking server has software to catch the signal sent by the device which is being tracked. The received data are in the hexadecimal format and are further converted into the readable format with the help of parser and converter, then the data are stored in the database and processed to further actions.

IV. PROPOSED SYSTEM

A. *WORKING MODULE*

Figure 4 shows flowchart of Working Module of Drones. The base or the warehouse receives signal for the dispatch of the package. The base then transfers the signal to the allotted drone. It flies out rising to a higher altitude to avoid obstacles and disturbances. The path is set to the delivery location and the drone tarts towards its destination. After it flies to the higher altitude, the drone is provided with the immediate location of the customer and it is constantly updated that is it tracks the location as it moves towards its destination.According to the architecture diagram, the GPS position of the distribution point will be read by the drone. After reading the exact position it will continuously monitor the current location and take it away from the base. It will fly to the delivery point and confirm the package to the correct customer by asking for the OTP sent to the verified device. After confirmation it will deliver the package and take it back from the delivery point to the base. In case the OTP is not valid that is, it does not verify, the drone will not lower itself and fly back to the base. The process will repeat itself until the package is reached to its customer.
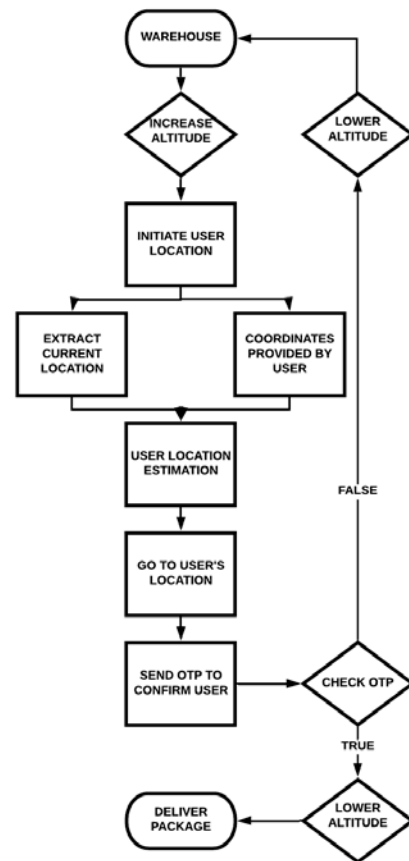

Figure 4: Flowchart of Working Module of Drones

B. *WORKING OF DRONE BASE*

Figure 5 shows the working of dron base. This is an abstract of a drone base created in a particular area that will operate in a specific zone. In case the delivery location is out of its boundary it will communicate with nearest bases. Then it delivers the package to the nearest base to the delivery location. Figure 6 shows how the base communicates with the customer and sends a drone with the required package on its path to deliver it to the customer. The drone will deliver the package to the customer only if it is 100 meters within the delivery location (the location provided at the time of order).
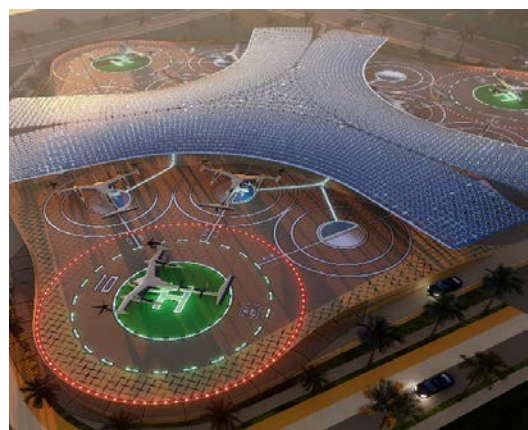

