ABSTRACT

The recent past showed a greater interest in recommender techniques. Now-a-days there are many travel packages existing from different websites to almost all the places over the world. A customer finds it very difficult to search for the best package as he/she has to browse multiple websites, contact many travel agents and etc. which is a tedious process and is time consuming. There should be a system where the user should find the best package on the Internet with a single click.

To address this issue, we adopt Travel Package Recommendation System which offers the best package among all the other packages that are on the web. This project will help tourist to suggest the best Travel Package among all the package deals on the web. On multiple demands of tourist that is, a customer will select a travel package for a particular place based on the recommendations provided by the previous customers who had experience with the package. Therefore, according to the personalized recommendations, he/she will choose the best package that is on the web.

Initially, we will evaluate the particular characteristics of the current traveling packages and we mine the data on the tourists rating and the intrinsic features i.e., locations, travel seasons etc. Based on the data collected after mining, we will generate a list for personalized travel package recommendations. Furthermore, we will extract the data based on the tourist's relation with the area and season.
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1 Background and Rationale

1.1 Introduction

Tourism can be considered as most favorite pass time when people get free time. Several travel organizations are available on the web. The people or the tourist select their own Travel Package according to their personal interest. The travel companies concentrate on the interest associated with tourist making sure to increase their particular market value and supply enormous package deals. So that they can make their Travel Package more effective. Now-a-days Recommender system is becoming very famous and people are getting attracted to it, as it is helping them to choose the best package in a short time.

Recommender systems are categorized into

1. Content based system:

With this, item recommendation is analyzed then it retrieves the information and filters this for research. For example, if the tourist goes to hill stations more often, then database contains “hill station” as recommendation [1].

2. Collaborative filtering systems:

It rely on the similar factors of user or items. Preferences of different users for same item are recommended by system [2].
There are many challenges in designing and executing Personalized Travel Package Recommendation System. The following shows some of the challenges:

1. The data for Travel is very less and scattered. For an example, recommendation for a movie may cost more to travel than the movie price.

2. Usually Travel package are location based so they are pertained to space or time to reach destination. For an example, the package contains locations which are geographically near and also vary season wise [3].

3. The older recommendation method is dependent upon rating and the travel data may not consist of this sort of rating [4].

1.2 Related Work:

1.2.1 Collaborative Filtering for Orkut Communities: Discovery of User Latent Behavior

“Recommender systems can be classified into two categories: Content - based filtering and collaborative filtering. Content-based filtering analyzes the association between user problems and the descriptions of items. To recommend new items to a user, the content-based filtering approach matches the new items descriptions to those items known to be of interest to the user. On the other hand, the collaborative filtering (CF) approach does not need content information to make recommendations. Users of social networking services can connect with each other by forming communities for online interaction. Yet as the number of communities hosted by such websites grows over time,
users have even greater need for effective community recommendations in order to meet more users. We investigate two algorithms from very different domains and evaluate their effectiveness for personalized community recommendation. The first algorithm is association rule mining (ARM) [5], which discovers associations between sets of communities that are shared across many users. The second algorithm is Latent Dirichlet allocation (LDA) [6], which models user-community co-occurrences using latent aspects. In comparing LDA with ARM, we are interested in discovering whether modeling low-rank latent structure is more effective for recommendations than directly mining rules from the observed data. Our empirical comparisons using the top ‘k’ recommendations metric show that LDA performs consistently better than ARM for the community recommendation task when recommending a list of 4 or more communities”.

1.2.2 Equip Tourists with Knowledge Mined from Travelogues:

“With the prosperity of tourism and Web 2.0 technologies, more and more people have willingness to share their travel experiences on the Web (e.g., weblogs, forums, or Web 2.0 communities). These so-called travelogues contain rich information, particularly including location-representative knowledge such as attractions which is Golden Gate Bridge, styles for e.g., beach, history, and activities (diving, surfing). The location-representative information in travelogues can greatly facilitate other tourist trip planning, if it can be correctly extracted and summarized. However since most travelogues are unstructured and contain much noise, it is difficult for common users to utilize such knowledge effectively. In this paper, to mine location-representative knowledge from a
large collection of travelogues, we adopt a probabilistic topic model, named as Location-Topic model [7]. This model has the advantages of distinguishing between two kinds of topics, i.e., local topics which characterize locations and global topics which represent other common themes shared by various locations, and representing locations in the local topic space to encode both location-representative knowledge and similarities between locations. Some novel applications are developed based on the adopted model, including destination recommendation for on flexible queries, characteristic summarization for a given destination with representative tags and snippets, and identification of informative parts of a travelogue and enriching such highlights with related images [8]. Based on a large collection of travelogues, the Adopted framework is evaluated using both objective and subjective evaluation methods and shows promising results.”

