Android Smart City Traveller for the Fullfillment of Master of Applications

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Abstract:- The Smart City Traveller is an Android application designed to create a personalized schedule for a traveller based on their interests and time. The system fetches the user's location using GPS and utilizes the Foursquare API to get information about the available locations and their rankings. The application then sorts and selects places based on rankings and creates a shortest route for the traveller. This paper describes the design and implementation of the Smart City Traveller application, including location detection, interests' selection, venue recommendation, and map view. The paper also outlines the methodology used in the development of the application, including the Control-Model-View (CMV) metaphor for software design. The application's user requirements are discussed, and user testing and evaluation are presented. Finally, future work and conclusions are discussed.

Keywords:- *Smart City App, Traveller Application, Android Application, Google map API, Foursquare API, Preferences, Shortest Routes*

I. INTRODUCTION

The Smart City Traveller is an Android application that is designed to assist tourists in creating personalized travel itineraries. The application allows travellers to specify their interests and types of places they want to visit, and then the system analyses their answers and creates a schedule based on their provided time. The application then displays the shortest route to reach all the places from one to another.

The Smart City Traveller application is an essential tool for anyone who wants to explore a city within a given time period and based on their interests. The system fetches the user's current location using GPS and then uses the Foursquare API to get information about the available locations and their rankings. The application then sorts and selects the best places based on their rankings and provides the shortest route to the user, saving them time.

II. LITERATURE REVIEW

Android is a widely used mobile operating system that provides a range of functionalities to its users. In this literature review, we will explore some of the key functionalities of Android that make it a popular choice among users and developers alike.

A. Overview of Travelers in Smart Cities

In recent years, the concept of smart cities has gained significant attention worldwide. A smart city leverages advanced technologies and data-driven solutions to improve the quality of life for its residents and visitors. Travelers play a vital role in the smart city ecosystem, as they contribute to the economic growth and cultural exchange of the city. With the increasing popularity of travel and the rise in smartphone usage, there is a growing demand for mobile applications that cater to the needs of travellers in smart cities.

B. Travellers' Requirements in Smart City Travel Apps

Travelers in smart cities have specific requirements and expectations from travel applications. These requirements go beyond general information and include features that enhance their travel experience. One of the primary challenges faced by travellers is navigating an unfamiliar city and finding efficient transportation routes. They also seek information about local attractions, events, dining options, and cultural experiences. Additionally, travellers are interested in personalized recommendations and suggestions based on their preferences and interests. Meeting these requirements can greatly enhance the usability and effectiveness of a smart city travel app.

C. Android Platform for Smart City Travel Apps

The Android platform has emerged as a dominant player in the mobile app market due to its widespread adoption and open-source nature. Android devices offer a range of features, including high-performance capabilities, extensive customization options, and a large user base. These factors make Android an ideal platform for developing smart city travel applications. Android apps can leverage the platform's advanced functionalities, such as GPS, location services, and real-time data integration, to provide seamless and personalized travel experiences to users.

D. Introduction to the Proposed Smart City Traveller Android Application

In line with the requirements of travellers in smart cities, the proposed smart city traveller Android application aims to provide a comprehensive and user-friendly solution for travellers visiting cityPlaces, one of the most attractive and tourist-friendly cities in Uttarakhand. The application will leverage the power of the Android platform to offer a range of features and services that cater to the needs of travellers.

E. Working of application

The user is asked some questions helping the system to filter out in searching the places, the places are displayed on a map giving a clear idea of the location and giving the paths from one place to another from the start location to the end location. The system also asks the user whether he/she wants to visit an adventure or water park or a temple or want to have coffee and will show the options based on the rankings and reviews about the place. Since the traveller may be new to the city not knowing any place, in the map view if the user clicks on the marker, he/she can see the ratings and reviews which are recorded from the Foursquare itself. The best thing is that the system will also forward a mail to the user containing information about his/her plan. The System requires a working internet connection all the time for the application to work.

F. How Location Detection works in android

Android Studio provides several ways to detect a device's location, including GPS, Network Location Provider, and Fused Location Provider.

