**Diagram

Description automatically generatedCurrent situation:**

1. Currently, 70% of the orders are placed on the platform during the peak hours of lunch and dinner
2. High traffic during these peak hours limits the serviceability of restaurants to a few kilometers
3. Gap between demand and supply
4. Design an efficient drone-enabled delivery system

**Objectives:**

1. To fulfill the Demand and Supply Gap
2. Implementation of Drone enabled delivery system
3. To reduce the Delivery time due to high traffic at peak hours

**Important Stages**

1. Launch Pads
2. 1st Distribution point
3. 2nd Distribution point
4. Integrated system
5. Control center
6. Surveillance system
7. Customer service representative
8. Delivery Location

**Process Plan**

Process Segregation Stepp by step

1. Product Funnel
2. Customer will log in to the Application and look for the best offers to order the food
3. Once he/she will choose the Restaurant (Depending on the food choice, reviews, and ratings), will add it to the cart
4. Processing to the Payment mode
5. Once the payment is done, an order will be placed.
6. Initializing the Drone system
7. Once the order will get placed, a notification will go to the desired restaurant. As soon as the Restaurant will accept the order it will Let the customer know with a notification “Your order has been accepted”, and then it will also notify the control center as well as the nearest Launch pad center, and the nearest Distribution point (Whichever is nearest the Restaurant area)
8. Meanwhile The nearest distribution point will send a broadcast notification within the area so that available DE can see it and accept the order.
9. Once any one of the DEs accepts the order, he/she will move toward the restaurant to Pick up the Food,
10. A drone will get assigned to move toward the Distribution point to pick up the order from DE(The nearest Distribution point from the Restaurant).
11. Picking up the Food
12. A DE will move towards the Restaurant to pick up the prepared food, once he picks up the food a Notification will send to the Customer as well to the Distribution point that, “Executive has picked up the food”
13. The drone will already reach over there to pick up the food
14. Once the DE will reach the Distribution point, one of the Staff members will pick up the food and attach it to the drone.
15. Travelling of the Drone from Traffic areas
16. Once the Food gets attached to a drone, the control system will get a notification and the drone will be ready to move toward the delivery location.
17. In between Surveillance system will constantly have an eye on the drone

-How it’s flying

-whether is it going toward the right location

-does it malfunction or not

-Is it going away from the desired path?

C. Once the drone completed 50% of the flight towards distribution time, a notification will be sent to distribution point 2, and Distribution point 2 will send a broadcast message within the area so that available Des can see the notification and one of them will get ready to pick up the order from the distribution point.

1. Distribution Point to Delivery location
2. Drone will reach distribution point 2, once it’s reached over there the DE already will be there to pick up the Food
3. A Company staff would be there to take care of the landing of the Drone and take food from DE and attach it to the Drone since there must be someone who’s aware of the drone system
4. He/She will pick up the Food, and the customer details would already be there on his/her smartphone, accordingly DE can go to the destination to deliver the food within the stipulated time

Key Points

1. There will be multiple Distribution points within the city
2. Limited Launchpads with Charging station, Maintenance, and Drone storage facility
3. Drone will fly back towards the Nearest Launchpads for charging. (Eg. If One drone is at the Distribution point and it came from launch pad 2, then it will fly towards the nearest Launchpad for charging and maintenance purposes if there are any.
4. Drones will be used for Peak hours/ Traffic hours and will be flown from areas where fewer obstacles are there
5. Distribution points will mostly be near the restaurant areas (Areas where multiple Restaurants are located), as well as based on the History data (Most ordered restaurants)
6. Above scenario will reduce the Waiting time of DE in traffic and will reduce his Stress/anxiety about the delivery stipulations.
7. All the systems will be integrated(interconnected), if any malfunction will be there, the surveillance system and control center will handle it efficiently.
8. Traffic areas will be covered by Drones only, which means distribution points will be within the radius of main traffic areas.