1.3 Existing System:

1. Travel data is generally less than the data for other items, such as movies for recommendation, the charges for a travel are considerably more costly than watching a movie [2].

2. Almost every travel package contains numerous landscapes with lots of people’s interest and attractions and thus has intrinsic complex spatial-temporal relationships. For an example, a travel package includes landscapes which are geographically aligned together.
3. The existing recommender systems usually rely on data which are gathered and analysed based on the ratings given by the user, but it is not conveniently available for travel data [4].

Disadvantages:

1. Travel data are much fewer and sparser than traditional items.
2. The traditional items for recommendation usually have a long period of stable value, while the values of travel packages can easily depreciate over time.
3. The real world travel recommendation systems are usually very complicated.
4. Every travel package consists of many landscapes (places of interest and attractions), and thus has intrinsic complex spatial temporal relationship.

1.4 Adopted Solution:

The problem of unique features to distinguish personalized travel package recommendations from traditional recommender systems remains pretty open. There are many technical and domain problems designing and implementing the effective recommender system for personalized travel recommendation system [9]. This project will help tourist to suggest the best Travel Package among all the package deals on the web. In this, a customer will select a travel package for a particular place based on the recommendations provided by the previous customers who had experience with the package. This makes easy for the user to choose the best package deal.
Advantages:

1. The Travel Packages will be presented based on the interest of the tourist.
2. By using tourist, area and season as our inputs we can represent our travel data in the best form.
3. By using this recommendation approach the flaws of the existing system will be eliminated as it performs much better than traditional techniques.
4. The algorithm ‘Weighted Average Entropy’ will help the tourist to find the best package in the particular area based on season and theme [2].
2 NARRATIVE

2.1 Problem Statement:

There are several packages available for a travel system on the web [10]. In order to select the best package to certain destination, there is no efficient recommendation system available. To overcome this problem, we are coming up with Travel Package Recommendation System where you can select the best package.

2.2 Motivation:

A tourist has to select a package based on season and location. For example, if a tourist wants to visit ‘Landscapes’ in ‘Winter’ season, then there will an option of choosing place and season. Therefore, through this a tourist can customize their package accordingly.

This feature is implemented by using Tourist, Area and Season Model which can effectively capture the unique characteristics of travel data and also captures the relationships among the tourists which implements the better performance of travel package recommendation. This approach is much better than the traditional techniques [11].

The goal of the personalized travel package recommendation represents the Travel Packages and interest of the tourists [12].
2.3 Product Description:

In this project, there are two types of users, one is Admin, and another is user. An Admin logs into his account, and his role is to add, edit, and delete packages. And also can provide recommendations accordingly.

A user logs in and provides personalized inputs (tourist, area, and season) to the system and the best package that is available on web which will be presented to the user.

2.4 Product Scope:

The Software product is designed for PC, laptops and all devices which are compatible with java. The users of this product can use the services of the software when they are connected to the web as data is retrieved and stored in SQL database and mined to get the results. The product is compatible with java 1.6 or higher versions and MySQL database.
3 PRODUCT DESIGN

3.1 Product Design and Architecture:

The System architecture shows how the data mining concept is applied on the Travel log. When a customer login to Travel Package Recommendation System website. Then he has to set input as Source, Destination and on which season to travel. Based on this data, the process starts analyzing travel log to display the best recommended packages on screen.

Figure 3.1 System Architecture
3.1.1 Tourism and travel package information:

People travel with families or for business purpose to have a good time, usually for a limited period. Tourism is commonly associated with domestic or international travels. Many travel companies are offering online services to people who want to travel and also this business domain is expanding. As there are large number of travel package information available, it is important to satisfy a tourist’s personal needs and preferences to serve with more attractive packages. First tourism recommender system was introduced by Delgado and Davidson [13].

