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WonderSL : The Recommendation Based Personalized Tour Planner

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Abstract:-Traditional guidebooks and tour operators have given access to mobile applications that claim to provide tourists with more than just information. Unfortunately, the deployed applications have been developed with a narrow aspect considering a single distinct feature where the travelers had to navigate multiple platforms to properly plan and manage a voyage. WonderSL initially focuses on Sri Lanka, a beautiful island known for its diverse and attractive destinations. WonderSL comes up as an innovative application in a time of technological innovation, introducing the concept of motivating the demotivated individuals to accomplish their travelling desires. The travelers are inspired through the potential technologies which includes recommendation suggestions, satellite map, 360-degree map view and Chatbot technology. As a result, the users can explore their preferred travel location comprehensively, beyond the textual descriptions. The application itself empowers strategically budget management for their trip during the planning phase. Therefore, the application guarantees that the individuals never overlook the travelling opportunities.

Keywords*: WonderSL, API,Artificial Intelligence, Virtual Reality, Satellite Imagery*

1. Introduction

The traditional methods of travel planning have experienced a major transformation in this digital age. WonderSL emerges as a visionary application conceived from the core ideas presented in *Scylax*[1]. The application's basic functionalities include a variety of features referred to address the complexities of modern trip planning. This research paper offers an in-depth look at WonderSL's architecture, including user management, travel destination management, methods of communication, and budget planning.

According to research it has been identified that people are struggling to balance their leisure activities with work and commitments. Although there is an abundance of travel information on the internet, choosing a destination is tiresome. Because the textual descriptions and static images about destinations are only contexed in the applications. The anxiety of the individuals due to lack of knowledge about the financial commitments about the tour is a fact to consider. As a result, this leads to overlooking different exciting travel opportunities simply due to lack of motivation. The significance of WonderSL is providing a unified platform by combining satellite imagery, user preferences, and budget plan consideration for the users to streamline their planning process. The proposed application acts as an inspiration, ensuring that the users never outlook the opportunities. The users can input their interests and preferences. Then, travel destinations are suggested to the user from the application by analyzing the user variables such as holidays, seasons, preferences, and passion to develop the user motivation. The travelers can navigate and overview the travel location through the satellite map view during the planning phase. After exploring the destination, the travelers can organize their tour according to the adventures as suitable for their budget and add the estimated other expenditures for the budget. If the user has any clarifications to be made during the planning process, they can accomplish it through the Artificial Intelligence(AI) powered chatbot through the mobile application.

Fig. 1 shows the main objective of this research paper, to motivate the demotivated travelers to voyage by suggesting plenty of travel locations using the mobile technology. Therefore, this research is based on the research question “Where shall we go?”[2]. In order to achieve the goal, the application leverages different technologies to make it comprehensive for the users. The application not only addresses the immediate question of "Where to go?" but also simplifies travel planning and decision-making, transforming potential obstacles into opportunities for exploration. Through these innovative features, this research contributes to rekindling the travel spirit and making voyages more accessible and enjoyable for travelers of all kinds.

