

A Synopsis on

# **Implementing AI Based Comprehensive Web Framework for Tourism**

Submitted in partial fulfillment of the  
requirements of the degree of

**Bachelor of Engineering**

in

**Information Technology**

by

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2020-2021

## CERTIFICATE

This is to certify that the project Synopsis entitled “***Smart Tourism System***” Submitted by “***Jaynam Shah (18104047), Harsh Shah (18104072), Nada Rajguru (19204005)***” for the partial fulfillment of the requirement for award of a degree ***Bachelor of Engineering*** in ***Information Technology*** to the University of Mumbai is a bonafide work carried out during academic year 2021- 2022

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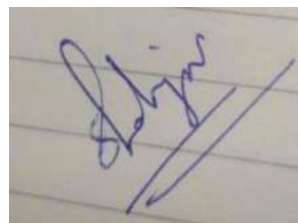
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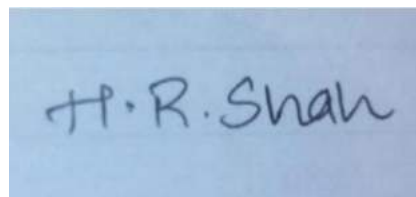
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## Declaration

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

A handwritten signature in blue ink on lined paper. The signature is stylized and appears to be 'Jaynam'.

(Jaynam Shah -18104047)

A handwritten signature in blue ink on lined paper. The signature is 'H.R. Shah'.

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(Nada Rajguru-19204005)

## **Abstract**

In current societies, the movement of all business activities is for effective participation among the market contenders, In addition not just withstanding their physical presence but also challenging their virtual presence. The Smart Travel Planner is a web-based framework for facilitating the tourist through the travel planning process. Unlike other similar web-based systems our system is unique as it streamlines all the processes required for travel planning making it easy and convenient to use. It provides a plethora of features like providing information about tourist attractions, recommending tours and places based on the user's interests, searching hotels or restaurants based on the user's budget, booking accommodation, and providing users with a personalized itinerary. It focuses on making e-tourism easier and convenient as more and more people use such travel websites to plan their trips.

# Introduction

The focus of this research is to create an AI-based tour recommender system. The recommendation framework is a web-based system that may deliver a customized rundown of vacation sites, eateries, and accommodations relying upon the traveler's inclinations. Conventional recommendation techniques like content-based filtering and synergistic sifting are known to be advantageous in the tourism industry. Moreover, in light of the information gained from user's interests and inclinations, recommendations are made utilizing content-based suggestions. Data dependent on comparable profiles is suggested when the client utilizes the service more using community oriented recommendation. Furthermore, a design of a chat box is provided which gives a genuine and precise response for any question using Artificial Intelligence, which permits individuals to textually communicate with the objective of organizing visits and requesting fascinating spots worth visiting. The Django development framework is utilized to construct the system, since it accentuates rapid development and simple, pragmatic design. The system methodology is discussed comprehensively with the aim of explaining the functionalities of the system.

## Objectives

- To develop an extensive Web portal that provides tourists/clients a tour itinerary furthermore displays hotel recommendations.
- To develop a system that generates a personalized tour itinerary, formulated on varying aspects of the clients budget, interests and time constraints.
- To design a recommendation system that will suggest tours and hotels.
- To allow users to make changes in the generated tour itineraries by providing an option for customization.
- To implement an AI chat bot for customer support and solve basic queries.
- To provide a forum where customers can communicate with travel agents/support groups to solve complicated queries or doubts.

## Literature Review

In literature [1]

The author focuses on the websites that are identified with travel agencies from the tourism industry. The author explores the improvements in the e-travel industry due to the impact of the agency's web design techniques and execution of SEO strategies. The results from the information gathered through controlled surveys demonstrate that the advancement of the tourism industry is the result of the significant connection between the variables that influence an appropriate website composition and the implementation of SEO.

