



“FlyingBox” Drone Delivery System

Less Human Interaction

Acknowledgment

In memorial of
Dr. Osama Abu Zaid

Supervision

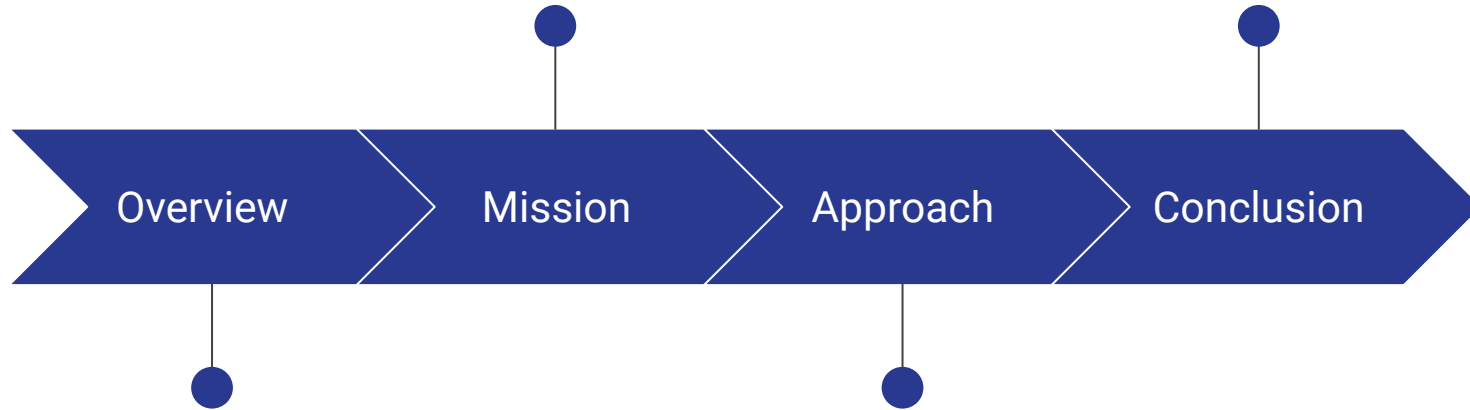
Dr. Haitham Elwahsh

Continuous Feedback

Dr. Enjy

Which needs we are
going to fulfill

The end-point we have
reached & The future
work



Current circumstances
and VRP history

Our solution steps
explained

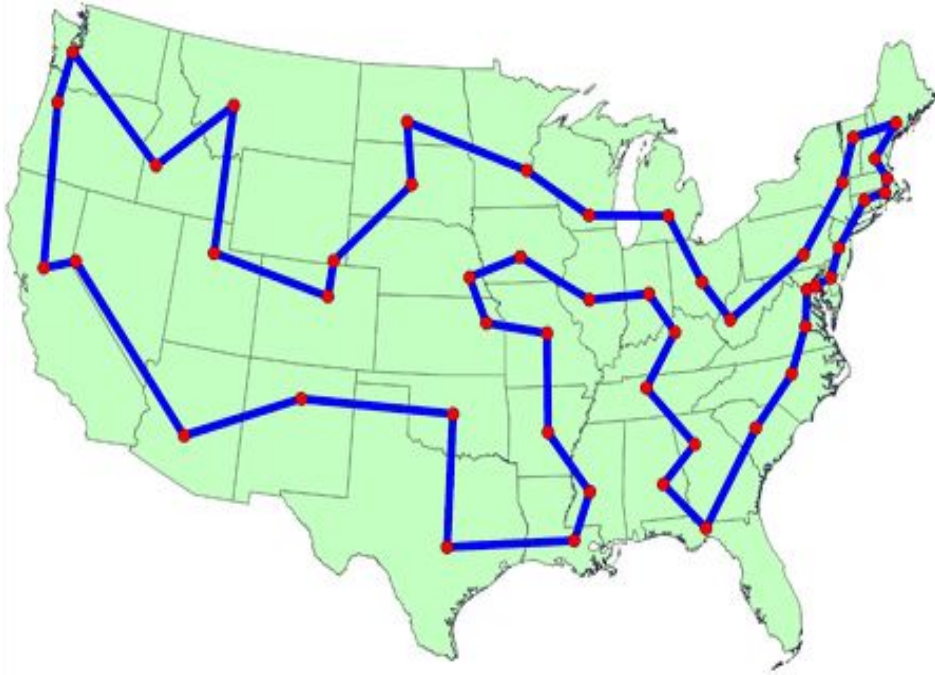
Overview

Call for Action

- E-commerce explosion
- Delivery drawbacks
 - Money
 - Time
 - Environment
- World during COVID-19



