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Hotel Recommendation based on User Preference Analysis

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Abstract - *Online hotel searching is a formidable task due to the wealth of online information. A hotel recommender system based on sales records includes the user's preference relations among hotels. Basic premise under the research is that the selling records include the user's preference relations among hotels. The proposed system recommends hotels based on preferences of users when a user selects a hotel. In order to recommend the hotels this identifies the user's preference transition and makes recommendation based on them. Based on user preference the system recommends hotel when a user selects a hotel.[1] The main function of recommender system predicts user's preference from the rating information, filters some items from massive information, and suggests candidate items for user. The system makes recommendation to a user based on a hotel which a user selects on the system.*

***Key Words*: *Recommender System, Text Mining, Information Filter, E-Commerce, Diversity*.**

I. INTRODUCTION

Today's people are getting dependent more on web technologies like internet. Many user-centered platforms are now available for information sharing and user interaction, such as Epinion, Amazon, Facebook and Twitter. But here comes a typical question for a trip: if we plan to visit the Forbidden City in Beijing for several days, where should we live? Selecting a suitable hotel can be vital for a pleasant trip. In general, this question corresponds to recommending a hotel given a certain destination. However, the past hotel check-in data of an individual may be sparse due to low rating frequency, which means the performance of rating based collaboration filtering technique is poor. The sparsity issue and the so-called cold start problem are the main challenges for hotel recommendation.[1] CF method is combined with CBF method to overcome sparsity issue. collaborative filtering (CF) or content based filtering (CBF).[1] CF focuses on finding similar users based on user-item rating matrix, the precision of which has proven to be good but sensitive to sparse data. When recommender system encounters a new user, background knowledge may be insufficient. It is hard to decide whether specific hotel match his/her preference or not. One possible solution is to employ diversity techniques [2], to satisfy one's preference as broad as possible, so that monotony of the recommendation result is avoided.

To provide appropriate recommendation to the user, service recommender system is a valuable tool. The existing service recommender systems fails to meet users 'personalized requirements' because of there is presence of the same ratings and rankings of services to different users without considering diverse users' preferences. Recommendations are offered as ranked list of hotels. In performing this ranking, recommender systems try to predict what the most suitable hotels or services are, based on the user's preferences [3].

II. PROPOSED SYSTEM

Implementation of the Proposed System:

Technologies used to implement proposed system:

1) Java

2) MySQL: MySQL is a free, open-source database management system.

3) jLDADMM: Open source package to implement LDA (http://jldadmm.sourceforge.net/).

4) Commons Math: The Apache Commons Mathematics library to perform matrix operations.

We have implemented this proposed system for android & web platforms.

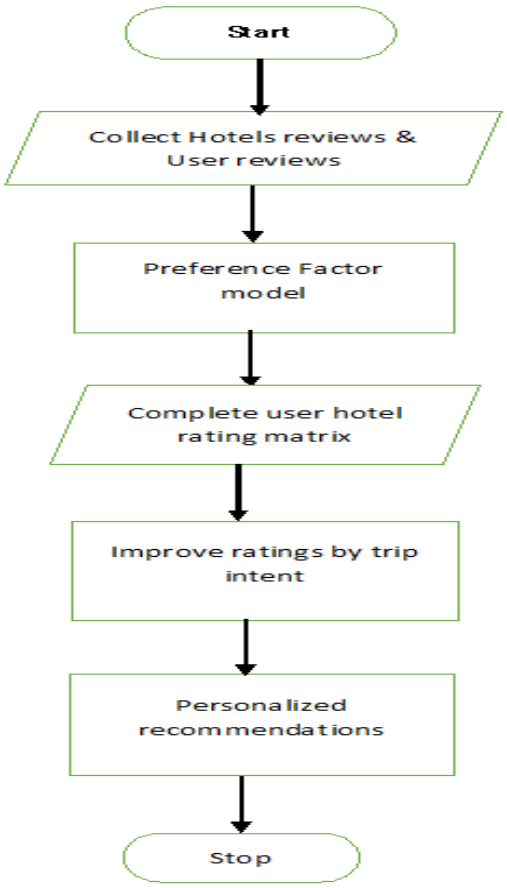

Fig -1: Flow chart for proposed system

1) Collect reviews for hotels & users:
   Hotel recommendation database stores the reviews added by users for various hotels. This review content will be an input for our recommendation framework. Along with reviews the ratings is used to create user-hotel rating matrix. This matrix is incomplete at the beginning as many users did not visited, reviewed every hotel present in this system. This review contents and incomplete user-hotel rating matrix will be acts as an input for preference factor model.

