JESSY: INTELLIGENT TRAVEL ASSISTANCE

Project ID: 2021-014

Individual Project Proposal Report

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B.S c. (Hons) Degree in Information Technology

Department of Information Technology

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DECLARATION PAGE OF THE CANDIDATE & SUPERVISORS

I declare that this is my own work, and this proposal does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other university or Institute of higher learning and to the best of our knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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The supervisor/s should certify the proposal report with the following declaration. The above candidates are carrying out research for the undergraduate Dissertation under my supervision.

....

Signature of the Supervisor Date

....

Signature of the Co-Supervisor Date

ABSTRACT

Tourism industry is perceived as the third highest economic activity in Sri Lanka. Even though Sri Lanka has a long-lasting history as a tourist destination, there have so many ups and downs currently due to political and social influences. According to the observations and studies done on tourism industry, the project team was able to identify few draw backs which needs the immediate attention due to this pandemic situation. When tourists visit Sri Lanka, they follow several ways of travelling. Some tourists use package-based services with travel agencies and backpackers are the form of independent, budget travelers, who are use booking hotels, way of transportation, their meal plans, places where they hope to visit decide independently. Under that supervision the project "JESSY: Intelligent travel assistant" will help them to travel safely. In a nutshell, the JESSY is an agglomeration of everything which a traveler should have in their possession at all times. A leisure time spending planner, a reliable travel guide suggestion for booking, virtual guide experience for the travelers, and a state- of-the-art conversational model (chatbot) which is going to deliver automated answers by analyzing and evaluating the data. The information, utilities, resources, safety equipped with cutting edge technology at your fingertips. This document focuses on the research problem, proposed solution and the technologies which is going to use by the project team.

Key Words: Tourism Industry, Sentiment Analysis, NLP, Machine learning, Social media information analysis, Mobile Development

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1. INTRODUCTION

New technology has aided modernization. Finding a consistent source of revenue is becoming increasingly difficult for companies. This is particularly true in the case of competitive advantage. There is a constant need to innovate in the travel and tourism industry. obtain and apply up-to-date details in order to assist its customers Processes of management and marketing. IT helps companies in dynamically handling knowledge and affects productivity by assisting decision-makers in making effective investments and resource allocation.

IT assists in meeting consumer demands for timely and reliable information, and IT penetration in the tourism and hospitality industries has increased at an unprecedented pace. This is shown by the widespread use of IT systems that work together to help decision makers provide high-quality service to their customers while also increasing operating performance and lowering costs. It has a direct impact on visitor perceptions and attitudes. It would be difficult to guide and handle companies that need a lot of data and information without IT systems, which would stifle their competitive spirit.

The times as this it is difficult to manage the lives as the ways that we used to. In the moderation of developing the standards and the expectations of the conventional world and the usual ways that people used to do things is coming to an end and nowadays people try to have different approach to the matters that in their hands. So that we needed a fresh update from the user point of view. Keeping that concept in mind we planned to reach the common tourist in the modern world and make the experience of touring a better one for the users in the safety, experience it selves, planning and execution and so on. In the procure of this venture we managed to narrow down the focus of this study and development into four main segments. In unfamiliar terrain, a tourist faces many challenges. It's difficult to navigate streets and recognize landmarks when you're unfamiliar with the area. Reading signs, taking a taxi, ordering food, and understanding

the remarks of strangers is difficult due to the unfamiliar language. Wearable computers have become available because of recent technological developments, which may benefit visitors. The machine will be able to provide a better understanding of the environment than the tourist if it has access to local databases and the Internet. As a result, they are ideal platforms for tourist applications. Furthermore, wearable computers can now access information from any place thanks to mobile computing technology.

What we trying to do here is that help the tourist to get the planning of the tour in a short amount of time period and make sure that they are going through a safe passage when they do the tour, and they can manage the time and the money in a proper manner. The research study and the development are more focus on making sure that the users can get through these barriers with minimal effort, and they can get the expected experience at a much better phase.

In my personal segment of the research study and development I more focus on the scheduling system that can be used as a proper trip planner for the users. The users just must -insert their basic information at the top and they can choose from the various options and suggestions that the segment of this project makes according to their interests and their preferences. And, the time that the users can spare, and the locations also taken into the consideration and most importantly the user safety is highly priorities when the system chooses possible venues for the users to visit.

1.1 Background and Literature Survey

The information that we can get the sources is unlimited at this movement. So that we can see that we can do whole lot of things that we can go through using these. Using the NLP framework and the sentiment analysis that information can be used to get the necessary information for the users in a better manner.

