

Advance Search using Data Mining and User behaviour Pattern

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Abstract- *The use of mobile devices such as smart-phones and tablets has increased over the year as Internet becomes the important part of people's daily life. Also the way of using Internet is changed enormously. The mobile devices are capable of tracking sophisticated browsing behavior. The aim is to make accurate personalized hotel recommendations by utilizing the user's behavior of browsing the hotel reviews on mobile devices to identify users' preferred aspects on hotel selection such as room cleanliness, service, etc. We identify the part of textual content that a user has seriously read by tracking the gestures on the touching screen of mobile devices. The user interest profile can then be obtained by deriving the features the user has shown interest through text mining techniques, including feature extraction and sentiment analysis. Then the user interest profile is employed to make personalized hotel recommendations based on the requirements of the user's preferred aspects.*

Keywords- Recommendation, Sentiment analysis, Text mining,

I. INTRODUCTION

In today's world everybody is dependent on Internet. Even the travellers are also go online to check the content about hotels, travel and tourism industries. traveller plan their trip by reading the customer reviews but some time it is not the fact. In such situations Recommendation systems are widely used to overcome the overload of information. Recommendation system actually does the information filtering. Its main function is to predict user's preference from the rating information. In General recommendation system is for selecting an item to gain the customer satisfaction. In e-commerce hotel recommendation is the legacy application. Our aim is to make an application for advance search using user behaviour of browsing reviews to know the aspects preferred by user about the hotel. Then interest profile of user will be obtained by the text mining techniques including sentiment analysis. Compared to searching for normal hotel website which gives only location based recommendation our recommendation system can achieve more effectiveness by adding text mining and sentiment analysis techniques.

II. LITERATURE SURVEY

1. Keng-Pei Lin, Chia-Yu Lai et al [1] in Personalized Hotel Recommendation Using Text Mining and Mobile Browsing Tracking said that customer who rates only small objects recommendations for them become difficult, context aware recommendation systems are introduced to solve this problem.
2. Matthias Fuchs and Markus Zanker [2] in Multi-criteria ratings for Recommender Systems: An Empirical Analysis in the Tourism Domain analyse the multi-criteria user ratings results into significant effect in multiple models of travel segments.
3. Gediminas Adomavicius and Alexander Tuzhili [3] in Context-Aware Recommender System states that in order to recommend items to users it is important to incorporate contextual information in recommendation system.
4. Dietmar Jannach, Fatih Gedikli, Zeynep Karakaya and Oliver Juwig [4] in Recommending hotels based on multi-dimensional customer ratings propose a contextual filtering recommendation approach which combines the user and item models to improve the recommendation accuracy.
5. Long Jiang, Mo Yu, Ming Zhou et al [5] in Target-dependent Twitter Sentiment Classification propose to improve target dependent sentiment classification by using target dependent and context aware approach.
6. Tobias Berka and Manuela Plonig, [6] Designing Recommender Systems for Tourism said that in decision making process only the combination of multiple different filtering techniques can offer significant improvement.
7. Minu.P Abraham and Rashmi. R [7] in Opinion Mining on Social Reviews- A Survey has given a brief introduction about opinion mining and sentiment analysis. OM and SA both are compatible. OM analyzes and extract people's opinion regarding an object and SA first identify the text and then analyze it.
8. Chia-Chi Wu and Meng-Jung Shih [8] in A Context-Aware Recommender System Based on Social Media said that traditional recommendation systems doesn't

provide enough information to user there is need of recommendation system which also give contextual information. They also propose a framework which extracts a contextual information from the social media which is treasure of information.

9. Ryosuke Saga, Yoshihiro Hayashi et al [9] in Hotel Recommender System Based on User’s Preference Transition propose the preference transition network which include implicit rating for the hotel created from sales records.

