TOURISM WEBSITE USING MERN STACK AND AUGMENTED REALITY

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Abstract **:** Web application today plays a vital role in ordering food from a restaurant, ordering any electronic items or anything from web applications, watching movies, booking a seat in a cinema, for studying, downloading images from the internet, etc. If you want to create a tourism portal that can to satisfy the client, you have to consider their wishes and interests, so we have developed a tourism website that consists of the best tourist spots and provided a very beautiful extended type of videos for you to view the places beautifully. And the MERN stack is one of the most popular JavaScript stacks used for easier and faster deployment of fullstack web applications containing backend, frontend and database components. Travel enthusiasts have always wanted to travel to fascinating places and archive their unforgettable experiences. Nowadays, there is a wide variety of travel based web applications. This project aims to explore features that could be integrated with travel applications and offer a customizable user experience. We further discuss the prevailing disadvantages of existing travel apps and look forward to the adoption of modern features that will make travel apps more accessible. Currently, there is no simple single platform where people can share their travel experiences, get suggestions of places to travel and recommend travel places to their loved ones. So we came up with the idea of creating a full-stack web app where people can share their journey through images and locations. This will eliminate the tedious process of browsing the web and traveling.

Keywords: - Augmented Reality, Chatbot, MERN Stack, Web Application.

I. Introduction

There are a number of travel apps on the web these days. The goal of these applications is primarily to help Users search for places and plan an itinerary. However, existing web applications lack a customizable travel experience when offering services to their users. The proposed web application overcomes this shortcoming by providing a user-friendly travel experience. To engage users in our app, features like augmented reality images, Chatbot and Google Translate contribute to the best user experience. AR images allow users to view a location in real time, available to them from anywhere. The chatbot serves as a travel agent that accompanies users on their journey. Suggesting destinations based on the user's history saves users a lot of web surfing. Presenting content in native languages makes the travel app accessible to a wide range of users. Recent travel-based apps are complex and can be intimidating for naive users. In fact, they lack connection with users. When discussing the accessibility of a web application, it is necessary to consider users with disabilities. For example, the text-to-speech feature uses application scope, making it future-proof. MERN Stack application development consists of three main parts:
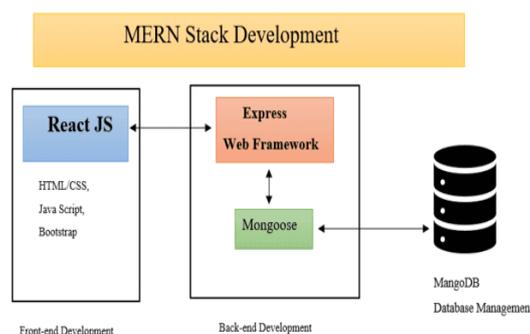
In this work, we have added various features like Chatbot to provide travel instructions to users, sending images to travel locations, displaying some famous destinations in AR, Geocoding API to preview location on map in real time, Authentication and authorization is implemented as to give the user permission to create their travel profile as well as view travel locations posted by other users. This full stack web application was deployed on a real web server.

II.   Literature survey

If you want to create a tourist portal that can satisfy the client, you need to consider his wishes and interests. Most of the transactions are now done online. Artem Vysockij, Nataliya Antonyuk, Anatolii Vysockij [1] and others designed a travel app that helps you explore famous places, restaurants, religious places and shopping malls. The application also has access to maps, with which the user will be able to reach the point you have chosen. The Google Cloud platform was used to store and display the data, which provides data integration and ease of use. Data is stored locally and even offline real-time events continue to work, providing a sentimental experience to the end user. The downside of this app is that it lacks new features. Augmented reality or features like geo-tagging, 3D images can be added for a better user experience.

With social development, tourism shows a rapidly increasing tendency. Therefore, it has become a new point of growth for the national economy. However, most tourism apps on the market are monetized, with monotonous content and low interaction. The system proposed by Yiting Ping, Lingjun Yang, Sanxing Cao [2] is a multimedia system in the field of cultural tourism, which is based on this phenomenon and is combined with multiple media technologies, relying on the WeChat mini-program platform. The system includes five main functional modules, which not only allow visitors to view the scenic spots in advance, but also help them learn about the history of the scenic spots. The proposed system uses MySQL as a database. However, MySQL does not support very large MongoDB database or the problem can be avoided by using cloud databases.

