

A Service Recommendation Method based on User Preferences for Big Data Applications

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Abstract— Recommender Systems are very useful software tools and techniques providing proper suggestions for items to be useful to a user. Now a days, the number of users, services and online information has increased rapidly, so it accepts the enormous information that's why there is investigation issue for recommender system. As a result, existing service recommender systems have scalability and efficiency issue when processing or analyzing large data, due to this distributed system come into existence. In existing service recommender systems, they present the same ratings and rankings of services to diverse user's without taking into account different user's preferences and therefore doesn't meet user's personalized requirements. In this paper, it is proposed to use a Service Recommendation method, which aims at presenting a personalized service recommendation list and recommending the most proper services to the users. To improve its scalability and efficiency in big data background, it is implemented on Hadoop, a distributed computing platform using the MapReduce parallel processing model.

Keywords- recommender system, preference, Big Data, Hadoop, MapReduce.

I. INTRODUCTION

Recommendation is playing gradually more vital role in our life. Exact recommendations enable users to quickly locate popular items without being overwhelmed by irrelevant information. It is of great interest for vendors to recommend to their potential customers products matching their interests and hopefully turn them into committed buyers [2].

In recent years, the amount of data in world has been increasing quickly and analyzing large dataset that is called Big Data [1]. Big Data means datasets whose size is in front of the capability of current tools, technique and theory to confine, control and develop the data within a sensible beyond time is much important [3]. The big data thing also poses heavy impact on service recommender systems [2]. With the growing number of services, recommending services that what users favored has become an important research issue [4].

In today's world, every person needs to purchase the best thing in short time. Everybody needs to purchase things in sensible cost. They favor online shopping, online proposal for a thing, with the goal that they can take a choice on a particular thing which may be appropriate for a specific purpose [6]. In such situation, Recommendation System assumes an essential part. It

helps in recommending items of a related type, whether it will be liked by user or not [7].

“Recommender system can be defined as system that creates customized suggestions as output or has directing the user in a personalized way to interesting or useful services in a huge space of feasible choices” [11]. Recommender system is a personalized data filtering technology used to compute whether a particular user will like a particular item or to identify a number of items that will be of important to a certain user. Recommender systems makeup a particular type of information filtering system technique that attempts to propose information items (products, films, TV program/show/episode, videos, music, books, news, pictures, web pages .etc.) or social components (e.g. people, events or groups) that are likely to be of interest to the user [6]. Examples of recommender system are amazon.com, Netflix.com, eBay.com, Moviefinder.com [3].

II. MOTIVATION

The motivation behind the research work is to gain insight and a deeper understanding of how a recommender system can be applied in various fields. Ever since an increase in number of customers, services and online information there are many critical challenges for service recommender systems in “Big Data” environment. Also, in most presented service recommender systems, such as hotel reservation systems and restaurant guides, the ratings of services and the service recommendation lists are the same that are presented to users. They don't consider the dimension of user's different preferences, without meeting user's personalized requirements.

III. LITERATURE REVIEW

There have been many recommender systems developed in both academia and industry. Recommender systems are generally classified into three types: content-based recommendations, Collaborative Filtering-based recommendations, and hybrid recommendations [12]. Content-based recommendations depend on content descriptions to match the content with the users' preference. CF is the most accepted approach to build recommender systems and has been successfully in use in many applications [13].

With the development of cloud computing software tools such as Map-Reduce, Apache Hadoop and

Mahout, it becomes possible to design and implement scalable recommender systems in “Big Data” background. The authors of [7] implement a user based CF algorithm on Hadoop. They solve the scalability problem by dividing dataset. But their method doesn't have favorable scalability and efficiency if the amount of data grows.

In the paper titled “New Recommendation Techniques for Multi-criteria Rating Systems”, the authors explain different techniques of recommendation system. In this, multi-criteria data provides value to online content providers and consumers as a component in personalization applications. Most existing service recommender systems are only based on a single numerical rating to represent a service's utility as a whole. In fact, evaluating a service through multiple criteria and taking into account of user feedback can help to make more effective recommendations for the users [8].