Online customer reviews could shed light into their experience, opinions, feelings, and concerns. To gain valuable knowledge about customers, it becomes increasingly important for businesses to collect, monitor, analyze, summarize, and visualize online customer reviews posted on social media platforms such as online forums. However, analyzing social media data is challenging due to the vast increase of social media data. The purpose of this paper is to present an approach of using natural language pre-processing, text mining and sentiment analysis techniques to analyze online customer reviews related to various hotels. [3]

NLP framework to uncover four linguistic dimensions of political polarization in social media: topic choice, framing, affect and illocutionary force. We quantify these aspects with existing lexical methods and propose clustering of tweet embeddings as a means to identify salient topics for analysis across events; human evaluations show that our approach generates more cohesive topics than traditional LDA-based models. We apply our methods to study 4.4M tweets on 21 mass shootings. We provide evidence that the discussion of these events is highly polarized politically and that this polarization is primarily driven by partisan differences in framing rather than topic choice. We identify framing devices, such as grounding and the contrasting use of the terms "terrorist" and "crazy", that contribute to polarization. Results pertaining to topic choice, affect and illocutionary force suggest that Republicans focus more on the shooter and event-specific facts (news) while Democrats focus more on the victims and

call for policy changes. Our work contributes to a deeper understanding of the way group divisions manifest in language and to computational methods for studying them. [4]

Like that we can see that this technique is used wide and that can be improved more than the ways that they have already used. For an example following avenues also can be applied when it comes to particle approaches.

Sentiment analysis refers to the class of computational and natural language processing-based techniques used to identify, extract or characterize subjective information, such as opinions, expressed in a given piece of text. The main purpose of sentiment analysis is to classify a writer's attitude towards various topics into positive, negative, or neutral categories. Sentiment analysis has many applications in different domains including, but not limited to, business intelligence, politics, sociology, etc. Recent years, on the other hand, have witnessed the advent of social networking websites, microblogs, wikis, and Web applications and consequently, an unprecedented growth in user-generated data is poised for sentiment mining. Data such as web-postings, Tweets, videos, etc., all express opinions on various topics and events, offer immense opportunities to study and analyze human opinions and sentiment. In this chapter, we study the information published by individuals in social media in cases of natural disasters and emergencies and investigate if such information could be used by first responders to improve situational awareness and crisis management. In particular, we explore applications of sentiment analysis and demonstrate how sentiment mining in social media can be exploited to determine how local crowds react during a disaster, and how such information can be used to improve disaster management. Such information can also be used to help assess the extent of the devastation and find people who are in specific need during an emergency situation. We first provide the formal definition of sentiment analysis in social media and cover traditional and the state-of-the-art approaches while highlighting contributions, shortcomings, and pitfalls due to the composition of online media streams. Next we discuss the relationship among social

media, disaster relief and situational awareness and explain how social media is used in these contexts with the focus on sentiment analysis. In order to enable quick analysis of real-time geo-distributed data, we will detail applications of visual analytics with an emphasis on sentiment visualization . Finally, we conclude the chapter with a discussion of research challenges in sentiment analysis and its application in disaster relief. [5]

Social media have been adopted by many businesses. More and more companies are using social media tools such as Facebook and Twitter to provide various services and interact with customers. As a result, a large amount of user-generated content is freely available on social media sites. To increase competitive advantage and effectively assess the competitive environment of businesses, companies need to monitor and analyze not only the customer-generated content on their own social media sites, but also the textual information on their competitors' social media sites. In an effort to help companies understand how to perform a social media competitive analysis and transform social media data into knowledge for decision makers and e-marketers, this paper describes an in-depth case study which applies text mining to analyze unstructured text content on Facebook and Twitter sites of the three largest pizza chains: Pizza Hut, Domino's Pizza and Papa John's Pizza. The results reveal the value of social media competitive analysis and the power of text mining as an effective technique to extract business value from the vast amount of available social media data. Recommendations are also provided to help companies develop their social media competitive analysis strategy. [6] As we can see here that the uses and the applications can be varied from the used applications. There can are more avenues and adventures that this technique and the applications can be used in more respective manner and a better way. This study is based on making sure that they can be applied for all of those cases.

The research paper by R. Sai Ganga, P. Chandra Prakash Reddy proposed a system intelligent tourist information system. This system is intelligent and learns from the users' inputs over

time, providing personalized, customized recommendations. Artificial Intelligence (AI) is being used in every discipline to change the way humans communicate with one another in order to obtain knowledge. SITI's key goal is to do this. For the first time in a tourist information system, machine learning techniques were used to create an AI component that intelligently provided customized information to each user, so a user rating was also requested in a small survey. API is an NLP library system. An easy method was used to achieve this using AI. This is the first of its kind to go to such lengths to have the best Tourist Information System (TIS) available today.

