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A DECISION TREE BASED RECOMMENADATION SYSTEM FOR TOURISTS

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ABSTRACT

In this paper, we present a Decision Tree-based recommendation system designed to enhance tourist experiences by providing personalized recommendations for attractions and activities. The system leverages a decision tree algorithm to analyze tourists' preferences, historical data, and contextual information, such as location and time of year, to generate tailored suggestions. By incorporating features such as user profiles, past behavior, and popular destinations, the recommendation system aims to offer relevant and engaging options that align with individual interests. The effectiveness of the proposed system is evaluated through user feedback and comparison with existing recommendation methods, demonstrating its ability to deliver accurate and user-centric recommendations.

I.INTRODUCTION

Choosing a tourist destination from the information that is available on the Internet and through other sources is one of the most complex tasks for tourists when planning travel, both before and during travel. Previous Travel Recommendation Systems (TRSs) have attempted to solve this problem. However, some of the technical aspects such as system accuracy and the practical aspects such as usability and satisfaction have been neglected.. To address this issue, it requires a full understanding of the tourists' decision-making and novel models for their information search process. This paper proposes a novel human-centric TRS

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that recommends destinations to tourists in an unfamiliar city. It considers both technical and practical aspects using a real world data set we collected. The system is developed using a two-steps feature selection method to reduce number of inputs to the system and recommendations are provided by decision tree C4.5. The experimental results show that the proposed TRS can provide personalized recommendation on tourist destinations that satisfy the tourists.

Objective: tourist destination from the information that is available on the Internet and through other sources is one of the most complex tasks for tourists when planning travel, both before and during travel. Previous Travel Recommendation Systems (TRSs) have attempted to solve this problem. However, some of the technical aspects such as system accuracy and the practical aspects such as usability and satisfaction have been neglected. To address this issue, it requires a full understanding of the tourists' decision-making and novel models for their information search process.

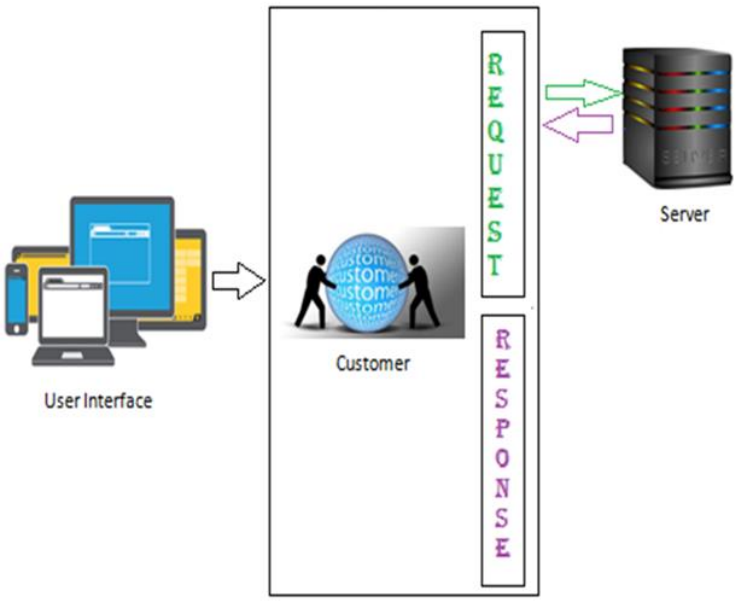

Fig1: System Architecture

II.EXISTING SYSTEM

Existing tourist recommendation systems predominantly utilize collaborative filtering, content-based filtering, or hybrid approaches to suggest attractions and activities. **Collaborative filtering** methods, such as those used by platforms

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like TripAdvisor and Yelp, rely on user-generated ratings and reviews to recommend destinations based on the preferences of similar users. While effective, these systems often suffer

from challenges such as the cold-start problem, where new users or items lack sufficient data for accurate recommendations.

