Mobile and Pervasive Computing (CSN - 521)

Submission for CP-1

Topic:

Daily Route Planner

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Given Problem statement

Many people own small business, where they drive care from one point to many. For driver of any kind where they are about to deliver any parcels or to use a particular direction, they can use this daily route planner where they can base their decision on what they should follow. This makes road trip easier and faster. This route optimization application will navigate your entire route in stop by stop sequence, from start to end. With this route optimizer application, travelling time can be saved and many places can be visited on the planned day. This android application can plan route for a road trip including all stops and make trip easier and smoother. It can help with the roundtrips which will last more than a day. Also, it will help any person to analyze in decision making with how many places he/she can visit in total with multiple stops within a time frame. Routes are optimized to its best using various TSP Algorithms.

Modules and APIs Used

APIs Used: Google Maps API.

How to get Api key for your project?

To get an API key:

1. Visit the Google Cloud Platform Console.
2. Click the project drop-down and select or create the project for which you want to add an API key.
3. Click the menu button and select APIs & Services > Credentials.
4. On the Credentials page, click Create credentials > API key.
   The API key created dialog displays your newly created API key.
5. Click Close.
   The new API key is listed on the Credentials page under API keys

After getting the API key paste it in the google_maps_api.xml .

Modules Used:
The following are the modules designed:

1) MapsActivity.Java
2) activity_maps.xml
3) Dispaly.Java
4) activity_display.xml

MapsActivity.Java module is the main activity class of the project. OnMapReady() function is present in this class. Also this module uses Google APIs to calculate the distance between the destinations and then we stored them in a Arraylist.Then using the Naive solution for Travelling Salesperson problem we calculated the optimised route.

The activity_maps.xml contains the design part of the user interface for selecting the destinations.

Display.java is used to display the optimised route and data is taken from the MapsActivity.Java for showing the final result.

The activity_display.xml contains the design part of displaying the final result.

Description of working of the Project

The following is the approach we used in making this project:

1. First we install JDK and add the path, then download and install Android Studio and related SDKs.
2. We used Google Maps API in the android studio project as a primary step of our project.
3. We designed the code for adding markers on the Google Maps to mark the location on the map for further processing.
4. Then, we designed the code of how to calculate the distance between the destinations on the map and then stored the distances in an Arraylist.
5. The method we used for route planning is Travelling Salesperson Naive solution.

Explanation of Travelling Salesperson problem using Naive Solution **:**

1) Consider city 1 as the starting and ending point.

2) Generate all (n-1)! permutations of cities.

3) Calculate cost of every permutation and keep track of minimum cost permutation.

4) Return the permutation with minimum cost.

