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Decision Tree based Tourism Recommendation System

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Abstract

The most complex tasks for tourists when planning travel is choosing a tourist destination from the information that is available on the Internet and through other sources both before and during travel. People have various holiday options for the trip but sometimes our options for vacations are not worth spending our relaxed time, because some destinations are only famous and worth visiting during a specific season. Hence selecting a destination based on the information available online and from various sources is the most strenuous task during planning, before or after travel. To address this pertaining issue, it requires a full conception of the tourists' decision-making and models for their information search process.

Keywords: Framework, Filtering, csv, algorithm

1. Introduction

1.1 Tourism Industry

Tourism is extremely important globally, contributing 10% to the world economy in 2015 and projected to grow to an estimated 10.3% average over the next decade (World Travel and Tourism Council, 2015) [1]. The number of tourists worldwide has increased rapidly. Over the same 10-year period, Asia is expected to be the fastest-growing region regarding travel and tourism's contribution to a countries or a region's Gross Domestic Product (GDP). Of particular note, Thailand, India, Singapore, and Myanmar were the countries identified as the most attractive tourist destinations in 2013.

Over the last decade, India's tourism industry has boomed, with international tourist arrivals doubling over the past nine years graph shown in the figure 1.1. In 2013 alone, international arrivals increased by 18.8%, the second highest rate among the top-ten most visited destinations in the Asian and Pacific regions [2]. Overall, India was the 10th most visited destination worldwide, and attracting 26 million international tourists, and growing by 18.76% over the previous year. Increasing both tourist numbers (international and domestic) and the benefits of tourism are a primary objective of the Indian government. Data mining is the process of analyzing hidden patterns of data according to different perspectives for categorization into useful information, which is collected and assembled in common areas, such as data warehouses, for efficient analysis, data mining algorithms, facilitating business decision making and other information requirements to ultimately cut costs and increase revenue.

1.2 Need for a recommendation system

1.2.1 Motivation

Recently, tourism has benefited substantially from Information and Communications Technology [3], and especially from Internet technology and its applications. Decision support tools, also known as Recommendation Systems (RSs), have been developed to address these concerns. In the tourism field, they are referred to as Tourism Recommendation Systems. Tourists and tourism providers can search, select, compare and make decisions almost instantly, and more efficiently than ever. The requirement for such an unorthodox system for a betterment of substantial revenue in small scale organizations is the right motivation for the proposed system.

1.2.2 Problem Statement

There is a vast growth in the tourism sector. Apart from just relaxation, people and various office employees also look for certain locations for conducting seminars, taking a break and looking for leisure time. Various small-scale companies are not able to run their business due to many online sites. Hence there is a need for a system which can help bloom their business. Various problems occur due to digital booking sites which reduce the system to improve their profit. Hence an optimal solution is required for such a system.

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1.2.3 Objective

To impart knowledge about different locations and their information. To empower small organizations by using this system which in place will help them grow their business widely. The main goal is to help the user select an optimal solution based on various factors such as weather, purpose and period of visit. Also help other users contribute to the system by giving their input based on personal experience.

1.2.4 Scope

Travelling and Tourism has been an integral part of Indian Culture and Tradition. There is vast scope tourism in India. Various travel agencies are running low because of the market nowadays. This system can be used to help bloom the business of many such units and also help in growing their business.

2. Review of Literature

The main aim of this research paper improves the capability of the software agency by supporting real time data communication and improves the given method; the proposed web application was tested based on case study with considering two scenarios which are with disturbance and without disturbance. However, this study has some limits that helped determine the topics for the future studies. The first limitation is the case study because the case study is not tested for actual customers. Therefore, it needs to be further simulated and tested in the common and the general environment. The second drawback is that the communications between the proposed system and the system, which was not tested via real hotel booking conditions. Hence, a more realistic condition will be tested in the future.

The authors have studied here that includes a knowledge-based Tourism Recommendation system Using Knowledge Base Filtering with Protégé Framework [4]. The study here is about a system which is a tourism system based on knowledge of the user held by his interest and helping in recommending the required optimal result for the same. A recommender system is the basic base of this paper. Most of the recommender frameworks contain many similarities that originate from machine learning. However, there are many courses for characterizing the similarity. A Recommender framework is programming operators that bring out the interests and inclinations of every user and makes suggestions as needed. These are usually the framework that suggests numerous things like music, recordings, books, online shopping, tourism, and so on.

