



Scenic Route Functional Specification



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Table of Contents

Table of Contents	1
Introduction	2
Description	2
Main functions.....	3
Target Users	5
Diagrams	5
Main Menu	5
Map Screen.....	6
Map in action	6
Suggestion List.....	7
Scenic Routes description	8
Selected a scenic route	9
Technologies	10
Frontend.....	10
React Native.....	10
Flutter.....	10
Maps APIs.....	11
Google Maps API	12
MapBox.....	12
OpenStreetMap	12
HERE Maps.....	12
GraphHopper.....	12
TripAdvisor API	12
Database.....	13
Firebase	13
MongoDB	13
Non-functional Requirements	13
Functionality	13
Usability.....	13
Reliability.....	14
Performance.....	14
Supportability.....	14
Conclusion	14
References	14

Introduction

This functional specification is aiming to describe the features and requirements of the Scenic Route , which provides scenic routes recommendations to the user to travel. The objectives and goal of the project will be written in detail to fully understand in this paper the aim of the project.

Description

A Scenic Route is an application that helps users discover and navigate historical and beautiful scenic routes for travel . The app provides a map with the current location of the user and when the user selects the destination from where he is and then the scenic route the app will show scenic routes where the user can go while they are going to their main destination. The main components of the application are:

Main functions

- **Interactive Map with Real-Time GPS Navigation:** which displays the current position of the user and is the main destination.



Picture 1 : GPS

- **Scenic Route Suggestions :** which suggest historical or popular places which the user may go and visit while he is going to his main destination.



Picture 2 : Suggestions

- **Custom Route Planning** : Enable users to create their own custom routes by selecting specific waypoints or destinations, allowing for personal preferences. Customization is essential to ensure that users can plan according to their interests.
- **Route Preview and Description** : whenever a user wants to see more information about a route suggestion this will show information about it.



Picture 3: Information

Target Users

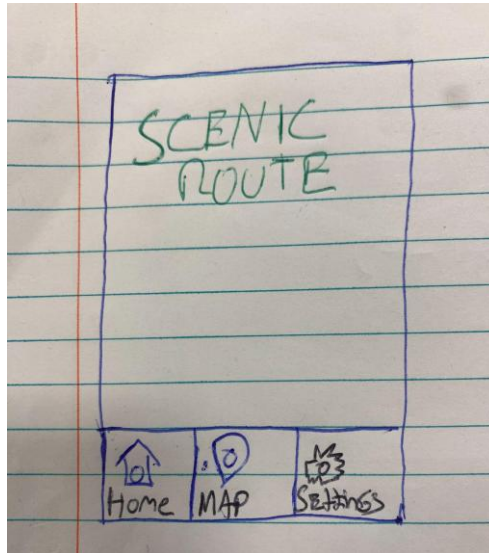
The Scenic Route is designed for those who like to travel and explore important or popular places of each places that they visit as:

- **Tourist** : for both domestic and international, who are visiting new places and want to explore the most famous, culturally significant, or hidden gems in each location.
- **Family-Friendly Routes**: Families who are on vacation or road trips and want scenic routes with frequent, kid-friendly stops. They value activities that engage both adults and children while ensuring comfort and safety.
- **Nature Enthusiasts and Adventure Travelers**: This group includes travellers who enjoy outdoor activities such as hiking, cycling, camping, or birdwatching, and who seek scenic routes that immerse them in natural landscapes.

Diagrams

Main Menu

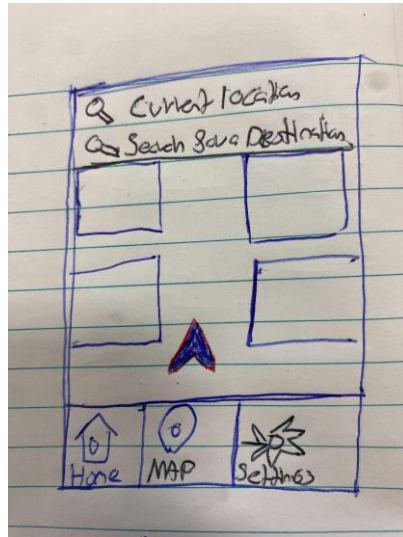
This is the home screen; this is the first page that the user will see after signing in or logging in to the Scenic Route application.



Picture 4: Main menu

Map Screen

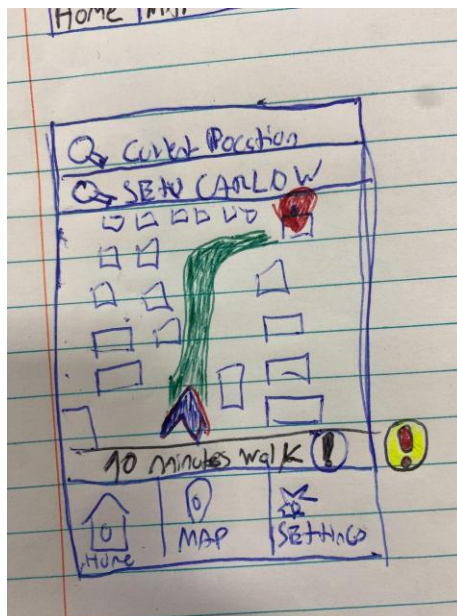
This is the screen where the user will be able to see its location, and on this screen the user will be able to insert a destination to which the user wants to go.



