Institute of Engineering and Technology (IET)

JK Lakshmipat University Jaipur

Design and Analysis of Algorithms

(CS1105)

Transport Route Algorithm

Project Report

Faculty Guides:

Dr. Suman Saha

Team Members:

Keshaw Soni (2020BTechCSE039)

Kondrolla Dinesh Reddy (2020BTechCSE040)

Rahul Jain (2020BTechCSE063)

Somya Gautam (2020BTechCSE076)

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Acknowledgement

It was a great pleasure for us to undertake this project. We feel highly grateful doing the project "Transport Route Algorithm". We would like to express our deepest appreciation to all those who provided us the possibility to complete this project. We express our deep sense of grateful to our project guide Dr. Suman Saha and also our vice chancellor Professor Dheeraj Sanghi, Director IET- Dr. Sanjay Goel. This project would not have completed without their enormous help and worthy experience. Whenever we were in need, they were there behind us. Although this report has been prepared with utmost care and deep routed interest. Even then we accept respondent and imperfection.

Sincerely Yours,

Keshaw Soni (2020BTechCSE039)

Kondrolla Dinesh Reddy (2020BTechCSE040)

Rahul Jain (2020BTechCSE063)

Somya Gautam (2020BTechCSE076)

1. OBJECTIVE

1.1 Problem Statement-

If someone has to Deliver/Exports goods then his main priorities are:

- To use minimum vehicles and export maximum goods.
- To transfer goods with shortest path possible for different places.

1.2 Proposed Solution-

We decided to create an algorithm that will take the weight of the goods to be transported as input and output the minimum number of vehicles required to transport the goods.

Furthermore, by providing the destination, we can easily obtain the shortest route available from the warehouses to that destination, as well as the total travel cost for exporting those goods via that route.

1.3 Project Features-

- Gives minimum number of vehicles.
- Gives shortest route from source to given destination.
- We can also transport goods at some via city on route irrespective of goods which should be transported at final destination.
- Gives total cost of travelling.

1.4 Technology Used-

To make this project, we used **JAVA** language and used **Eclipse IDE** as software to write and run code.

2. Implementation

2.1 Algorithms Used-

To begin, in order to solve the minimum vehicle problem, we created an algorithm based on coin denomination and modified it to meet the needs of our project. When a user enters a weight, the algorithm will automatically divide that weight by the vehicle's capacity, which we have already specified in the code, and output the smallest number of vehicles required to transport the goods. And to find the shortest route for goods transportation, we used Dijkstra's algorithm with a (33x33) adjacency matrix, using all of Rajasthan's districts as nodes/vertices and routes between them as edges.

And we have chosen our sources/warehouses in Jaipur, Udaipur, and Jaisalmer, and when the user enters the destination, it will show the shortest route distance available as well as the via cities that will come in that route. It will also show the cost of travelling on that route.

3. PROJECT SNAPSHOTS

Output Snapshots:

```
..TransportRoute_Algorithm..

Enter the Weight to be Transported :
29000
Enter the Warehouse
1. Jaipur
2. Udaipur
3. Jaisalmer
3
Enter the Destination :
Kota
==================================================XXXXXX==========================================

Source: Jaisalmer
Destination: Kota

Distance (Km): 664.0 Km

Path: -> Jaisalmer -> Jodhpur -> Kota

==================================================XXXXXX==========================================


You will require -> 2 Vehicle of Capacity (Kg) : 15000

Total cost for delivery : 29880 Rs
Do you want to add Via Path (Y/N):
y
Enter the Weight:
1000
Enter your Via Destination:
Jodhpur
==================================================XXXXXX========================================

Source: Jaisalmer
Destination: Jodhpur

Distance (Km): 281.0 Km

Path: -> Jaisalmer -> Jodhpur

==================================================XXXXXX========================================

Weight for via path is less than the empty space in the vehicle, So we can allot.

You need to add your weight in the last Vehicle of Capacity (Kg) : 15000


Drop 1000 weight at Jodhpur and Reach to the Final Destination.


Do you want to Continue (Y/N)n
Exit
```

