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“Smart Tourist Application”

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Abstract—Smart tourist app is an AI based application. This application will help users/tourists to plan their trip smartly. It has many features that will be useful for the user/tourist to plan their trips as well as while traveling .It contains features like Location detection using GPS sensor on the basis that user will get suggestion of nearby hotels/restaurant/what are other places to visit nearby to that location and Landmark detection using image provided by user so that user will get information about that place, recommendation of nearby hotels/restaurant/places to the user so that it will more beneficial while traveling.

I. INTRODUCTION

The tourism sector, one of the biggest sectors worldwide, is a crucial component of the social and economic activity of a country as it generates various job openings and business opportunities. The tourism industry is increasing yearly. Tourism in India is important for the country's economy because it holds a major part in countries GDP and is growing rapidly. The World Travel and Tourism Council calculated that tourism generated approx. ₹16.92 lakh crore (US\$240 billion) which is 9.2% of India's GDP in 2018 and it supported 42.673 million jobs and 8.1% of its total employment for the country. Travelling has become a very important factor of our life. Planning a tour all by ourselves is a very difficult task and it is very time-consuming. Generally, while planning for a trip, we often prefer taking recommendations from our friends or relatives, but these suggestions are limited to the places they have visited. Also, the suggestions taken from travel agents for planning the trip are sometimes biased because their objective is to sell their Tour packages & make money out of them. Hence it is

necessary to come up with an automated user-friendly solution for solving some tourism related issues.

The Smart Tourist Application is an AI based application which helps users/tourists to plan their trip more efficiently. The application of smart tourism specifically to cities makes a lot of sense given the high needs for infrastructure and high concentration of other resources and users necessary information. The focus on sustainability and the development of smart solutions for tourism has led to the emergence of many concepts such as smart tourism, smart destinations, smart hotels, and smart applications. This application contains various features which help users or tourists in various ways. The user can use this application and can use this application while traveling also.

II. LITERATURE SURVEY

TripAdvisor :

Tripadvisor, Inc. is an American online travel company that operates a website and mobile app with user-generated content and a comparison shopping website. This application established in 2000. This Application uses Natural Language Processing (NLP) to find groups of hotels that have an interesting theme. This application have feature to add a review of any hotels /places or read someone else. So, because of that user can know any person's point of view regarding that particular hotel or place.

- Recommendation based on reviews -
In this method Tripadvisor recommends hotels/restaurants/places/flights based on past reviews posted by users. Things with more positive

reviews are recommended first.

UTravel :

UTravel is a leading travel agency which was established in 2017. Its mobile app utilizes user profiling in combination with context based data in order to guide individuals .

- K-Means Clustering for recommendation :
This application uses the K-Means Clustering algorithm for recommendation. Basically, it uses the user's profile and based on that it divides each sector into the clusters and next time based on users choices it recommends cluster wise.

Find Tourist Profile :

Find Tourist Profile is an application which was developed in 2017 to detect the users preferences or choices for traveling. This application uses a tourists profile to give suggestions of tourism locations to tourists.

- Deep Learning :
Find Tourist Profile detects the user interaction and preferences based on social media photos and for that they use Deep Learning technology.

Cam Find :

CamFind is an application that provides image detection and for that user needs to take the image of an object and the application will generate the results and tell you what it is.

- Image labeling search technology :
Users need to take the image of that particular object and provide it to CamFind. After using image labeling search technology, CamFind displays what it is and generates similar results.

III. MOTIVATION

A. Need of this Application

In recent times the Tourism sector hit the hardest lost out of any other industries worldwide because of COVID-19 pandemic.

We all know that tourism is one of the key factors or we can say one of the biggest factors for a country's economy. There are many people who love to travel across various places in the world. Traveling is the most common hobby. People love to travel to the place they are fascinated with. According to the UN news, by 2030 approx. 1.8 billion people are expected to be traveling the world. But the problem arises when people come across an unknown place. Suppose, on social media, but he/she does not have any kind of information about that place as well there is no such information given on a social media site in a form of caption or location.

So, unfortunately they change their plan because of a lack of information. So basically, it affects both tourists as well as the growth in economy of that unknown place. So there should be a system that can identify the location of that place/name of that place by image provided by the user. So user can get help to plan their trip.

B. Why are we developing this app?

As we all know the problem faced by users there should be an application that will help users/tourists to plan their trip more efficiently. So we are creating this application so it will be beneficial to the users/tourists. The ultimate aim is to improve the efficiency of resource management and to use available data more efficiently.

IV. PROPOSED SYSTEM

Problem definition:

Tourism industry is a booming industry that enriches knowledge, brings social development and economic growth. In today's time there are many tourism related applications that provide data such as hotels, restaurants etc. but they are not using their data efficiently for serving users. So we are creating a system which uses various techniques like machine learning, prediction, location detection and recommendation to use this data efficiently and also we are bringing tourism related features under a single platform.