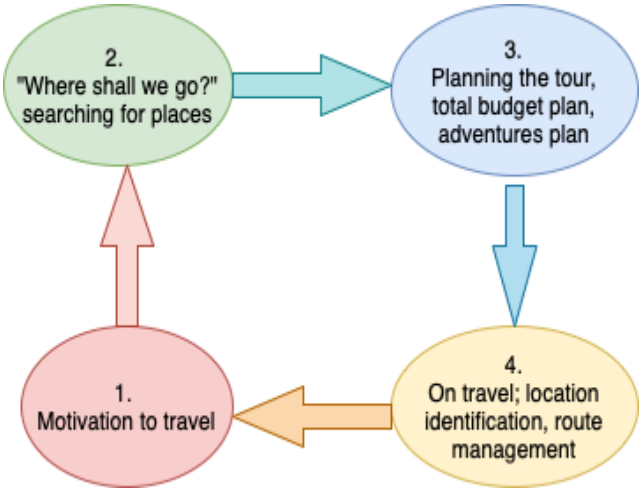

Fig. 1 Travelling Cycle

2. Literature Review

The advancement of technology and the demand for personalized tourism experiences has been a remark for the innovation of different web and mobile applications to simplify the user tasks within a few clicks. The incorporation of innovative features and the harmonious convergence of user data and preferences have become essential factors that will define the future of travel applications. Therefore, the literature review is based on the concept and the theories used with travel planning applications, personalization, AI, and Virtual Reality (VR) integration, user experience and budget management.

Accordingly, SriLanka.Travel[3] is a user-friendly web application implemented to attract travelers by illustrating the enchantment of Sri Lanka. This focuses on the user preferences through the “Where to go?” option. However, in comparison to the WonderSL application, SriLanka.Travel lacks certain features that enhance user experience.

One notable distinction is that WonderSL provides personalized recommendations to users based on their interests, making it easier for travelers to plan their trips according to their preferences. In contrast, SriLanka.Travel categorizes itineraries and activities related to specific locations but does not offer tailored recommendations.

Focusing the foreign travellers, SriLanka.Travel has vividly displayed the details where the upcoming events in the country, updates and press release are updated subsequently. Another point of differentiation is the navigation experience. While both applications allow users to plan trips and view travel destinations on a map, WonderSL appears to offer a more comprehensive navigation experience, enabling users to further explore locations on the map.

Google Expeditions[4] is a platform developed with the virtual reality (VR) feature for the students to have virtual tours around destinations. The Google Expedition provides 360-degree panoramic images and videos, allowing the students to capture captivating destinations, historical landmarks, and marvels. The WonderSL has the facility of providing 360-degree view of the images of the travel locations but offering a different perspective for travelers seeking in-depth visual experiences during their journeys.

While Google Expeditions focuses on educational content, WonderSL's approach is tailored towards enhancing the travel experience by providing comprehensive visual information about the leisure activities and to-do activities for informed decision-making and exploration.

Foursquare City Guide[5] is a mobile application uses GPS technology which provides unique recommendations of places to go nearby tracking the user's current location based on user's browsing and preferences. Foursquare provides user generated reviews, ratings, and suggestions about different locations to help the travelers to make decisions about the destinations. This can be considered as social networking platform where it helps the users to collaborate with the friends, discovering new destinations with the help of friends, see their check-ins and to receive recommendations for their preferences and activities through social networking.

In contrast, WonderSL adopts a distinctive approach by prioritizing user preferences and providing inspiration to all individuals, irrespective of their social network connections. While Foursquare thrives on user-generated content and social interactions, WonderSL focuses on tailored travel experiences based on individual interests and needs. This differentiation ensures that WonderSL remains a versatile and personalized travel companion for a wide range of users.

TripAdvisor[6] is a transformative travel guidance platform collaborating with the travelers from the planning procedure to booking the destinations. The application gets the user preferences before planning the voyage and offers numerous recommendations and user-generated content, encircling hotel reviews, ratings photographs, and travel guidance and information. Through the application itself the travelers can evaluate a wide spectrum of accommodation options, catering to the traveler's preferences.

This user-centric approach empowers travelers to make informed decisions, particularly when evaluating a diverse range of accommodation options tailored to their preferences. The user-centric features pioneered by platforms like TripAdvisor impact the design, functionality, and overall user experience of WonderSL travel application. It discusses the features to enhance traveler satisfaction, convenience, and decision-making in the context of modern travel planning.

