

# Smart City Traveller

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**Abstract**— Medieval methods for planning a trip involve estimation of time for visiting places, selecting places of interest and evaluating convenient routes, all within a stipulated time frame. The objective of this paper was to propose an android application that automatically determines a travel route and a plan for the user. The highlight of this application is that it takes into consideration a time constraint defined by the user. The proposed system helps simplify decision making with respect to the places to visit. Optimized Google Map Layout displays routes determined for the traveller. A user-friendly questionnaire smartly analyses user's preferences by using Relational Queries. The system considers GPS data in real time and calculates the distance based on the latitude and longitude of the places, from the user's current location. Firebase handles real time database which is required by our system to store the current location of the user, also it can be used for storing and analysing the relational database which is an important aspect. One of the parameters for selecting locations depends on its shortest distance from the user's current location. This is implemented using the Shortest Path Algorithms. With the assistance of the Distance Matrix API, the distance and time required to reach a location can be calculated.

**Keywords**— Travel route, time constraint, Google Maps layout, Questionnaire, Firebase, Shortest Path Algorithms, Distance Matrix API.

## I. INTRODUCTION

Today, mobile applications play a very crucial role in every business domain as well as in real life. Public utilization of mobile applications for multipurpose has now become a major part of the E-business industry. Travel and tourism industry is no such exception since a huge part of its success relies on these applications. Quite simply, if mobile technology's impact on general society over the last decade has been extensive, its impression on the tourism sector has been gargantuan, is no longer a leap into the unknown. The smartphone and the capabilities it gives by its very nature, tourism is an "on-the-go" experience, and therefore mobile technology is suited as the perfect travel partner. No traveller wants to feel like a nomad while travelling. Mobile and digital technology have ensured that travelling tourists at their fingertips has empowered tourists with a sense of freedom, flexibility and choice than ever before. Somehow it is important for a mobile application to have a proper and well defined platform. Developers can get help from the Android developer community for the forthcoming versions which they can incorporate into their app development projects. Android is an operating system for smartphones which is developed by Google. Android is based on linux operating system and it is used in touch screen smartphones. The real challenge for businesses today is to create, market, and sustain a mobile application in this ever-growing ocean of applications — and ensure that the differentiators are not only regarding of "what" the application has to offer, but also "how" it delivers complete user satisfaction. A good interface design intends to guide users through their journey on an application. One of the most stressing parts about joining an application is to provide detailed information on a Log-in form, just to have complete access. On one hand where log-in forms are essential for application owners, they can also be cumbersome and often take people off of an application. This is because they lookout for other easier log-in options on similar kind of applications where it is not always a hassle to log in to an application to use it. Our objective was to keep it simple, so as to give the user the benefit of a hassle free login. We understand the importance of the user's time, energy and patience.

A clear, clutter-free and spaced out page is important to keep the user oriented and interested. The days of paper maps, guidebooks, booklets have been replaced by interactive and amazing mobile applications for travel and tourism industry that come along with various functionalities. <sup>[3]</sup> The proposed system is bent on helping tourists who have a desire to visit and explore a city within a stipulated amount of time. Every tourist has a list of likes and dislikes. Some tourists might be interested in visiting heritage sites to understand the cultural diversity, whereas some of them would prefer knowing more about the natural biodiversity, so parks, zoos and gardens. With a lot of options in hand, it becomes time consuming for the tourist to analyse the options against his/her likes and dislikes. That's where our application helps simplify decision making.

A user that intends to use the application is expected to go through a simple login procedure. It is followed by a questionnaire which helps us in compartmentalizing the user's preferences. It is a list of simple questions that ask the user, how they feel about visiting museums, parks, beaches, etc. While preparing a schedule for the user, the application takes into account the time constraint provided by the user. <sup>[1]</sup> The application automatically stores the current location of the user. Based on these two parameters, the system smartly analyses through the user's preferences and prepares a schedule which consists of the user's places of interest, located within proximity of the user's current location. It is important that the locations selected by the schedule remain in close proximity due to the time constraint. The system considers GPS data in real time and calculates the distance based on the latitude and longitude of the places which has been predefined in the database from the user's current location. To calculate the shortest distance, we make use of shortest path algorithms to determine the route. <sup>[4]</sup> The system makes use of the Google Maps API to get all the places around the selected location. Then, these locations are sorted based on time, distance, and various other constraints to place it before the user. <sup>[2]</sup>

## II. METHODOLOGY

For the proposed system, the entire application is developed on android. Android is widely used in touch screen based smartphones. Android has very large communities that extend its features and create apps that cover almost all aspects. The app will be divided into 3 sections. The first section is for the user login and registration. The second section will provide the list of questionnaire that is required for the system. The third section shows the map of the city which will show the shortest route. This section will also provide other features like information about the tourist places around the city, availability of public transport etc. <sup>[6]</sup> Google Maps API allows maps to be added based on Google Maps data to an application. Google Maps API itself, handles access to Google Maps servers, data downloading, map display, and response to map gestures. API calls can be used to alter the user's view of a particular map area. <sup>[7]</sup> These objects provide additional information about map locations and improve user interaction with the map.