3.1.2 Tourist-Area-Season-Topic Model:

Travel time and traveling areas are divided into distinct seasons and locations. Based on these factors, we develop a Tourist-Area-Season Topic Model which represents distinct distributions of a topic model in a travel package. The content of the travel packages and the interests of the tourists represents the intrinsic features such as locations, travel seasons etc., where the tourist’s topic is mined [14]. A personalized travel package recommendation is developed which is based on TAST Model, while considering some additional factors such as seasonal behaviors of tourists and the cost of travel package.
3.1.3 A Mixed Recommendation approach:

In this approach, we use the list of topic distribution which was generated in TAST model. For personalized travel package recommendation, the data is displayed for location and price. As the tourist selects the package based on location or price, the data is updated in the database and the admin or the users can view the count of people who has selected a package based on a particular location or a particular price [15]. It is important for the user, as it helps the users in deciding the location based on the popularity of the location and also it helps when pricing plays a major role in deciding a package. It will give admin a perspective about the Travel packages which was added as it will be useful for the admin to add future packages based on the popularity of the location and the price the users have selected.

3.1.4 Tourist-Relation-Area-Season-Topic Model:

Here we find the tourist relationship in a travel group based on TRAST model. The tourist in each travel group are grouped as a one single record, thus it is a very cumbersome process, and we can understand this process by simple example. Consider there are two travel groups G1 and G2. They have decide to travel in winter season and the destination is North America. For generating a travel landscape, [2] we first extract a relationship (Ex: Age), then find a topic to travel in winter (Ex: skiing). Finally, based on this skiing topic and the selected travel area (Ex: Northeast America), we define a landscape. So, in this TRAST model, a group of tourist and the corresponding package
for this travel group refer to the topic distribution and relationship distribution which are specific to each relationship-season pair and tourist.

3.1.5 Hobbies:

Due to differences of people’s age, occupation, hobbies as well as their knowledge, the consumers still have a different opinions and understandings to select a package [16]. A user has many interest and taste, so based on his interest, he can select any package. By selecting the hobby the user is presented with package details where the packages are displayed based on hobbies.

3.1.6 Weighted Average Entropy:

Initially, the entire year is viewed as a big season and then we partition it into several seasons recursively. In each iteration, we use the weighted average entropy (WAE) to find the best split [2]. To calculate the weighted average entropy we need package id, theme, destination, cost, area, and landscapes from package details table where theme is the ‘where’ condition which is an input as shown in Figure 3-2.
As shown in Figure 3-3, the select query retrieves a list of the details from the package details table which will be stored in an array.

```
VIEW Formulaf="select pack_id, theme, pack_desc, cost, season, area_wise_landscapes from packagedetails where theme=?";
```

Figure 3.3 Query

As shown in Figure 3-4, we first calculate weighted average entropy for ‘North America’. In try block we first establish connection with Oracle database by calling ‘getConnection’ function in ‘AbstractDataAccessObject’ which has a reference to JDBC driver of oracle database.

A reference to ‘View_Formula’ which is in ‘sqlConstants’ class as shown in Figure 3-4, passing the input as theme as shown in Figure 3-2 and then by executing query the result of the query will be stored in the result set. By navigating to different rows with the result set object ‘rs’, all the details will be stored in an array with index ‘i’.
After storing all the details in an array, we initialize Winter, Summer, Spring and NUSA (North USA) to String Variables as shown in Figure 3-5, which is ‘S1(powerp(i))’, ‘S2(powerp(i))’, ‘S3(powerp(i))’ which are Winter, Summer and Spring respectively, in the formula which is in numerator. In a ‘for’ loop we iterate ‘j’ to loop to all the rows retrieved. String ‘str’ is theme which is given as input. For example ‘Adventure’.

In the ‘if’ loop, we check two conditions. In the first condition, we first compare two strings which are themes, array ‘t’ contains list of all the themes that are retrieved from the database. For example, Adventure, Backwater, Beach, Family, Heritage and so on. Where the string ‘str’ contain input which is given by the user e.g. Adventure.