Trail Wallet[7] acts as a travel budget application designed to record the expenditures prior to the voyage or while on the road. Trail Wallet's user-friendly interface allows the travelers to input the estimations according to the voyage time duration, record the expenditures, organize the expenditures by the category, customize the categories and significantly this allows to update the budget plan up to 218 country's currency rates. The application provides a comprehensive summary on the screen using different types of charts for daily expenses which helps the users to visualize their spending patterns. Inclusion of the Trail Wallet with WonderSL enhances the travel experience for the individuals as it manages the expenses which leads the user to worry less.

Scylax is a well proposed system developed adhering required features for an individual expected in travel planning. This application emphasizes tailoring the journeys to individual preferences, incorporating virtual reality 360-degree view to explore desired routes. As identified *Scylax* highlights personalized tour planning with virtual reality and WonderSL is an integration of components comparatively to *Scylax* but helps the users to completely plan their budget more over *Scylax*.

In comparison, WonderSL takes a comprehensive approach, integrating various components to not only personalize travel experiences but also empower users to efficiently plan their budgets. While *Scylax* excels in personalization and visual engagement, WonderSL extends its capabilities to address budgetary aspects and overall trip planning.

The above-mentioned tools in the applications are used to customize the voyages, draw insights, and reshape the tour plan. However, managing multiple tools simultaneously can be inconvenient. Therefore, this research is dedicated to the development of a unified platform within WonderSL that streamlines all these operations, providing users with a single, cohesive application for all their travel planning needs.

3. Methods

The architecture of WonderSL encapsulates a multipurpose approach for personalized travel planning. Through this Fig. 2 it is identified how the system abides the user's preferences and analyzes the user preferences and continue the task flow to complete the user tour planning.

User management serves as the foundation, ensuring a tailored experience for each traveler. Extensive research in the field of user profiling and preference analysis underpins the platform's ability to cater to individual travel aspirations.

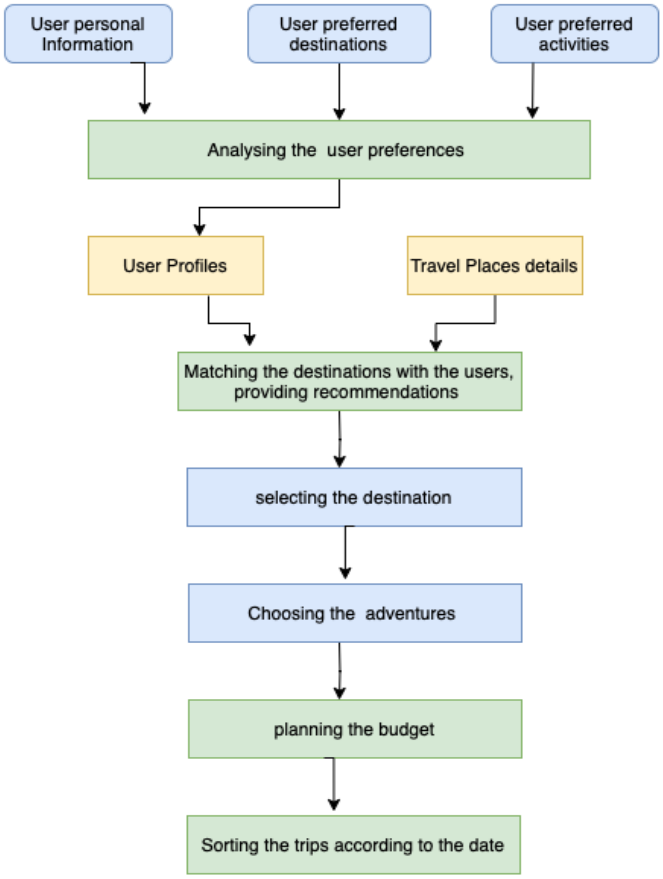

Fig. 2 Process of the system

A. .Tour planning and Budgeting

The integration of satellite map Fig. 3. showcases destinations in a captivating and informative manner. This innovation brings destinations to life in a way that significantly contributes to the user experience, capturing the attention of both travel enthusiasts and academic researchers.