- GPS: Android devices have a built-in GPS chip that can be used to determine a device's location. The GPS system works by using a network of satellites to triangulate a device's location.
- Network Location Provider: Android devices can also use network-based location detection, which uses information from cell towers and Wi-Fi access points to determine a device's location. This method is not as accurate as GPS, but it can provide a rough estimate of a device's location.
- Fused Location Provider: The Fused Location Provider is a combination of the GPS and Network Location Provider methods. It provides the best possible location accuracy by using both GPS and network-based location detection methods.

G. Controlled Model View

The Control-Model-View (CMV) metaphor is used for software design in the Smart City Traveller application. The Control represents the "user" input and timed events within the software game. In Android programming, the Control is the "Main Activity" that first opens on execution of the program. Model represents the data structure of the objects and the functions that govern the flow of logic and action in an application. The View retrieves positions, orientation, data, and graphics from the Model and draws them on the screen.

H. Map View

When the user has selected the venue, all the venue locations, along with the current location are shown on the map. For this, GoogleMaps. Direction API is used. The API returns the most efficient routes when calculating directions. Travel time is the primary factor optimized, but the API may also take into account other factors such as distance, number of turns and many more when deciding which route is the most efficient.

- Places are defined within this API as establishments, geographic locations, or prominent points of interest. The following place requests are available:
- Place Search returns a list of places based on a user's location or search string.
- Place Details returns more detailed information about a specific place, including user reviews.
- Place Photos provides access to the millions of place-related photos stored in Google's Place database.
- Place Autocomplete automatically fills in the name and/or address of a place as users' type.

I. API Uses

API level is an integer value that uniquely identifies the framework API revision offered by a version of the Android platform. The Android platform provides a framework API that applications can use to interact with the underlying Android system. The framework API consists of: A core set of packages and classes.

J. Foursquare API

Foursquare API is a location data provider that allows developers to access information about millions of venues and points of interest worldwide. It provides a comprehensive database of places, including details such as venue name, location, category, ratings, reviews, photos, and more.

In Android, developers can use Foursquare API to integrate location-based features in their applications. For example, they can use the API to search for nearby venues based on a user's location, display venue details, and enable users to check in or leave tips and reviews. The Foursquare API provides various endpoints and parameters to customize the search and retrieve venue information.

K. Google Maps API

The Google Maps API is one of those clever bits of Google technology that helps you take the power of Google Maps and put it directly on your own site. It lets you add relevant content that is useful to your visitors and customise the look and feel of the map to fit with the style of the site.The API automatically handles access to Google Maps servers, data downloading, map display, and response to map gestures.

L. Geocoding API

Geocoding is the process of converting addresses (like a street address) into geographic coordinates (like latitude and longitude), which you can use to place markers on a map, or position the map. Reverse Geocoding is the complete opposite of Geocoding. Reverse Geocoding converts the coordinates into a Street/Location address. This API is vastly used in Android Smart City Traveller, to convert addresses into geographical coordinates and vice versa.

III. CONCLUSION

The Smart City Traveller application is an essential tool for tourists who want to explore a city based on their interests and time. The application's implementation is based on the Control-Model-View (CMV) metaphor for software design, which allows the programmer to model the user input, logic, and animation/output for their game, animation, or simulation. The application's location detection, interest's selection, venue recommendation, and map view make it easy for travellers to create personalized travel itineraries.

IV. FUTURE WORK

There are several potential areas of future work that can be pursued to enhance the Smart City Traveller application:

- **Integration with more location-based services**: The application currently uses the Foursquare API to provide venue recommendations. However, there are other location-based services available that can be integrated to provide more comprehensive recommendations. For example, integrating with Yelp, TripAdvisor, or Google Places can provide additional options for restaurants, attractions, and activities.

- **Personalized recommendations based on user history**: Currently, the application uses the user's current location and interests to provide recommendations. However, it can be improved by using the user's past behaviour, such as their check-in history or ratings of previous venues. This would provide more personalized and relevant recommendations.

- **Integration with transportation services:** While the application provides a shortest route to visit all the recommended venues, it does not currently integrate with any transportation services. Integration with services like Uber or Lyft can allow users to easily book a ride to their desired venue.

- **Multi-city itineraries**: Currently, the application provides recommendations for a single city. However, users may want to visit multiple cities during their trip. Providing recommendations for multi-city itineraries can enhance the usefulness of the application.

- **Social media integration**: Integration with social media platforms like Facebook or Instagram can allow users to share their travel experiences with friends and family. It can also provide an additional way to collect user feedback and improve the recommendation algorithm.

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