

An Intelligent Mobile Tourism Recommendation System Using Full Stack Architecture and Content based Filtering

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Abstract:

The competitive nature of the tourism sector necessitates ongoing flexibility in response to shifting consumer demands.. With the onset of the corona, human interaction is constantly feared and the guides that promise safety do not give accurate information regarding the places we visit. The genuineness is always on the line and tourists tend to take a blind step forward. This paper suggests the creation of a pocket tourist guide, a full stack application that combines personalized recommendations and services with comprehensive and current information. The application also provides information regarding present covid and vaccinated statistics along with the rules and regulations enforced in the places being visited.

Keywords: Tourism, Machine Learning, Full-stack, Covid, Recommendations.

Introduction:

The industry of tourism and hospitality is one of the largest service industries. It has grown to be one of the key participants in global trade and, at the same time, one of the primary sources of income for many developing nations. The world economy received a cumulative 9.3 trillion dollar boost from travel and tourism in 2019. With the covid-19 pandemic, travel and tourism industry is among the most affected sectors impacting economics, livelihoods, public services and opportunities globally. The strict lockdowns have confined everyone in their homes, restricting movement in the hope of getting control over the massive corona virus spread. Now, with several measures enforced and

vaccines introduced, the global situation has become better to a certain extent. This has provided people with enough courage to step out of their homes for visiting new places. However, basic human interaction is still feared. The genuineness is always on the line and tourists tend to take a blind step forward. Due to the rapid advancement of technology, there is a wealth of online travel information available to travelers. When making reservations for lodging and transportation, or arranging their schedule for a destination, tourists must visit a variety of websites, which takes a lot of time and effort. They struggle to compare and select the finest solution because the necessary information is available on numerous websites. Even while there are a few websites that analyze various travel costs, lodging

options, and ratings, they fall short in accurately indexing all hotels, particularly the more modest or unpopular ones. The last ten years have seen numerous attempts to integrate technology into travel services and the prevalent issue of information overload.. These systems are working but with outdated technology and separate services, therefore the tourists will still have to use multiple applications. The mobile phone has become a ubiquitous technology, a result of an increase in trend for mobile based applications. The mobile phone being small and easy to carry around, gives the tourist an advantage when it comes to searching up data "On the go". Our application also provides information regarding present covid and vaccinated statistics along with the rules and regulations enforced in the area being visited. A prototype of the proposed application is implemented. This prototype uses APIs for delivering dynamic data to the user and uses machine learning algorithms to provide users with personalized recommendations and services.

Literature Review

Many papers have been published regarding the application of technology in travel and tourism services.

W. Boulila (2021) et al. presented a paper named GuideMe: A Mobile Application based on Global Positioning System and Object Recognition towards a Smart Tourist Guide. This paper proposes an application that is based on either manual search, using GPS to find the location or by using Deep Learning methods for identifying the image taken by a visitor. All three options are provided in the developed mobile application.

H. Dong (2020) et al. presented a paper named Design and Implementation of Intelligent Tour Guide System in Large Scenic Area Based on Fog Computing. This paper has focused its application based on the basic requirements of smart tourism, and proposes an application based on fog computing. However, Fog Computing has a disadvantage when it comes to security. Thus, the application is prone to experience network and security issues.

L. Liu (2012) et al. presented a paper named Android city tour guide system based on Web service. In this paper, three layer architecture of Web development into mobile phone software development is proposed. The three layer architecture, though described as an effective

solution does not seem to be on par with today's technology and thus is not so very efficient.

Jingyuan Yang (2011) et al. presented a paper named Intelligent tourist attractions recommendation system based on cases. This paper describes how to meet the tourist's demands. However, Use of web crawlers results in increased traffic and thus required high bandwidth and space which would cause issue to the website.

R. Sood (2017) presented a paper named Intelligent mobile based tourist assistance system. This paper describes a module along with an app for tourists which would provide them all the required information about places nearby and provides emergency numbers. The information is provided by the kiosk being installed at different places via BLE Technology. But, BLE Technology cannot hold large data rates and cannot be used for long distance communications which will pose as major drawback for the proposed system.

J. Tseng (2018) et al. presented a paper named Development of Intelligent Tourism Information System Based on Virtual Reality. This paper develops a tourism information system by using virtual reality technology to show the landscape information intelligently by detecting what the user sees.

V. Singh (2014) et al. presented a paper. This paper presents a tourism information system that gives a centralized tourist travel guide system for Fiji where a number of services are available. The proposed system is a centralized system based on web services which provide all necessary information and tools that can be used by tourists to organize their trip.