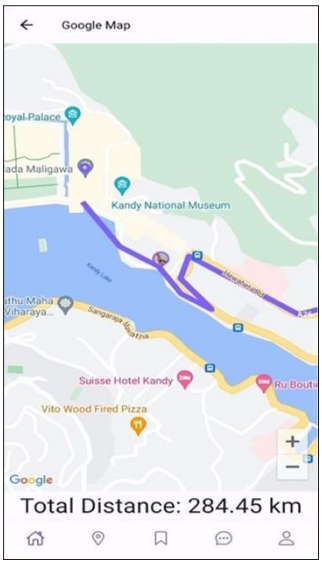

Fig.3 Satellite Map View

Within the system according to Fig.4, an integral feature calculates the distance of the intended tour. Once this distance is determined, users are seamlessly guided through the process of estimating the total transportation costs. This estimation is made highly user-centric, allowing travelers to select their preferred mode of transportation based on their unique preferences and requirements.

Fig. 4 Transportation Cost UI

In practical terms, the system provides a step-by-step approach. Users can input their selected transportation mode, whether it be by car, bus or motor bike, aligning with their specific travel style and budget. The system then efficiently computes the associated transportation expenses, offering travelers a clear and itemized overview of their expected costs.

This user-friendly and personalized approach to transportation cost calculation empowers travelers to make informed decisions that not only align with their financial plans but also cater to their travel preferences. It ultimately ensures that the journey is not only budget-friendly but also tailored to the individual needs and desires of the traveler.

WonderSL offers comprehensive functionality, allowing users to gain a clear and concise understanding of the overall budget required for their trip after the estimation of the transportation cost to enhance their excitements

discriminating their anxieties. This feature ensures that travelers can make informed decisions and manage their budget effectively, empowering them to explore their desired destinations with confidence and financial stability as displayed in the Fig. 5.

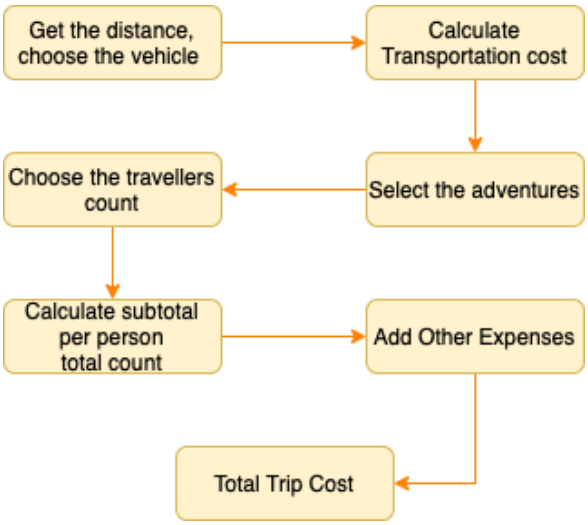

Fig. 5 Budgeting Process

B. Communication Channel

The chatbot follows a structured flow to provide users with efficient and personalized assistance. As shown in Fig. 6, begins when a user initiates a conversation, and natural language processing algorithms are employed to comprehend the user's input, identifying keywords, and extracting intent. The chatbot then accesses travel-related data sources for travel attractions. The chatbot can facilitate bookings and share details, providing ongoing support, including reminders and travel tips. It may seek feedback for improvement and continuously learns from user interactions, creating a seamless and user-friendly travel planning experience that automates tasks and delivers quick, relevant information.