In the second condition we compare two strings where the string str1 is NUSA and array ‘ar’ contains list of area which are retrieved from the database for e.g. NUSA, EUSA, WUSA, SUSA.
If the first if condition was successful, we check another if condition where we compare two strings where array ‘se’ contains list of seasons Summer, Winter, Spring and based on whatever the condition is successful we increment the variables a, b, or c. The variables a, b, c are ‘mod(S1(power p))’, ‘mod(S2(power p))’, ‘mod(S3(power p))’ which is in the denominator in the formulas [24] shown in Figure 3-6.

```java
int a=0, b=0, c=0;
String s="Winter"; //S1(power p(i))
String s1="Summer"; //S2(power p(i))
String s2="Spring"; //S3(power p(i))
String str1="USA";
for(int j=0; j<ar[j]; j++)
{
    if(str.equals(t[j]) & str.equals(ar[j]))
    {
        if(s.equals(se[j]))
        {
            a++; //mod (S1(power p))
        }
        else if(s1.equals(se[j]))
        {
            b++; //mod (S2(power p))
        }
        else if(s2.equals(se[j]))
        {
            c++; //mod (S3(power p))
        }
    }
}
int cot=0;
System.out.println("<-----------------North America-----------------> ");
```

Figure 3.5 First snippet for weighted average entropy
Figure 3.6 Second snippet for weighted average entropy

‘cot’ is a integer variable which in ‘$S(power p)$’ in the formula which keeps the count of number of rows retrieved based on the condition on theme and area. for example, theme = Adventure and area = ‘NUSA’.

To calculate ‘WAE, First divide ‘$a$’ with ‘cot’ to get ‘$a1$’,’$b1$’,’$c1$’ which is ‘$S1(powerp(i))$’ divides ‘mod($S1(power p)$)’.

In order to calculate entropy of ‘$S1(powerp(i))$’,’$S2(powerp(i))$’, ‘$S3(powerp(i))$’, we subtract the ‘log($a$)’ and ‘log($cot$)’ and divide the result with the Gibbs Constant (2.303) and assign it to ‘$a2$’,’$b2$’,’$c2$’ which is ‘$Ent S1(powerp(i))$’, ‘$Ent S2(powerp(i))$’ ,’$Ent S3(powerp(i))$’ [24].

```
System.out.println("a "+a+ "b "+b+ "c "+c+ ");
For(int k=0;k<=x++;)
{
  if(str.equals(c[k]) & str.equals(ar[k])
  cot++; //3(power p)
}
Double d1,d2,d3,d4,s1,s2,b1,b2,c1,c2;
System.out.println(" cot "+cot);
q1=(double)a/cot;
b1=(double)b/cot;
c1=(double)c/cot;
System.out.println(" a "+a " b1 "+b1 " c1 "+c1);

a2=(Math.log(a)-Math.log(cot))/2.303; // calculate entropy
b2=(Math.log(b)-Math.log(cot))/2.303; // calculate entropy
c2=(Math.log(c)-Math.log(cot))/2.303; // calculate entropy
d1=s1*e2;
d2=b1*b2;
d3=c1*e2;
d6=d1+d2+d3;
System.out.println(" d1 "+d1+ " d2 "+d2+ " d3 "+d3);
System.out.println(" d9 "+d9);
System.out.println("Value for NUSA "+se10[0]);
System.out.println("--------------End North America------------");
request.setAttribute("se0", se10[0]);
```
The above formula to calculate Weighted Average Entropy is as shown in Figure 3-7.

Then we finally multiple ‘a1’ and ‘a2’ and assign it to ‘d1’(d1 is S1(powerp(i)) divides ‘mod(S1(power p))’ multiplies ‘Ent S1(powerp(i))’ and similarly for ‘d2’, ‘d3’, then we add ‘d1’, ‘d2’, ‘d3’ which are the values for winter, summer and spring. Add all values and assign it to ‘d4’ which is then assigned to array se and displayed for North America as 0.467892456390274. Similarly we calculate for South America, East America and West America as shown in Figure 5-16.

```java
Double max=se1[0];
for(int j=0;j<4;j++)
{
    if(max<se1[j])
        max=se1[j];
}
System.out.println(max);
request.setAttribute("se4", max);
```

Finally we calculate the maximum value area-wise which is NUSA, EUSA, WUSA and USA and the maximum value is displayed as shown in Figure 3-9.
Figure 3.9 Displays all the area-wise values

We select the area based on the maximum value and see the results in the form of a list view as shown in Figure 3.10.

