

# AN IMPLEMENTATION OF RECOMMENDATION SYSTEM FOR HOTELS BASED ON MAP-REDUCE FOR BIG DATA APPLICATIONS

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## Abstract

The large data-sets called big-data provides new opportunities and challenges in service recommendation. To analyze huge data-set, traditional recommendation services suffer problems of efficiency and scalability. Information extracted from the former user's reviews will be used for recommending appropriate services to the new user. This uses a method based on keyword aware for generating recommendations. Reviews from former users are used to retrieve new user choices. It calculates rating values for various services preferred by new user. Efficiency along with scalability of the recommendation system is attained in Big Data applications by implementing it in Hadoop which uses Map-reduce paradigm. Based on rating values, a recommendation list of hotels is produced and those with high ratings is suggested to the new user.

**Keywords:** BigData, Hadoop, Mapreduce, KSR,

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## 1. INTRODUCTION

The explosive increase in the amount of data in our world challenges IT industry and academia. The large data-sets called big-data provides new opportunities in service recommendation. To analyze huge data-set, traditional recommendation services suffer problems of efficiency and scalability.

In recent years, the use of recommender system has been growing exponentially due to the increase in number of users, services, and data-sets. A recommender system analyzes available data-set in order to make suggestions to consumers about services and products that he might be very interested. It guides the user with large number of possible options about interesting and useful services or products.

There exist so many recommendation methods. We explain a method in which the users' priorities are indicated by keywords. To generate recommendation, we use user based collaborative filtering technique. Our method is implemented in hadoop, which uses map-reduce parallel processing.

## 2. KEYWORD BASED SERVICE RECOMMENDATION (KSR)

This uses a method based on keyword aware for generating recommendations. Users indicate their priorities for the services with the aid of keywords. Reviews from former users are used to retrieve new user choices. It calculates rating values for various services preferred by new user.

Efficiency along with scalability of the recommendation system is attained in Big Data applications by implementing it in Hadoop which uses Map-reduce paradigm.

This method considers users two sets: the set of former users or former users and the set of new users or new users. The new user is the current user who needs recommendation for any item/service.

### 1. Identify New User Priorities

In this step, we identify the new user priorities. This user has to provide the priority regarding the service dimensions. He can select keywords from a keyword list. Keyword list is a set of keywords which represent users' priorities. It specifies various words related to the services which is the concern of the new user.

**Table.1** Keywords and its related words in the reviews.

Keyword	Related words presenting in the reviews
Cleanliness	Clean, dirty, neat,...
Food	Lunch, food, eat, dishes,...
Room	Bed, bathroom, room,...
service	Staff, waiter, reception,...
Shopping	Shop, mall, market,...

### Services Concerned by the New User

A user selects the services which he concerns, by selecting keywords from the list. The following list provides various services related to hotels. The services selected by the user are considered for similarity computation in the next phase.

Fig.1 An new user selects the services which he concerns.

### Extracting the Keywords from Reviews

Here, keywords are extracted from every review based mostly on the keyword list. If a former user review contains a keyword which is matching to the word within the domain, then the keyword should be included in the keyword set of the former user. For example, in a hotel recommendation system, if a former user review contains the word “mall”, which is matching to the word “Shopping” within the domain, then the keyword “shopping” will be included in the priority keyword set of the former user. The times of repetitions of a keyword are considered, if it appears additional than once in an exceedingly review. Keywords appearing more than one time are of additional importance. The count of repetitions is treated as input to measure the burden of the keyword in keyword set within the next step.

Table 2. Example for keywords extracted from former users' reviews.

Former user priorities	Related word extracted from reviews	Keyword in the list
Rooms were adequate sized and the very clean and detailed	Rooms, clean	Room, cleanliness
All the staff was friendly and helpful without any attitude	Staff	Service
Lots of shops and places to eat close by	Shops, eat	Shopping, food
The staff was wonderful	Staff	Service
Easy walk to anywhere downtown	Walk	transportation
Great service; and beautiful room	Service, room	Service, room

### 3. SIMILARITY COMPUTATION

We determine the reviews of former users who have similarity with the tastes to a new user. Similarity computation is applied only when removing reviews which are not related to the new user's priority. To calculate this similarity, we apply the concept of intersection. If the intersection of the priority words of the new user and that of a former user is a null set, then those words of former user will be removed out.

