



# MACHINE LEARNING BASED TRAVEL RECOMMENDATION WEB APPLICATION

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**Abstract:** Tourism is a rapidly growing industry, and with the rise of machine learning techniques, it is possible to make personalized tourist recommendations. Machine learning models can analyse a large amount of tourist data, including historical tourist trends, demographic information, user preferences. To develop a personalized tourist recommendation system, one approach is to use a combination of machine learning algorithms. The proposed system helps in guiding users with all the information regarding tourist places. In this paper the system also provides a personalized experience to tourists by taking into account their individual preferences. The proposed system helps user to give rating and reviews on the places they visited.

**Keywords:** Recommendation Web Application, Machine learning, Collaborative filtering algorithm, Content-based filtering, Knowledge-based filtering.

## I. INTRODUCTION

Tourism is an essential industry that contributes to the economic growth of many countries. With the increase in the number of tourist destinations and activities, tourists often face the challenge of selecting the best places to visit based on their preferences and interests. Machine learning has become increasingly popular in recent years, to develop recommendation systems that provide personalized suggestions to tourists.

The website also provides reviews and ratings given by various users who visited tourist places and this is implemented by using machine learning algorithm (Collaborative filtering algorithm, Content-based filtering, Knowledge-based filtering). Machine learning can be a powerful tool for improving tourist recommendation systems and providing more personalized and relevant recommendations to travellers.

The structure of the paper is as follows: Section II discusses previous research papers, Section III covers the methodology and algorithms used, and Section IV has results of the project done.

## II. RELATED WORK

Riteshwari Ganjare et al.,[1] proposed the system for recommending tourist place using machine learning algorithms: content-based filtering, collaborative filtering and hybrid recommendation. E-Tourism is a tourist recommendation and planning application that uses a recommender system to offer city places based on user preferences. It includes a planning module to schedule recommended activities as an agenda. The paper provides an overview of recommender systems and their categories, and discusses limitations and possible extensions for improvement. The system focuses on helping travel agents suggest options to customers who are unsure about their travel plans and analyses private web chat messages between the agent and customer.

Pooja Hajare et al.,[2] proposed a Tours and Travel Recommend System using machine learning techniques like Naive Bayes, Support Vector Machine, ANN, and Deep Learning network. They applied the K-means algorithm with a personal device-based GPS tracker. Hybrid recommendation models, combining algorithms like collaborative filtering and KNN, are gaining popularity in e-commerce and tourism. Some researchers have explored unsupervised machine learning for personalized recommendations, while others proposed conversational recommendation models based on feature extraction. Chatbot-based tourist recommendation models are also popular, enhancing customer experience with model-based reasoning. However, existing tourism apps often lack the ability to provide specific spot recommendations based on user preferences using AI or other methods, instead providing a list of spots for users to choose from.

Pravin Kumar Swamy et al.,[3] proposed a Tourist Place Recommendation System that aims to provide recommendations for tourist destinations through a mobile application. The system takes into consideration user interests and analyses similar contents and users to build an optimized recommendation system. This is done to overcome the challenge of information overload and the limitations of top-rated places or nearest location-based recommendations. The Recommendation System analyses available data and provides recommendations based on user interests. The better the system understands user interests, the more accurate and relevant the recommendations will be. Traditional methods are



used for recommending items to users, but the proposed system aims to provide optimized recommendations for tourist destinations based on user interests.

Ashishika Singh and S. Babu [4] proposed Travel Route Recommendation that aims to provide the best customer experience by leveraging user keyword search. The system gathers historical data of user travels, including user reviews, tags, check-in information, and social media, to create a dataset. When a user enters keywords to search for a travel destination, the system matches those keywords to user reviews and designated points of interest (POIs) in the dataset. It then generates the most suitable travel route based on the matched keywords to ensure user satisfaction. The system applies the function of matching user queries and uses skyline query logic to determine the most optimal travel route that connects the user's keywords. This approach helps in diversifying the route dataset and provides the final recommendation for the travel route.

Abhishek Agarwal and Linus W. Dietz [5] focuses on recommending the duration of stay in personalized travel recommender systems. While traditional recommender systems use ratings to predict item suitability, this project analyses the problem of recommending the quantity or duration of stay at a tourist destination. The goal is to evaluate algorithms that can compute the optimal duration of stay based on hotel booking data and traveller mobility from location-based social networks. Determining the duration of stay is crucial for online tour planners, and the research incorporates clustering approaches to identify traveller types based on past check-in durations and frequencies from location-based social networks. This approach aims to provide personalized travel recommendations based on users' travel behaviour and predicted duration of their next trip.