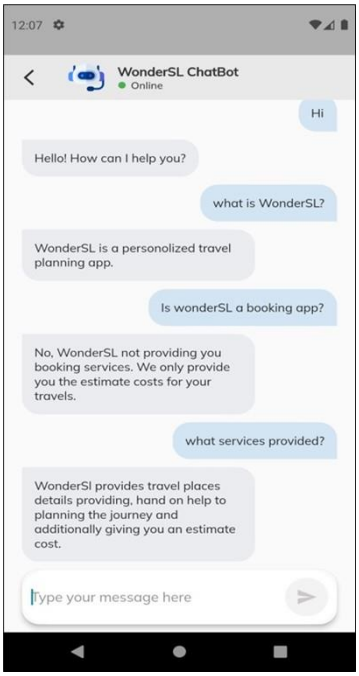

Fig. 6 WonderSLChatBot

Here popular tools like Flutter, Mapbox, Firebase, VS Code, GitHub, and DialogFlow which are used for the implementation of the mobile application.

Flutter[8] is an open-source UI software development kit created by Google which is used to develop cross platform applications from a single codebase for any web browser, Fuchsia, Android, iOS, Linux, macOS, and Windows.

Mapbox[9] is a mapping and location cloud platform for developers and this platform used to implement location. Both Google Maps and Mapbox support the idea of customization, but customization is the main strength of Mapbox. Google map is a bit strict, or we can say less flexible when it comes to customization.

Firebase[10] or google offered real-time database platform is a set of backend cloud computing services and application development platforms provided by Google which hosts databases, services, authentication, and integration for a variety of applications, including Android, iOS, JavaScript, Node.js, Java, Unity, PHP, and C++.

Visual Studio Code[11], also commonly referred to as VS Code, is a source-code editor made by Microsoft with the Electron Framework, for Windows, Linux and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git.

GitHub[12] is a platform and cloud-based service for software development and version control using Git, allowing developers to store and manage their code. It makes it easy for developers to share code files and collaborate with fellow developers on open-source projects.

Dialogflow[13] is a natural language understanding platform developed by Google that allows developers to create chatbots and virtual assistants. It enables the design of conversational interfaces that can understand and respond to user queries in a human-like manner, making it a powerful tool for building interactive and intelligent chatbot applications.

Apart from those tools

1) Requirements gathering

To create a user-centric mobile travel application, a multifaceted approach was taken to gather comprehensive requirements. Interviews were conducted with stakeholders associated with the tourism industry, including tour operators, travel agencies, and local authorities. These conversations offered valuable insights into the industry's pain points, challenges, and evolving trends.

All the requirements gathered from these multifaceted sources were meticulously documented to establish a clear and comprehensive scope for the project. This scope served as the foundation for designing, developing, and refining WonderSL into a powerful and user-centric travel companion. By incorporating insights from stakeholders, survey data, and user feedback, WonderSL was tailor-made to address the specific needs and challenges faced by travelers in the ever-evolving landscape of modern tourism.

2) Analysis and design

According to the collected requirements, the functional and non-functional aspects of the travel planning app were analyzed. Use cases, wireframes, and flowcharts were created to visualize the app's behavior, to identify the navigation flow and the data storage mechanisms.

3) System overview

The WonderSL application operates through layers and components that collaborate to improve individualized travel planning as illustrated in the Fig. 7. In the user interface layer, the mobile app interface connects user inputs and responses with the system. Map Interface triggers the recommendation Engine and Google Maps API for navigation and suggestions, while Messenger Interface provides real-time communication with Chatbot.

Application logic layer has user Management which manages data within user database. Recommendation Engine draws the destination database for personalized suggestions. Budget calculation estimates costs based on budget information. Chatbot service engages users with AI chatbot interactions and responses.

In the Data Management layer, User Data stores and retrieves user profiles. Destination database contains details about various travel spots. Budget information provides cost data for calculations while AI chatbot data holds predefined responses for chatbot service.

External services consist of weather forecast API. The locations are filtered by the Google Maps API and integrated to enhance navigation and location data in the map interface. And the Weather Forecast API fetches real-time weather data for users.

