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Travel Package Recommendation System Based on Package Locations and Rating using Collaborative filtering algorithm.

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***Abstract*—** Over the decades, travel has toughened continuous growth and deepening diversification to become one amongst the quickest growing economic sectors within the world. Among the present move applications, solely one or two facilitate the flexibility to arrange a tour that is entirely supported user preferences, whereas giving an in-depth inspect the specified destination. Therefore, this analysis focuses on integration Semantic technologies and Collaborative filtering into the domain of travel and supply most well-liked user familiarized tour plans with superlative user satisfaction. Collaborative filtering is applied to spot a set of elective purpose of interested that maximize the potential satisfaction, whereas there are some pre-selected necessary points traveler should visit. The key issue that has to be understood is that the preferences or the behavior of one user is also entirely totally different from another. The system has introduced the idea of preferences and behavior based customized tour coming up with and also the approach of exploring desired routes.

***Keywords*—** Personalized Tour Plans; Semantic-Matching; Tour Suggestions; Collaborative Filtering

I. INTRODUCTION

Tourism is one of the best growing industry in India as well As all over the World. This travel management System is helping the people for faster and easier travelling. It is a web-based application for tourism management with the help of different algorithms for enhancing the speed of searching the results. This project will help tourists for better experience of travelling with less efforts to find out the places. This project using the algorithm for fastest route finding with optimal distance, it is also using the recommendation system for better options of travelling [1], it will create the most suitable packages through the rating system.

Travelling is an immensely developing field of concentrate over the globe. In their framework contains principally 11 modules i.e. administrator login, add packages, add special offers, user login, apply packages, get payment, weather report, select guide, guide login, view user, budget report details and many more. Current web administrations are improved with location aware highlights, giving the client better utilize encounter 360-degree view of the particular location. So as to help the client who is more up to date to the city at the travelling time and gets present area, delineate, between two urban areas, climate report, see 360-degree view and criticism. [2]

Collaborative Algorithm is used in the system has different area of working there two type of collaborative filtering algorithm.

1) Item based Collaborative filtering Algorithm.

2) User based Collaborative filtering Algorithm.

In this system we are using item based Collaborative filtering algorithm. User give feedback to the system, based on that feedback system creates rating and recommends the best packages.

Rest of the paper is organized as follows, Section I contains the introduction of system, Section II contain the related work of tourism, Section III contain the methodology about algorithms, Section IV contain the proposed system, section V explains the system implementation and development, Section VI describes results and Section VII concludes research work with future directions.

II. RELATED WORK

Tourism is one of the Fastest growing industry all over the world. Now days everything is online. In previous era if anyone wants to travel then traveler needs to search for the all details about the tourism places, hotels near the places so it was little hectic work for the voyager. So, as per the need of world we are trying to cooperate everything on one platform so traveler can travel with ease. Comfort of user and benefits for user with the essential recommendations to give

them more travel options are main motive behind this system. This system is trying to break the traditional approaches and create new ways to explore the world. [3]

Also, the guide module is introduced to give user a better experience with his native language guide. User will get notification about the upcoming weather of that particular location he wants to visit. [4]

III. METHODOLOGY

Collaborative Filtering algorithm is implemented with the feedback taken from the user, when database collect the information regarding feedback it starts processing.

In our model we have two main objects – items and users. The Item class contains the name of the item:

```
1.  private String itemName;
```

On the other hand, the User class contains the username:

```
1.  private String username;
```

Finally, we have a InputData class that will be used to initialize the data.

Based on the available data, we'll calculate the relationships between the items, as well as the number of items' occurrences. For each user, we check his/her rating of the items:

```
1.  for (HashMap<Item, Double> user : data.val
    ues()) {
2.
3.      for (Entry<Item, Double> e : user.entr
    ySet()) {
4.
5.          // ...
6.
7.      }
8.
9.  }
```

In the next step, we check if the item is existing in our matrices. If this is a first occurrence, we create the new entry in the maps:

```
1.  if (!diff.containsKey(e.getKey())) {
2.
3.      diff.put(e.getKey(), new HashMap<Item,
     Double>());
4.
5.      freq.put(e.getKey(), new HashMap<Item,
     Integer>());
6.
7.  }
```

The first matrix is used to calculate the differences between the user ratings. The values of it might be positive or negative (since the difference between ratings might be negative) and are stored as Double. On the other hand, the frequencies are stored as Integer values.