III. ARCHITECTURE

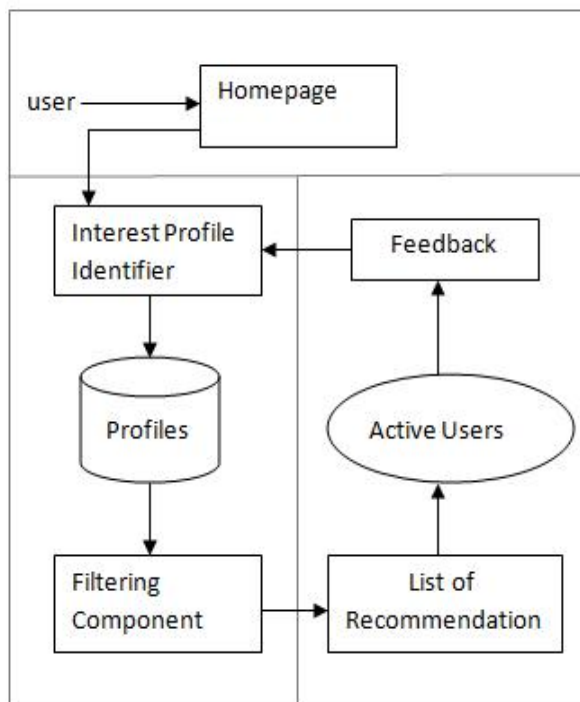


Figure 1. Architecture Diagram.

Figure 1 shows the architecture view of the proposed idea. Using the web application user can search for the hotel and also can read the reviews about the particular hotel. After that based on the user's interest profile will be identified. If user's preferred aspects match with the hotel's aspect then that hotels will be recommended for user.

IV. RESULTS AND DISCUSSIONS

In experiments we compare three methods Average Rating, Equal feature weight and Discriminating feature weight. We observe that the average rating method is the most commonly used by commercial hotel websites. and same score of hotel is received by every person. In Equal feature weight method the recommendation in done by sentiment analysis and individual have the same score of hotels. Discriminating

feature weight is the approach that we proposed, it recommends the hotel based on the preferred aspects of individuals detected from their browsing behaviour.

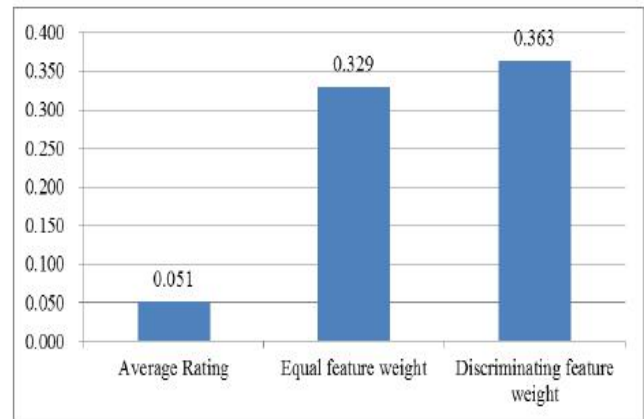


Figure 2. Comparison of different methods of recommendation system.

V. APPROACH

In our advance search using user behavior pattern include two phases, First is user interest profile identification in which the browsing behavior of the user is captured. Then the hotel recommendation phase recommend the hotel based on the preferred aspect of the individual. User interest profile identification phase captures the important weights of preferred aspects. the aspects such as cleanliness in hotel, hotel rooms, food, places nearby, facilities, etc are analyzed in this phase. We develop a normal application for searching the hotel and let users search the hotel. This application records the users browsing behavior of reading the reviews about the hotel. The reviews which the user has seriously read are identified. Then the text mining technique is applied on that review and checked with the preferred aspects and respective weights of user.

The weights of user is calculated as follows:

$$W_i = \frac{A_i}{\sum_{i=1}^7 A_i}$$

For hotel recommendation we represent each review as vector. Then from review vector we calculated the sentiment on particular aspect

$$sen_r(r, a_i) = \underset{f \in a_i, SER}{AVG} (sen_s(s, f))$$

Where,
 sen_s(s, f) is a sentiment of sentence s to a feature f.
 r is a review and ai is a aspect.

The overall sentiment for hotel can calculated by

$$sen_h(h, a_i) = AVG_{r \in h}(sen_r(r, a_i))$$

The final score of hotel h recommendation with respect to interest profile of user is as follows:

$$score(h) = \sum_{i=1}^7 w_i \cdot sen_h(h, a_i)$$

After all this process the hotel will be recommended to the user.

VI. CONCLUSION

We proposed the hotel recommendation system using the browsing behaviour and user reviews of the user by using textual data. Most of the hotel websites only list the rating rather than the user preferences and reviews of reviewers. Through our work we propose that both preferences and reviews of the user are important factors for good hotel recommendation.

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