The research paper by Jie Yang, Weiyi Yang, Matthias Denecke, Alex WaibelA proposed a Tourist Assistant System Called Smart Sight. They present their efforts in creating an intelligent tourist system in this article. The device has a one-of-a-kind combination of sensors and software. Two processors, a GPS receiver, a lapel microphone with an earphone, a video camera, and a head-mounted monitor make up the hardware. This combination allows a multimodal interface to provide assistance to a tourist using speech and gesture input. Natural language processing, speech recognition, machine translation, handwriting recognition, and multimodal fusion are all supported by the program. A vision module has been trained to find and read written text, adjust to new settings, and interpret the user's intentions, such as a spoken statement or a pointing gesture.

1.2 Research Gap

A reviewing system is a basic application in a modern day uses. But the issues that they have is that the applications that in use do not comprehend all the avenues. They just provide a linear perspective that the users can see what the number is or what is the words say. They do not provide comprehensive view in the matters, places, and the people.

The proposed system that the team is researching and developing is that a way to provide a comprehensive application that the users can understand the best and the true self of the people and the places. So that we provide the application that can give a broad perspective about the reviews and the ratings in a one quantitative value using social media analysis and the given information from the users and other relevant sources.

Features	Current Platforms	JESSY
Reviewing system	✓	✓
Rating system	✓	✓
Comprehensive Review outcome with complex analysis	×	✓
Analyse the social media data related with user (Facebook, Insta)	×	✓
Ability to suggest best guide for the particular user	×	✓
Automate guide suggesting system according to earlier reviews	×	✓
Nearby Location tracking System	×	✓
Verified resources and information	×	✓

Table 1.1: Comparison between JESSY and Current Platforms

1.3 Research Problem

Since the end of thirty years war, the tourism industry of Sri Lanka has begun a rapid growth for the global tourists' advents and tourisms incomes. This rate of growth in tourism industry once again degraded due to the Easter Sunday Attack which happened during April of 2019. According to the records, it is mentioned that Sri Lanka has lost nearly US $ 1.5 billion of tourism revenue [2]. Even if Sri Lanka was able to recover again the COVID19 virus has caused a considerable damage for the tourism industry again. As of now, thousand number of tourism services in the range of souvenir sellers to blue chip companies have entered to an unstable period with zero revenue. This prompt us how fragile the responsibility of tourism industry in Sri Lanka towards the outside shock waves. Although Sri Lanka has been successful to a significant level of controlling the pandemic situation, it is very unlikely to see that foreign and local travelers engage in leisure trips. Therefore, Sri Lanka needs to take immediate actions on increase tourism attraction. As per research done on available technologies, safety methods and controls on tourism industry, the project team found several crucial situations that needed immediate attention. One of the foremost problems in tourism industry in our country is that they do not have an accurate mobile technology get linked with tourists. Even if there are so many mobile platforms, still there is no centralized platform which have been addressed each major problem mentioned below. It has become a key challenge to tourists who visits Sri Lanka to find a human tour guide for themselves. Even if they found themselves a tour guide, there can be more issues because some human guides utter nonsense, delivering content is not accurate, lack of communication due to language issues. In other way around, there are talented Sri Lankans who do their best towards the tourism industry as tour guides. The issue here is that they do not have a platform to get connected with tourists directly. Same time, there is a higher chance of Sri Lanka to be visited by budget travelers including both local and foreigners who would not have enough possessions to hire a human tour guide. Also, there is a high risk

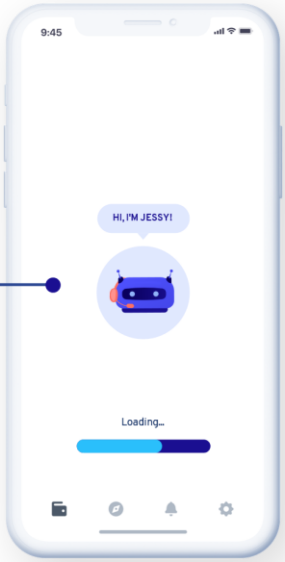
of safe health during this pandemic for both travelers and tour guides and we as Sri Lankans have experienced such incidents last year due to spreading COVID19 via a group of Italian visitors and a tour guide. As per stated, the available technologies do not contain any virtual assistant guide instead of having a human guide. Another main fact that should needs the attention is safety of tourists. Still there is no one centralized mobile platform which specifically created to tourists for their complaints and contacting authorities for any type of harassment within the Sri Lanka. In a traditional country like Sri Lanka, it is more likely to have physically and mentally harassment such as being robbed, murdered, or sexually threats. Another issue in that mobile technologies is that there is no intelligent guidance for plan leisure time in the range from selecting nearby places to visit and restaurant to eat according to travelers' preferences. There are some mobile applications for such problems but still there is a high gap of not having a single platform which performs each function, and which is user friendly. Therefore, the need of a multitasking digital guide app with intelligent guidance should be undertaken at highest priority.