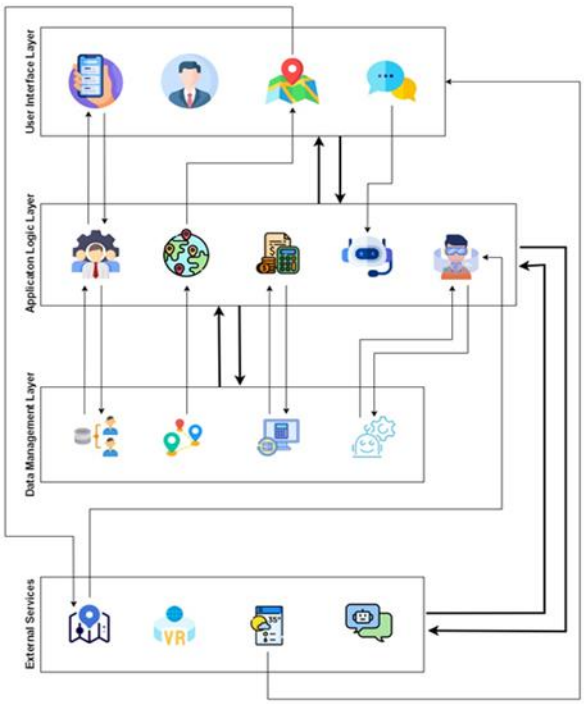

Fig. 7 System Overview Diagram

4. Results

The implementation of WonderSL yielded promising results. Users reported enhanced satisfaction and convenience in exploring travel destinations. The option of recommendations based on user preferences and schedules was well received, enhancing the overall value of the application. Furthermore, the application's user-friendly interface and intuitive navigation have contributed to its popularity among travelers, making it a go-to choice for seamless and enjoyable trip planning.

Additionally, through the applications the users can plan their budget customized according to planned number of days, group size, and desired activities at each destination. This feature empowers travelers to avoid financial limitations at the point of travelling or have the preliminary capacity to adjust their plans at any moment.

The integration of satellite maps view aids the users to get captivating visual experience that aids users in making informed decisions about their travel destinations. The application constantly updates the weather forecast and allows navigations through the satellite view of the map to avoid the barriers such as road closures, traffic congestion and constructions for the travelers to be aware of the concurrent situation.

The chatbot feature demonstrated efficiency in addressing user queries, has been a significant contributor to overall user engagement and satisfaction. Users are satisfied with the simplicity of using a single, user-friendly portal to obtain extensive travel information, to view activity details, and schedule them for budgeting purposes.

According to statistical analysis, customer satisfaction and the level of convenience can be levelled up[14]. People mostly use these types of applications for Socialization, Educational, Prestidge, Natural admiration and advertisement. According to information found from a study, the ratio of people purpose for the usage of such application is as follows.

Fig. 8. illustrates the varied purposes for which travelers use travel guide applications across different cultural contexts. These purposes include seeking inspiration for natural admiration, connecting with others through socialization, acquiring educational insights, and enhancing one's prestige through informed travel choices. This analysis highlights the multifaceted roles that travel guide applications play in catering to diverse travel preferences and objectives across the globe.

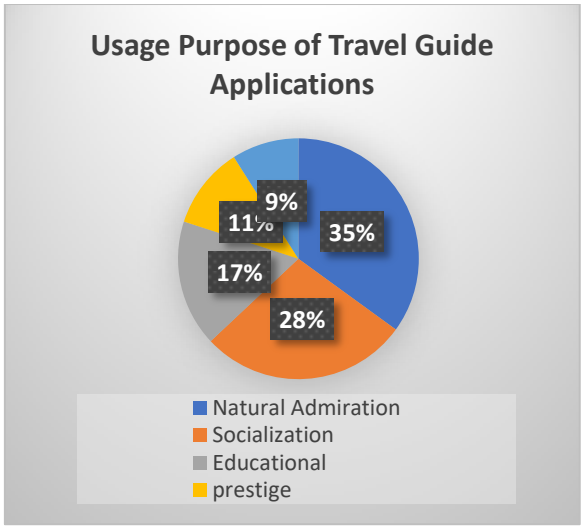

Fig. 8 Analysis of the usage of Travel Guide Applications for purpose

This underscores the positive impact that the application's user-centric features have on the overall travel experience. This diverse range of use cases highlights the versatility of WonderSL in catering to the multifaceted needs and interests of travelers, making it a valuable tool for a wide audience of users.

