An Image-Based E-Tourism Web Application

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***Abstract*-Tourism is an important industry that contributes significantly to the global economy. The advent of digital technologies has transformed the way people plan and experience their travel. Today, many travelers use the internet to research destinations, book accommodations, and plan their itinerary. In this context, image-based e-tourism has emerged as a powerful tool for promoting travel destinations and attracting tourists. This paper presents an e-Tourism Web Application system that serves as a Virtual Guide, facilitating the travel planning process. We have proposed an application that gives information regarding the monument or places with a single click of the picture. Our application also ensures that only the relevant information is available to the tourists. The distinctive feature of this application, distinguishing it from other comparable applications, lies in its exceptional amalgamation of essential travel planning information and functions. In our application, we are implementing features like information of tourist spot through image processing, nearby tourist spots, availability of nearby restaurants and hotels, live weather conditions. In our system, tourist can even explore a city's various other famous landmarks. Our application significantly reduces the time required to search for a place, leading to quicker decision-making, making trips easy and comfortable, and providing users with relevant information regarding the monuments.**

***Keywords*- image guide; tourism; web applications; weather condition; Image Recognition**

I. INTRODUCTION

In recent years, the proliferation of internet technologies and the growing popularity of e-commerce have revolutionized various industries, including the tourism sector. The advent of e-tourism has significantly transformed the way people plan and experience their travel journeys. As a result, tourists often prefer to visit multiple destinations in a single trip.

The tourism industry plays a vital role in the global economy, contributing an estimated 10% to the gross domestic product (GDP) worldwide [4]. However, the abundance of available information has made it increasingly challenging to access relevant data, complicating the decision-making process for travelers.

Planning a travel itinerary has become a daunting and time-consuming task, involving numerous steps such as selecting appropriate transportation options, identifying desirable destinations and lodging accommodations, researching tourist attractions at various locations, creating daily schedules that account for breaks, and navigating dining options. Additionally, optimizing routes to make the most of limited time further adds to the complexity of the process. Although several travel-related websites and online services have emerged to assist travelers in recent years, these services are often numerous, disjointed, and limited in scope. They offer only a narrow perspective on the planning process and provide limited customization options for generating results. Consequently, the travel planning problem has been exacerbated.

Despite the wealth of travel information available on the internet and through various apps, there is currently no application that allows tourists to directly obtain historical or relevant information about a monument or place simply by using its picture. Visitors must rely on guides to gain additional insights about a place or monument they are visiting.

To address this issue, this research paper aims to explore the potential of an image-based e-tourism web application as a novel and effective tool for travel planning. The application offers a unique and engaging user experience by incorporating visual content(images) as a primary means of communication and information delivery. By harnessing the capabilities of images, this web application goes beyond the limitations of textual descriptions, allowing users to extract information about tourist spots and nearby amenities, including restaurants, hotels, and live weather conditions with a single click.

In summary, we have developed an intelligent web-based system [10] that streamlines the travel planning process, focusing on providing accurate, comprehensive, and customized information to tourists. By harnessing the potential of visuals, the application have the potential to offer an immersive and captivating journey through the digital realm, enriching the travel planning process and fostering memorable experiences for users.

The remainder of this paper is structured as follows: Section 2 provides an overview of the existing applications available to assist travelers in planning their trips. Section 3 outlines the implementation and functionalities of our proposed applications. In section 4, we present the compiled data and discuss the findings. Finally, Section 5 concludes the paper and outlines potential directions for future work.

II. LITERATURE SURVEY

B. Maulik et al. undertook the development of a flutter-based application that consolidates various functionalities within a single app, thereby providing tourists with essential information and features in one place, eliminating the need to navigate multiple applications [1].