In literature [2]

The author describes understanding the web surfer's behavior and preferences allow the travel and tourism service providers to strategize their businesses effectively. To investigate and inspect the correlations and contrasts as far as web browsing inclinations among the Malaysian people and worldwide web users. The author proposes the utilization of a mixed hybrid recommendation technique including demographic, content-based recommendations, preference- based filtering to travel and tourism service providers.

In literature [3]

The author explains that the Smart Travel Planner is a web-based system for streamlining the travel organizing process, which is a mix of several travel-related service APIs. The author has created a system that features calendaring programs, checking hotel availability, calculating optimum routes between user-specified locations at various travel destinations, and providing sightseeing recommendations taking into account the user's interest, trip dates, sleep, and personal preferences.

In literature [4]

The author explains about the increased inclination for the need for recommender system as more and more people rely on web-based services to gather data to plan and organize their trips. The author emphasizes the implementation of E-CRM website features for ease of planning, booking the travel system.

In literature [5]

The context can be defined as the characteristic information of an entity such as users or an object. The contextual information can be helpful to personalized recommendations when the available information about the item or person is not sufficient. This method is beneficial in producing recommendations on tours, travels, and places (Thomas and John, 2021). This is also useful for recommending movies according to the user's location, moods, the climate of the user's environment, etc. For example, the user's likeliness to watch horror movies at night can be recognized using the collected information. In the traditional recommender systems, the rating function used to compute ratings uses only the user profile and item profile, but in recommendation systems based on context awareness, the rating function is three-dimensional. I.e., the ratings are calculated using the user profile, item profile, and contextual information (Adomavicius and Tuzhilin,2011). According to Adomavicius

and Tuzhilin, three methods such as contextual pre-filtering, contextual post-filtering, and contextual modeling, can be used to calculate contextual information.

In literature [6]

The proper application of algorithms in recommendation systems is critical to delivering improved results. The dependability factor of various recommendation algorithms is determined by various factors, one of which is the data qualities. In some circumstances, an algorithm may generate superior results when working on one data set but fail to produce desirable results when working on another. Different assessment mechanisms are used by the platforms to determine which algorithms operate best under particular conditions. The applicability of an algorithm is determined by a variety of parameters, such as the number of users, number of items, distribution of user ratings, and the impact of data sparsity (Kaushik, 2018).

In literature [7]

The content-based filtering method includes heuristic functions such as the cosine similarity metric function to complete the tasks. This approach is purely dependent on the target user and does not require information from other users. As the name implies, the content-based filtering method focuses on the data in the user profile to produce recommendations. The algorithms utilized will be focused on listing offers without taking into account user ratings. Because the system is user-independent, this ensures that cold start issues are eliminated (Pujahari and Padmanabhan, 2014)

## **Problem Definition**

There are many e-tourism websites that provide generalized tours to clients. Increasingly tourists are planning trips by themselves using the abundant information available on the internet, however they still expect and want trip plan advisory services. The vast amount of tourist find it excessively challenging to do their own research by visiting various websites to get information to plan for the tour. The planning made by the users mostly can't be accurate as the websites they refer do not have a proper feedback system to analyze if data provided by the tourist websites or blogs is correct. Therefore in order to avoid making mistakes users choose the mainstream mode of planning and booking a tour, which is done by physically approaching the travel agent or travel company and booking a tour. Usually booking with the tour agent or a company means generalized tour plan and itinerary to fit all sorts of customers which might not be enjoyable or worth the user's interests. The travel companies have tie ups with accommodation and transport providers to cut cost, which might not be suitable for the user. Hence the user is not provided with choices which makes fun tours feel like field trips. Also, tourist have to visit multiple websites researching attraction sites, guides, restaurants, hotel reservation and in a nutshell planning the entire trip, which is not effective and very time consuming.



## Proposed System Architecture

The proposed system is represented through a flowchart below introducing the steps involved to generate a personalized tour plan.