Content-based filtering systems focus on the characteristics of attractions and user preferences. For example, systems like Google Maps and Foursquare recommend places based on detailed descriptions and users' past interactions with similar activities. However, these systems may lack contextual awareness and may not fully capture the nuances of user preferences.

Hybrid systems combine both collaborative and content-based approaches to mitigate individual shortcomings. For instance, platforms like Airbnb and Expedia use a blend of user reviews and attraction features to provide more comprehensive recommendations. Despite their advantages, hybrid systems can be complex and computationally intensive.

III.PROPOSED SYSTEM

The proposed DM framework consists of four phases including data acquisition, data pre- processing, data analysis, and result interpretation. (1) For data acquisition, the designed questionnaire, which has four parts, is distributed and collected from Chiang Mai, Thailand. (2) The collected data is pre-processed using several data pre-processing techniques involving data cleaning, data transformation, and feature selection methods. (3) The third phase involves the data analysis processes using a decision tree C4.5 as classifier. The aim of the third phase is to identify suitable features and find personalized systems have not been a focus of RS research.

1. To overcome from above problem author is asking to use C4.5 decision tree algorithms which take experiences of previous users and then build a model and if new user enter his requirements then decision tree will predict best location based on his given input. Decision tree don’t need new users past experience data.

2.To implement decision tree model, we need to have dataset and this dataset sometime will have empty or garbage values and this values will put bad effect on decision tree model so we can remove

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such empty or garbage values by applying pre-process techniques.

3.Sometime to predict or build model no need to use all columns (attributes) values from dataset and these unnecessary attributes can be remove by apply features selection algorithms and here we are using MRMR features selection algorithms to remove unnecessary attributes to reduce execution time of building model and to increase system accuracy.

IV.LITERATURE SURVEY

Tourism recommendation systems play a crucial role in enhancing travel experiences by providing personalized suggestions to tourists. Traditional recommendation methods such as Collaborative Filtering (CF) and Content-Based Filtering (CBF) have been widely used in this domain. CF techniques rely on analyzing user behavior and historical data to make recommendations, as discussed by Schafer, Konstan, and Riedl (2007). While effective in many scenarios, CF methods face challenges such as the cold-start problem, where new users or items have insufficient data, limiting the system's ability to provide accurate recommendations. In contrast, CBF approaches, explored by Lops, Bertini, and Dardi (2011), recommend items based on their attributes and the user's profile. Although CBF can address some limitations of CF, it may lack the contextual adaptability needed for dynamic environments like tourism.

To address the limitations of CF and CBF, Hybrid Recommendation Systems combine both techniques, as reviewed by Burke (2002). These hybrid models aim to enhance recommendation accuracy by integrating collaborative and content-based methods, but they often come with increased complexity and resource requirements. Decision Trees offer a different approach by providing a transparent and interpretable model that can handle diverse features and user preferences. The foundational work of Quinlan (1986) on Decision Trees introduces a model that splits data based on feature values to make predictions, making it suitable for personalized recommendation tasks where explicit feature analysis is beneficial.

Recent applications of Decision Trees have shown their effectiveness in recommendation systems. Khan, Hayat, and Shah (2013) demonstrated the utility of Decision Trees in e-commerce, where the technique provided scalable and interpretable recommendations based on user behavior and item attributes.

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Additionally, García, Gervás, and León (2014) extended the use of Decision Trees to the tourism sector, proposing a model that integrates user preferences with destination features to generate tailored recommendations. Their research confirmed the capability of Decision Trees to manage complex, multi-dimensional data and improve the relevance of suggestions for tourists. This body of work underscores the potential of Decision Trees to offer a transparent and effective alternative to traditional recommendation methods.

V.MODULE DESCRIPTION

Our application consists of three modules

1. Customer module

Customer

This module describes all about customers, by using this module any customer can perform operations like the upload dataset preprocess & MRMR Feature Selection Generate C4.5 Decision Tree Model Tourist Recommendation features Selection Graph.