<table>
<thead>
<tr>
<th>PackageId</th>
<th>Tour Place Name</th>
<th>LocationName</th>
<th>Location Picture</th>
<th>Tour Highlights</th>
<th>Tour Area</th>
<th>Tour Season</th>
<th>Theme</th>
<th>DurationAndCost</th>
<th>Rating</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>152</td>
<td>Arizona to Dakota park5</td>
<td>Mountains</td>
<td>![Mountains Image]</td>
<td>9 days and 10 nights</td>
<td>Dakota Mountains &amp; Summer</td>
<td>Heritage</td>
<td>11 days</td>
<td>$2500</td>
<td>ViewDetails</td>
<td>EXCELLENT</td>
</tr>
<tr>
<td>153</td>
<td>Arizona to Missouri park6</td>
<td>Lakes</td>
<td>![Lakes Image]</td>
<td>4 days and 5 nights</td>
<td>Soulful Missouri &amp; Spring</td>
<td>Hills</td>
<td>6 days</td>
<td>$3000</td>
<td>ViewDetails</td>
<td>EXCELLENT</td>
</tr>
<tr>
<td>158</td>
<td>Detroit to Dakota park11</td>
<td>Lakes</td>
<td>![Lakes Image]</td>
<td>5 days and 4 nights</td>
<td>Dakota Mountains &amp; Summer</td>
<td>Family</td>
<td>5 days</td>
<td>$2500</td>
<td>ViewDetails</td>
<td>EXCELLENT</td>
</tr>
</tbody>
</table>

Figure 3.10 List of maximum value calculated by WAE (area-wise)

3.2 Difference between Existing and Developer Design
In the Existing system when a user wants to select a package, the user is allowed to select between two options which is source and destination and the package list is displayed to the user. In order to overcome the problem with the existing system, we have adopted a developer design where a user has an option to select a package by choosing a theme from the list of given options and a package list is displayed with all the package details including the source and destination. From the displayed list, the user has one more option to select Landscapes which will mine the list and displays the packages with all the package details. So, by following this approach the problem in the existing system is avoided.

In Mixed Recommendation approach, the Existing system has a price constraint which is added for developing personalized package recommender system. The price of travel packages may vary from $20 to more than $3000, so the price factor influences the decision of tourists [2]. In the existing system, the price is divided into different segments. By using a forecasting method the next possible price range for a given tourist is predicted, where as in Adopted system, the price list and the number of tourist who have chosen the particular price is displayed to the user. So a user has an option to view which package price is popular among the tourist, which can be considered as the best recommendation method for a customer rather than predicting the price range.

In the existing system, the user doesn’t have an option to select a package by providing an input as his hobby where as in the proposed system, the user have an option to select a package by selecting an input as his hobby.
Instead of providing inputs as source, destination and getting a package list with all the different hobbies displayed with the package. It is difficult for a user to browse through each package which includes his hobby as it takes more time. In order to make it more user-friendly, in the proposed system, it displays the package list which are only targeted to the hobby and it takes less effort and time. For example, if a user wants to have ‘fishing’ in his travel package then the package list is displayed to the user which are targeted to ‘fishing’.

3.3 System Requirements

These prerequisites are known as (computer) system requirements and are often used as a guideline as opposed to an absolute rule. Most software defines two sets of system requirements: minimum and recommended [17]. The minimum system requirements need to be met for the software to run at all on your system, and the recommended system requirements, if met, will offer better software usability.

3.3.1 Software Requirements

- Language : Java
- Version : JDK 1.5
- IDE : MyEclipse 2015
- Back-end : Oracle 10g
3.3.2 JAVA:

"Java is a high-level programming language which was developed by Sun Microsystems. It is an object-oriented language similar to C++, which was simplified to get rid of some common programming errors. Source code (files with a .java extension) of Java is compiled into a format called bytecode (files with a .class extension), which can be executed by a Java interpreter. Operating Systems such as UNIX, the Macintosh OS, and Windows contain JVM.” [17]

3.3.3 My Eclipse:

"Eclipse is an integrated development environment (IDE) for developing Java applications and also other languages like PHP, C/C++, and HTML5. It is also an application platform framework for Java desktop applications and others. The MyEclipse IDE is written in Java and can run on Windows, OS X, Linux, Solaris and other platforms supporting a compatible JVM” [18].