Picture 5: Map Screen

Map in action

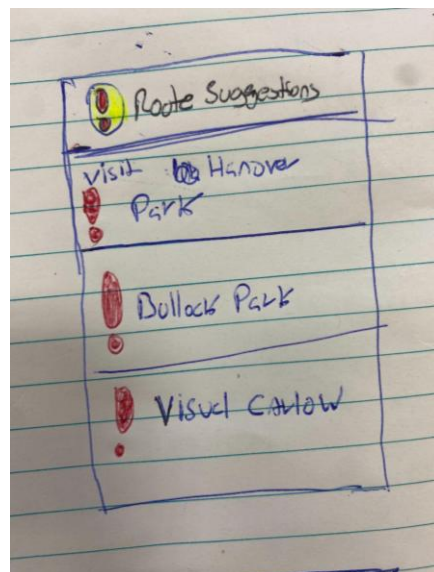
When the user selects a destination the user will be able to select a destination by typing the destination and this will show on the map the current location of the user and the destination on the map and how long it will be. An exclamation mark will show up on the screen that exclamation mark will display possible scenic routes for the user.



Picture 6: Map in Action

Suggestion List

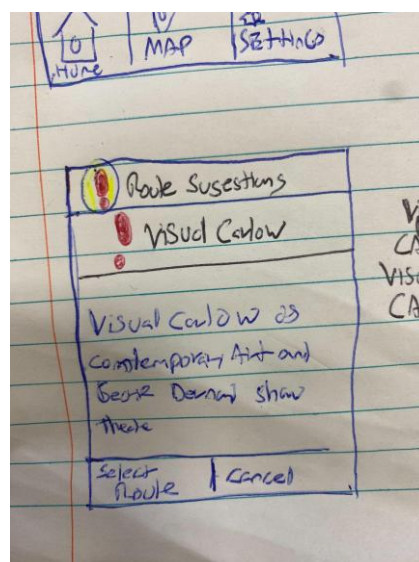
When the user presses on the exclamation icon, this will display on the screen a list of scenic routes that the user will be able to select which scenic routes the user will like to see on the way to the main destination.



Picture 7: List Suggestion

Scenic Routes description

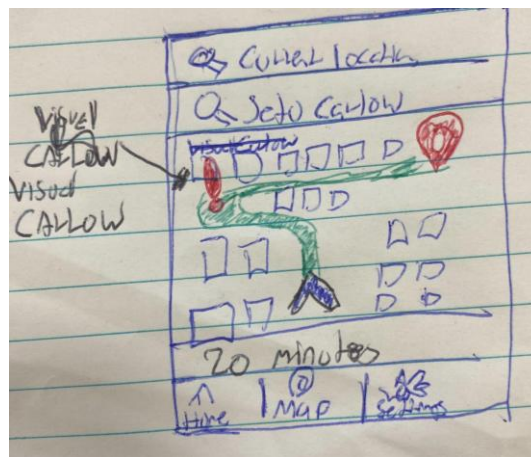
The user will be able to see a brief description about each of the scenic routes to see what each one is about.



Picture 8 : Description

Selected a scenic route

After selecting one of the scenic routes available on the list of suggestions, when the user selects a scenic path that they will like to see on their way to their main destination, this will show on the map, and the time to go to their destination will change based on how long they will spend going to the scenic route.



Picture 9: Map with the suggestion recommendation

Technologies

For this project, I have been doing some research on the possible technologies that it can use in this project.

Frontend

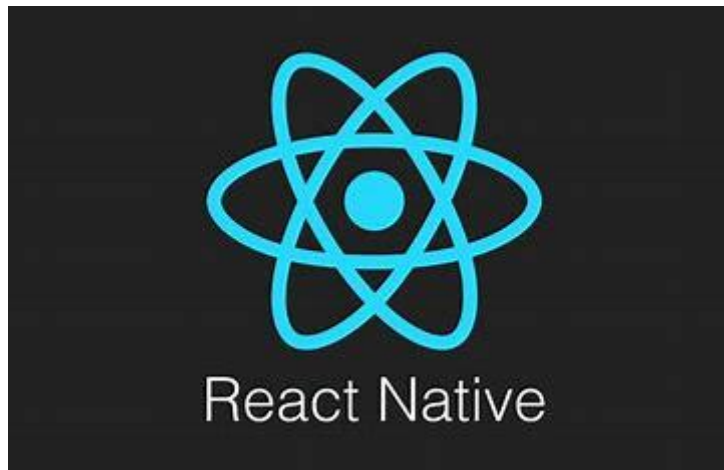
For the frontend of this project, it is important to have a good frontend for the user to know just by looking at it and how to use it. I have done research on two good options:

React Native

React Native [1] is very popular, has a very big community, and is a good frontend, which is a very good option if we want to build software for different cross-platforms as Android, iOS, or websites, as we don't need to code each one; using a single code base is enough. The main coding language of React Native is JavaScript, which is a very common language that must be known to developers, so this will not require spending a lot of time trying to learn it.