2) Preference factor model:
   This model converts in complete user hotel rating matrix into complete user hotel rating matrix. Here we are using LDA model to identify one's preferences from their reviews. The features generated by LDA will be used to calculate the similarity between any pair of hotels or any pair of users. This similarity information is used to convert incomplete user-hotel rating matrix into complete matrix.

3) Improve ratings matrix by trip intent:
   Hotel recommendation database stores the review content along with trip intent. This additional information it is been possible to deal with cold start problem. Trip intent is the purpose of visit and its classified into six categories: single, couple, group, family, business and others.

4) Personalised recommendations:
   The complete user-hotel rating matrix is used to generate the list of top K hotels for a user. We are using MMR algorithm to reorder this list of top K recommended hotels.

The proposed system is further divided into three subtasks:

1. User preference analysis and solve sparsity issue by integrating CF and CBF.
2. The intent of a trip is introduced to solve cold start problem with higher prediction accuracy.
3. Diversity techniques are used to optimize the hotel recommendation list.

In proposed system two types of methods is include CF and CBF method. This methods loading to hybrid techniques of CF method and CBF method [4]. McAuley etc. the review dimension and proposes the hidden factors and hidden topics (HFT) model to link the latent factors with latent topics which are automatically extracted from review contents [4]. Topic MF model is proposed to further improve rating prediction and accuracy by learning topics for each review, which matches better with users' rating behavior. In order to give more explainable recommendation, the explicit factor model (EFM) is proposed. EFM manages to extract explicit item features and user preference based on sentiment analysis, which is the closest approach to ours. In contrast, we pay more attention to the similarity between users and hotels to improve prediction accuracy.

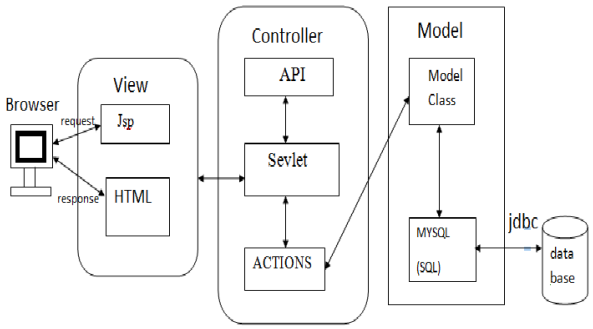

Fig -1: Block diagram for proposed system

MODEL - performs major database operation.

MYSQL (sql) – Mysql is used to access and store data.

JDBC – JDBC acts as bridge between Mysql.

CONTROLLER:-

Servlet controller – accepts request and generate response.

API'S – Implement to project specific logic like login, mail, file operation etc.

Action – Action is used to Performs various actions like store reviews and get reviews.

III. EXISTING SYSTEM

The existing system is a user login authentication system. Existing system is a combination of two phase Login phase and sign up phase.

Login Phase:

1. For step-I authentication user is asked for user name and password. The user has to enter a correct username and for password there should be a correct selection login page.
2. For step-II authentication, user login in facebook account. By using facebook id and password.
3. After the successful selection in both the steps the user is an authorized user to access the particular system and search hotel by user preferences.

Registration Phase

1. User enters the username.
2. User enters the Mail Id.
3. User enters the mobile number.
4. User has enter the correct captcha.
5. Systems send the correct password to the user mail id.
6. Registration successful if users select the login phase and enter user name and password.

IV. METHODOLOGY

a) Content-based filtering:

Content-based filtering method is domain-dependent algorithm and it emphasizes more on the analysis of the attributes of hotel in order to generate predictions. Content-based filtering method is the most successful. CBF uses different types of models to find similarity between documents in order to generate meaningful recommendation. These methods make recommendation by learning the underlying model with either statistical analysis or machine learning techniques. CBF technique still has the potential to adjust its recommendations within a very short period of time.

b) Collaborative filtering:

Collaborative filtering is a domain-independent prediction method for content that cannot easily and adequately be described by metadata such as movies and music. Collaborative filtering methods works by building a database (user-item matrix) of preferences for hotels by users. It then matches users with relevant interest and preferences by calculating similarities between their profiles to make recommendations. Recommendations that are produced by CF can be either prediction or recommendation.

c) MAIL-ID Notification:

This module takes care of sending password to eligible user when its account get created and any new user is sign up the web app.

V. CONCLUSION

Our aim was to use innovative technological tools, as a way to boost tourism sector. The idea of "Hotel Recommendation by user preferences" will help user to change their way of search hotel by there own requirements or preferences.

Further work involves the implementation of this system throughout the Pune city, and the testing of its efficiency with tourists interested in this region. Therefore, the criteria to success would be the degree of general satisfaction of visitors during their trip.

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