Abhishek Kulkarni et al.,[6] and his team proposes a machine learning-based tourism recommendation system that uses sentiment analysis. The system aims to reduce user effort by creating a personalized recommendation list based on the analysis of user reviews and inputs. A deep learning algorithm determines the sentiment of the reviews (positive or negative) and ranks the places accordingly. The system takes into account user preferences such as the type of location, number of travellers and children, and duration of the trip. Based on these parameters and the reviews, a unique recommendation list is generated for each user, providing tailored trip plans that consider their opinions. The system works in two phases - gathering reviews and assigning average ratings in the first phase, and utilizing these ratings and user parameters to generate personalized recommendations in the second phase.

Ram Krishn Mishra et al.,[7] proposed a knowledge-based topic retrieval system for tourism recommendations and promotions. The system uses reviews, blogs, and ratings to build a personalized recommender system for discovering new places based on individual interests. Machine learning techniques like decision tree and random forest classifiers are used to predict star ratings from reviews. Clustering and topic modelling identify topics from reviews, and sentiment analysis generates a feedback model. The recommender system incorporates user preferences, restaurant knowledge, and sentiment analysis to provide customized recommendations for each product or service.

Nandarani Kadam and Sarika Solanke [8] proposed a travel bot that utilizes social media dialogue for travel recommendations. The chatbot interacts with users in a conversational style and provides options for countries to travel based on important features. Users can select an option, and the chatbot presents the results using graphs for analysis. The chatbot uses machine learning and AI to constantly improve its responses and can store and categorize information from interactions. The travel bot is efficient, enhances performance through Twitter data, and provides additional information such as quality of life, safety, and pollution index for countries.

Ashvini Chavan and Prof. Nita Dimbale [9] proposed a framework that combines explicit and implicit information for social recommendations. The model improves recommendation accuracy by integrating social relationships and capability prediction. It addresses complexity challenges in implicit recommendations with practical tricks to reduce it. Experiments show that the proposed model outperforms existing solutions for both explicit and implicit social recommendation systems with only two parameters. The system focuses on recommending places for new users, considering explicit feedback and pseudo-negative drawings to overcome limitations in data availability and trust levels.

Yashraj Patil et al.,[10] proposed a Smart Tourist Application that helps users plan their trips efficiently. The app uses GPS to detect user's location and suggests nearby hotels, restaurants, and places to visit. It also includes a landmark detection feature where users can provide images of a place for information. The backend of the app is built using NodeJS and web scrapers collect data from multiple sources. The app also features a content-based recommendation engine for personalized suggestions. The user-friendly Android app provides various features like cost estimation, recommendations, news reports, and helps in promoting tourism and country growth.

### III. METHODOLOGY

The main goal of this research project is to recommend best tourist place for users of their own interest with all the information about the place and direction to visit that place. To implement all these features machine learning algorithms have been used which helps in filtering reviews and ratings given by other users who visited and suggest new user by recommending them tourist place having highest rating.



Machine learning algorithm used in this project is Collaborative filtering algorithm, Content-based filtering, Knowledge-based filtering algorithm. These have been used to implement recommendation system.