Requirement Analysis :

1. Functional requirement -

- User Friendly interface
- Should identify image provided by user
- Application should performed all required changes in database according to condition
- Provide proper response to the user
- Clean and simple ui/ux
- Should have an admin panel

2. Operational Requirements -

- Database should have proper accurate data related to that location
- API connection with the backend should be proper
- User should get proper information from the backend of the app

3. Technical requirements -

- Database should be well constructed and all the relations should be well defined between different modules
- A proper relation should be there between frontend and backend

Project design :

Travel apps are incomplete without data so in this system there are two sources of data i.e web scrapers and database. The database will consist of information like places information and popular food items in that place to manage this data and to perform CRUD operations the admin panel is designed. And web scrapers are designed in such a manner that they will grab hotels, restaurants and things to do for a given location with the help of real time scrapping and after grabbing the data from the backend there is another layer called recommendation engine. Which will filter out data according to user preference. Which is of type content based filtering.

So after filtering ,to send this data to the front end REST Api is designed which will act as an interface between frontend and backend. The complete backend and rest api is developed on nodejs .And to communicate with REST Api various http calls are required e.g. GET,PUT,POST etc.

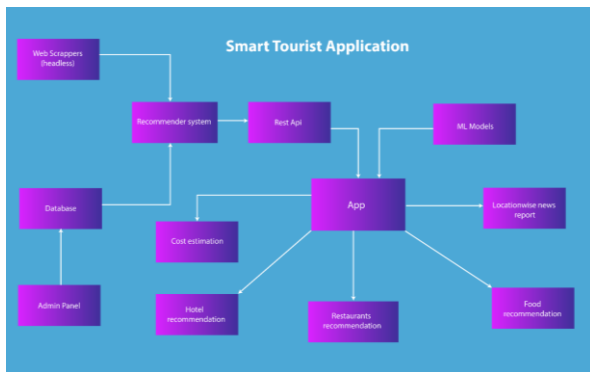


Fig.4.1 Project Design

Front end will be an android app which is developed on JAVA Front end has many features like cost estimation, hotel/restaurant/food recommendations, location wise news reports, Landmark/food detection using machine learning etc.

Technology Used :

1. Backend -

- Language : Node.js
- HTTP server : Express
- Database : MongoDB
- Web Scraping : Puppeteer (Headless browser)
- Admin Panel : Adminbro

2. Machine Learning -

- Language : Python
- Tensorflow, CNN

3. Android -

1. Platform -Native android development in android studio
2. Language-Java

Design implementation :

The project is divided into three modules: Backend, Android and Machine learning.

1.Backend-

For building backend we are using NodeJS. Node.js is useful for creating servers which handle asynchronous client requests. Backend consists of a database, API, web scrapers scripts, recommendations logic and admin panel.

Rest Api Using Express :

Express is a popular node module in nodejs which is capable of handling http req in server asynchronously. we can create various endpoints for Rest Api which when triggered the api will provide output as json. The sources of data for this api is from two sources first one is web scraping and second one is MongoDB database. Web scrapers are designed in such a manner that they will grab hotels and restaurants for a given location with the help of real time scrapping when client send request to the server.

Web Scraping: Web Scraping refers to the process of extracting data by crawling on different websites. The role and implementation of web scraping in the project is as follows:

Role of webscrapping: Web scrapers are designed in such a manner that they will grab hotels, restaurants and things to do data for a given location with the help of real time scrapping and send the output in json format to the front end.

Steps for implementation of web scrapers:

- Creating REST Api with Express framework.
- Creating web crawler script using puppeteer..
- Creating json output for clients.

Travel Cost Estimation :

In this project, we are calculating the travel cost based on different parameters. We are using web scrapers & Machine learning model for average cost prediction. Web scrapers will calculate average cost of hotels, trains, flights and also showing best hotels and travel options according to user need. ML model will calculate cost of living based on different params like no of peoples, no of days, destinations etc. After that all combined output will be passed to the front end using REST Api.

User Recommendation :

In this project we are giving recommendations to users for hotels and restaurants.. For building recommendation engines we are using content based filtering. For that we are using different parameters based on hotels/restaurants prices as well as rating and for restaurants their categories like Indian, Italian etc.

2.Machine Learning -

Machine learning is the technology that focuses on detecting and predicting the future state by using computer algorithms that improve through experience and by the use of data.

Machine Learning Model :

For machine learning model creation we are using tensorflow. Tensorflow is the free and open source library used for machine learning and artificial intelligence. Its main focus is on training and deep neural networks. Tensorflow consists of workflows so that we can develop and train the model and also we can deploy on any platform.

Machine Learning Model Flow :

There are three ML model in our project:

1) Location Detection Model:

For model generation, images of different places are taken as an input. We are using these images for training and testing the model. So this model we are using in our application for location detection.