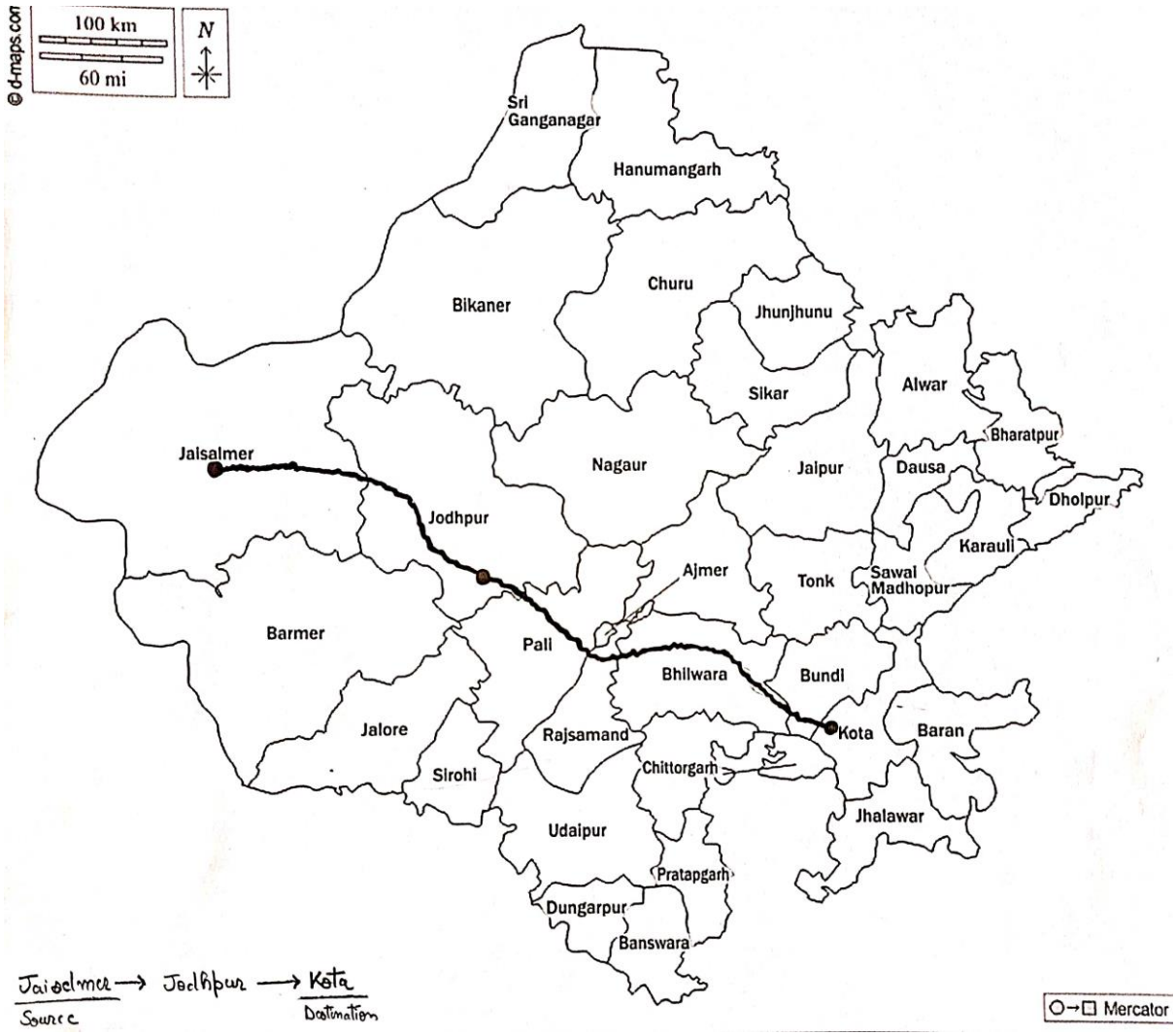

Figure 1 Route View on map

Source: Jaisalmer

Destination: Kota

Route: Jaisalmer→ Jodhpur→ Kota

Distance : 664km

Cost: 29,880Rs

Another Example:

```
..TransportRoute_Algorithm..

Enter the Weight to be Transported :
53000
Enter the Warehouse
1. Jaipur
2. Udaipur
3. Jaisalmer
2
Enter the Destination :
SriGanganagar
=================================================XXXXXX=============================================

Source: Udaipur
Destination: SriGanganagar

Distance (Km): 722.0 Km

Path: -> Udaipur -> Rajsamand -> Nagaur -> Bikaner -> SriGanganagar

=================================================XXXXXX=============================================
```

```
You will require -> 3 Vehicle of Capacity (Kg) : 15000

You will require -> 1 Vehicle of Capacity (Kg) : 7000

You will require -> 1 Vehicle of Capacity (Kg) : 1000


Total cost for delivery : 56558 Rs
We can't add weight to via path.
```

