Project Synopsis

Personalized Itinerary Recommendation System

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Abstract

The hassle of deciding on a travel destination is often overlooked by travel websites. Travellers, a lot of times, don't have a clear idea of where they want to travel to. We aim on solving this problem by introducing a chat bot system that can recommend travel destinations based on minimal information from the user. Also, another interesting feature of the project is its itinerary generator. The system aims on providing a human-like user experience through the use of a chat bot interface. The interface interacts with the user to retrieve information about the user's details like travel date, number of children and adults travelling and the budget of travelling. The user's budget will be the main focus of this application as we want to give the end-user the best travel experience based on their particular budget. The recommendation system also considers external data such as reviews from travel website and travel advice from various blogs. The system utilizes data from multiple reliable sources to determine how the external factors affect the planning of a trip. By factoring in the external data, we are able to increase its accuracy. Thus, improving customer satisfaction. The itinerary generator module uses the external data too. The itinerary generator uses this information to provide the user with an array of itineraries that fit into the budget.

1. Introduction

In order to make travel convenient, the main focus of destination recommendation module and personalized itinerary generator is to keep the application user-centric. A personalized itinerary recommendation system uses machine learning to dynamically recommend a famous tourist hot spot across India as well as curate a personalized itinerary according to the user's interest. It takes user input such as the budget of their travel, day and date of travel and number of adults and children travelling etc. Based on the interest of the user, various similar places will be recommended along with a number of personalized itineraries for that particular place, from which the user can choose an itinerary of his/her choice. The recommendation system also recommends a convenient mode of travel, keeping in mind the budget of the traveller.

Another interesting feature of this system is its user friendly chatbot interface. This chatbot interface helps the user interact with the system as though the system was another human. Thus, improving overall user experience. The system also factors in external data that affect the quality of the trip making the process of trip

planning more reliable. The system gets most of its data through web scraping [4]. The external factors improve the quality of results generated by the system.

2. Literature Review

In the research paper '*Personalized Attraction Recommendation System for Tourists Through Check-In Data'*, the authors have mentioned focused on building a personalized recommendation system that outputs the most optimal travel destination as per the user's social network data [1]. It specifically utilizes Facebook's check-in data from the user's friend list. The paper proposes a recommendation system that helps resolve the 'cold-start' problem i.e. the RS does not have any information about a new user [1]. The user information is obtained through check-in data. Using this data, the system can dynamically learn user behaviour and accordingly tune the recommendations.

In the research paper '*Building a Spatially-Embedded Network of Tourism Hotspots From Geotagged Social Media Data*', the authors focus on building a network of tourist hotspot [2]. The paper provides solutions to obtain alternate routes and analyse the overall tourist behaviour using social media data. The paper focuses mainly on Flickr to obtain data but our system utilizes the core idea proposed in this paper to build and optimize the recommendation system.

The project paper on '*Crowd Prediction System for Tourists*' proposes a solution for dynamically obtaining the crowd density in a particular tourist hotspot [3]. This paper provides valuable insight into how we can incorporate the proposed solution into the recommendation system. The itinerary generator benefits the most from the solution proposed in this paper. Incorporating crowd density measurement into the recommendation system will ensure that the recommended places and the generated itineraries are always the most convenient for the tourists.

3. Problem Statement

To develop a user-friendly system that recommends a travel destination based on minimum user input and also generates a set of itinerary for the user to pick from.

The biggest hassle encountered by tourists when planning a trip is picking a destination and also, creating an itinerary for the same. This problem can be solved through an automated system that accurately provides desired results through minimal user involvement.

The system proposed here plans on tackling this very problem in a user-friendly. The system also ensure accurate results.

4. Objectives

1. To make the process of trip planning hassle free and cost-effective.
2. To make it convenient for the users to pick a travel destination and itinerary of their choice.
3. To curate a travel plan according to the user's preferences, making the user's budget the center of attention.
4. To ensure maximum accuracy through consideration of external factors.
5. To provide the best possible user experience.