Figure 5: Drone Base

Figure 6: Base interaction with Customer

C. USER SYSTEM INTERACTION

Figure 7 show the user system interaction Long distance vehicles carrying more payloads require more energy and batteries for each unit of travel. Larger multi-stop vehicles carry more battery and payload and pay for it in drag. Vehicles are conservatively sized to be able to traverse the entire delivery route and return to the fulfillment center with all packages. The burden of irreversible packages increases with each additional package and with compounds. On the delivery date the information is sent to the customer's phone and he updates the system with either his live location. If the payment is received on delivery the drone collects the payment in a safe-box installed in the central controlling head. The drone reached the users location but before lowering itself , the OTP is confirmed. The drone has to be provided with a unique feature so that there is no interchange with some other customers packages to ensure that the customer will be provided with a code during the creation of the package on its designated route. As soon as the package reaches the customer, the code will be asked and matched to the number given in the drone. In this way delivery of the correct package will be assured.
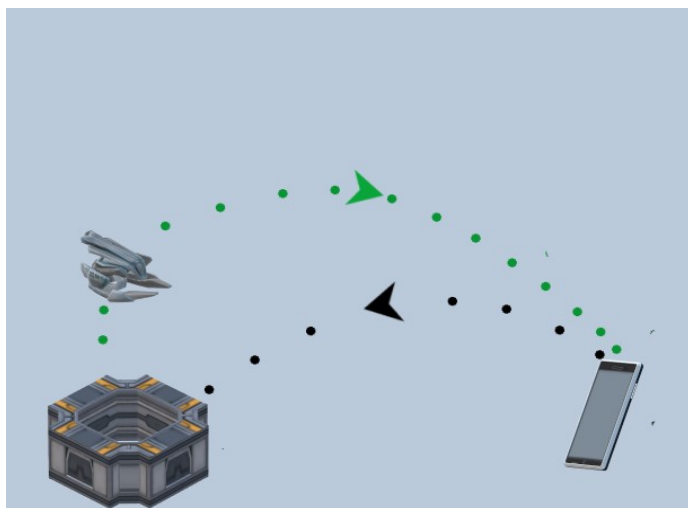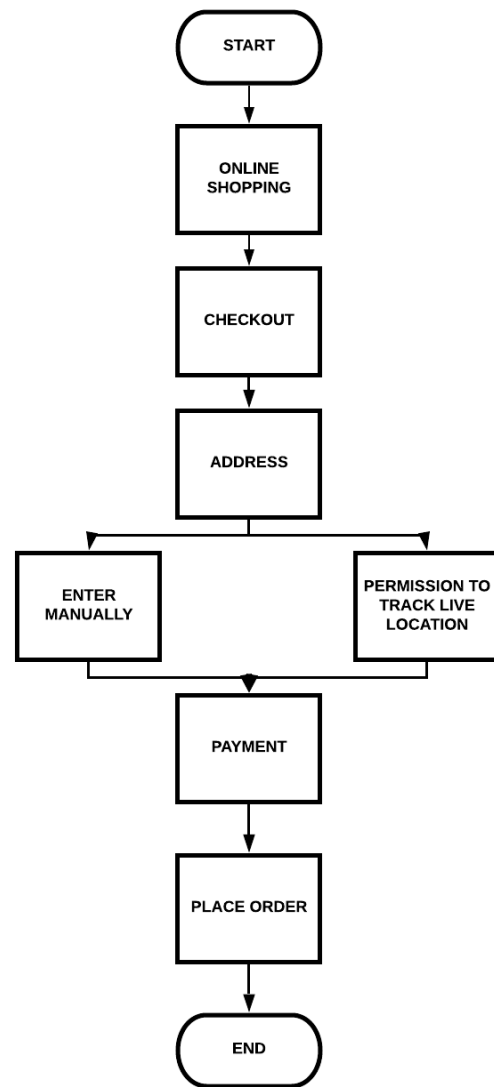

Figure 7: User System Interaction

Figure 8: Extraction of user's location flowchart

Figure8 shows the process of getting the customer's location. While ordering the customer will be asked to provide their address. They will have the option to provide their live location or enter their location manually. In both cases they have to set their location on the map provided. The drone will have unique design and it will remove obstacles that use image processing to detect any obstacles and be safe during storms and inclement weather. It will reach the people and once reached the location it can be lowered by hand gestures.

D. LOCATION TRACKING

Figure9 shows the location tracking. The location tracking is an important part of this project to ensure the confirm and correct delivery of the package to the customer. The location tracking of the customer will work in two parts. First the customer will provide their location at the time of ordering the product. Then package will be transferred to the nearest main warehouse of that city, and then it will be further transferred to