In accessing the subdomain of having a reviewing system that can provide a better example for the users in order to make sure that the experience and the behavior can be channeled into a better set of reviewing rather than a linear set of reviewing system. So that the users can have a better understanding about what they are getting into and what they are dealing with. That inspect is become a vital for the users and that has become the segment of the issue for this research.

2. OBJECTIVES

MAIN OBJECTIVE

Identify previous feedbacks, social media interactivity and suggest reliable human tour guide based on preferences.



SUB OBJECTIVES

1. Understanding the location demography.
2. Register the guides in the system using their details & pros. (Personal data, Education Level, Qualities, Languages speak)
3. Link their Social media accounts (Fb, Instagram) & Other Feedback on existing platforms. (API)
4. Register the Travelers in the system using their details.
5. Update the DB with registered data.
6. Get their preferences using filtering criteria.
7. Filter the registered guides with high ratings with suitable filtering criteria when Analyzing their feedbacks & social media interactivity. (Sentiment Analyze & Social Media Data Analyze)
8. Suggest the Rated Travel Guides based on preferences.
9. Get client feedback & opinions.
10. Update the DB using the details from the review given.
11. Responsible for interface implementation.
12. Integrate the model to the Mobile app.

2.1 Main Objective

The main purpose of introducing Jesse is to find and recommend solutions to enhance people's travel experience who use traditional travel applications in their daily lives. Moreover, the proposed solution app has a mechanism to monitor the variability of people's travel patterns and locations using social media accounts (Facebook, Instagram) & Other Feedback existing platforms, providing appropriate suggestions. Therefore, the mobile app's device links with social media accounts and Other Feedback existing platforms, provides suggestions to explore new places and helps travelers improve and obtain travel habits. Furthermore, filter the registered guides with high ratings with suitable filtering criteria when Analyzing their feedbacks & social media interactivity. Sentiment Analyze & Social Media Data Analyze included here to provide more exciting traveling to the travelers. Therefore, monitoring linked social media accounts (Fb, Instagram) & Other Feedback existing platforms, making the appropriate suggestions, and suggesting suitable guides are the sample cases of this part of the JESSY application's main objective.

2.2 Specific Objectives

In order to achieve the main objectives, the specific objectives to be achieved are as follows:

- Optimize data capture and processing.

Initially, developers need to determine data collection points and application locations to obtain accurate data with minimal effort. The optimal frequency of intervals at that data should be obtained by analyzing data and user inputs from social media and & Other Feedback existing platforms is also determined by the authors based on a reasonable hypothesis.

- Suggest the Rated Travel Guides based on preferences.

Filter the registered guides with high ratings with suitable filtering criteria when Analyzing their feedbacks & social media interactivity. (Sentiment Analyze & Social Media Data Analyze). The system provides valid statistical and qualitative information to travelers to make decisions based on this information comfortably and trustworthy.

3. METHODOLOGY

The proposed system has the capability of,

1. Understand the demography and geo-locations.
2. Collecting previous instances and train the model.
3. Register the guides in the system using their details and pros.
4. Link their social media account
5. Register the travelers using their details.
6. Update the database using registered data
7. Get their preferences using filtering criteria
8. Filter the registered guides with high ratings suitable for filtering criteria when Analyzing their feedback & social media interactivity.
9. Suggest the rated travel guide base performance
10. Integrate the model to the mobile app.

3.1 Software Solution

We used Agile Methodology as the software development lifecycle. The scrum will be the methodology that will be followed under the agile methodology. Scrum is a lightweight, agile project management framework with board application for managing and controlling iterative and incremental projects of all types.

3.2 Requirement analysis and gathering

First will be the requirement gathering process. Investing time in a requirement gathering questioner has helped us understand what people think about travel assistance and what they have in mind to make the application a better version than the conventional ones.