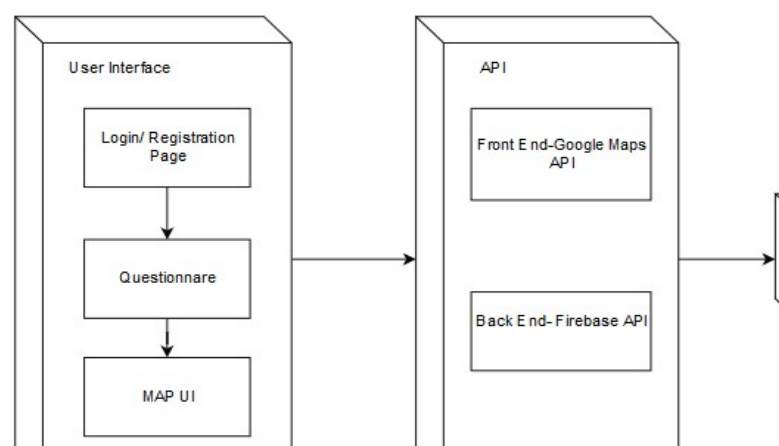


Fig 1:Block Diagram

The entire registration process is on the first page of the UI. The UI also provides the list of questionnaire which is required by the system. The output generated by the system i.e. the route generated is displayed on the map. The processing of data and implementation of algorithms is carried out by API. The front end API is responsible for making an interactive UI and acts as a platform to execute the algorithms. The back end API is responsible for managing the database.

### III. IMPLEMENTATION

#### A. Android Studio

Android Studio is a software for android application development. It provides all the API required to create and application. It is a Gradle-based build Support which easily supports features of performance, compatibility and usability. Android Studio brings incremental changes to an existing app code or resource is now easier and faster. It accommodates a built-in Google Cloud Platform and an Android Emulator to debug and run developing apps in Android Studio. [8]

#### B. Google Maps API

Google Maps API automatically handles the access to Google Map Servers. It allows maps data to be added to the application. It can be used to add route designs, custom icons and markers to a basic map and change the perspective of a particular map area. User Interactions can be easily made efficient with the help of the API. The Google API allows users to build location based applications for their business purposes.

#### C. Firebase

Firebase is a platform for developing web and other mobile applications. It provides a precise real-time database. The Firebase API allows to store in the data in the Firebase cloud and provides backend services. It features a NoSql format, that indicates it do not require tables or queries and therefore providing an additional advantage over any other traditional relational database. All clients connected with the real-time database will be immediately updated. [5]

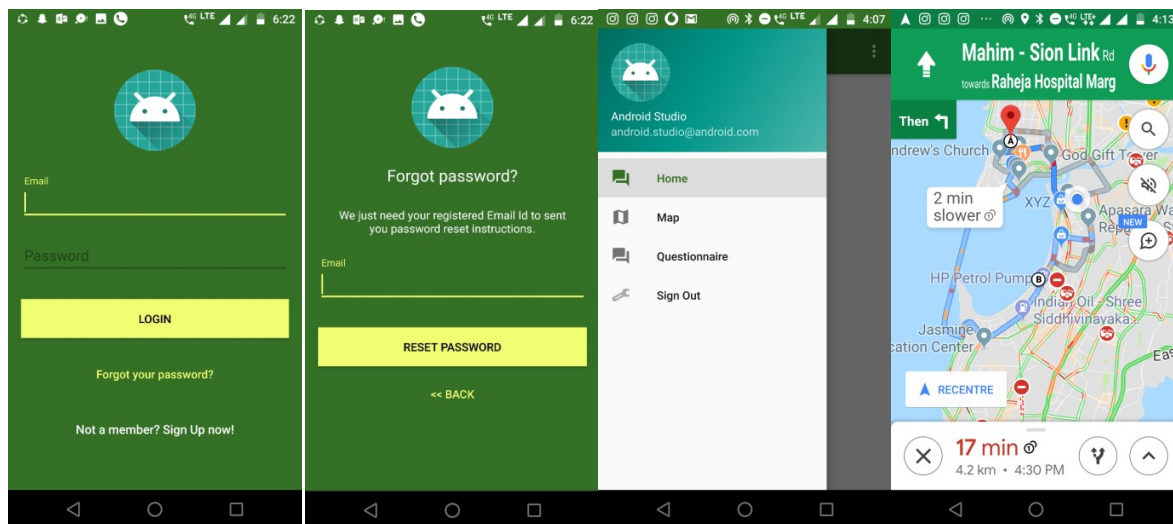


Fig2:Application UI

#### IV. CONCLUSION

Humans have been traveling from long time for a variety of reasons. Traveling not only takes us to distant places, countries but also acquaints us with different people, but it also tends to break the monotony of our lives. Since modern times, travelling has become more of an urban necessity. Primitive methods of planning trips involve searching for popular spots, figuring out routes by referring to maps, fixing the number of places one can visit in a duration, etc. The days of paper maps, guidebooks, booklets have been replaced by interactive and amazing mobile applications for travel and tourism industry that come along with various functionalities. The accelerating interaction between technology and tourism has changed radically the efficiency and effectiveness of tourist guidance systems. Mobile applications and the capabilities it gives tourists at their fingertips has empowered tourists with a sense of freedom, flexibility and choice than ever before. An application like Smart City Traveller saves the user's precious time and leads to quicker decision making. A simple user- friendly, jargon free interface ensures that users of all types can easily interact with the application. Furthermore, it deals with taking care of tour and travel management. Smart city travel shapes up the future with socially integrated experiences with convenient localization techniques. As a consumer, a marketplace application that fulfils the need of ease -of-use and broad functionality. It is an initiative to abolish primitive ways of planning and scheduling trips and also to help users to utilize their time to enjoy to the fullest.

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