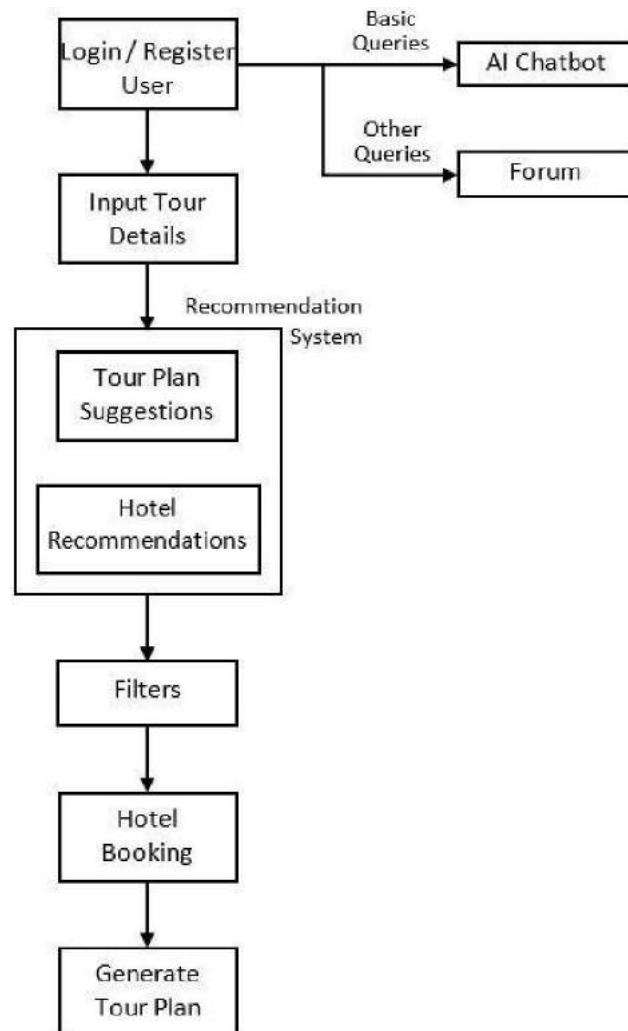


Figure 1: Proposed System Architecture

In the content-based filtering technique, recommendations are made according to the analysis of the item's attributes. It makes use of the algorithms that are domain-dependent. The recommendations are derived from user profiles based on the characteristics of the users' interactions with items. The content-based filtering techniques use different models, such as vector space models, to produce recommendations. The primarily used vector space model is Term Frequency Inverse Document Frequency (TF/IDF). The terms are

obtained by eliminating the tags such as HTML tags, stop tags, suffixes, prefixes, and repeating words from the domain. Furthermore, the models such as Neural networks and Decision trees are also used to produce the similarities or the relationships between different items. Later, the user profiles are set up similarly according to the terms related to the users' interests obtained from the different types of feedback. These terms are then classified into two classes named positive and negative class. Only the positive class is relevant to the users for a recommendation, and the negative class is irrelevant.