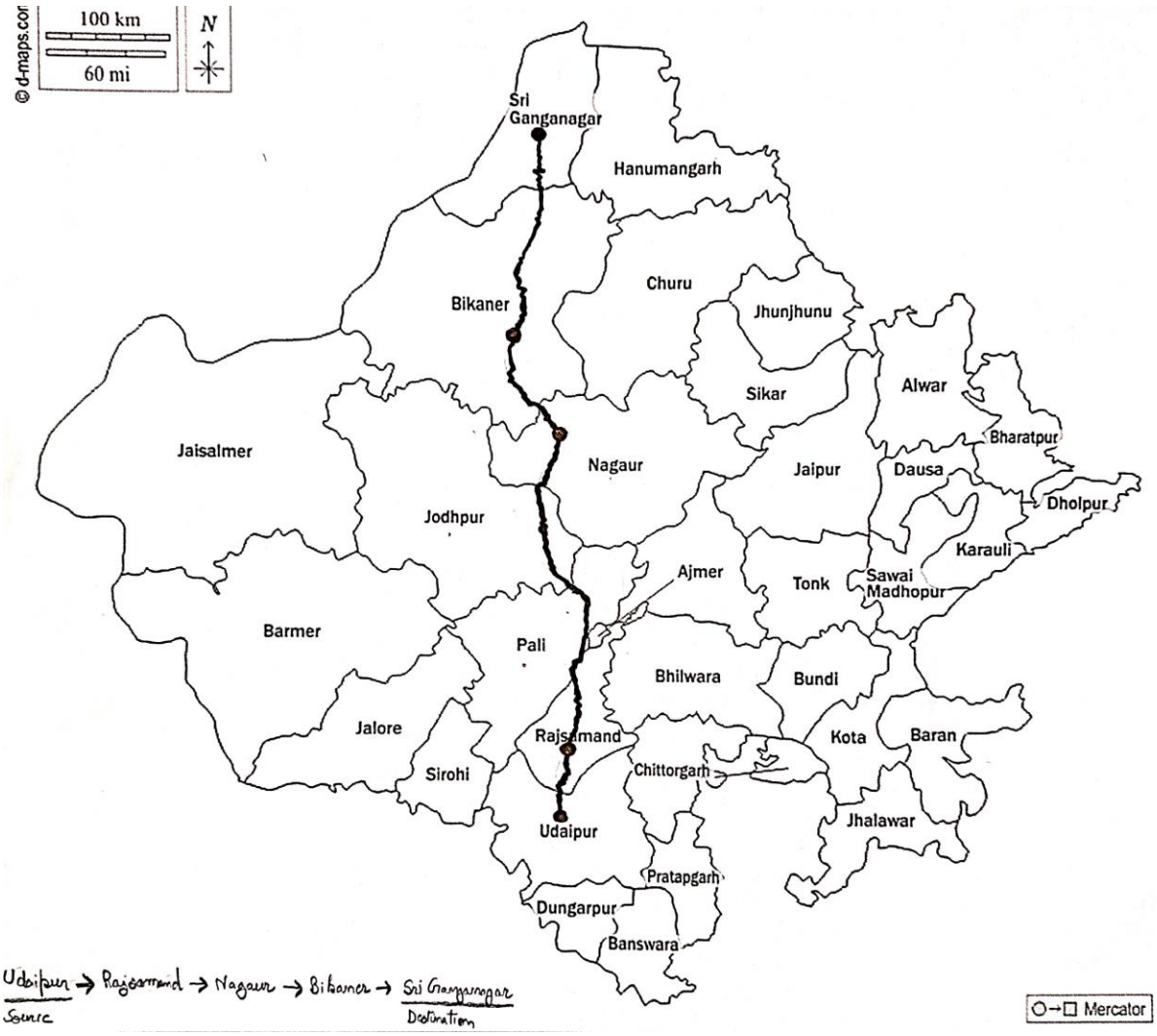

Figure 2 Route View on map

Source: Udaipur

Destination: Sri Ganganagar

Route: Udaipur→ Rajsamand→ Nagaur→ Bikaner→ Sri Ganganagar

Distance : 722km

Cost: 56558Rs

4. Future Scope

- We can add multiple source to multiple destination feature, in which it will compare the source and destination and will gives routes that will be close to each other.
- We can add more states to make it more realistic and real-life project.
- We can add more vehicle-capacity in future.

5. PROJECT GITHUB REPO

• GitHub Repository for Our Project:

Keshaw08/TransportRoute_Algorithm: Best Route Transportation with the Minimum Vehicles. (github.com)