In the next step we are going to compare the ratings of all items:

```
1.  for (Entry<Item, Double> e2 : user.entrySe
    t()) {
2.
3.      int oldCount = 0;
4.
5.      if (freq.get(e.getKey()).containsKey(e
    2.getKey())){
6.
7.          oldCount = freq.get(e.getKey()).ge
    t(e2.getKey()).intValue();
8.
9.      }
10.
11.
12.
13.     double oldDiff = 0.0;
14.
15.     if (diff.get(e.getKey()).containsKey(e
    2.getKey())){
16.
17.         oldDiff = diff.get(e.getKey()).get
    (e2.getKey()).doubleValue();
18.
19.     }
20.
21.
22.
23.     double observedDiff = e.getValue() -
     e2.getValue();
24.
25.     freq.get(e.getKey()).put(e2.getKey(),
    oldCount + 1);
26.
27.     diff.get(e.getKey()).put(e2.getKey(),
    oldDiff + observedDiff);
28.
29. }
```

If somebody rated the item before, we increase the frequency count by one. Moreover, we check the average difference between the item's ratings and calculate the new observedDiff.

Please note, that we put the sum of oldDiff and observedDiff as a new value of an item.

Finally, we calculate the similarity scores inside the matrices:

```
1.  for (Item j : diff.keySet()) {
```



```
2.
3.      for (Item i : diff.get(j).keySet()) {

4.
5.          double oldValue = diff.get(j).get(
    i).doubleValue();
6.
7.          int count = freq.get(j).get(i).int
    Value();
8.
9.          diff.get(j).put(i, oldValue / coun
    t);
10.
11.     }
12.
13. }
```

The main logic is to divide the calculated item rating's difference by the number of its occurrences. After that step, we can print out our final differences matrix.

As the main part of the Slope One, we are going to predict all missing ratings based on the existing data. In order to do that, we need to compare the user-item ratings with differences matrix calculated in the previous step:

```
1.  for (Entry<User, HashMap<Item, Double>> e
    : data.entrySet()) {
2.
3.      for (Item j : e.getValue().keySet()) {

4.
5.          for (Item k : diff.keySet()) {
6.
7.              double predictedValue =
8.
9.                diff.get(k).get(j).doubleVal
    ue() + e.getValue().get(j).doubleValue();

10.
11.             double finalValue = predictedV
    alue * freq.get(k).get(j).intValue();
12.
13.             uPred.put(k, uPred.get(k) + fi
    nalValue);
14.
15.             uFreq.put(k, uFreq.get(k) + fr
    eq.get(k).get(j).intValue());
16.
17.         }
18.
19.     }
20.
21.     // ...
22.
23. }
```

After that, we need to prepare the "clean" predictions using the code below:

```
1.  HashMap<Item, Double> clean = new HashMap<
    Item, Double>();
2.
3.  for (Item j : uPred.keySet()) {
4.
5.      if (uFreq.get(j) > 0) {
6.
7.          clean.put(j, uPred.get(j).doubleVa
    lue() / uFreq.get(j).intValue());
8.
9.      }
10.
11. }
12.
13. for (Item j : InputData.items) {
14.
15.     if (e.getValue().containsKey(j)) {
16.
17.         clean.put(j, e.getValue().get(j));

18.
19.     } else {
20.
21.         clean.put(j, -1.0);
22.
23.     }
24.
25. }
```

The trick to consider with larger data set is to use only the item entries that have a large frequency value (for example > 1). Please note, that if the prediction is not possible, the value of it will be equal to -1.