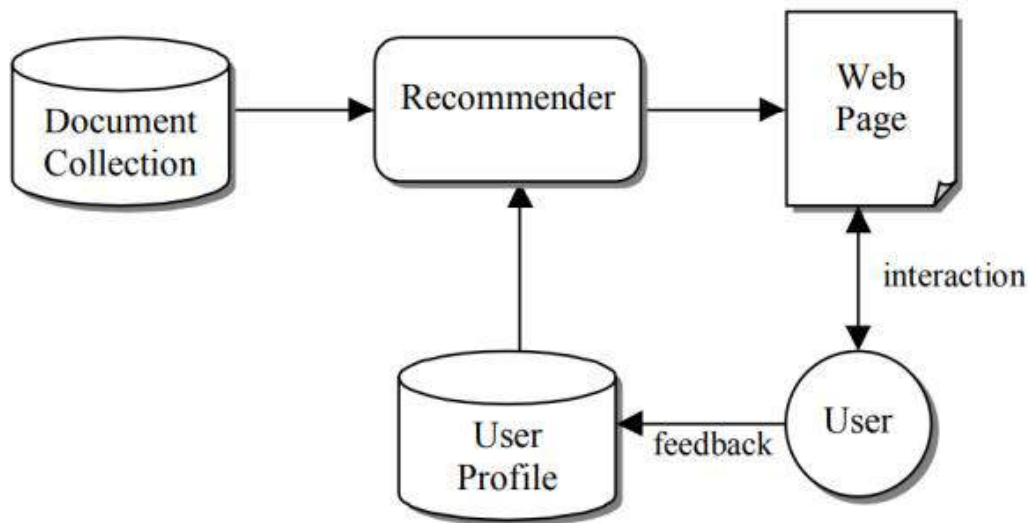


Figure 2: Content-based Recommendation System

Phases of recommendation system.

In order to ease the process of making decisions from the pool of available information and the dynamically generated information or data, recommender systems have been introduced. The recommender systems have a significant influence on the areas such as E-commerce, E-learning, and other streaming platforms such as movie streaming, music streaming, and gaming. According to De Nart, Ferrara, and Tasso, the collective phases in a recommendation process include:

1. Information collection phase,
2. Learning phase,
3. Prediction or recommendation phase.

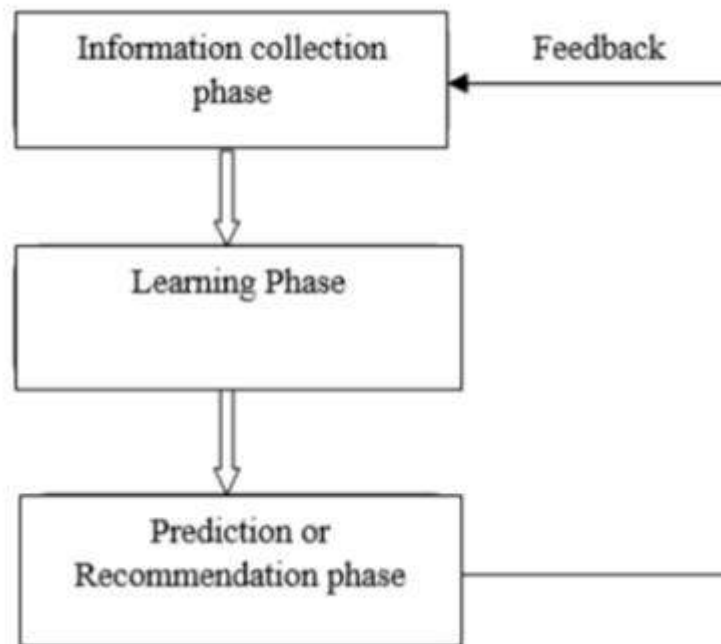


Figure 3: Phases of recommendation system

#### Information collection phase

The quality of the recommendation system's recommendation is highly dependent on the information gathered from the user and their interest in the products and services. This includes the user interest, attributes feedback. The gathered information is then used to produce the model for further processing. According to Felfernig & Burke, the knowledge or information gathered can be divided into social knowledge, personal knowledge, and content knowledge.

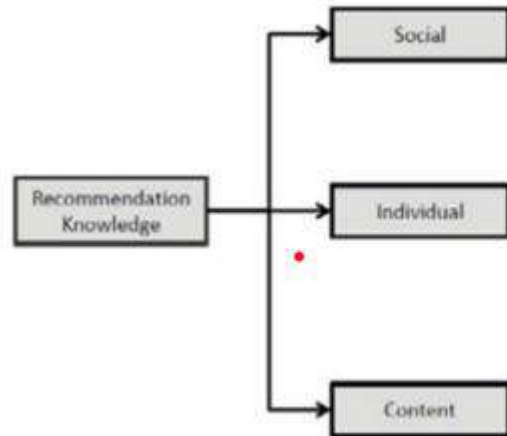


Figure 4: Taxonomy of knowledge sources in recommendation (Felfernig and Burke, 2008)