3.3.4 MySQL:

"MySQL, the most popular Open Source SQL database management system, is developed, distributed, and supported by Oracle Corporation. A database is a structured collection of data. To add, access, and process data stored in a computer database, you
need a database management system such as MySQL Server. Since computers are very
good at handling large amounts of data, database management systems play a central role
in computing, as standalone utilities, or as parts of other applications.” [19]

3.3.5 Tomcat Server:

“Apache Tomcat is an open-source web server and servlet container developed by
the Apache Software Foundation (ASF). Tomcat implements several Java
EE specifications including Java Servlet, JavaServer Pages (JSP), Java EL,
and WebSocket, and provides a "pure Java" HTTP web server environment for Java code
to run in.” [20]

4 SYSTEM IMPLEMENTATION

The web based application Travel Package Recommendation System was
implemented in JAVA using MyEclipse, the database is MySQL. Here are some of the
implementation details.

4.1 Travel Package Recommendation System

The Travel Package Recommendation System was developed using MyEclipse in
Windows 8.1. The web-based application requires access to the networking services. As
shown in Figure 4-1, the user has to register in the website, in order to access the
application. Once the user is registered in the website, the user is allowed to login to the
application and will be navigated to the Home screen.
4.1.1 Admin Activity

There is only one admin for the website. When an admin logs in, he is presented with the homepage which has a menu bar, a picture map of United States of America and a welcome message. Admin can view User details and delete users from the list. By clicking the View button in the menu bar, admin gets a list view of users registered with the website.

The admin can add a tour package which will be displayed to all the users who are registered with the website as shown in the Figure 4-2. In this form, we add a package name with the description then select Cost for it and add Source and Destination. Here we
can add hobbies, seasons, theme and we can upload an image of the location which gives a perspective to the user about the package.

![Holiday Package Form](image)

**Normal Recommendation System**

By selecting ‘Normal Recommendation’ from ‘Get Recommendation’ in the menu bar, an admin can view list of Users who has selected a particular package. The list displays the users and their package details who booked a package using normal recommendation system (traditional) where a user gives only two inputs that is Source and Destination. This is the existing system which has disadvantage as the user would not be able to customize his package based upon his interest.

**Season Recommendation System**
To view the list, admin has to click ‘Season Recommendation’ from ‘Get Recommendation’ in the menu bar, an admin can view list of Users who has selected a particular package with their cost and season [9]. The list displays the users and their package details who booked a package using season based recommendation system where a user has to give inputs like Source, Destination and Season.

**COLLABORATIVE FILTERING**

a. **Same location**

The data is displayed when a user selects a package to same location, then the user count is incremented at the Tourist Rate column. The list shows the number of users who have selected the package in the same location. A user selects ‘Same Location’ button from Segmentation menu bar where he can view the list.

b. **Same cost**

On clicking ‘Same Cost’ in the ‘Segmentation’ menu bar, the list view is displayed. The list shows the number of users who have selected the package of the same cost. The tourist rate column is updated immediately when a user selects the package which has same price for it.

**TRAVEL LOG**

It displays the list of packages the admin has added from the add package form, by clicking on ‘Record Information’ a list of package details will be displayed. This
information is used when an admin wants to view all the packages with the ratings given by users.

**TOURIST-RELATION-AREA-SEASON-TOPIC MODEL**

In this we first create a travel group by taking input as age and theme as shown in Figure 4-3.

![Figure 4.3 Create a travel group (by age and location)](image)

We create a travel group for people who are going to the same location and or of same age group as we assume that same age group may have similar tastes as well.
As shown in Figure 4-4, a list is displayed with a location and age which was given as an input, then admin clicks on the check box and select the users and enters a group name and the group is created. The admin can view the group and the number of users in each group by clicking on view travel groups as shown in Figure 4-5.

As the name suggests TRAST i.e, the tourist relation area season topic model. It defines a relation among users which helps the users to travel with a group to make their tour successful.
4.1.2 User Activity

There can be any number of users who can register to the website. When a user is logged in, the user will be presented with the user home page which has a menu bar, a picture map of United States of America and a welcome message. A user can view all the User details who has registered to the website, which is useful if the user wants to contact other users and inquire about the travel packages to get a review.

NORMAL RECOMMENDATION SYSTEM

In this a user selects a package by giving input as Source and Destination only as shown in Figure 4-6. On selecting ‘Existing Recommendation’ from ‘Package Information’ in the menu bar, a user will be displayed with those packages [21]. Thus, when a user purchase the package, the result is stored in the database as well as is displayed at admin side.
The user can view Total packages that are added by the admin, by selecting ‘Total packages’ button from ‘Package Information’ menu bar.