Tourist reviews are a source of information for travelers about tourist places. Unfortunately, some reviews are irrelevant and become noisy data. Muhammad Afzaal, Muhammad Usman, Alvis Fong[3] present an aspect-based sentiment classification framework that not only identifies aspects very efficiently but can perform the classification task with high accuracy. The framework has been implemented as a mobile application to help tourists find the best restaurant or hotel in town. The accuracy of this model is very high (85 percent identification and 90 percent classification). One thing that can be added to text classification is image classification. This will make the application easy to use with less vulnerabilities.

Providing tourists with a piece of correct and interesting information is always a challenge that we have to deal with. One of the online tourist guides is the travel guide created as part of the Peregrinus Silva Bohemica project [4]. The goal of the project was to make the historical cultural landscape more attractive for tourists through a multimedia digital travel guide. It uses a 3D map window that allows the user to browse the selected location and obtain information about the object of interest. A guide is also available for those who prefer to read offline. Along with the online application, if they can add AR features to the guide, it would be a really amazing experience for the users. Qiaoyi Li [5] mainly focuses on the development status of Internet tourism and the problems of tourism integration management, and proposes an optimization solution for Internet tourism to facilitate the rapid development of the local tourism economy, such as strengthening the development of intelligent system, improving the online tourism management system , combined tourism talent training, optimization of the market investment mechanism system, and expansion of marketing and operation methods. However, these solutions require continuous improvement of industrial integration management. Proper progress is also needed in the management of the integration of the tourism industry and the full expansion of the local tourism economy and the complete improvement of service content.

.Hui Jie Lin, Ming Jian Mo, Yong Gang Tang [6] focus on Smart Tourism with the help of cloud technology. The 5G network plays an important role for the success of smart tourism. To bring smart tourism to reality, user data is collected in the form of big data and this data is analyzed and decision making is done using this. With the help of artificial intelligence and machine learning, the user experience is improvised and the experience is customized. Provide VR/AR/MR tourism project to users as the technology is brought into the picture. This technology implementation is only possible thanks to the 5G network, which has low latency. Its transmission speed is up to 10 to 100 times faster compared to LTE. This makes information processing much faster. This system can only be built on the pillars of the 5G network, which is still in research and actual deployment. Smart devices and AR/VR/MR still have many technical issues that need to be solved. Robotic technology is still in research and development.

Zhou Juelu, Wang Tingting [7] transferred a cultural tourist attraction into a virtual 3D model using 3D virtual reality fusion quantitative tracking technology. Multigen Creator software is used to create a virtual simulation experimental system. 3D scanning technology is used to recreate the virtual tourism system. Vega Prime is used to create 3D environments. This system has been shown to have a faster iteration than the traditional system. The 3D rendering and integration used in the system can require heavy hardware calculations. A system environment variable for attributes and structure must be added exactly.

Sulistyo Heripracoyo and Suroto Adi [8] aim to promote digital tourism business using web and data communication technologies using Apache MQ, web services and API. Tourism business is not a single business such as only a tourist destination but also includes other service businesses such as travel, hotel and culinary services. The integration of information and data from each of the four websites was done using web services, APIs and apache MQ tools that can automatically exchange data, which in turn can increase efficiency and convenience for tourists by only accessing through one source of information from one of the collaborating websites. It helps office tourism, travel agency and travel agency, hotels and tourist destinations to provide information easily and effectively to promote their information, tourism visitor can get information faster and easier. A given system integrates data from various available sources, and the sources are not necessarily trustworthy. Data from different sources can be structured, semi-structured or unstructured, making it difficult to convert them into a single form.

Charnsak Srisawatsakul and Waransanang Boontarig [9] focused on recommending tourist places to users using a content-based filtering method. The Instagram user handle is used to submit the data. Instagram mining is done on user ID to collect photos. Google's machine learning API is used to extract expressions from photos. A vector scaling method is used to find similarity. A similarity index will be created between the tourist spots and the user. Based on the cosine similarity index, sites are recommended in ascending order. The downside of this system is that it uses Instagram users to recommend places. Also, Instagram subject handle must be public. Instagram must have enough data to process.

Ankit Verma, Chavi Kapoor, Abhishek Sharma, Biswajit Mishra [10] created a web application that helps college students, faculty and alumni communicate on one platform. This is a university website that uses the NLP machine learning model for text analysis. The ML model analyzes the emotions in the text and classifies them as positive, neutral and negative. It doesn't analyze images, so if someone uploads an inappropriate image, it won't be classified as negative.