A.Data acquisition

To understand tourist's search behaviour in assessing travel information and decision-making processing for destination choice, we use a questionnaire as a data collection method due to its effective mechanism for collecting information from tourists. Pre-study on variety of factors that influence tourist's preferred destinations were identified for questionnaire design. The questionnaire design contains four parts containing a set of factors related to tourist's preferred destinations as following:

1)Trip characteristics: These variables are the most important variables when tourists select their destinations. This includes trip length, travel purpose, trip composition, and etc.

2)Tourist characteristics: These variables include pychological, congitive and socioeconomic status varaibles that influence on the tourist destination choice process.

3)Travel motivations: Travel or tour motivation is one of the important factors we have found from literature reviews when tourists are selecting their destinations. This variable describes the reason that a tourist chooses to visit a destination.

4)Tourist sociodemographic information: The individual demographics may influence the information seeking behaviour.

To run project

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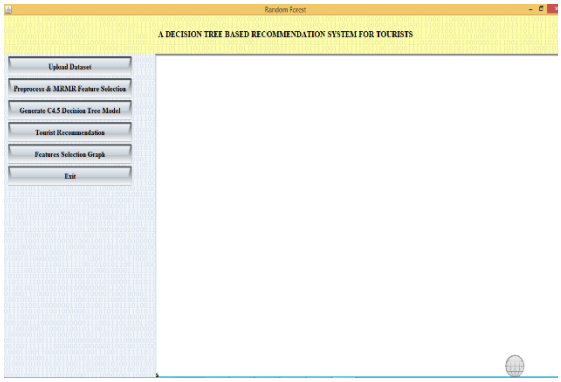
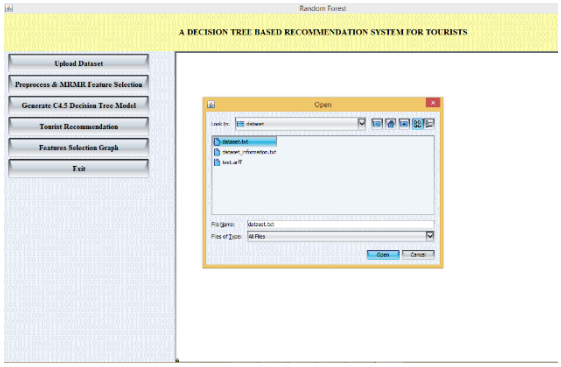
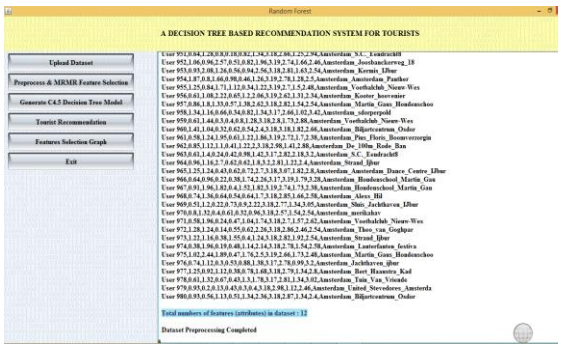


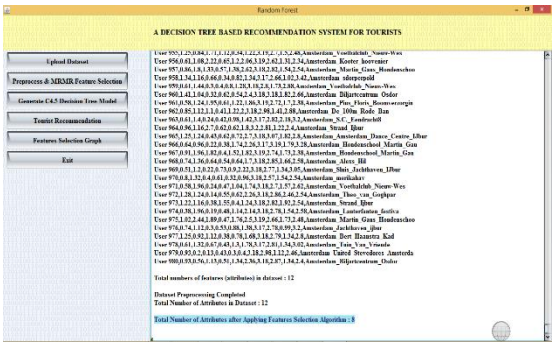
In above screen click on 'Upload Dataset' button and upload dataset file



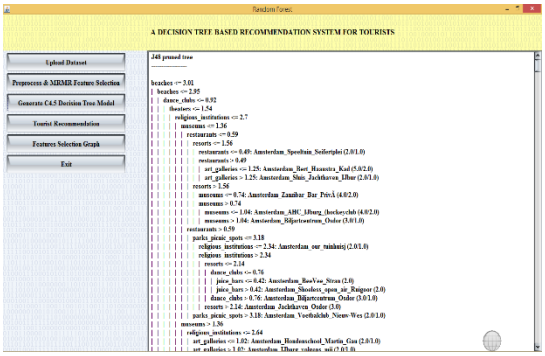
After file upload will get below screen with all dataset details



In above screen all users past experience dataset loaded and total 12 attributes are there in the dataset. Now click on 'Pre-process & MRMR Feature Selection' button to remove empty values and reduce attributes size.