Advantages

1. It’s easy to handle the drone from one specific station to different, instead of sending the drone to every Restaurant and doorstep delivery
2. We can avoid Accidents and Casualties since no DE/Restaurant Staff/Customer will be directly involved in the process of Loading and Unloading
3. Flying from One Location (Launchpad) To another location (Distribution point), the chances of Damaging and Theft of Drone will get minimized.
4. Drone will cover the Main traffic areas which would be decided by the historical data, and accordingly distribution points will be set up.
5. Easy and efficient process.
6. Speedy delivery

Disadvantages

1. Noise pollution
2. Security risk
3. Maintenance
4. Payload that can be carried
5. Special Packaging

What is the use of Distribution points? Why not for door-to-door delivery and Restaurant to the restaurant to Pick up

1. To avoid accidents, what if the delivery boy is taking the order or loading the order to a drone, what are the chances of not having accidents? There would be a probability of casualties.
2. What about Theft or damaging the? Indian roads and places are congested, and the Restaurant areas are always full of crowds, would it be possible to Take drown at that level to attach the food every time?
3. Either the Restaurant staff is needed to load the food or the Delivery executive is at the place of the restaurant, which means both persons are needed to be performed in that scenario, is it possible every time?
4. What is the accuracy of the drone? If it’s going door to door, of restaurant to restaurant then distribution point?
5. Disturbance for the people who are already there in the restaurant and having food

Financials

1. Current revenue is 69 rs per order, and the Single DE is delivering the 350-500 orders per day. Taking an average of 425.

2. But this count will get increased since we are getting the orders from 3km, 4km, 5km but With introducing the drones 6km, 7-10km orders we are also getting

4. 1080000 New orders per month we are getting and expecting the growth in the count

5. Revenue per order after implementing the drone delivery system would be the 138 and Signicant growth in it with YoY considering the comition from the Restaurant and Avg order value( for the year of 2022)

6. And this results in addition of per day of order count and It's revenues and this one is major Advantage to introduce Drone Delivery system

7. The complainant thay we were getting of about 25% of late deliveries is significantly reducing since the Delivery time is reduced.

8. The max flight range of the single drone is 7-8km, and max time range of drone(Charge span is) is 30 min, on the basis of this calculation one drone can Deliver the 2-3 orders in a single charge. And will be getting approx. 252 orders at a single distribution point on peak hour and due to this the required count of the drone is 75-80 excluding Buffer drones, Taken the count high since The drone is also a Machine and there would be some possibility of malfunction, damage or any technical cause so we have to be ready to deal with it, that is why Additional drones are there.

9. Initially the investment is high due to Costing of drone will be added there, Infrastructure cost, And addition of Operational cost(Hiring new staff, technical an maintenance staff, etc)

1. Initially 2 years can't give us the profit margin considered above expenses, but once the operational set-up is done and we are getting the new oders with huge potential number, that would deffileads to growth in Revenue after 2 years, Percentage would be the less but thr New beginning would be there.

Operational

1. Currently, 70% of the orders are placed on the platform during the peak hours of lunch and dinner

High traffic during these peak hours limits the serviceability of restaurants to a few kilometers

Gap between demand and supply

Design an efficient drone-enabled delivery system

2. Our current Objective is to increase the no of orders that comes in peak hours which results to the increase in the Revenue, and Reduce the percentage of late deliveries

3. Unlock the new order from the longer distance, like beyond 5km

4 Currently we have 5% orders from 6Km, and 0% beyond 6, which we have focused mostly

5. Operational as we discussed, there would be the multiple distribution points within the city

6. No direct contact of Restaurant staff/customer/DE with drone

7. 1st and Last mile deliveries will be done by DE only

8. So first we will go to the setting up the distribution points within the city

Total area of the city is 741 sqkm

if we devide it lenght wise, taken the 25-26 by 25-26 km

Where as, each distribution point will 5km apart from each point in a Staight line

In Diagonally distance between two distribution point will be 7.5km, to accommodate these distance we've come to the result with min 25 distribution points within the city