M. Wang, et al. delves into the design concept of a smart tourism system platform that additionally enables the planning of travel routes based on diverse travel service indicators. [2]

L. Zhang, focused on the optimization design of virtual and real integration of the visual communication based scenic spot guidance system. [3]

Y. Zhang et al. directed their efforts towards harnessing next-generation art technology in conjunction with the rendering capabilities of the Unreal 4 engine and VR architecture. [4]

P. K. Katkuri, et al. focused on Virtual and Augmented Reality, which provides the necessary information about the destinations and their attractions.[5]

J. -L. Tseng et al. focused on leveraging virtual reality technology to intelligently showcase landscape information based on user perspective detection.[6]

Ivaldir de Farias et al. dedicated their work to developing an application aimed at enhancing tourists' understanding of the cities they visit by providing comprehensive area-specific information. [7]

Alexander Smirnov et al. concentrated on creating a mobile application that proactively suggests tourist attractions based on individual preferences and the current regional conditions.[8]

A. Smirnov, et al. developed an Android Mobile application which incorporates APIs of Google Maps to determine the location and also forecasts weather conditions. [9]

K. Al-Rayes et al. emphasized the intelligent automation capabilities of their system. By utilizing rapid advancements in electronic information technology and computer technology, this research combines the shortest path algorithm and relevant graph theory knowledge to design algorithms and processing schemes. Additionally, the study introduces the research design of an intelligent tourist system. [10]

Xiaoyu Shi et al. introduced a fundamental concept centered around common conversations in various locations that travelers typically encounter upon arriving. Notably, the main highlight of this work lies in the interactive nature of user interactions. [11]

Jian Meng and Neng Xu developed a hybrid recommendation system that incorporates agent technology. This system takes into account online communication with other sectors within the tourism industry, including the tourism supply chain and agencies. The online communication between these sectors is facilitated through agents, utilizing the contract net protocol as the underlying framework for its design and development.[12]

S. Sharma and A. Agrawal focued on providing the tourists to know the all information about the particular tourist places

and take full advantage of the visit without missing the main information and history.[13]

III. METHODS

To simplify the process of organizing trips, we have developed an intelligent web-based system that provides a wide range of functionalities. The application is created using Google Maps API technology, leveraging programming languages such as Python and JavaScript, and incorporates OpenCV for image recognition. The GoogleMapsActivity feature is employed to seamlessly integrate Google Maps into the system. For image recognition, OpenCV is utilized to compare uploaded images with those in the database in order to identify monuments. The application utilizes histogram comparison and the ORB algorithm for feature detection in image comparisons.

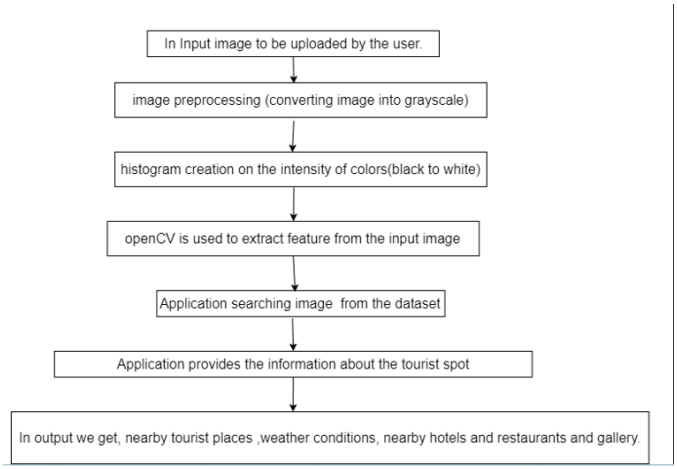

Fig. 1. Data Flow Diagram

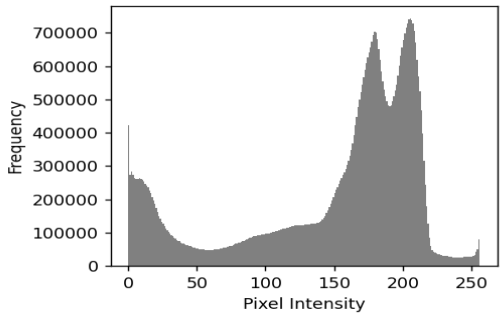

Fig. 2. Histogram of the monument's image

The application provides several features and functionalities, which are displayed in the form of buttons as cards on the home screen.

A. The Splash Screen (Fig.3) serves as the initial screen upon opening the application, showcasing an image, video, or the current software version. The Go button is provided for users to upload an image.