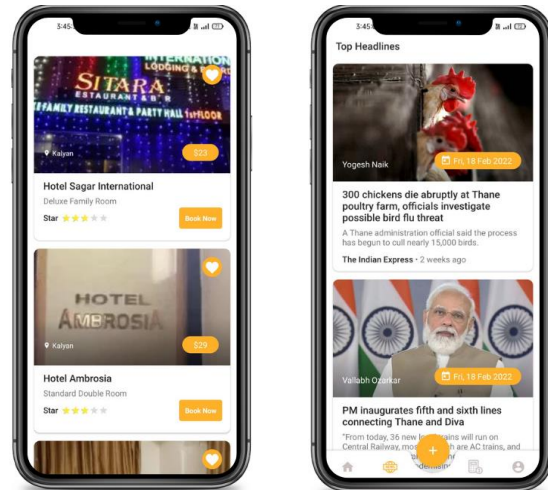
2) Food Detection Model:

For model generation, images of different foods are taken as an input. We are using these food images for training and testing the model. So this model we are using in our application for location detection.

3) Price prediction model:

We are taking input from the user regarding the number of days he wants to stay and the number of people traveling. Based on that will predict the average cost price for the user.

Nearby Hotels/Restaurants and News :



3. Android -

For implementation of all this feature, we are creating a frontend in android. Android app is natively developed in java. This app will display all features like hotels/restaurants recommendation, things to do ,travel cost estimation,news report based on location ,landmark detection etc.

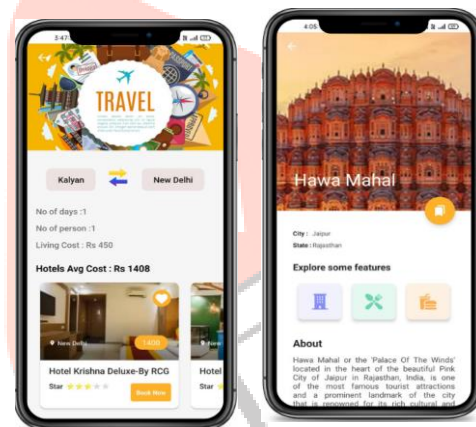
Smart Tourist App has many features based on location so to change this all features location wise we have added two options that are GPS and Geocoder. GPS is used for current location while Geocoder is used for searching different locations. To communicate with the backend, REST Api we have used Retrofit. Retrofit will act as a client for communicating apps with the backend. Retrofit uses various http calls like GET, PUT, POST etc. to communicate with the backend. This app also has features like landmark detection and food detection based on machine learning. So to deploy a machine learning model in android we have used tensorflow lite framework.

To make this application more user friendly and interactive we have created a different layout based on google's material design standards.

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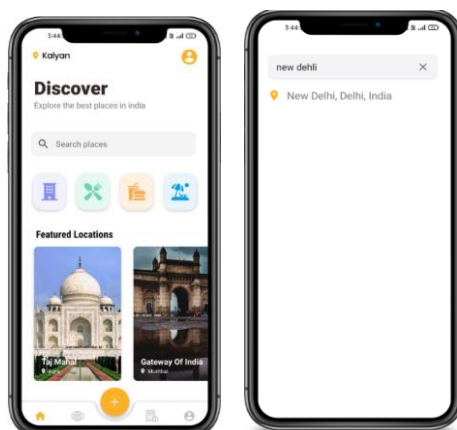
After selecting the particular location, the application will display nearby hotels which shows the feed according to recommendation and also displays location wise news.

Travel Cost Estimation and Landmark detection :



V. PROJECT OUTPUTS

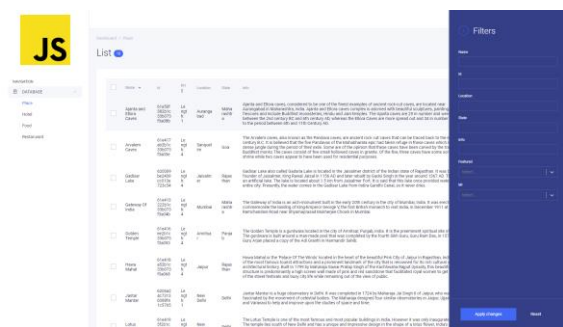
Home Screen :



This is the Home Screen of the Smart Tourist App which contains features like nearby hotels/restaurants, things to do ,travel cost estimation,news report based on location ,landmark detection etc.

So these are outputs of the Travel cost estimation feature and image detection feature.The cost estimation is based on user preference and the place is identified by the image provided by the user.

AdminPanel



The database will consist of information like places information and popular food items in that place ,so to manage this data and to perform CRUD operations this admin panel is designed. Admin panel also has the capability to search different entries.

VII. CONCLUSION

Our app has all tourism related features in one place. So because of that it helps tourists to plan their trip efficiently and easily. So overall it helps countries to build tourism. Because of all these features this app will increase tourism and also help for countries' growth. Smart Tourist application provides reliable, fast, and better services to the users. So because of that it helps tourists to plan their trip more efficiently and easily. Smart Tourist app has a user friendly interface and it also provides best services to users so that they can enjoy their trip.

VI. FUTURE SCOPE

1. **Automated Booking system** : With this feature users can compare the price between the multiple sources and the user will be notified regarding new offers and discounts.
2. **Machine learning Improvement** : To add more labels and to improve accuracy of image detection so that users will get accurate results.
3. **Trip reviews**: Using this feature, users can share their experience and review about the place so that other users can refer to these reviews while traveling.



VIII. REFERENCES

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