Keeping the end goal in mind to construct the appropriate travel plan by fulfilling the user inclinations, the gathering profile will be characterized physically by the travel organization. This work is to characterize the collective profile of every individual, to describe the appropriate administrations and to automize the work of the customized travel by considering the gathering inclinations and constraints. The aim was to study the different ways to utilize imaginative innovative tools, also to make good use of it in tourism recommendation system.

The paper [5] shows the study of Tourism resource management based on AI. The author has stated about a recommendation system using AI. In the era of digitalization, it provides great chances for users to obtain information. Particularly, tourists want to easily get huge information about their tourism plans. Therefore, in this paper, we aim to design a tourism resources management system and help the tourists to plan their travel routes. The proposed tourism resources management system has 3 modules which mainly contains information organization and filtering module and contents module. The main innovation of this paper is to bring in the introduction of artificial intelligence technique in tourism resources management that is we proposed a novel Web data extraction method to generate tourism website contents. Finally, experimental results prove that the proposed tourism resources management system is able to properly integrate tourism information and provide high quality information service for tourists.

3. Materials and Methods

Decision Tree algorithm belongs to the family of supervised learning algorithms. Unlike other supervised learning algorithms, the decision tree algorithm can be used for solving regression and classification problems too.

3.1 Theory

The goal of using a Decision Tree is to create a training model that can use to predict the class or value of the target variable by learning simple decision rules inferred from prior data (training data).

In Decision Trees, for predicting a class label for a record we start from the root of the tree. We compare the values of the root attribute with the record's attribute. On the basis of comparison, we follow the branch corresponding to that value and jump to the next node. [4]

3.2 Terminologies of Decision tree

There are 7 Important terminologies in decision tree [6].

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a. **Root Node:** It represents the entire population or sample and this further gets divided into two or more homogeneous sets.

b. **Splitting:** It is a process of dividing a node into two or more sub-nodes.

c. **Decision Node:** When a sub-node splits into further sub-nodes, then it is called the decision node.

d. **Leaf/Terminal Node:** Nodes that do not split is called Leaf or Terminal node.

e. **Pruning:** When we remove sub-nodes of a decision node, this process is called pruning. You can say the opposite process of splitting.

f. **Branch/Sub-Tree:** A subsection of the entire tree is called branch or sub-tree.

g. **Parent and Child Node:** A node, which is divided into sub-nodes is called a parent node of sub-nodes whereas sub-nodes are the child of a parent node.[7]

3.3 Proposed System

This System proposes an inexpensive system. It works on the input given by the customer and then suggests an optimal solution so that the customer can travel without any difficulties. This System utilizes a decision-based algorithm which proves beneficial results and the so-called confusion for the customers are avoided.

4. Results and Discussion

The experimentation in this system provides information whether the acquired chosen package of the user is recommended or not. In this way the user can choose whichever package needed. The proposed system is being implemented and explained with proper description.

4.1 Recommendation system

The Recommendation system simply works on the principle of a recommender. A recommender in Machine learning is described in two types which are mainly content based approach and collaborative approach. There is another type which is a combination of both these methods which is being used in our system.

The recommendation system in tourism system works on basis of a simple rating system [7]. This rating is produced by an average 'pi' value of each different categories used in filtering. Filtering involves namely 4 categories in the recommender system.

The categories used in the recommender are Date of travel, Place, Group type (Office trips, Family, Friends, Romantic), Reviews (Based on previous users). After filtering through all these categories, the system helps in enquiring whether the current package is being recommended to the user or not. If the 'pi' value falls above a certain rating which is based on threshold, then the package is recommended [8}. The decision tree algorithm selects the highest value on the node produced and gives the final output. In this way the recommendation system works based on the decision tree algorithm.

5. Methodology

This System helps in recommending a suitable destination after proper computation of the data given by the admin and helps choose the right option by reviewing the previous reviews given by the users. In this way, when a new user logs in, he or she can find the proper required destination based on many aspects such a weather, cost and the type of group travelling with. There are many groups categorized such as Family, Friends, Office trips and romantic trips. According to the user's choice the system can help in booking the selected place by the user. The system gives the user liberty to go through previous reviews for personal purpose as well.

6. Conclusion

This Project was taken into consideration after understanding various recommendation systems. The ontologies of various systems were also studied for understanding how to find the optimal solution. Decision tree-based tourism recommendation system is an enhanced topic for understanding how to get the proper result for a location which helps in being both fitting and satisfactory. The website in this system is able to recommend various packages to the user based on reviews and helps the user book based on his personal choice. It also stores data based on various reviews and bookings. It can help various small scale tourism agencies to grow based on the increasing users providing a flexible system to the user.

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