5. Scope

Personalized itinerary recommendation system recommends a travel destination to a user with the help of minimal information from the user. The system focuses on the problem of a cold user i.e. a new user with no previous interaction with the system. The system has no information on the new/cold user. The issue that arises due to this scenario is called as the cold start problem. The recommendation system uses previous set of data obtained from previous travellers to key destinations and their experience with the said place. We utilize web scraping to collect data and create a dataset that is most recent and up-to-date [4]. The user interacts with a chatbot interface to provide the system with required information.

Another key function of the system is to generate an array of itineraries for the recommended destination. The choice of itineraries will have different itineraries to suit different user interests and trip purposes. The itinerary is generated based on the information available about the destination, user's information, from the chatbot interface, such as the budget, trip duration and traveller information. The itinerary will be generated with all the aforementioned information which is applied against a generated model that outputs an itinerary which is most convenient to the user. The itinerary is generated taking external factors such as the crowd density, season of travel, the costs associated with the activities available at the recommended destination into consideration to provide the most accurate, convenient and well-suited itinerary for the user.

6. Benefits for the environment

Travel recommendation system can provide many benefits to the environment. Instead of physically going to the travel agencies for the recommendation, the users can simply interact with the personalized itinerary recommendation system through a chat bot. Moreover, the travel agencies provide information to the users through brochures or pamphlets, resulting in a huge amount of paper wastage. Instead, the users can find the information regarding all the places through this online system. This reduces the use of paper and hence reduces the cutting down of trees, which directly benefits the environment.

7. Benefits for the society

Travel and tourism is considered as the biggest and most renowned industry in the world. Tourism has the potential to increase public appreciation of the environment and to spread awareness of environmental problems. The personalized itinerary recommendation system has the effect of guiding users in a personalized way to interesting places in a large space of possible options. Because of the easy interaction that the system provides to the user through a chat bot, it attracts more and more users to use this system thereby attracting them to different places. Certain users may even leave a full review of the places that they have visited which in turn benefits the other users. This helps to increase tourism and brings people into closer contact with nature and the environment. Moreover, Tourism is the fastest growing economic sector in terms of foreign exchange earnings and job creation. It has become one of the most important sources of employment. It also provides financial support for the conservation of the ecosystem and natural resources management making the destination more reliable and desirable to visitors.

8. Applications

A lot of online travel websites in the market do not recommend a place of user's interest dynamically. Rather, they expect the user to enter the destination of their own choice. In this case, the user is burdened with the task of searching for a destination, even though he/she has no particular place in mind. Personalized itinerary recommendation system helps overcome this problem and recommends travel destination to the user. As an added perk, the system also generates multiple itineraries to choose from. This system utilizes an intuitive chat-bot interface which improves the quality of user experience. By integrating this system into major travel websites, we can improve the overall user interaction and experience. Integration of this system will reduce the user's burden of going through the hassle of finding a

travel destination and preparing an itinerary for the trip. The proposed system can easily be integrated as an add-on that assists the users on trip planning.

This system can also function as a stand-alone application. The application will primarily assist a user in planning the trip by recommending a travel destination and generating several itineraries for the users to pick from. The application may use affiliate links to other travel websites via APIs to generate revenue. Additionally, it may also offer to pre-book certain activities and services through the application itself, generating revenue through commissions.

9. Technology Stack

1. Android Studio:

   Android Studio will be used to build an Android application that will house the proposed system as a stand-alone application. The stand-alone application helps demonstrate the functioning of the system.

2. Dialogflow:

   Dialogflow will be primarily be used to provide a chatbot interface for the user to interact with the system. The chatbot interface provides a more human-like interaction with the system.

3. Firebase:

   Firebase is being used to store data required in the form of json files. The data will be used by the chatbot, data models and to store user information. It will also be used to host and communicate with the chatbot.

4. TensorFlow:

   TensorFlow will be used to train and test the relevant data models to recommend both the destination as well as the itinerary. It’s the technology of choice since a TensorFlow kit is available on Firebase.

5. Jupyter Notebook:

   The Jupyter Notebook web application will host the code training and testing the data models to recommend both the destination as well as the itinerary.

References

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[4] WebHarvy – What is web scraping? https://www.webharvy.com/articles/what-is-web-scraping.html

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