Michael Kenteris (2006) et al. presented a paper. This paper presents a mobile tourism research prototype which uses web-based technologies for the creation of portable tourist applications with rich content that matches the users' profiles. However, this paper uses J2ME, whereas React Native, which is much more efficient and is in trend as it is a cross platform and can be used anywhere.

R. Fatima (2016) et al. presented a paper named Mobile travel guide using image recognition and GPS/Geo tagging: A smart way to travel. In this project, we are making an android based mobile application that can be used as a guide by the tourists. The main function of this application is to recognize a monument or a famous

spot from the picture clicked/uploaded by the user and to provide detailed information regarding it.

Alexander Smirnov (2015) et al. presented a paper named Application for e-Tourism: Intelligent Mobile Tourist Guide. The application recommends the tourist attractions that are interested to him/her based on the tourist preferences and the current situation in the region. Attractions and their descriptions & images are extracted from accessible Internet sources.

X. Shi (2010) et al. presented a paper named Tour-Guide: Providing Location-Based Tourist Information on Mobile Phones. This paper presents the architecture and implementation of such a location-based application, called Tour-Guide. Implemented on iPhone, the system is designed to provide tour information services; therefore people can get tour guidance information that they need anytime and anywhere.

A. Maryam (2016) et al. presented a paper named Travel management system using GPS & geo tagging on Android platform. The android project used for acquiring information about particular city's hotels, restaurants, historical places, etc. It will also provide the current location of the user. This application will also be used by travelling agencies to manage their customer trips, acquire information, etc.

A. Ismail (2016) et al. presented a paper named iTourism Travel Buddy Mobile Application. This paper presents a tourism mobile application that supports tourism information with assistive travel features to ease tourists by using technology that is closest to them.

Proposed Work:

The proposed system is a full stack application, built using MERN Stack, where the front end portion of the application is built using React Native which is a framework suitable for both Android and iOS systems. MongoDB is used as the database for the application. MongoDB Realm's edge-to-cloud sync and fully-managed back-end services poses as a great advantage in the building and deployment of applications. Google Places API is used to get information about places, which are defined as establishments, geographic locations, or prominent points of interest, etc. The information is returned in the form of HTTP requests. Information regarding the booking of available flights on leading global airlines is taken from Amadeus API. Apart from this, the Amadeus API also gives

information regarding the covid-19 rules and regulations enforced in almost 200 countries. Hotel and Restaurant recommendations are delivered to the user using content based filtering algorithm. This comes along with reviews thus, offering the user an almost accurate data regarding the place they want to explore. This application also offers background history and engages the user with local folklore and gossip thus making sure the tourist gets an all round experience.

System Architecture:

The user checks the application for information and updates. This request is passed on to the server. The server either triggers the API or the ML Model for information on the places to visit, flights to book, covid details or for recommendations on hotels and restaurants to book respectively. These process the request and display the result on the screen for the user to view. The information through APIs is in the form of HTTP requests. This is displayed below in the form of a pictorial representation. Based on the user's prior behavior or explicit feedback, the content-based filtering algorithm used for recommendations leverages item features to suggest additional items that are similar to what the user already loves. The Machine Learning algorithm used for recommendations is called content based filtering algorithm which uses item features to recommend other items similar to what the user likes, based on their previous actions or explicit feedback.

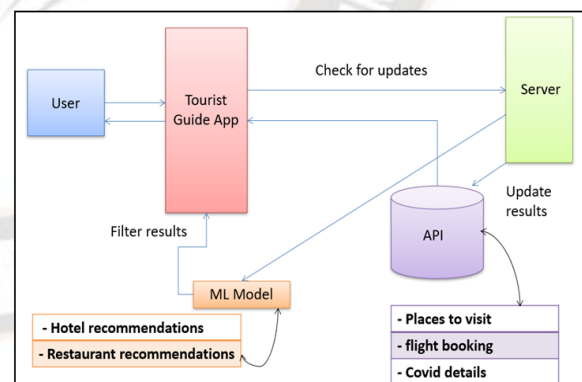


Figure 1 : Application Architecture Diagram

Results and Discussion:

The application is built using MERN Stack which ensures a very efficient and fast system performance. The proposed system design has made it possible to provide the tourism industry a number of benefits. The user periodically checks the app for news and updates.