In above screen after applying MRMR features size reduces to 8. Now click on 'Generate C4.5 Decision Tree Model' to build model



In above screen we can see using IF and ELSE statement decision tree has generated model. If > it will choose some decision if < it will choose some other decision. Now click on 'Tourist Recommendation' button to upload test file with '?' as location and application will predict it

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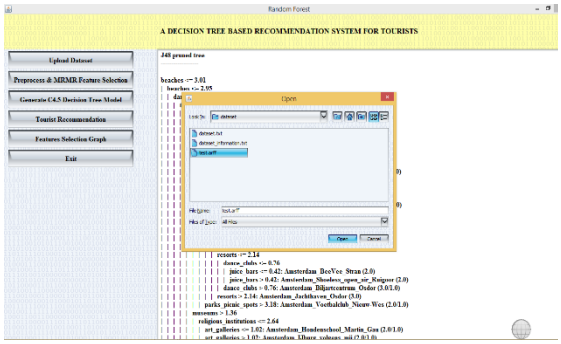
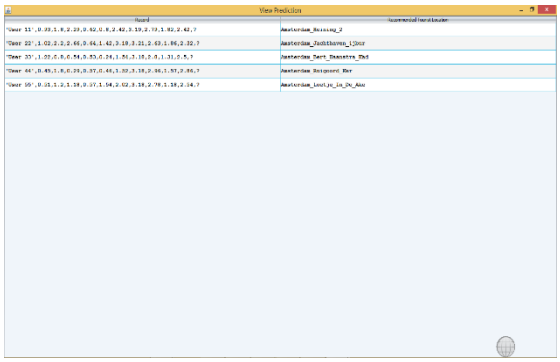
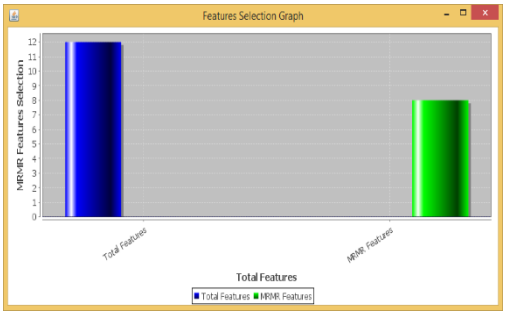


In above screen i am uploading test file now click open to get predicted or recommended location.



In above screen we can see test data contains ? in place of location but application recommend location name in second column. You too can add new values in dataset/test.arff' file in the bottom lines and give user id as double numbers such User 66, User 77 or User 88 etc. Now click on Features Selection Graph button to get below graph



In above graph x-axis contains total features and MRMR features and y-axis represents count of features and in above graph we can see after applying MRMR technique features size reduces.

VI.CONCLUSION & FUTURE WORK

a decision tree based tourist recommendation system has been presented in attempt of solving the current challenge of the destination TRS. The data set has been decomposed into two sub data sets using relevant tourism domain knowledge. This was done to increase classification accuracy rate and to reduce the complexity of the decision tree. The optimal decision trees from NMIFS with the highest accuracy rate and simplicity (i.e. less number of leaf and tree size) have been constructed for destination choice. The decision rules from decision trees were extracted. It can be seen that NMIFS is the optimum method because it uses fewer number of feature than MRMR for both of the data sets. Finally, the experimental results

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confirm applicable of the proposed a TRS. The proposed TRS satisfies the tourists' requirements who plan to visit or during their visit the city of Chiang Mai.

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