

The Navigators Team

Overview

The Mini GPS Application is developed for use and helps in the application of efficient navigation within a network of cities. The application will, therefore, be used to simulate the functionalities of a standard GPS system, basically meant for educational and development purposes, whereby it provides an interactive place for users to experience, learn, and explore route planning and optimization in a controlled environment.

Problem Statement

Effective means of travel from one place to another place can be a challenging decision in personal and commercial contexts. Whether it be the consideration of time, the number of paths that you should choose from, or even just the issue of being lost in the middle of the road. All of this requires an application that allows the user to find an efficient way between the cities and helps find the shortest path between any two linked points.

Our Mini GPS Application seeks to address these issues through the use of OOP programming concepts, the implementation of data structures such as graphs and vectors, and the implementation of Dijkstra's algorithm to allow the calculation of the shortest possible paths within a network of interconnected cities on a map input by the user..

Functionalities Provided by the Application

The Mini GPS Application is an application designed as a strong set of navigational tools that provide the following features:

Graph Management: The edges represent the roads connecting those cities, and the lengths of the roads are the attributes assigned to the edges.

Display Graph Data: The textual or visual presentation of the whole graph to have all the cities and the connections of each city visible to the user.

Update Graph Data: The system allows users to update a graph by adding or removing cities and routes, hence allowing updates dynamically in the network.

Save and Load Graph Data: The graph data should be saved and loaded from the external file to keep the data intact for future purposes.

Routing and Navigation: Users will be allowed to add more cities and add or delete the direct routes between the two cities and the distance between them to the graph.

Delete City: Cities will be deleted from the graph along with the routes of the city to be deleted. It will not affect the networking structure.

Short Shortest Path: Dijkstra's algorithm is used to find the shortest path between any of the two selected cities in order to plan a route optimally.

Display The shortest path: The program displays the shortest path and distance between two cities on the map

Strengths of our implementation:

Customizability: The program gives users the ability to fully customize the graph in a way that allows the creation of a complete virtual GPS map

Real-Time Updates: The program continuously updates the graph data from the user inputs

Usability: The program has been designed with a user interface that provides the user with a suitable GUI which allows them to fully use its function simulating a real GPS application concept.