In the paper titled “Bayesian-inference based recommendation in online social networks”, the authors propose a Bayesian-inference-based recommendation system for on-line social networks. They claimed that the proposed Bayesian-inference-based recommendation is comparable to Collaborative Filtering recommendation and is better than the existing trust-based recommendations.

In [9], Adomavicius and Tuzhilin give an overview of the field of recommender systems and describe the current generation of recommendation methods. They also described various limitations of current service recommendation methods and discuss possible extensions that can improve recommendation capabilities and make recommender systems applicable to an even broader range of applications.

IV. PROPOSED SYSTEM

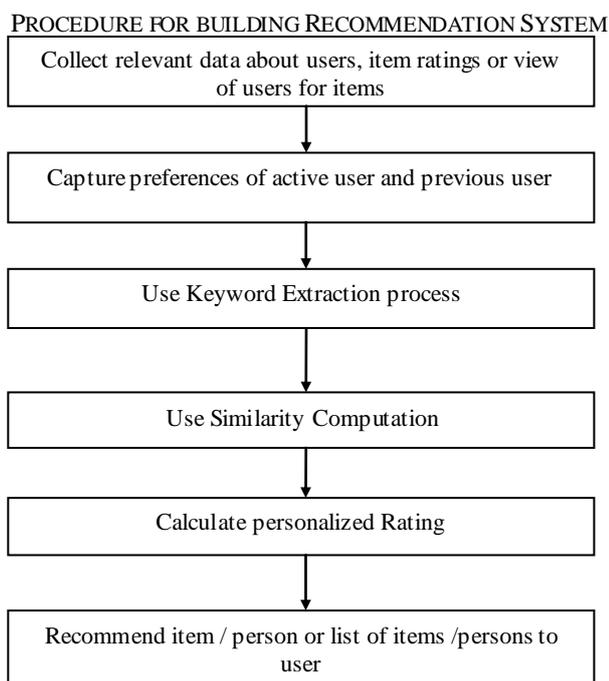


Fig. 1: Basic Procedure for Recommendation system [1].

Capture user preferences of active users & previous users: In this step, the preferences of active users and previous users are formalized into their corresponding preference keyword sets. In this, an active user refers to a current user needs recommendation [1].

Keyword extraction: In this phase, each review will be transformed into a corresponding keyword set. For example, if a review of a previous user for a hotel has the word “spa”, which is corresponding to the keyword “Fitness” in the list, then the keyword “Fitness” should be contained in the preference keyword set of the previous user. If a keyword appears more than once in a review, the times of repetitions will be recorded. In this paper, it is regarded that keywords appearing multiple times are more important. The times of repetitions will be used to calculate the weight of the keyword in preference keyword set [10].

Similarity computation: This block describes the reviews of previous users who have similar tastes to an active user by finding neighborhoods of the active user based on the similarity of their preferences. Before similarity computation, the reviews unrelated to the active user's preferences will be filtered out by the intersection concept in set theory. If the intersection of the preference keyword sets of the active user and a previous user is an empty set, then the preference keyword set of the previous user will be filtered out [1].

Calculate personalized ratings and generate recommendations: Based on the similarity of the active user and previous users, further filtering will be conducted [1].

V. CONCLUSION

A Service Recommendation Method based on User Preferences has got tremendous applications specifically in the area of Big Data. Hence it has been decided to propose a service recommendation method, by using user's preferences and a user-based Collaborative Filtering algorithm to generate appropriate recommendations. The active user gives his/her preferences and the preferences of the previous users can be extracted from their reviews for services. This method aims at presenting a personalized service recommendation list and recommending the most appropriate service's to the user's. Also, to improve the scalability and efficiency in “Big Data” environment, a MapReduce framework in Hadoop platform will be used.

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