The server receives this request and forwards it. The proposed system design has enabled to provide several features to the tourism sector. The user checks the application for information and updates. This request is passed on to the server. The server either triggers the API or the ML Model for information on the places to visit, flights to book, covid details or for recommendations on hotels and restaurants to book respectively. These process the request and display the result on the screen for the user to view. The prototype developed for initial testing is restricted to India and thus even though the APIs used offer information worldwide, it is not used for initial testing purposes.

Tourist's first and foremost problem faced when they visit an unknown place is the lack of information and proper direction. This application offers it all and more.

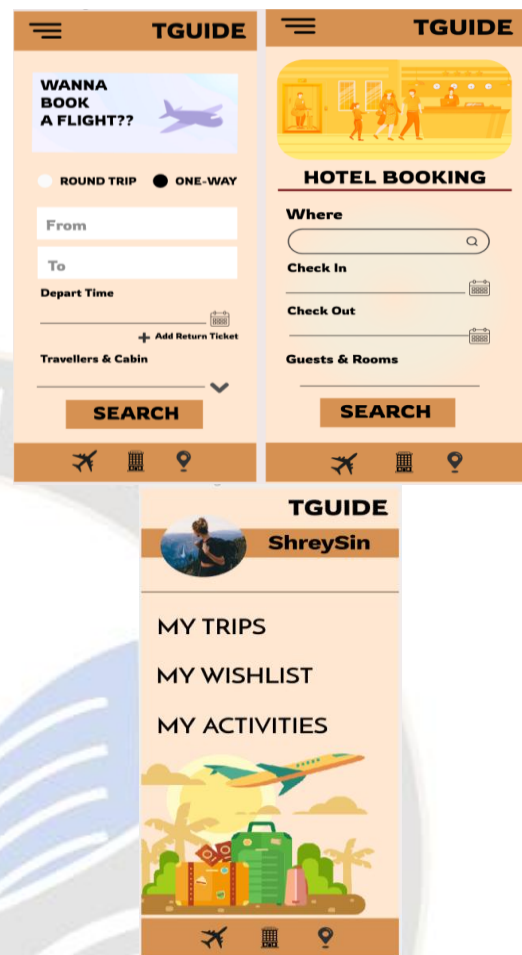
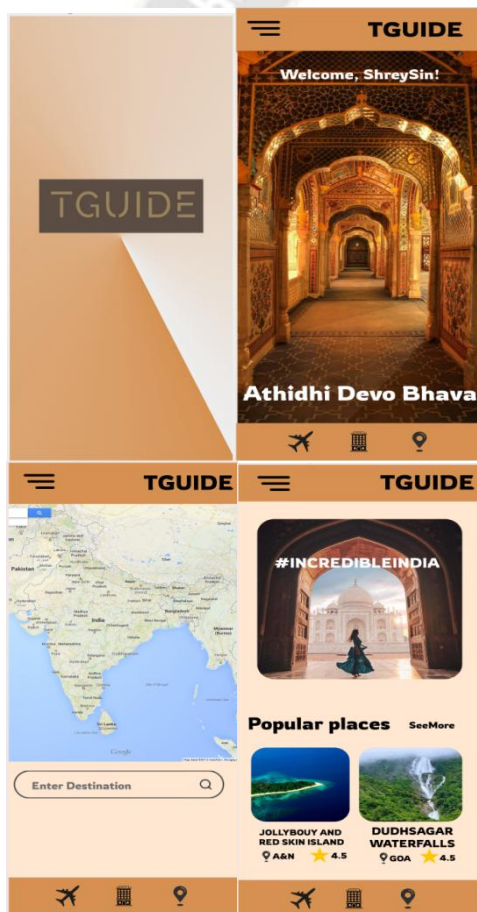


Figure 2: Pages of Application

The future scope of the project is to include regions worldwide and provide a translator tool to help in communication. Also, the application at this point works only with Internet and so the future improvement would be to make sure it works offline and as soon as internet connectivity is established, data gets updated. The basic architecture of MERN Stack technology used in this paper can be further extrapolated to other use cases and web applications.

Conclusion:

'Vacation' is the word that sounds like music to everyone regardless of age. Due to corona, holidays and workdays are all spent inside homes. Now, the situation has become less frightening and lockdowns have been lifted. People are stepping to spend their holidays elsewhere. With this comes loads of planning and packing. As much as a perfect place is important, perfect planning is required to make a trip a hit. Thus comes into picture the pocket tourist guide that provides

all details starting from flights to book, to hotels, restaurants and famous places to visit with their history, folklore and local gossip. The application built using MERN Stack promises an efficient and fast system which is the need of the hour.

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