ADOPTED RECOMMENDATION SYSTEM

The user can select a package using Adopted Recommendation System where a user has an option to select package based upon Season, Source and Destination as shown in Figure 4-7 and a list is displayed.
On selecting ‘Adopted Recommendation’ from ‘Season Based Recommendation’ in the menu bar, the data is extracted based upon user input. Thus, when a user purchase the package, the result is stored in the database as well as is displayed at admin side. Thus this covers the second module of the project. A user can also view details about any package before payment.

SEASON BASED PACKAGES

The Season Based Packages provides user the custom preference option where a user can select packages based on only seasons. On selecting ‘Season Group Info’ from ‘Season Based Packages’ from the menu bar. The user is asked to select any listed season. On selecting particular season, for example ‘Spring’, the user is displayed with only those packages which are offered in Spring season.

PACKAGE DETAILS

By clicking on view details, the details of the package are displayed. After viewing the package details, a user can buy a package on clicking the buy package link.
PAYMENT

By Clicking on Buy Package button the user will be presented with payment details to be entered and can pay the package price. The user needs to enter credit card information with the CVV number and expiry date. The user clicks on make a payment button where the payment for the package is made.

INBOX

As soon as the payment is made, the particular package is added in the inbox. The inbox displays list of packages and its details a user is going to travel.

RATING

The privacy of the ratings and recommendations of the users is maintained to the fullest extent possible [22]. After the tour, the user can rate the package by clicking on rate details and the user will be presented with the package details and a select box to rate package. When every user gives rating, then the system collects all the ratings of the selected package and calculates average of it and displays as the package rating and it eliminates unfair ratings as it will not allow malicious users to gain unfair advantage [4].

MIXED RECOMMENDATION

In mixed recommendation first approach, the user can view how much users are paying for a package which gives user a perspective to decide a package if price is the factor as shown in Figure 4-8.
In mixed recommendation second approach, the user can view how many users are going for same location which gives user a perspective to decide a package as the user will know which package is popular.

**HOBBIES**

To recommend a travel plan for elderly people, we have to consider more constraints related to ability and health. In order to enhance the quality of service of elderly people, we propose a pattern Web service, which takes into account these constraints [23]. The user can select the packages based on hobbies as shown in Figure 4-9.
By selecting the hobby the user is presented with the following screen where the packages are displayed based on hobbies as shown in Figure 4-10. For example, a user has selected ‘Scuba Diving’ then the packages displayed are of that particular hobby.

**Figure 4.10 View packages based on hobbies**

**VIEW/UPDATE PROFILE**

The user can view his profile by clicking on view profile in the ‘Profile’ menu bar. He can update it by clicking on update button.
CHANGE PASSWORD

The user can change the password by clicking on ‘change password’ button in ‘Security’ menu bar where the user is presented with field’s login name, old password and new password. On clicking change the password is changed as shown in Figure 4-11.

![Change Password Form](image)

**Figure 4.11 Change Password**

CHANGE QUESTION

The user can change the question for security reasons as it will be used if the user forgets the password. As the user selects change question from the menu bar, the user will be presented with the change question screen which consists of fields as login name, security question and security answer. The user can change the question and type in a new answer and on clicking change button the security question and answer will be updated in the database.
5 EVALUATION AND TESTING

i. Login

a. **Negative Test Case:** if the user gives wrong credentials and try to login, then a message which will be shown saying “Invalid username and password” and if the fields are empty then an alert box pops up saying “login name is required”.

b. **Positive Test Case:** by giving the valid credentials and then click on the Login button then the user is authenticated and navigated to admin/user home screen where a message is displayed saying “welcome to user/admin”.

ii. Registration
a. **Negative Test Case:** Clicking on Signup button without entering values in any of the fields and trying to register with the application will pop up an alert box “Field is required” as shown in Figure 5-1. The validation is for each text box in the registration page.