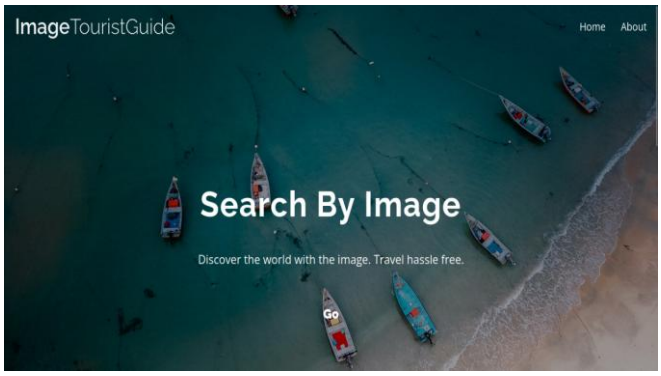

Fig. 3. Splash Screen.

B. The main screen or Home Screen (Fig.4) enables users to access relevant information about monuments. This screen highlights the key features and functionalities of the application, with buttons corresponding to each offered functionality.

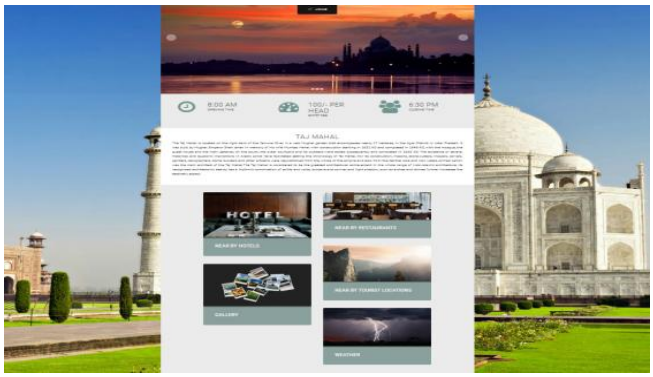

Fig. 4. Home Screen.

C. The Nearby Hotels and Nearby Restaurants buttons (Fig.5) display the location of the hotels and restaurants and their locations, respectively, using the Google Maps API.

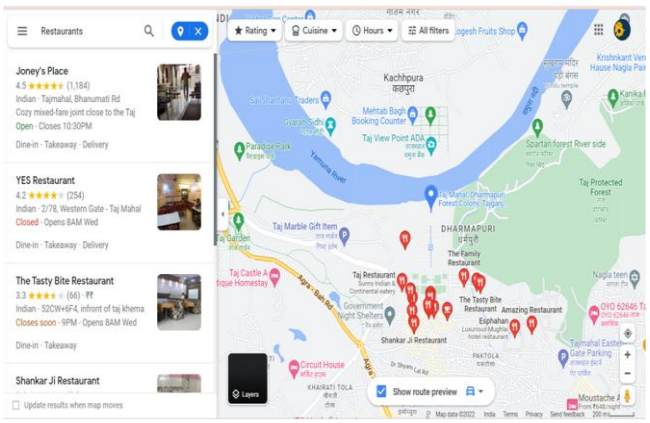

Fig. 5. Nearby Hotels and Restaurants.

D. The Nearby Tourist Locations button (Fig.6) displays a list of all the tourist spots surrounding the location of the uploaded image and also displays their location and route.

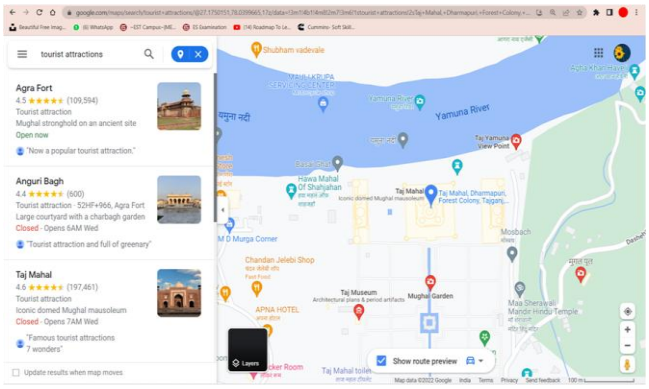

Fig. 6. Nearby Tourist Location.