Finally, very important note. If our algorithm worked correctly, we should receive the predictions for items that user didn't rate, but also the repeated ratings for the items that he rated. Those repeated ratings should not change, otherwise it means that there is a bug in your algorithm implementation.

IV. PROPOSED SYSTEM

In proposed system, Initially Admin module is proceeded. Admin module consists of different authorities such as package allocation. package recommendation, Package creation, granting the request of user for particular packages, It stores the details about registered users, registered guides, special offers and package allocated.

This System is mainly providing the recommended packages to the users based on the algorithm named as collaborative Filtering algorithm which is used for recommendation.

User module consists of the available packages, special offers, images and videos related to the packages and locations .user gives the feedback to packages he visited previously based on the feedback the system creates the rating for the use of next users. The algorithm is used for the recommendation of the packages gets the data from feedback given by user.

Another Module which is used for this System is guide package which is an optional field, which is user's choice to select or not, guide will be helping the tourist to travel the particular places mentioned in the packages. [5]

V. SYSTEM IMPLEMENTATION AND DEVELOPMENT

In the Implementation of Travel Package Recommendation System, three major stages Consist:

1. Creating User Interface for Web Portal.
2. Creating Database related to the system from different users.

1. Creating User Interface for Web Portal.

The NetBeans is a web pages for creating web pages for different modules. The front end of GUI is designed by using Java and html languages. The system consists of 3 modules In Web Pages:

1) Admin Module.
2) User Module
3) Guide Module.

2. Creating Database related to the system from different users.

For creating a larger database that contain data of registration officer, different shopkeeper, and customers as well as the allocated ration is also stored.

Using MYSQL Workbench Database Format we store the revenant data for enhanced effectiveness, several worker threads are generated for directing different API requirements and recovering the consistent dataset concurrently. This whole data is stored in tabular format in database.

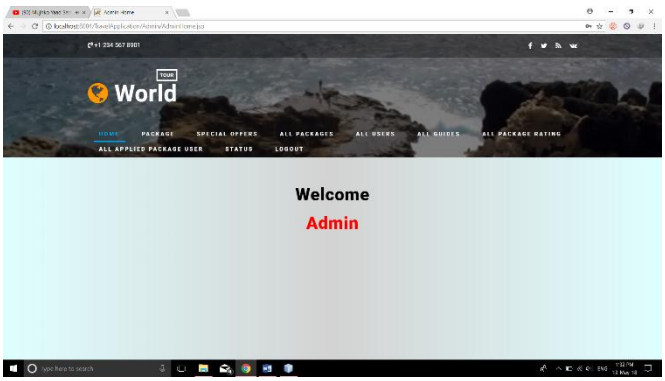

Figure 1: Admin panel.

VI. RESULTS

A. Registration System

With help of Java and Html we create a web page. The web pages for the registration of travellers(users) and guides is done. This page is one kind of interface between the travellers and guide.

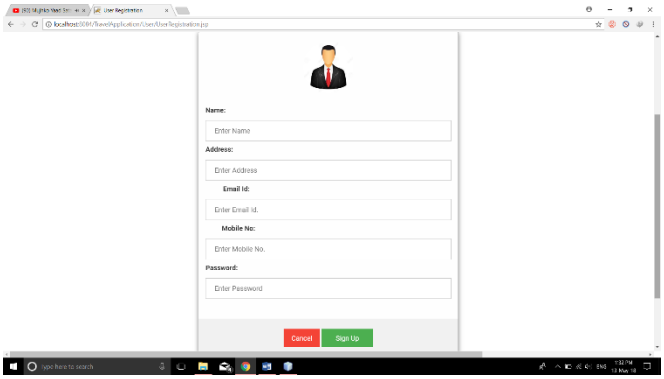

Figure 2: User Registration.