![Figure 5.1 Negative Testcase (Registration)](image)

b. **Positive Test Case:** As Shown in Figure 5-2, the image on right side shows the successful registration, by which we ensure the user is registered successfully and the app will navigate the user to login page. Before registering the user we make sure all the fields are validated.
iii. Collaborative Filtering

a. Negative Test Case: Clicking on Show list button without selecting values in any of the fields will display a message saying “There are no packages” as shown in Figure 5-3.
b. Positive Test Case: As the user selects from the drop down box and click on show list button it will display a list based on inputs as shown in Figure 5-4.
iv. **Collaborative Filtering (Create Group name)**

a. **Negative Test Case:** Clicking on go button without entering values in the field will display a message saying “No Group Created”.

b. **Positive Test Case:** As the user enters the group name and click on go button it will display a message saying “user group created successfully” and the group created can be viewed as shown in Figure 5-6.
v. **Tourist-Area-Season-Topic MODEL**

In TAST model which is topic area season model the user can select a package based on theme.

a. **Negative Test Case:** Clicking on ‘view Packages’ button without selecting a theme in the field will display a message saying “No Theme Selected”.

b. **Positive Test Case:** After selecting the package based on theme as shown in Figure 5-7, the user will be presented with the following screen as shown in Figure 5-8 where the user can further select the package based on landscapes.
As the user selects landscapes the list is further mined and the following packages are displayed as shown in Figure 5-9.
vi. **Weighted Average Entropy**

a. **Negative Test Case:** Clicking on ‘calculate’ button without selecting a theme will not display any values for the areas and maximum value as shown in Figure.

![Figure 5.10 Negative result for WAE](image)

b. **Positive Test Case:** By selecting a theme as ‘Adventure’ and clicking on ‘calculate’ button will display all the values according to area-wise and also the maximum value as shown in Figure 5.11

![Figure 5.11 Positive Testcase for WAE](image)
As shown in the Figure 5-18, the graph displays the analysis between existing recommendation and adopted recommendation system. The values that are used as an input in the graph are the no. of users who have selected the packages.

The bar graph consist of two bars where the color brown is for the Adopted systems and the color blue is for existing systems. The inputs are taken from Figures 4.4 and 4.5. It gives admin a perspective as which recommendation system is popular among users, so that he can create new packages by analyzing the result of graph.
**c. Comparison between existing system and Developer system:**

<table>
<thead>
<tr>
<th>Existing System</th>
<th>Developer System</th>
</tr>
</thead>
</table>
| i. No Algorithm available in the existing system | i. **Weighted Average Entropy:** It is an algorithm to find the best package area-wise by considering theme and season. 

\[
WAE(i; S^p) = \frac{|S^p(i)|}{|S^p|} \cdot \text{Ent}(S^p(i)) + \frac{|S^p(i)|}{|S^p|} \cdot \text{Ent}(S^p(i))
\]

NUSA: 0.4678924  
SUSA: 0.412622  
EUSA: 0.458063  
WUSA: 0.451463  
Calculated maximum value:  
NUSA: 0.4678924  
(North USA) |
<p>| ii. As a user selects a package using existing system approach the field for the existing system is updated and the result is displayed in | As a user selects a package in Adopted system the field for the Adopted system is updated and the result is displayed in the form of a graph. |</p>
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| iii. | A user has no option to select a package based on theme and landscapes. | **TAST Model:**
|   | T | A user can extract the package details based on theme and it displays the result matching the keyword. A user can then filter out the packages further by selecting Landscapes. |
| iv. | A travel group is created randomly without considering any relation among users. | **TRAST Model:**
|   | T | Can create a Travel Group by considering tourist who are traveling to same Location and are of same age group. They all made as a group and sent together. |
| v. | A user can only select a package by giving only source and destination, and | A user can select a package based upon season, source, destination, theme and hobbies (The data can be filtered by using |
vi. A collaborative filtering system operates in a manner similar to word of mouth recommendation, the use of existing Collaborative filtering based travel recommendation is unfit for recommending travel packages because it cannot provide multi-class recommendation [25].

**Collaborative Filtering for Same Location and Same Cost:**

User can get a recommendation for the package by viewing the tourist rate based on same Location and same Cost and knowing which package is popular among users.
CONCLUSION

This project will help to suggest the best Travel package among all the package deals on the web. In this, a customer will select a travel package for a particular place based on the recommendations provided by the previous customers who had experience with the package. This makes easy for the user to choose the best package deal.

The user can select the best package in short amount of time (instead of navigating to other websites). Finally, the goal of the project is to make an efficient system which is effective in terms of cost and money.

Future Work

1. It can be made as a mobile app for platforms Android and IOS.
2. It can be used to solve other similar problems such as flight deals, best university and so on.
3. Festival as an input can be added.
4. Best Hotels in the recommended area can also be included.
5. As soon as the user logs in, the home page of the user must be displayed with the recommended list of packages based on Hobbies. This helps elderly people to directly purchase the package from the homepage itself.
REFERENCES