E. The Gallery button(Fig.7) displays the pictures of the monument using Google Images. It displays lot of beautiful photos to showcase the travel destination and venues.

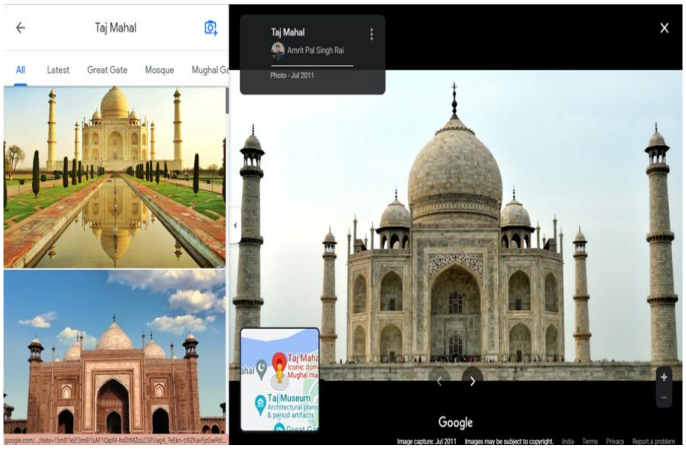

Fig.7 Gallery

F. The Weather button (Fig.8), displays the current and future weather conditions of the location of the monument or tourist spot in a tabular and graphical manner which is implemented using the web application.

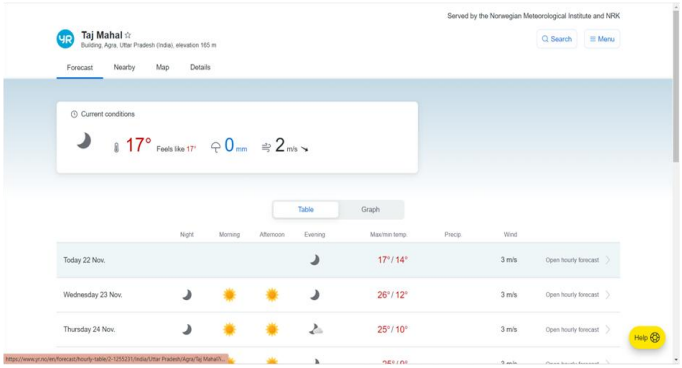

Fig.8 Weather Conditions

IV. RESULTS AND DISCUSSIONS

The application presents a menu that showcases the main categories of available attractions. By uploading an image, users can access all the relevant information related to the attraction. Additionally, users have the option to delve into more detailed information about the spot and perform various actions such as viewing a gallery, checking weather conditions, navigating to the attraction, or learning about its history. When selecting the nearby hotels and restaurant feature, Maps is utilized. The user can also access an exclusive list of nearby tourist destinations. All the images are matched from the dataset that has been created. However, due to its prototype nature, the dataset is currently limited in size.

Features	Proposed Application	Locatify	Flux guide	Tour Buddy
Touristic Sites	Y	Y	Y	Y
Access to maps	Y	Y	Y	Y
Bus Routes	Y	X	X	Y
Hotels	Y	Y	Y	Y
Tourist Attractions	Y	Y	X	Y
Bilingual	X	Y	X	X

Table 1: Comparison between our application and existing

V. CONCLUSION AND FUTURE WORK

Several potential enhancements can be implemented in future iterations of this app:

- The database used in the app is not currently an open-source database but rather a prototype database containing images for testing purposes. It will need to be expanded in the future to include information about monuments in different cities around the country or even globally.
- An improved search feature can be introduced to enhance the speed and accuracy of results. This can be achieved by dividing the database according to country, state, and city. Users can provide information about the country, state, or city they are visiting, resulting in faster and more targeted search outcomes.

- A user registration feature can be added, allowing users to create and update their profiles, as well as set preferences according to their individual preferences.
- An additional feature can provide detailed information about the region the user is currently in, not limited to just any monument.
- To facilitate effective communication with local people, a feature can be incorporated that enables the translation of user-written text into the local language. This translated text can then be converted into voice for easy communication. Similarly, the app can also support voice input in the local language, which can be converted into text in the user's language, promoting seamless communication between tourists and locals.

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