ID 2216 - Developing Mobile Applications

Assignment – 4 (Web Services)

Project Report – Traveling Salesman Application

Group 6: **The Super Group**

Application Name: **UTurn**

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Introduction

In this report, we explain the web services we have used in developing our Android application along with the subsequent testing and feedback from the real users.

Application Requirements

Our application is map data-centric and uses locations as inputs and gives an efficient and optimized route as output. We therefore to are required to use those services that provide us with data about places and distances handling location and navigation. Our application also requires to store good amount of user data such as login and profile information and data about the saved trips permanently for it to be fetched and used at a later point of time.

Web Services – which services and how they are used

We found that the best choice for this was Google's Maps and related API. It uses HTTPS for communication to specific URLs and both HTTP requests and responses are formatted as JSON objects. The HTTP requests are directed at specific URL with parameters as arguments. So for every location that the user inputs, we add it in the request object. A typical web service request is commonly of the following form:
https://maps.googleapis.com/maps/api/*service/output?parameters*

Our application mash-up framework could be represented as below.

Components	Application-specific Elements
Type	Consumer
Service Provider	Google Maps API, Directions API, Distance Matrix API and Google Places API
Protocol	REST as HTTPs
Data Format	JSON (Data from Google APIs)
Architecture	Mobile
Interface	Multi-pages touch Interface

Google Maps Direction API – It provides the waypoints and the travel time between different locations. It is used to fetch the time data for our efficient route tracing algorithm.

Google Distance Matrix API – It provides the distance between the various locations, traffic patterns and stuff and is extensively used in our application.

Google Places API – It provides with Place Search – list of places based on user's location or a search string and Place Details – detailed description about the place including the user review.

Each of these APIs are used in ***HomeScreen*** and ***MapScreen*** of our application and provides the data in the ***JSON*** form which we parse to get the necessary data. We shall then use this data to create a matrix of the distance and time it takes from one node to another and use it as inputs to our application's internal algorithm that calculates best and efficient route.

Moreover, we uses ***SQLite*** – A lightweight file database based a query language for storing the ***login and profile information*** of the users. We also store in the database the ***past trips history*** which the user wishes to save when he is in the MapScreen using the Save button. ***Reason for saving the trips history*** is purely to comfort the user with an option to share their trip plan with their friends. This feature received well by out real users as observed during our testing. We have two tables by name ACCOUNT_INFORMATION and TRIPS_HISTORY that serves the aforementioned purposes.

We also have a ***shared preferences*** file by name APP_PREFERENCES that stores the data in PRIVATE mode. It stores the user's account mail ID for AUTO_Logon purpose and also some of the application specific settings. The following screenshots helps in identifying the usage of the above mentioned services and storages.

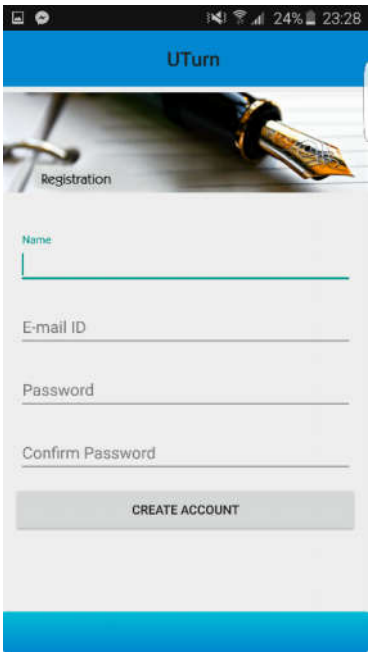

Figure 1: User Account stored in DB

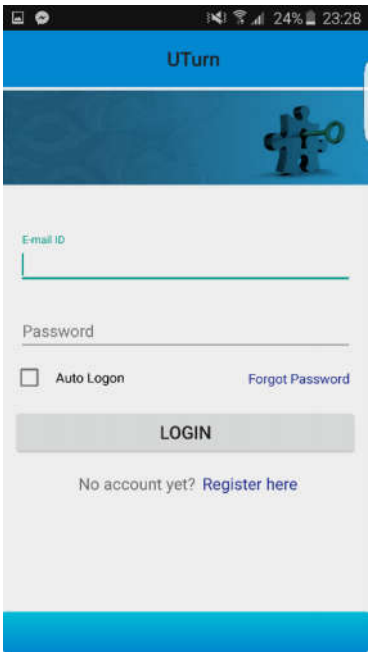

Figure 2: Auto Logon option reads data from Shared Preference file and then from DB

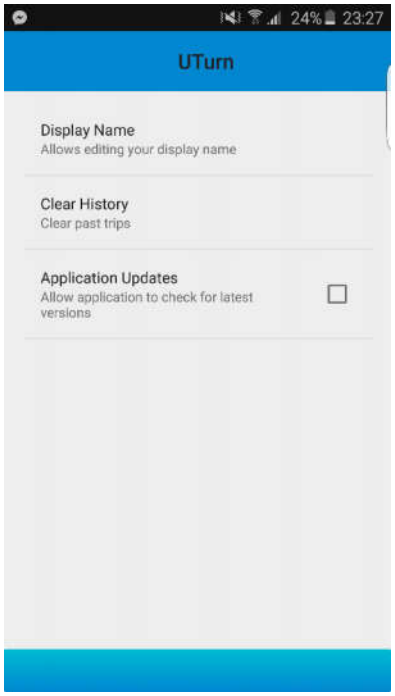

Figure 3: Shared Preference file (Other Contents)

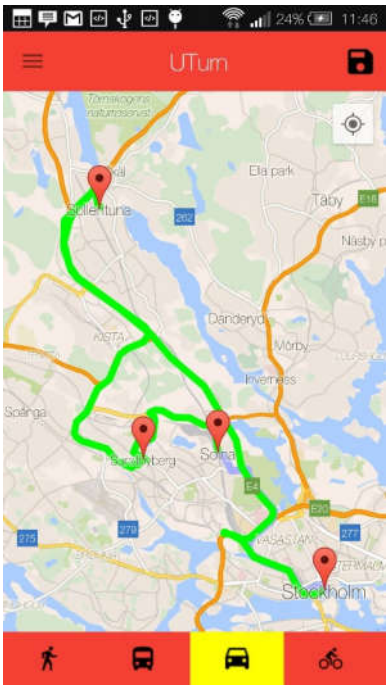

Figure 4: Map Screen showing a sample route

Testing and Observations

Our test group consisted of five people who were familiar with our application from previous testing sessions we had with them. This time the focus was laid more on the newer services (web services), therefore our questions were mainly focused around how they found our application and is there anything that could be possibly be improved. Was it easy to understand? Did it seem familiar in a sense to how other applications use this feature? Thanks to our users for their invaluable feedback, time and cooperation. Following is a collective summary of feedback and responses.

- The use of maps is similar to other's that I know
- It looks good that it gives a short route.
- It is a nice feature with the street view.
- Save trips option is good so that I can share my trip plan with my friend or show to them instead of explaining.
- It would be better to change this Red color. Don't you think? ☹
- Nice to have integration with restaurants and motels finder.

Conclusion

It is very convenient to use already well known web services because they present you with a feature that is well known for the users and data is more reliable (of course it is – Google). It is also easy to understand and use it for the developer. It was a great learning of these concepts and was fun. We would like to incorporate few more suitable functionalities and make the app more useful and take it closer to the real world.