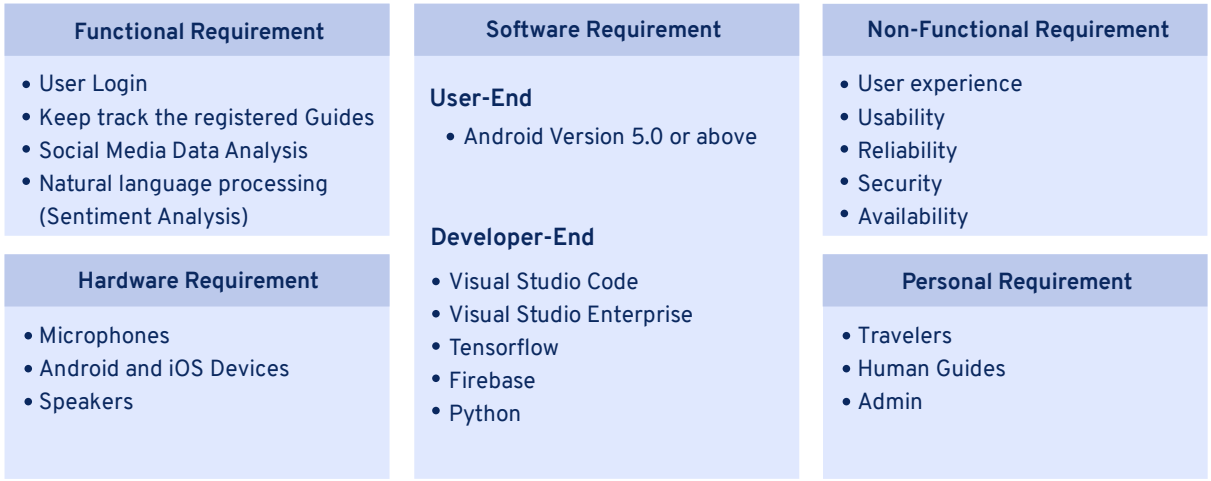


Figure 3.1: Requirements and Tools

3.3 Feasibility study

Schedule feasibility: The proposed project should be finalized in the deadline in the defined time limit, completing each phase with creditable outputs while maintaining a timeline and present with the outcome product on the planned date.

Economic Feasibility: The components used must be low-cost and reliable if they have a high cost of success. Therefore, the cost of resources and necessary components was limited.

Technical Capabilities (Skills): To complete the proposed project, project members must have the required expertise in application development, machine learning, and equations and some experience in front and rear end development.

3.4 Implementation

The implementation phase complies with the development of the functionalities Below,

- Precise data capturing and processing
- Analyze their details & pros. (Personal data, Education Level, Qualities, Languages Speak), Social media accounts (Fb, Instagram) and Other Feedback existing platforms. (API)
- Apply the back-end machine learning solutions in order to make the decisions
- Deliver the suggestions to the users.

3.5 Mobile Application development

The final product contains an Android mobile application to increase usability and user-friendliness. React is a free and open-source platform and more comfortable to market, and it forms popularity. It is easier to develop, saves time, money and enables faster release. Developers can use Python as a programming language. To develop the application, researchers should have adequate knowledge in Android application development and Machine Learning.

3.6 API maintaining

The API is an essential part of this development. It will contain all the information and details regarding the project, and API will make the necessary computations using NLP – Machine Learning and make a congenial environment for the application.

3.7 Deployment

The applications will be deployed into the Google Play store in the first stage, and then they can be used across multiplatform. (iOS)

3.8 Marketability and Commercialization

- For Human Tour Guides,

  Who were already registered under SL Tourism Development Authority, we hope to give ***Permanent Subscription for 10$.***

- For other Individual Tour Guides and Safari Drivers,

  We hope to charge ***Monthly Subscription of 3$.***

- The model which I develop is not only use to suggest human tour guides, nut we can use it to examine any kind of people.

  Ex: When interviewing a candidate, we can use this model to keep track his/ her social interactivity.

