CS 243 Software Engineering Lab

Assignment 1

Group 2

Title: Campus Tour

Using campus map image, display info about different places in the campus when clicked.

Platform: Visual Studio 2013 Professional

Language: Visual C++

Description (including major functionality):

- Campus tour means to help the users of the application to see the entire IIT-G campus as a map.
- On this map you can see different places in the campus like hostels, SAC, Academic complex etc. These are shown as objects on the map. When you click on these objects, you get detail about the place like what facilities are available, rating, news feed, review, coordinates, images and basic info.
- Not only this, you can also look for different routes available between different places that you will need to specify as starting point and destination. The path of shortest distance will be preferred over other routes. Also you can see the distance between the two places you have specified along with the estimated time taken by different ways of conveyance.
- For those who are not so familiar with the campus, there is a drop down menu where one can see all the important places of IIT-G and see their location on the map along with other info specified above.
- Also if you don't need to specify the place. Any keyword related to the place would work. Example if you search for food you will get the all the messes and canteen highlighted on the map.
- You can also zoom in and zoom out of the map to see the map the way you like.

Target User Group:

This app is a must use for all the people visiting the campus for conferences, fests like Alcheringa and all those who are new to the campus. These include visiting professors, fresher's etc. Apart from these, all the students and professors staying in the campus should try the app.

Modules

1. ### Data Structures

   This module handles the structure of the map that will be used for implementation of all the features and algorithms on the map.

   #### 1.1 Graph Data Structure

   - This is a **weighted graph data structure** implemented using an **adjacency list**.
   - This is the primary data structure of the map that contains all the nodes in the map that will be used for perform distance searches (this includes various diversions as well).
   - Since the nodes are used for distance calculations, this data structure contains nodes that are representative nodes of the actual points on the map.
   - These nodes are represented on various roads and other places accessible places.
   - Each node also stores the coordinates for representation on the map.

   #### 1.2 Perfect k-ary tree

   - This is a two level tree data structure with maximum number of k nodes at the leaf level.
   - The nodes in the leaf level of this data structure contains the places to be represented on map.
   - Level 1 of this tree contains the grouping of various places on the map.

- This grouping is done to perform advanced search feature. Each group is linked to a certain array of key words to perform the search feature. Example the group of eating joints will contain keywords like “Food”, “eat”, “eating joints”, ”drink” etc.
- The leaf nodes will also be linked to a database that will contain all the satellite data associated with the node to be shown on the map.
- This data contains rating, news feed, review, coordinates, images and basic info.

2. Features and algorithms

This module deals with various algorithms used for distance searches and keyword search and the implementation of various other features in the app.

2.1 Algorithms

- Best first search algorithm will be used for distance search between two given nodes on the graph. The algorithm works similar to depth first search however the next level is selected greedily from the sorted array according to their weights.
- Linear search will be used for searching various key words and places in the map.

2.2 Features

- Including multiple pictures, a textual description, co-ordinates and reviews of various places on the map.
- Providing the user with a list of important places in form of a series of drop-down menus.
- Displaying the distance between two places, along with showing the shortest path between the two.

- Advanced search with auto complete feature, search will recognize commonly used keywords like food, hostels, libraries etc.
- Zoom in and zoom out of the map(this is a tentative module, will be implemented if feasible)

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