5. Discussion

The results illuminate the challenges faced by modern travelers and WonderSL being able to provide solutions as a unified platform to offer valuable insights for the travelers to plan and organize their voyages systematically. Most significant feature addressed by this application is providing suggestions according to the flexible schedules to revolutionize the people's interest and increase the approach for traveling through satellite maps. This could have been an impact on the growth of the tourism industry in the country. Giving priority for the user preferences and presenting relevant travel information technically using 360-degree views, simplifies the decision-making tasks for the users. The integration of budget management tools allowing the travelers to be financially stable and updating the users constantly throughout the explorations using map views can be considered as significant.

WonderSL can provide practical implications to travelers through the AI chatbot. They let the user's concerns be solved by generating quick answers to make things convenient for the user.

However, it is important to acknowledge the boundaries of this study. As this application is guiding the travelers from the primary level to inspiration of the next voyage it is important to get user feedback constantly on the fact how effective WonderSL is at solving the problems considered. Also, being adaptive to the different approaches people might use according to their preferences aluminide with their knowledge on using the technology and internet connectivity. As a result, individuals will get the chance to systematically manage and plan their explorations by accessing the latest opportunities duly without any obstructions.

In addition to the considerable advantages highlighted in this study, it's important to recognize potential areas for further improvement and expansion. While WonderSL has undoubtedly streamlined travel planning and exploration, ongoing user feedback and adaptability to varying user preferences and technological proficiency are crucial factors for sustained success.

This iterative process of refining and enhancing the application ensures that it remains a dynamic tool for travelers, effectively addressing their evolving needs and preferences. Moreover, the continuous updates and real-time information provided through map views are integral to keeping travelers informed and helping them navigate unforeseen challenges during their journeys. As a result, WonderSL not only simplifies travel decision-making but also contributes to a more organized and seamless travel experience, which is paramount in today's fast-paced world of tourism.

6. Discussion

In conclusion, this research paper introduces a mobile application for the local and the foreign tourists to create their personalized travel plan who are interested to explore Sri Lanka but lack of motivation and support to make it a success. This application primarily centers around offering recommendations, personalized travel planning, communication management and budget management. By integrating satellite map view, 360-degree imaginary view, user preferences, AI powered chatbot and interactive navigation.

While this study has provided an overview of the application's institutions, functionalities, limitations, and outcomes. In terms of future research investigations are to be performed to improve the application through user feedback and conducting user experience assessments. This cross-cultural analysis of the usage of Travel Guide Applications for purpose surveys underscores the universal appeal of such applications, as they effectively cater to the diverse travel motivations and objectives of individuals from different cultural backgrounds.

Integration of emerging technologies such as AI and Machine Learning algorithms to overcome the language barriers, collaborate with friends or groups using a messenger option, save their memories in the application by securing the user privacy, incorporating additional locations, collaborating with nearby hotels according to the user preferences and facilitating the users to add the accommodation plans for the budget plan and heatmaps to enhance the applications functionalities and the user experience. This pre-trip exploration increases the excitement by supporting the users to be confident on the choice they make on the destination they select to visit. Remarkably, this application addresses a solution for the challenges faced by modern travelers[15].

In conclusion, this research introduces WonderSL, a mobile app designed to transform how travelers plan and enjoy their journeys. WonderSL addresses the challenges modern travelers encounter, aiming to reignite their love for exploration. Through personalized recommendations, immersive features, and a focus on user needs, WonderSL represents a beacon of innovation in travel technology.

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