Travelling Salesman Problem (TSP)



- Definition
 - Since 1956
 - \$1M From Clay Mathematics Institute
-

Previous Solutions

→ Dynamic Programming

◆ $O(2^N * N^2)$

→ Brute Force

◆ $O(N!)$

Mission

Goal

Transform the world wide delivery
system

From
Human based

Into
Contactless machinery delivery



Constraints

Warehouses

- Several Inventories.
- Each Location is Different

Drones

- Transportation.
- Using Shortest Path.

Product

- Different Types.
- Availability at warehouses.
- Fixed Weight.

Orders

- Customer Specified.
- Includes at Least 1 Product.

Approach

Challenge 0

Dataset

- ❑ Data Wrangling.
- ❑ Extract the data from the compact text file.

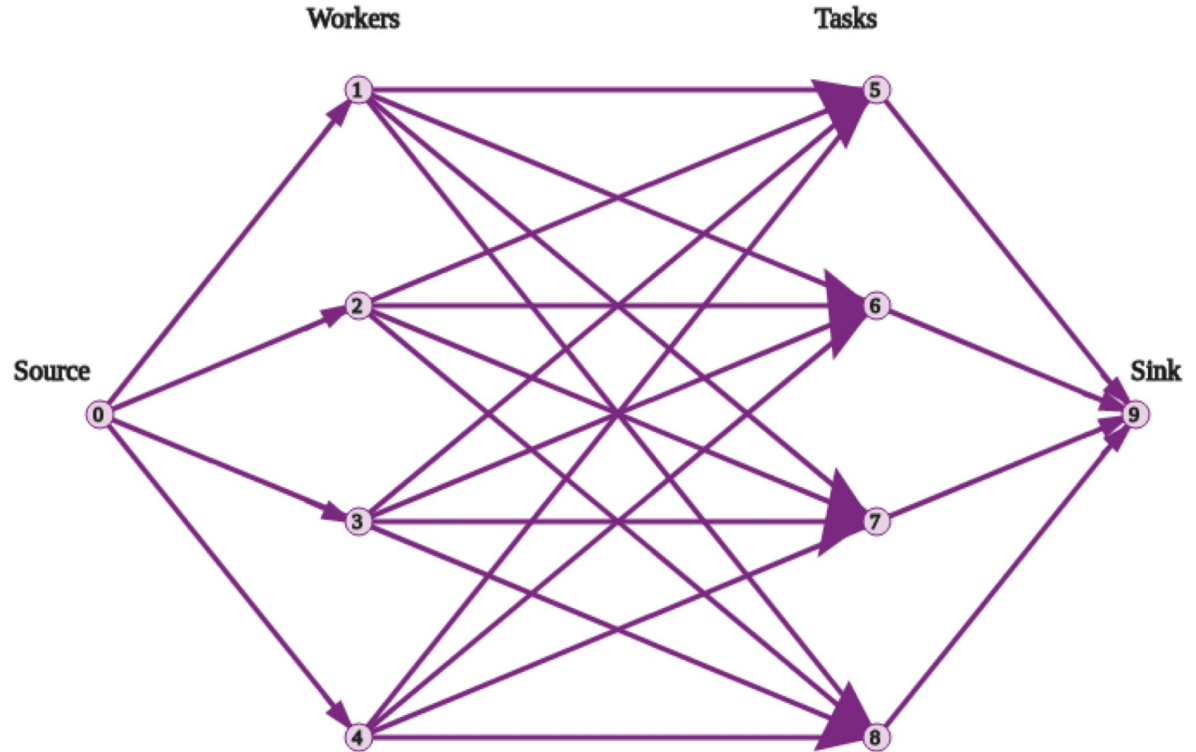


Approach

Challenge 1

Warehouse Assignment

- ❑ Warehouses are assigned to orders.