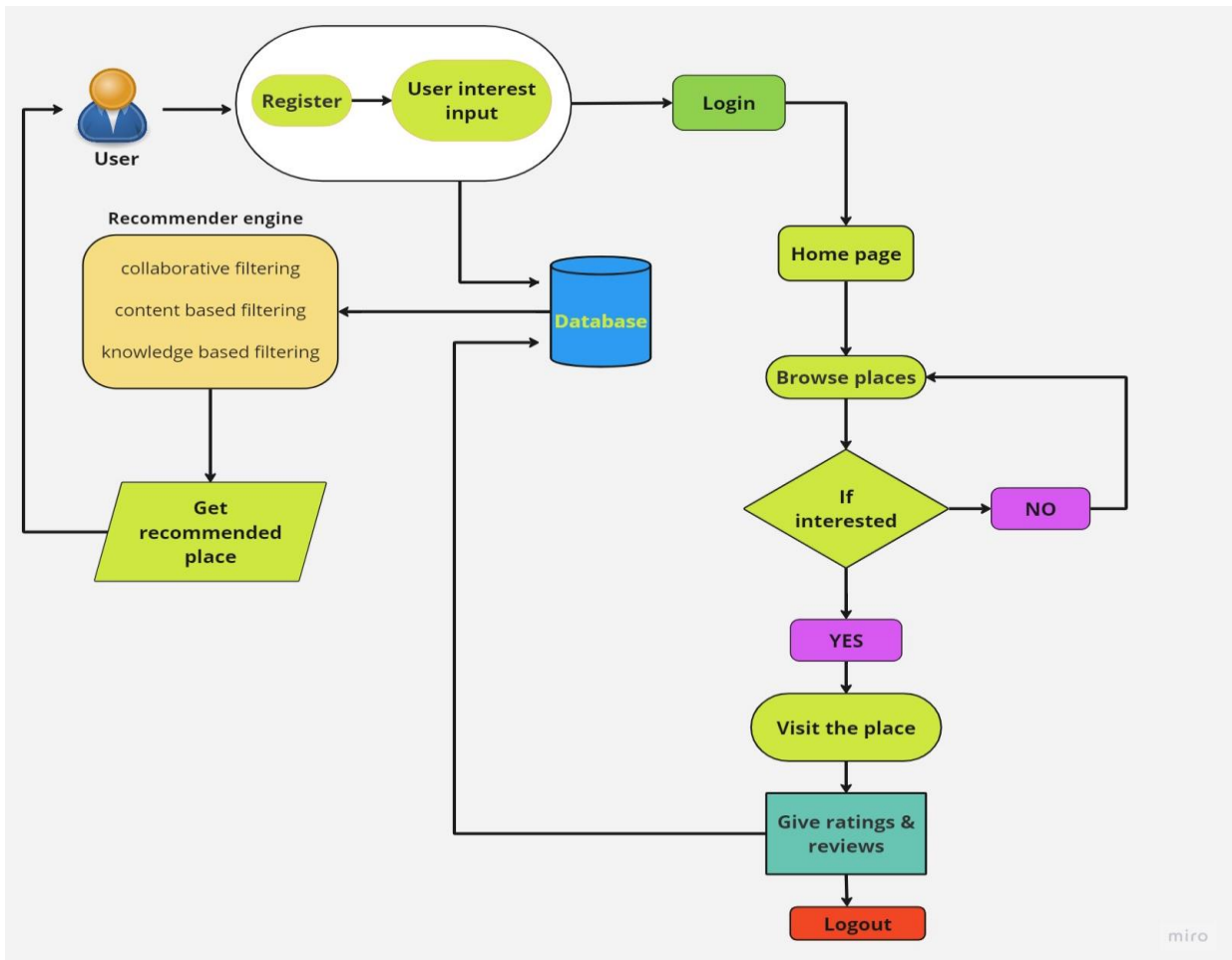


Fig.1 System architecture of project

The figure 1 represents system architecture of research project. At first user registers and enters input of their interest which stores in database. Then according to the input given by user as soon as user login to the website they get list of places they mentioned in user interest input. In order to choose places of their interest content-based filtering algorithm is used. For further recommendation process collaborative filtering algorithm is used which is mainly used for recommendation of places get filtered using reviews and ratings given by other users. Users can even provide rating and reviews on places they visited through the website which helps for other users to visit those places. This algorithm helps user to choose best place which is recommended by other users through filtered result. It even helps user with direction of the place they choose. All these have been implemented using machine learning algorithms.

- Collaborative filtering algorithm:** This algorithm helps in recommendations by finding similarities between different users or items. The idea behind collaborative filtering is that if two users have similar preferences for certain items, then they are likely to have similar preferences for other items as well. Similarly, if two items are frequently rated similarly by a group of users, then those two items are likely to be similar in some way. The algorithm works by creating a matrix of user-item ratings, where each cell in the matrix represents a user's rating of an item. The algorithm then analyzes this matrix to identify patterns and similarities between users and items. One common approach is to use a technique called "matrix factorization," which breaks down the matrix into smaller, more manageable components. Once the algorithm has identified similarities between users or items, it can make recommendations based on those similarities.
- Content-based filtering:** The algorithm works by analyzing the content or metadata of the items, such as text descriptions, genres, tags, or attributes. It then builds a profile for each user based on the items they have rated or interacted with in the past. The profile captures the user's preferences or interests in terms of the



characteristics of the items they have liked. Once the profiles are created, the algorithm compares the user's profile with the features of the remaining items that the user has not yet rated. The algorithm then recommends items that have similar characteristics to the items the user has liked in the past.

- **Knowledge-based filtering:** The algorithm works by capturing the user's preferences or requirements through a series of questions or inputs. The inputs may include information about the user's context, such as their location, age, or interests. The algorithm then uses this information to search for items that match the user's requirements based on the rules or knowledge base. It provides a way to make personalized recommendations based on explicit rules or knowledge about the items, rather than relying on implicit patterns in data or metadata.

These are algorithms used to implement the travel recommendation web application. Recommendation of places have been successful by implementing the web application with all options that is required for user.

#### IV. RESULT

The travel recommendation web application that uses Machine Learning algorithms provides personalized recommendations for travel destinations based on the user's preferences. By analysing large datasets, the application can predict user behaviour and make recommendations that are likely to be relevant and appealing to them. The final result is an interactive and user-friendly platform that assists travellers in making informed decisions and planning unforgettable trips.

#### V. CONCLUSION

Recommendation of tourist place for users with their own preferences and interest is established. The personalised web application provides all the information regarding tourist place with including directions, reviews and rating option and recommend them right destination to travel as all these have been implemented using machine learning algorithms. This application aims to help users create unforgettable travel experiences and embark on their dream adventures with confidence.

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