III. Existing work

There are a number of travel apps on the web these days. The main goal of these apps is to help users search for places and plan an itinerary. However, existing web applications lack a customizable travel experience when offering services to their users. There are a number of travel apps on the web these days. The main goal of these apps is to help users search for places and plan an itinerary. However, existing web applications lack a customizable travel experience when offering services to their users.

IV. IV. Proposed System

The proposed web application overcomes this shortcoming by providing a user-friendly travel experience. To engage users in our app, features like augmented reality images and Google Maps contribute to the best user experience. AR images allow users to view a location in real time, accessible to them from anywhere. Google Maps serves as a travel guide that accompanies users on their journey, it also allows users to send map directions of their journey directly to their phone, and also allows users to search for nearby hotels, restaurants and many more. Thanks to the presentation of content in native languages, the travel application is accessible to a wide range of users. Recent travel-based apps are complex and can be intimidating for naive users. In fact, they lack connection with users. When discussing the accessibility of a web application, it is necessary to consider users with disabilities. For example, the text-to-speech feature leverages the scope of the application, making it future-proof.

V. Methodology

A. Front end

The front-end of the web application was developed using ReactJS. When visiting a web application, a single page is rendered to the user. The home page displays a list of users registered in the application. The user interface consists of various components such as a navigation bar for app navigation, login, login, add location and edit location forms for users that provide basic information, a list of users and locations, a side drawer for mobile view as well as a browsing model maps ReactJS, which is a JavaScript library, was used to create the user interface. ReactJS makes it possible to create applications with a rich user interface and an improved user experience. Building modern web applications React ensures better performance, scalability and a better user experience. Using ReactJS improves page rendering and gives the user a mobile app-like experience. In our work, we used React router to make navigation fast and user-friendly. State management through Redux helped make DOM updates faster and more interactive. Designing the user interface through reusable and manageable components makes overall development a breeze. A loading API baked into the browser along with React was used to communicate with the backend via http requests.

B. Back End

The back-end is built using NodeJS and ExpressJS. -Routes for various API endpoints for users and locations were configured using the Express router. To send quick responses to the frontend, a REST API was used to communicate data associated with users and places in JSON format. Since our application is a SPA, the backend is stateless and separate from the frontend, user authentication is done using a JSON web token. User profile images and location images are also stored on the backend to optimize overall application performance. Authorization provides role-based access, meaning users can manipulate their own travel locations and simply view locations posted by others. To ensure data integrity, transaction data is validated on the backend before finally being saved to the database.

NodeJS helped create a fast, scalable and robust server. Versatile modules and packages helped make development easier. Development dependencies helped in the process of automatically restarting the server after making changes. Since security is a big concern in modern web applications, a package offered by NPM was used to hash passwords. In terms of authentication, a JWT token generator dependency has been implemented to encode the user's confidential data. Thus, NodeJS combined with its ExpressJS framework has significantly increased application performance due to its event-driven architecture compared to other server-side technologies.

C. Database

In our web application, the database is developed using MongoDB. The Mongoose API is used to query the database from the NodeJS backend. MongoDB comes with a tool called MongoDB Atlas for monitoring and managing database activities during local development. The database consists of two collections namely Users and Places. User document contains fields like id, name, email, password and image. Similarly, a place document consists of id, name, description, address, location and image. The advantage of using the Mongoose API is that multiple database operations can be performed efficiently by batching them into a transaction.

MongoDB is used in the MERN Stack because it is very compatible with React, Express and Node. A JSON document created in React can be sent to a Node Express server where it can be processed and validated, thereby directly storing them in MongoDB for future retrieval. The advantage of using MongoDB is that it is ideal for travel applications that require real-time scalability, such as Geocoding.

In our proposed work, MongoDB is dynamic, flexible and schema-free. As our application grows in terms of the number of users and consequently the huge amount of application data, MongoDB will be handled optimally. Furthermore, it has been observed through Atlas MongoDB that read/write performance improves linearly as more nodes are added. When it comes to user data reliability, MongoDB offers a replication feature that provides high availability by keeping multiple copies of documents on different computers. With dynamic schemas, MongoDB allows convenient modelling of the real world as well as the flexibility to add new fields without rewriting the entire application. So, MongoDB is the perfect choice when building a modern web application.