Social knowledge is the information regarding the social backgrounds of the users in general. This can be opinions, behavior, demographics, context, etc. Personal knowledge can explain the information regarding the particular user for which the recommendation is generated and the requirements for generating the recommendations for the individuals. So, this type of information can be opinions, demographics, requirements, or behavior. Furthermore, content knowledge can be explained as the information regarding the item or material that is being recommended. These types of information include the features or specifications of the items and domain knowledge. The most crucial information that is collected from the user is the user feedback. This gives much about the insights of the users and the surrounding population. The feedback collected from the user side can be broadly classified into three:

1. Explicit feedback
2. Implicit feedback,
3. Hybrid feedback.

## **Principle Working of the System**

Upon visiting the website, the users can avail the benefits of the website by logging in to the system. User login is only possible for users that have registered/signed up to the website. New users can register themselves by signing up to the website by setting a username, password, and additional details which are further saved on the system database. Once a user has been registered, they can log in to the website using the input username and password used during sign-up. Once the login details match the details saved on the database the login is successful and the user moves to the next page. On logging in successfully, the process to find the best attraction place for the user begins with collecting details of the tour from the user. This process functions by taking users' interests and preferences into consideration. Data taken from users include the type of tourist attraction site the user wishes to tour, for e.g. Outdoor activities, indoor sites, architectural heritage sites, environmental locations, etc. The user must select up to 2 or more types of preferred interests.



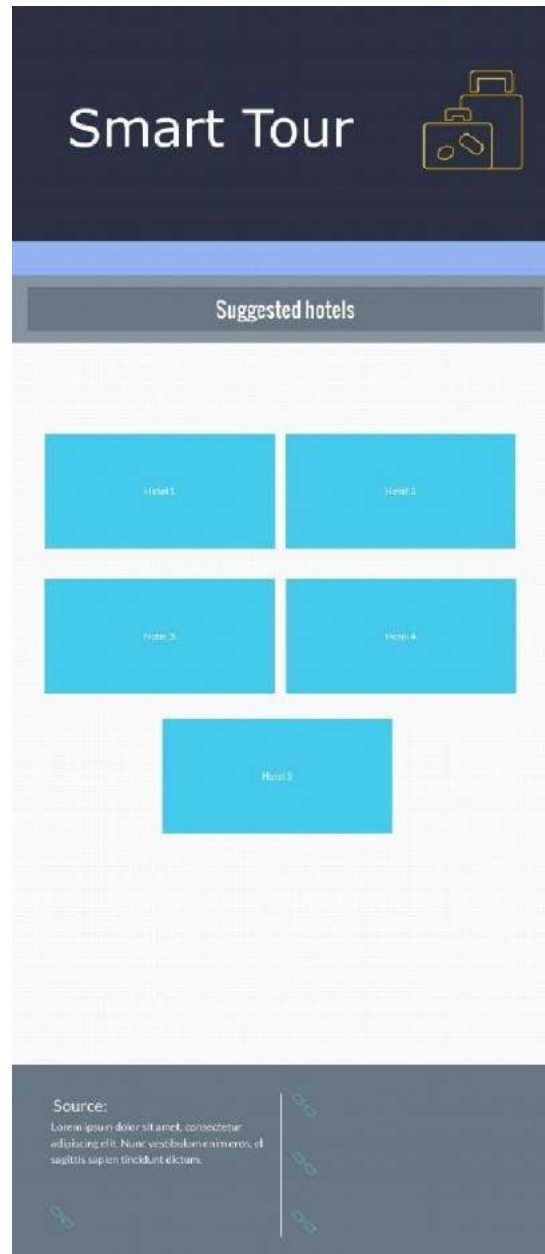


Figure 3: Hotel suggestions by the recommendation system

Filters based on gross tour budget, Area of stay, type of accommodation, period of stay, type of hotel, food preference, etc. Subsequently, the user can proceed with a hotel reservation after determining the budget, time of stay, quality of stay, service, and choice of cuisine. This provides users with a plethora of options to try new exciting experiences or go with their favorite and standardized choices. The helps users customize their plans and is suitable for users for all ages and interests.