3.9 Technologies

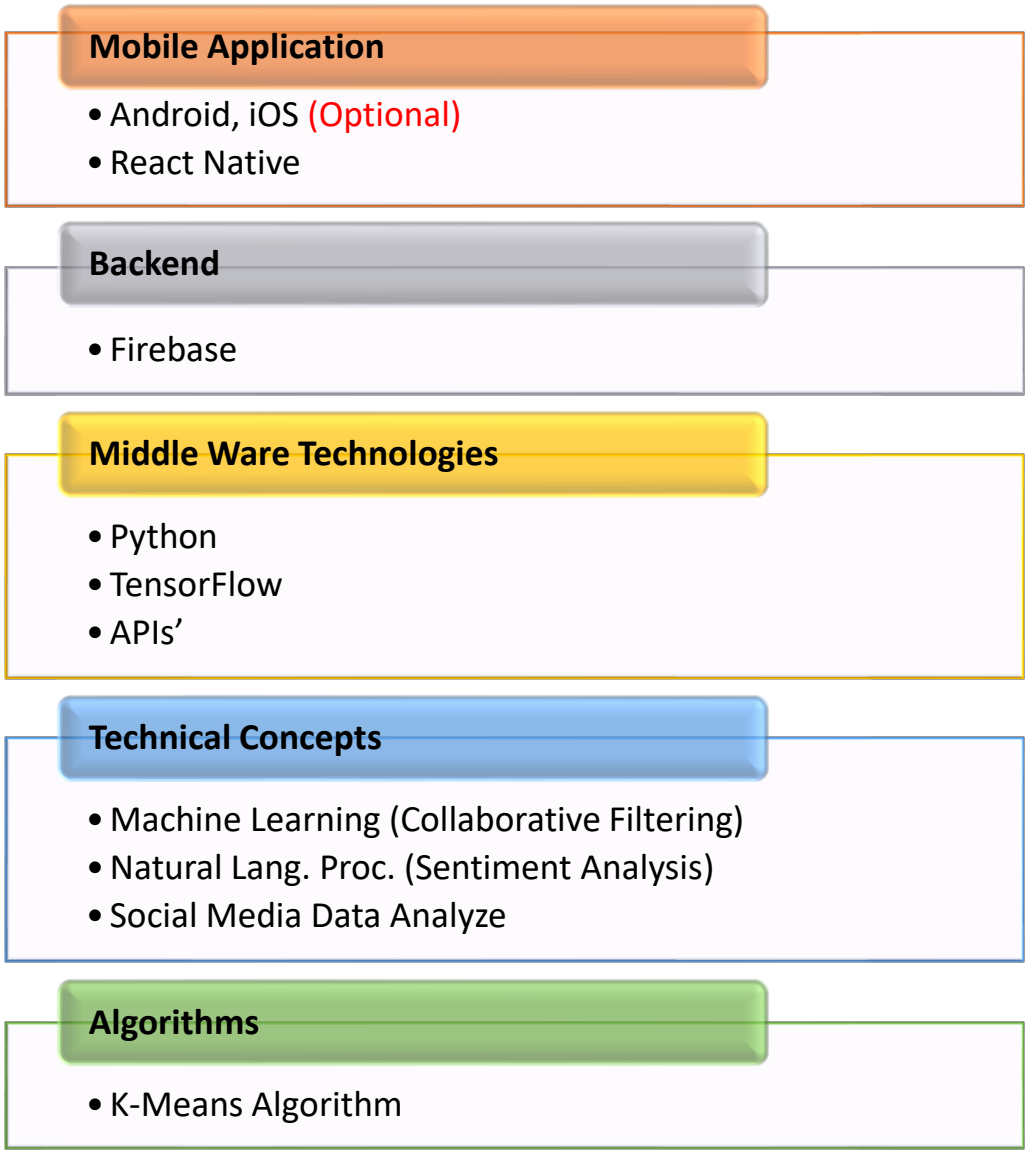


Figure 3.2: Technologies to be Used

4. DESCRIPTION OF PERSONAL AND FACILITIES

4.1 Data Analysis using Machine Learning methods

1) Obtain the required user data from the data sources
2) Analyze and identify suitable guides.
3) Assess the real-time situation

4.2 Providing Recommendations and Suggestion to the user

1) Compare the analyzed data with the database and machine learning model using an algorithm.
2) The program will automatically analyze the user's data and notify the user when a suggestion is detected.

4.3 Other functions

1) Authentication
2) Provide voice command support.
3) Get user suggestions and comments. (Feedback and User Reviews)
4) Share user experiences into the public timeline.

5. BUDGET AND BUDGET JUSTIFICATION

Resources	**Price (Rs.)**
Traveling Expenses	8000.00
Internet Charges	1500.00
Documentation Printing	3500.00
Play Store and Apple Store License	18000.00
Other	500.00
Total	**31500.00**