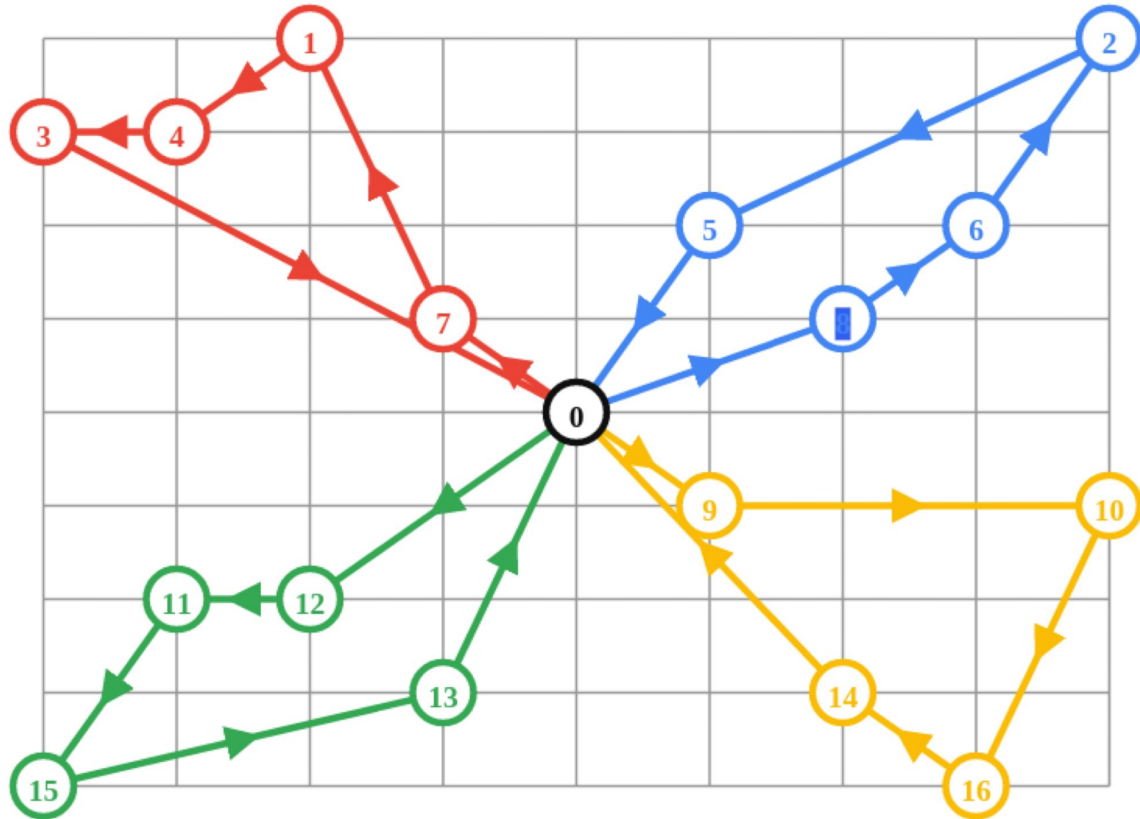


Approach

Challenge 2

Construct Path

- ❑ Determine the sequence of customers.