The approximate similarity computation is applied when the weights of the keywords in the set are out of stock.

#### Approximate Similarity Computation

This technique is that the most often used for determining the variety as well as similarity of user's tastes. In this computation method, we use Jaccard coefficient methodology. It is accustomed calculate the similarity between the priorities of the both users.

In this approach, the weight of the keywords isn't considered.

Fig.2 Some of the hotels with its similarity value.

Hotel Name	User ID	Similarity
Casablanca hotel	Soundbit	0.222222
Surya hotel	chesterrant	0.214286
Mayas hotel	08NOVA	0.222222
The bryant park	wheeliebag	0.25

### 4. GENERATE RECOMMENDATIONS BASED ON CALCULATED RATING VALUES

Based on the similarity of the new user and former users, the priority word set should be removed out. For a threshold value  $d$ , if similarity (new user keyword, former user keywords)  $< d$ , the priority set of keywords of a former user will be removed out, otherwise it will be preserved.

Thus we tend to found the set of most similar users. Once it is done, we calculate the customized rating worth for all services for the new user. Based on these values, list of hotels are created and hotels with high ratings are counseled to the new user.

We use Hadoop platform to implement it, so that it improves measurability and potency of the tactic.

### CONCLUSION AND FUTURE WORK

It became easier to design and implement recommender systems with the event of computer code tools like Apache Hadoop, in Big Data environment. KSR analyses reviews to determine the former users having similar tastes of that of a new user. Thus makes suggestions a lot of correct, scalable and economical. Division of data-set solve the scalability drawback.

In keyword- service recommendation, keywords represent users' priority. A new user will offer his/her priority concerning services by choosing words from a list, whereas a former user priorities are captured from their reviews. Based on customized rating values, a recommendation list of

services (hotels) are made and hotels with high ratings are suggested to the new user.

We can perform additional analysis in such a the way to separate the positive and negative reviews of former user, thus on create the suggestions a lot of correct.

## REFERENCES

- [1] Shunmei Meng, Wanchun Dou, Xuyun Zhang, Jinjun Chen, "KASR : A Keyword-Aware Service Recommendation Method on MapReduce for BigData Applications", IEEE Transactions on Parallel and Distributed Systems, 2014.
- [2] Sandra Elizabeth Salim, R. Jebakumar, "KBRS - Keyword Based Recommendation System in Social Networks", 2015 International Conference on Innovation Information in Computing Technologies(ICIICT), Chennai, India.
- [3] Paritosh Nagarnaik, Prof A. Thomas, "Survey on Recommendation System Methods", IEEE Sponsored 2nd International Conferences on Electronics and Communication System (ICECS 2015).
- [4] Kai Zhang, Keqiang Wang, Xialing Wang, Cheqig Jin, Aoying Zhou, "Hotel Recommendation based on User priority Analysis", ICDE Workshops 2015.
- [5] G. Adomavicius, and Y. Kwon, "New Recommendation Techniques for Multi criteria Rating Systems", IEEE Intelligent Systems, Vol. 22, No. 3, pp. 48-55, 2007.
- [6] Z. D. Zhao, and M. S. Shang, "User-Based Collaborative-Filtering Recommendation Algorithms on Hadoop," International Workshop on Knowledge Discovery and Data Mining, pp. 478-481, 2010.
- [7] Aditya B. Patel, Manashvi, Ushma Nair, "Addressing Big Data Problem using hadoop and Mapreduce," 2012 Nirmala University International Conference on engineering, NuiCONE-2012.
- [8] Y. Chen, A. Cheng and W. Hsu, "Travel Recommendation by Mining People Attributes and Travel Group Types From Community-Contributed Photos", IEEE Transactions on Multimedia, Vol. 25, No.6, pp. 1283-1295, 2012.
- [9] Firat Tekiner, John A. Keane, "Big Data Framework", 2013 IEEE International Conference on Systems, Man, and Cybernetics.
- [10] Xiwang Yang, Yang Guo, Yong Liu, "Bayesian-Inference-Based Recommendation in Online Social Networks," IEEE Transactions on Parallel and Distributed Systems, Vol. 24, No. 4, pp. 642-651, 2007.
- [11] Zheng Siting, Hong Wen Xing, Zhang Ning, Yang Fan, "Job Recommender Systems : A Survey," The 7th International Conference on Computer Science and Education ( ICCSE-2012 ), July 14-17, 2012.