D. Augmented Reality

The image gallery page of our app has various images related to various monuments in India. By scanning these images, users will see a 3D model of that image. These 3D models were added using the Unity 3D engine. Vuforia SDK was also used. With the help of Vuforia SDK, AR can be implemented on Android, IOS and UWP. As of 2017, Unity3D has built-in Vuforia support to make creating AR projects easier. The image target can be set using Vuforia. It enhances the user experience and creates unique digital experiences that combine the best of the digital and physical worlds.
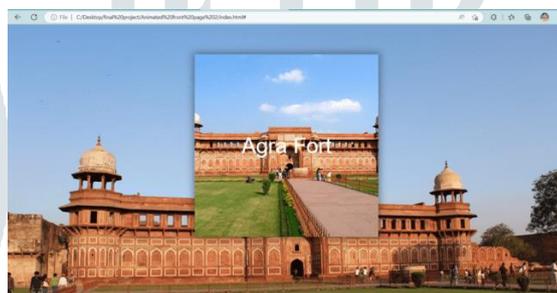
VI.   Result

Home page:

Places list:

Taj Mahal
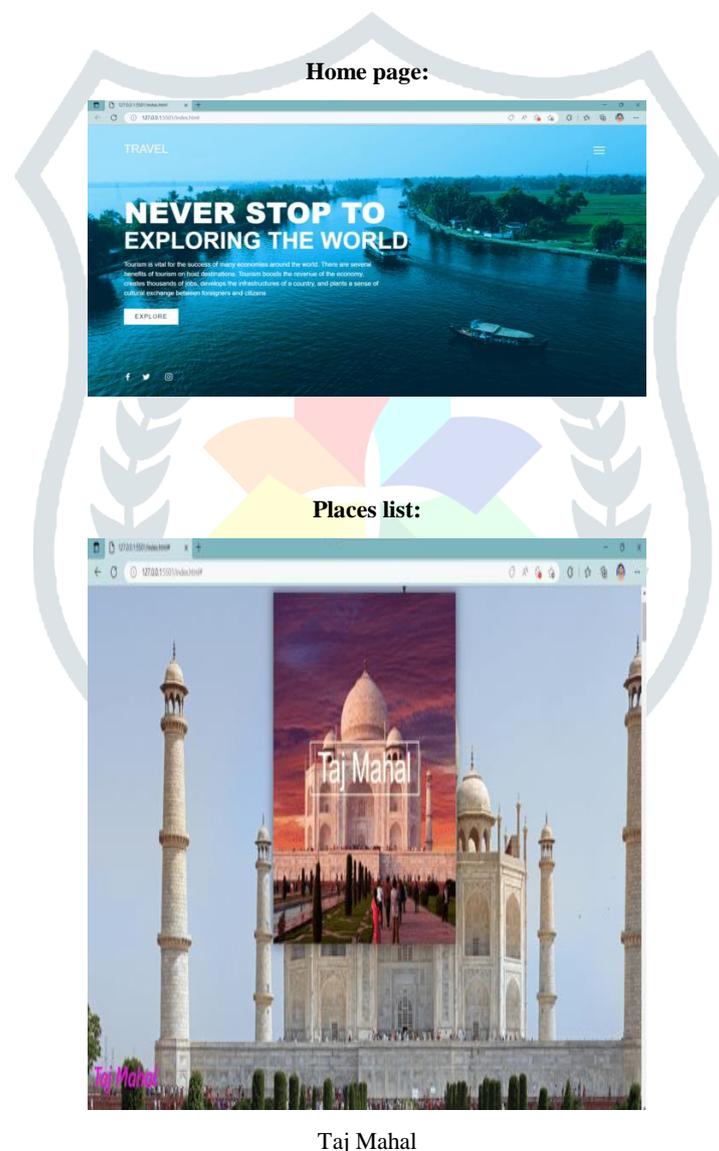
Akshardham

Lotus Temple

Agra Fort

Panch Mahal

Varanasi

Maldives

Mauritius Island

Goa

VII.   Conclusion

Tourism is a great source of income for any nation. Governments around the world have a Ministry of Tourism responsible for attracting tourists around the world. Attracting tourists is the most important task and providing them with an insight into the travel experience. Travel agencies play an important role in attracting tourists. Travel agencies operate their business through online websites where the user receives personalized recommendations and bookings are made. But as technology evolves, our proposed web application meets the requirements of modern users. The web application consists of React.js for the frontend, Node.js and Express.js for the backend, and a MongoDB database for storing transactional data. To make the app accessible in native languages, Google Translate has been embodied for the best user experience. It uses augmented reality to super-impose real-world objects, and location-based augmented reality has also proven to be the most attractive feature, super-imposing hotel and restaurant ratings on maps in real-time. Chatbot makes the web application more engaging with users and helps them explore their travel destinations.

VIII.   References

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