

Haick24- Fuel Delivery Optimization

Challenge Description:

Overview

This challenge revolves around optimizing fuel delivery to various service stations using a fleet of trucks. The goal is to minimize the total distance traveled, the overall fuel consumption, the total driving time, and the computational time required to determine the optimal routes. The challenge incorporates elements of the **Traveling Salesman Problem (TSP)** and the **Capacitated Vehicle Routing Problem (CVRP)**.

Points of Interest (POI): Service Stations

Each service station is defined by:

ID_POI: Unique identifier for the station

Longitude: Longitude of the station

Latitude: Latitude of the station

Capacity (Litres): Fuel capacity of the station (fixed at 8000 litres)

Authorized Truck Type: Type of truck allowed (small or large)

as follow:

1. POI « **Point Of Interest**»: Service stations

ID_POI	Longitude	Latitude	Authorized Truck Type
1	3.1775	36.69528	small/large
2			

2. Small Trucks

ID_Truck	Quantity	Capacity (Litres)	Consumption (L / 100 Km)
1	07	15000	34
2	03	12000	34

3. Large Trucks (tractors)

ID_Truck	Quantity	Capacity (Litres)	Consumption (L / 100 Km)
1	10	27000	38
2	14	27000	40

4. Starting Point

Kharouba: Coordinates (36.745812, 3.097812)

5. Objectifs and scores:

a. Shortest Total Distance (40 Points):

- Minimize the total distance traveled by all trucks combined.

b. Lowest Overall Fuel Consumption (20 Points):

- Minimize the total amount of fuel consumed by all trucks.

c. Total Optimal Time (20 Points)

- Minimize the total driving Time, such that: Average Speed of Trucks (80km/h).

d. Lowest Computational Time (20 Points)

- Minimize the time taken by the algorithm to compute the optimal routes.

Note global: 100 Points

Notes:

- Consider the fuel tank capacity of all service stations: 8000 litres.
- Consider the speed of all the trucks: 80km/h
- The solution must provide the route (optimal route) for each truck, exp: Start at Kherouba -> Service Station 1 -> Service Station 3 -> Service Station 5 -> Return to Kherouba.
- The return route of all trucks to Kherouba must be taken into account for the calculation of the overall route.
- The distances of the routes between service stations and the starting point Kherouba must be measured OSRM api, use this link format:
<https://router.project-osrm.org/route/v1/driving/{lon1},{lat1};{lon2},{lat2}>

6. dataset

[dataset_sheet](#)

7. submission

Upload your solution notebook in this form (the notebook must include the required results: the optimal path for each truck and the four required scores).

You have only 10 submissions for the entire competition.

[submission form](#)

Happy Coding!!