The image shows a mobile application interface titled "Smart Tour" with a briefcase icon. Below the title is a blue bar with the text "Help us find your favorite Restuarant". The main content area is a grid of filter categories: "Cuisine" (Indian, Chinese, Italian, American, Japanese, American, ?), "Dietary" (Fast Food, Veg, Non-Veg, Jain, ?, ?), "Budget" (a slider from \$300 to \$12,000), and "Type" (Fine Dining, Casual Dining, cafe, Buffet, Fast-Casual, ?). A "NEXT" button with a right arrow is at the bottom right. The footer contains placeholder text and social media icons.

Figure 4: Filters for suitable restaurants

The users are provided with a wide range of selections to be customized from one person to another. The restaurant selection can be done with ease and efficiency by selecting the cuisine preferred by the user. Next users can funnel best restaurants suitable for them by selecting the type of restaurant for eg. Fast food, Vegetarian, Non- Vegetarian, Jain etc. Furthermore users can select the budget range they choose to spend at the restaurant followed by the type of restaurant they would like to dine at eg. Fine Dining, Casual Dining, Buffet, Café, Fast Casual etc.



# Smart Tour



Find your Hotel

Budget

\$300

\$12,000

Room type

Single

Double

Deluxe

Twin

Twin double

Penthouse

Suite

?

?

Preferences

With Availability

Budget Friendly

Luxury

Cleanliness

Pool

Laundry

?

?

?

→

NEXT

Source:

Lorem ipsum dolor sit amet, consectetur  
 adipiscing elit. Nunc vestibulum enim eros, et  
 sagittis sapient. Incididunt dictum.

Figure 5: Filters to find suitable hotel

The steps to booking a hotel for accommodation is similar to the restaurant booking process. Firstly users can select their budget the wish to have for accommodation. This is followed by selecting the type of room the user wishes to stay eg. Single, Double, Deluxe, Twin, Twin double, Penthouse, or Suite. Then the user needs to select according to their preference based on availability, Budget friendly, luxury, cleanliness, pool, laundry services etc. Following the hotel booking the user is presented with a unique and personalized travel plan, along with information of the tourist sites, nearby restaurants, itinerary.

## **AI based chatbot**

A chatbot is an artificial intelligence (AI) program that can mimic a discussion with a user in genuine human language through informing mediums like websites, mobile applications, or messaging apps. This project incorporates the presence of an AI chatbot using Tensorflow which is a library of python. Thus while operating the website or the app the users can get a personalized automated support assistant to guide them through in and out of the system. The AI bot is trained using intents and entities to identify and understand the user and to provide suitably trained replies. However, the AI chatbot can only be used for basic user queries. Furthermore, other complex user queries can be posted on the forum. The forum is a community that includes people from the tourism industry, travel agents, and appointed forum administrators who help by answering the user's queries.

## **Conclusion**

In this project we have created an e-tourism website that allows users to plan their trip entirely by themselves from researching places, to know about restaurants and hotels suited to the user's budget and preference, booking hotels, generating unique personalized tour plans etc. The Smart Tourism System provides a streamlined approach through the entire tour planning process. It helps users by avoiding waste of the users time to go through various tourist platforms to research and plan the tour, streamlines the process of booking hotels and restaurants based on users preferences, prepare the entire travel plan at the ease of the user at the comfort of his home. The users can plan and book the tour virtually than to physically visit the travel agent or tourist companies. The users can safely book tours by avoiding some travel agents that can scam tourists. This project helps users connect better with the tourism community and support when users have any tour related queries. This project thereby improves the efficiency, simplifies the process and consumes less time to plan a tour.

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