Expo[1] enhances React Native by offering tools and libraries that simplify development, testing, and deployment. It provides built-in features like push notifications and camera access

without requiring native code, making development faster and more beginner-friendly. Expo's seamless live previewing through the Expo Go app further streamlines the process.



Flutter

Flutter[2] is another well-known frontend that is known as I can build software using a single base code to build an android app, an iOS app, and a website. The programming language of Flutter is Dart, which is similar to Java, so it shouldn't take much time to learn how it works. Flutter offers a rich set of pre-designed widgets that allow developers to create highly customisable UIs.



Maps APIs

For the maps for the scenic routes is important to find a api which will provide enough information about possible places for the user to visit , during my research i found this possibles Maps Apis:



Google Maps API

Google Maps API[3] is a one of the most mapping services used. It offers a lot of features as routing navigation , traffic updates etc. Google map can provide detailed road data , alternative route suggestions and point of interest along the way, is free to download but there are some features that have a cost depending of what type of feature do you want on the app.

MapBox

MapBox[4] is another great API that is a flexible mapping platform that offers customisable map navigation services. Provides customisable route to avoid traffic , able to save favourite scenic areas and create a scenic route .

OpenStreetMap

OpenStreetMap[5] is an open-source mapping platform that allows developers to access and contribute to detailed geographic data. It can be used in conjunction with other services to

provide scenic routes by leveraging community-sourced data, such as lesser-known trails, viewpoints, and scenic byways.

HERE Maps

HERE[6] Maps provides mapping, location, and navigation services similar to Google Maps but with a stronger focus on automotive navigation and enterprise solutions. It's an excellent option for generating scenic routes due to its route optimization features and real-time data.

GraphHopper

GraphHopper[7] is an open-source routing engine that can work with OpenStreetMap data to generate custom routes, making it an excellent choice for scenic routes. It supports multiple transport modes (driving, cycling, walking) and can be highly customised.

TripAdvisor API

TripAdvisor API[10] provides access to extensive travel information, including hotels, restaurants, attractions, reviews, and photos. It offers dynamic data like ratings, operating hours, and nearby recommendations, allowing apps to deliver accurate, up-to-date, and tailored travel experiences.

Database

Is important to have a reliable database to use for able to storage user details and scenic route that the user has saved , i found two that works well for this type of projects:



Firebase

Firebase[8] Realtime Database is Firebase's original database offering. It stores data as one large JSON tree and pushes updates to clients in real time. This database is known for its simplicity and real-time syncing across devices; this means that each action made in the database will be changed at the same time.

MongoDB

MongoDB[9] is one of the most popular NoSQL databases, known for its flexibility, scalability, and powerful querying capabilities. It stores data in JSON-like documents (BSON format), allowing for a highly dynamic schema.

Non-functional Requirements

Functionality

The app provides route planning, POI recommendations, user preferences for categories, and features like saved routes, leveraging real-time data from external APIs.

Usability

It offers an intuitive interface, clear navigation, simple search options, feedback notifications, and support for multiple languages.

Reliability

Real-time POI updates ensure data accuracy, with fault-tolerant handling of failed API calls and high server uptime for consistent availability.

Performance

The app minimizes latency with optimized API calls, ensures smooth map interactions, and is scalable to handle increased user demand.

Supportability

A modular backend simplifies maintenance and updates, while thorough documentation and expandability ensure the app is future-ready.

Conclusion

The Scenic Route application is designed to provide users with a personalized and enriching travel experience by recommending Points of Interest (POIs) along their chosen routes. By integrating external APIs for real-time data and offering intuitive features like customizable ranges, category-based suggestions, and saved routes, the app ensures usability, functionality, and reliability. Through its scalable design and modular architecture, it is well-

equipped to handle future growth and feature enhancements. With its focus on user convenience and dynamic travel options, the application stands out as a valuable tool for exploring scenic journeys.

References

- [1] [React Native · Learn once, write anywhere](#) Accessed [15/10/2024]
- [2] [Flutter - Build apps for any screen](#) Accessed[15/10/2024]
- [3][Cloud Computing Services | Google Cloud](#) Accessed[15/10/2024]
- [4][Mapbox | Maps, Navigation, Search, and Data](#) Accessed[16/10/2024]
- [5][OpenStreetMap](#) Accessed[16/10/2024]
- [6][HERE WeGo](#) Accessed[16/10/2024]
- [7][GraphHopper Directions API with Route Optimization](#) Accessed[16/10/2024]
- [8][Firebase | Google's Mobile and Web App Development Platform](#) Accessed[16/10/2024]
- [9][MongoDB: The Developer Data Platform | MongoDB](#)[16/10/2024]
- [10] [Content API | Tripadvisor Developer Porta](#) Accessed[20/11/2024]
- [11] [Expo](#) Accessed [20/11/2024]