the nearest sub warehouse of the locality. The drones will then take the package from the nearest warehouse and fly to the location of the customer provided at the time of ordering the product. The drones will track the customer's location through his phone and he should be present within the 100 meters of the provided location, only then the package will delivered otherwise it drone will itself cancel the delivery and fly back to the warehouse from where it picked up the package.
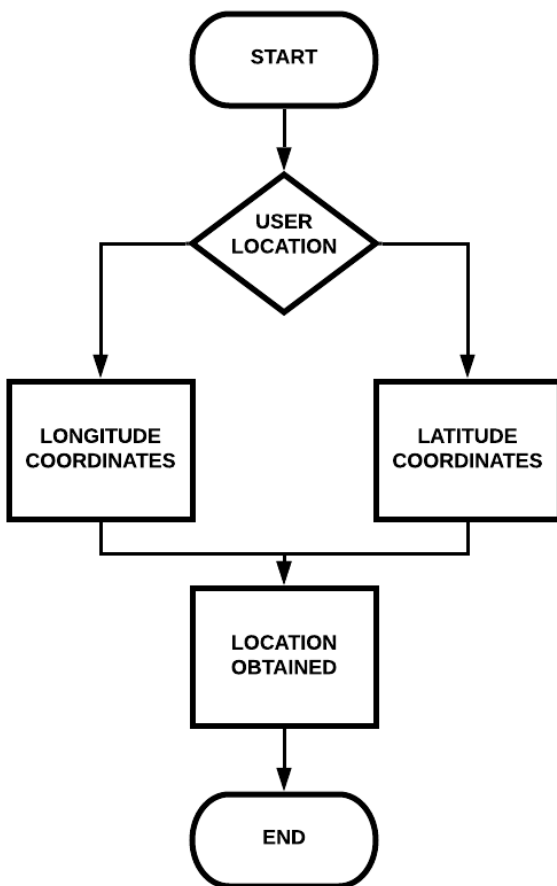

Figure 9: Location Tracking Flowchart

E. ADVANTAGES OF PROPOSED SYSTEM

Efficiency of proposed method over other methods of package delivery:

- It is fast and reliable
- It has the features on in hand delivery
- It will avoid thefts and hassel faced by customer
- Customer will not have to wait in a fixed location to collect the parcel
- It is robust and spontaneous
- Very efficient over short distances
- Can be controlled with gestures if modified.
- Self updating of user location.

F. ROUTE

Figure 10 shows the drone route .In drone delivery system, the drones will not be travelling on the present features of the map because they only provide navigation through the road but drones requires a different route that is it have to fly over buildings and reach location as fast as they can. The drones will be provided with different route just like flights. Flights have their own route to travel from one city to another. The drones will be provided with same route as flight but on small scale that is within the city. They will fly over buildings and cover the shortest distance to reach their customer.

Figure 10: Drone Route

Figure11 shows the working of drones while selecting the best route to deliver the package to the customer. The drones will be programmed to automatically select the best to reach the customer quickly. The navigation symbol shows the destination and the red shaded area shows the drone base. The navigation on the users end is followed by the map provided by the delivery system to track its drone just like any other tracking system except that the route is by air at not on ground. Anyhow, the drone's algorithm detects obstacles and controls its own path and sets accordingly to reach the user, which the user can also see.
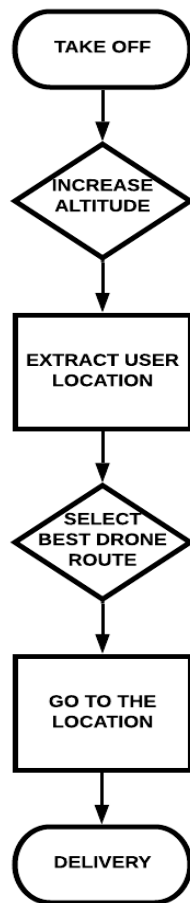
Figure 11: Flowchart of selection of best route by drones

V.   CONCLUSION AND FUTURE SCOPE

The aspect of this journal is the future of technology. The manual delivery will not be able to satisfy the demands of human race in the future. Drones will become a necessity and will be of immense use in delivery of packages and couriers to the respective customers. In future, people will become so engrossed in their own work that they would not have time for collecting parcels and packages separately. Thus these drones will ensure the correct delivery of their demands in their current positions that is wherever they are. For this system to work properly image processing also has to be implemented in order to remove obstacles in the delivery path. If the dangers or obstacles are intermittent and sudden due to a storm or a bad weather which is harmful, the drones will eliminate it from the path using laser. For a more advanced and efficient system of work and delivery the drone delivery system in the future will be AI controlled that is self processing and implementing. They will be self processing the path if there are any living object as an obstacle through algorithms.

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