Time Complexity: Θ

Screenshots of working of Application

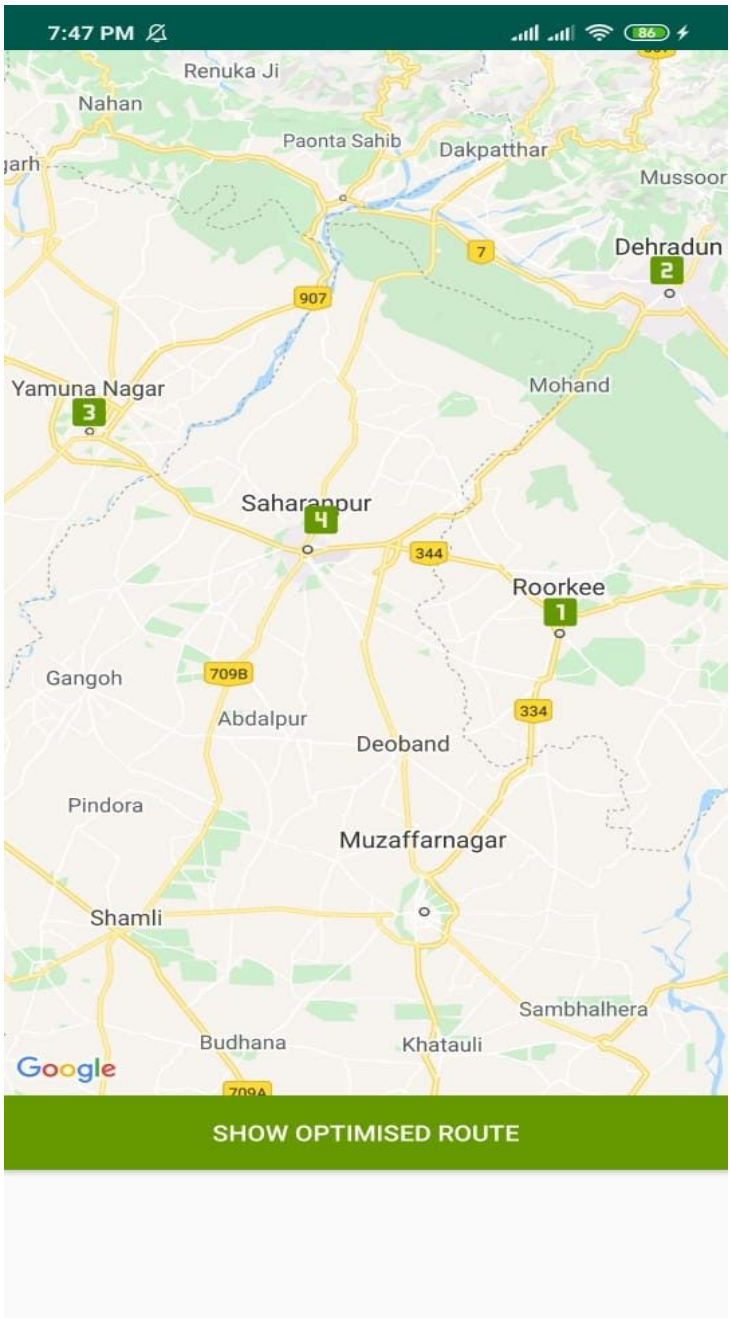

Figure 1. Location Set By User

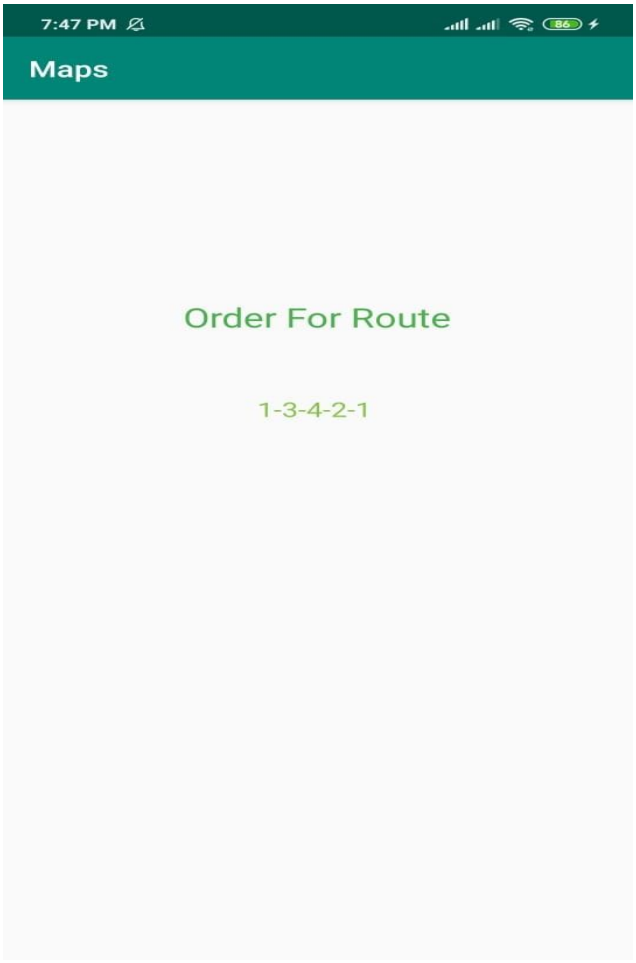

Figure 2. Optimised Route shown by the application covering the shortest path

Future Scope

In this Application we implemented the idea of optimised route for multiple destinations,But for further development part we can also use Google Places API to make enter the user location with names and We can use the Google Direction API for showing the actual route on the map to the user

Youtube Video Link: https://youtu.be/Ib-ZlIXfRzo

References

1. https://www.youtube.com/watch?v=jg1urt3FGCY&t=160s
2. https://www.youtube.com/watch?v=eiexkzCI8m8
3. https://www.geeksforgeeks.org/travelling-salesman-problem-set-1/