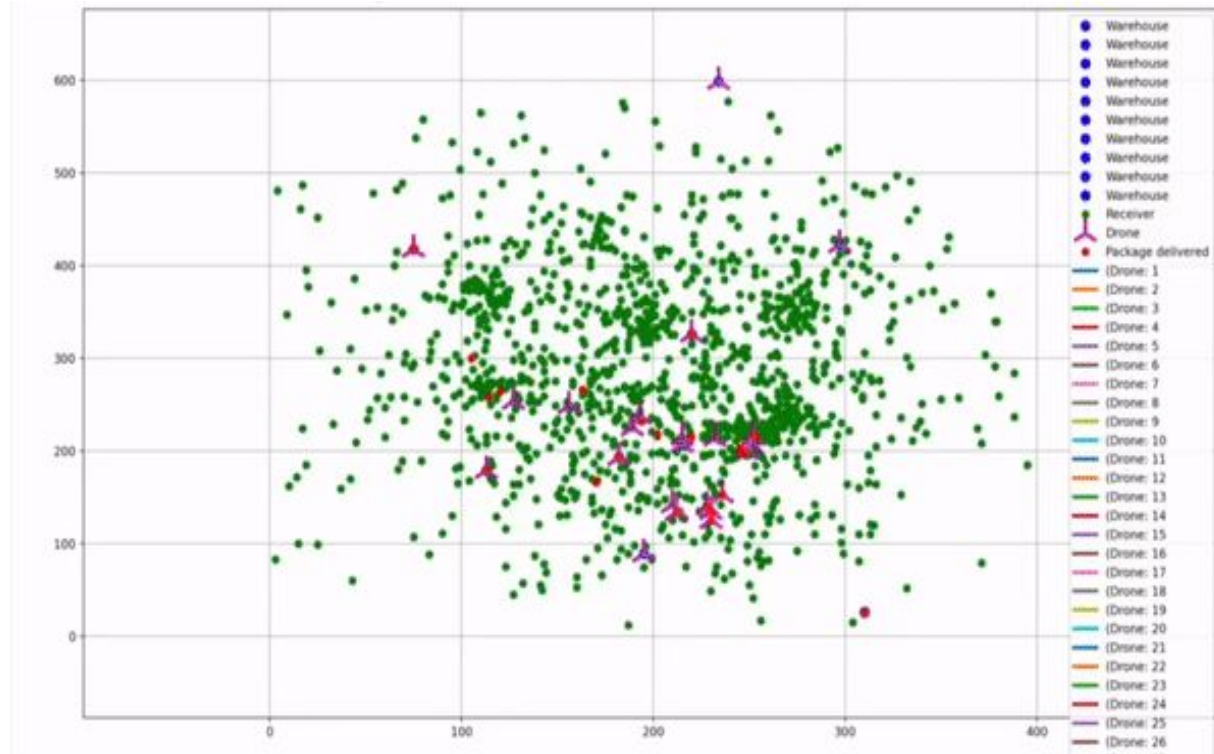


Approach

Challenge 3

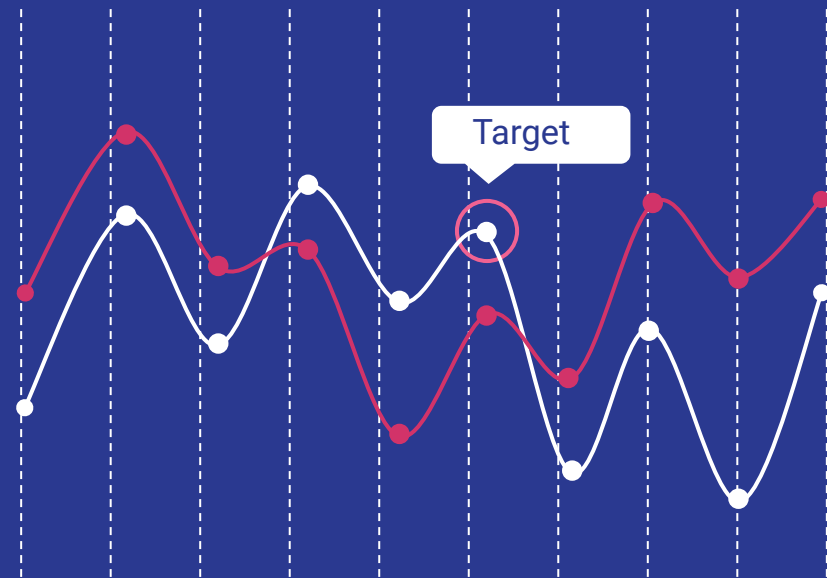
Visualization

- ❑ Using *pyplot* with *PythonQT* to visualize our solution.



Accuracy

- **83%** from optimal output.
- **180sec** Runtime using google notebook.





Conclusion & Future work

Conclusion

Advantages of
“FlyingBox”

- Faster Delivery.
 - Reduced Shipping & Operational Costs.
 - Reduce Return Issues
 - Higher Convenience.
-

Future work

We still need to study this approach to gain more knowledge of its pros and cons and to determine a constraints and improve its accuracy.

Planning to excel in this field to reach a notch in the *market* of delivery and remote shopping, to be the first in the *EMEA* who apply the Sky Express delivery by the fleet of hero drones started from *KafrElSheikh University*.



Thank you