Table 5.1: Budget

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7. APPENDIX

7.1 System Diagram

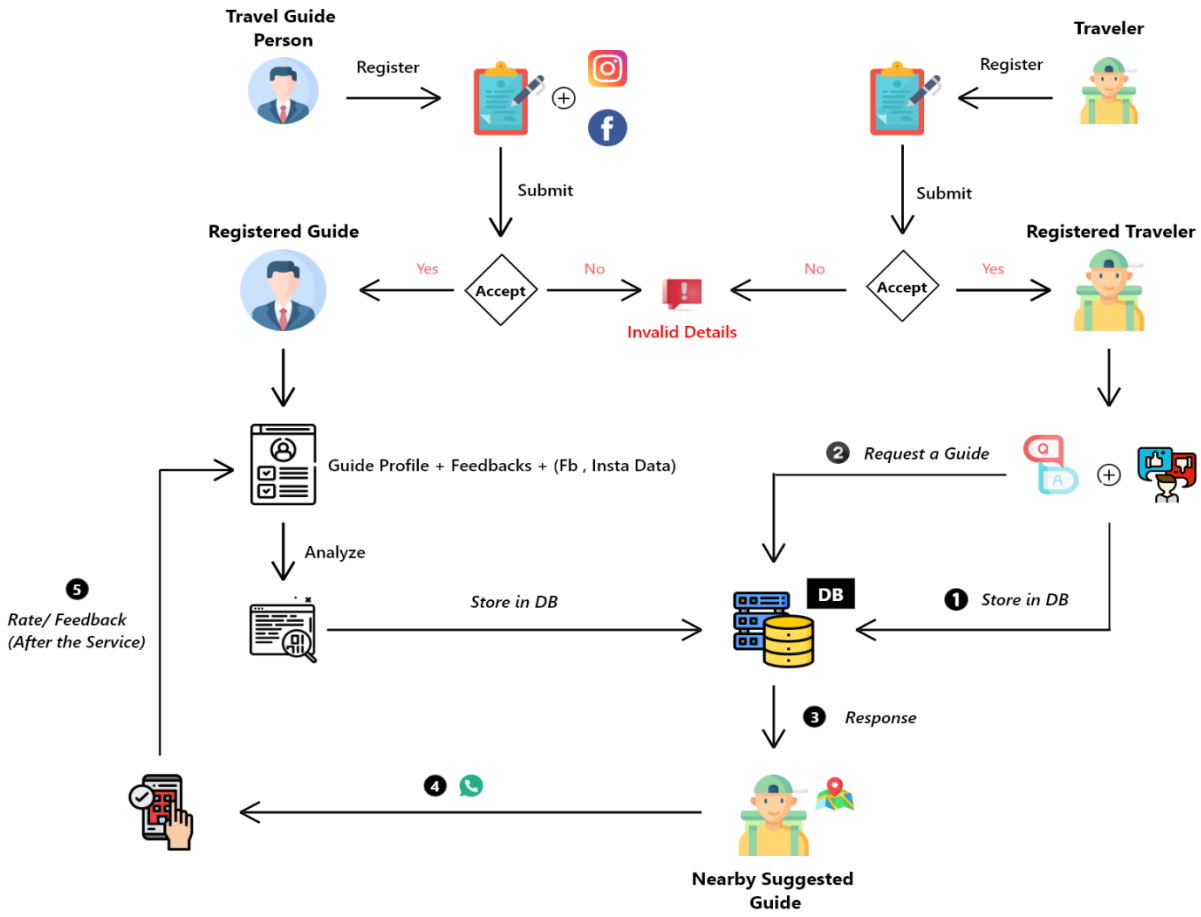

Figure 7.1: High-Level System Diagram