B. Package recommendation using feedback

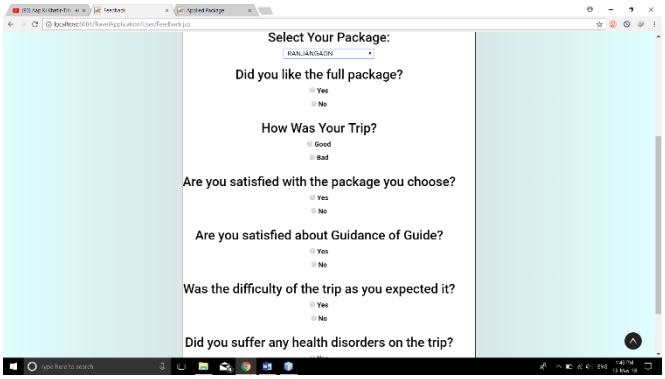

Figure 3: Feedback form.

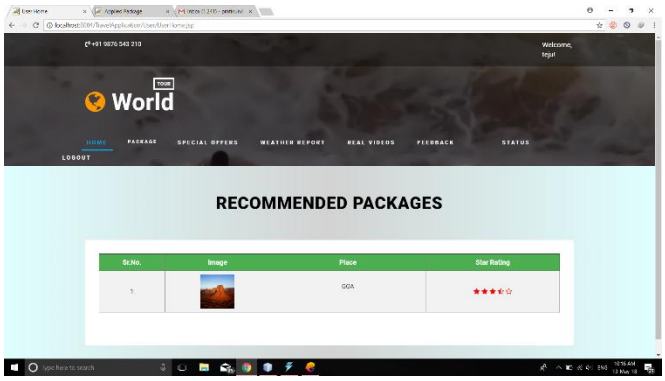

Figure 4: Recommended packages.

C. Package staus

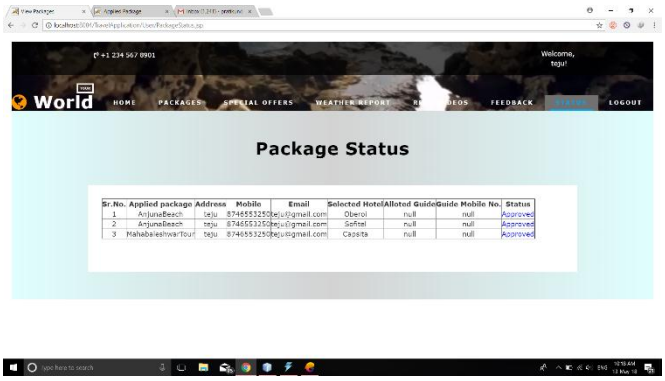

Figure 5: Package status.

D. Adding packages

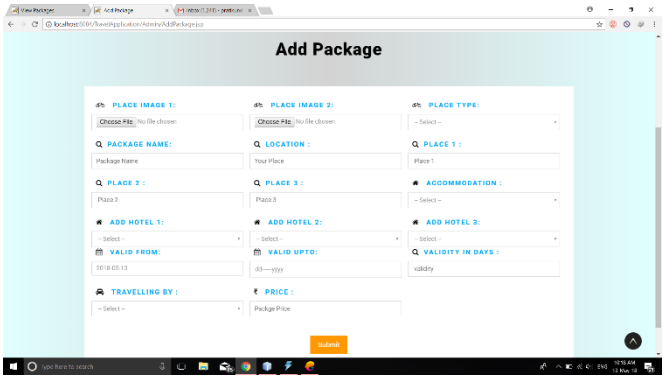

Figure 6: Add package.

VII. CONCLUSION

In this new system, with the help of Collaborative Filtering algorithm. This helps to reduce the manual work of users and also provides the efficient packages to users. Users can also get the short routes suggested by use of the application along with the major stops which they can visit or attractions in the form of a virtual tour. This will help travellers to the decide choice of what they really want to see rather than taking them into what the application wants them to see and wasting their time on experiments. It will help user to select a guide for his comfort language with their mutual understanding. So, traveller cannot waste their time to find the guide. User will get notification of predicted weather before actual tour.

The future work on this system can be share the tour with friends and more accurate weather prediction for the user.

The advantages of the new portal are as follows:

1. User friendly.
2. Less time consuming.
3. Everybody can make use of this application by simple registration.

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