7.2 Work Breakdown Structure

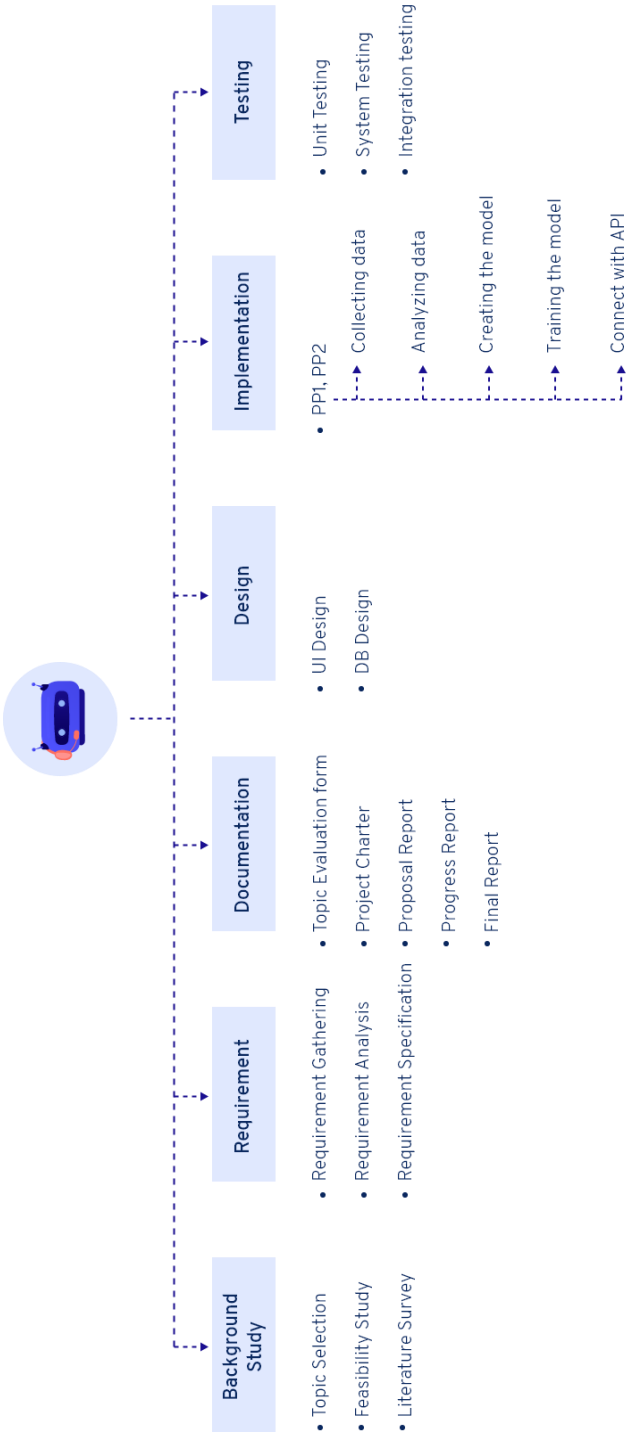

Figure 7.2: Work Breakdown Structure

7.3 Gantt Chart

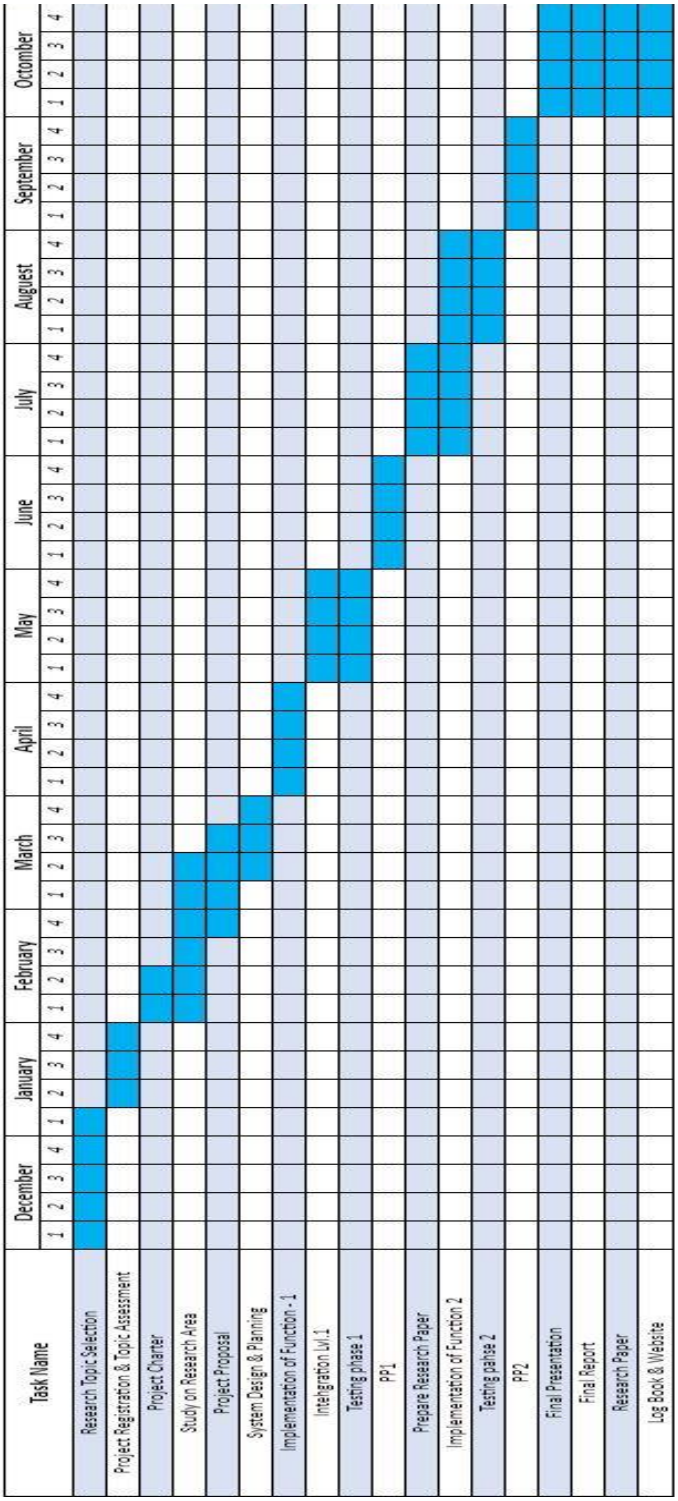

Figure 7.3: Gantt Chart