The Recommendation system as per User Interest on web

Prof. V.S.Nandedkar[1], Priyanka D.Khawale[2]
[1, 2] Department of Computer Engineering
[1, 2] PVPIT, Pune, India

Abstract- *Nowadays, Web service recommendation with effective approaches has become a key issue in the field of service computing. Web services have been rapidly developed in recent years and played important roles in E-Commerce and other organizations .Web Service Recommendation system focuses on satisfying the user's potential interests. Most of the existing recommendation approaches focus only on missing QoS values only, assuming that the result contains independent web services, which might not be true. As a result redundant web services appear in the list. The existing system takes into consideration active user's QoS preferences as well as diversification of the web services list.*

Keywords- Web Personalization, Web Usage Mining, User Profiling, WWW.

I. INTRODUCTION

Recommender system helps users to process huge data and find the information or items of their interest. It has been used in communities where items like movies, music, books, news, etc. are suggested to users. A recommender system is a system to help customers to find what they want easily and help them to discover products they like but are not looking for. Main goal of our recommender system is to suggest items in diverse categories which reflect changes.

With this information overload, the web service discovery has become a critical problem. Many web services are available with similar functionality but non-quality requirements. Web service selected should be high in quality, and must satisfy user's functional and non-functional requirements. [1]

Web Service Recommendation is a process of proactively discovering and recommending web services to the user. Most of the recommendation system uses collaborative filtering approach, content-based approach, or a mix of both i.e., hybrid approach, for recommending potential active user's interest. Most of the systems focus only on missing QoS preferences. But, they miss to exploit the user's own service usage history for predicting QoS preferences. A recommender system or a recommendation system is a subclass of information filtering system that seeks to predict the "rating" or "preference" that a user would give to an item. Another major drawback of existing systems is that, they assume that the top-k recommendation list is dissimilar, which may not be true. They do not feel the need to make top-k recommendations dissimilar. As a result, user's satisfaction degree is reduced.

In this paper, the top-k recommendation list is given to the user with the diversity of web services. The system takes into consideration functional and non-functional requirements of the user with the diversified recommendation list. User's usage history is mined, through the text similarity and operation similarity. Then active user's potential interest is calculated through the collaborative filtering approach. QoS preferences are mined from user's usage history. Scores are calculated for each web service candidate through interest relevance and QoS utility. Ranking of optimal web services is done through diversity-aware web ranking algorithm.

II. RELATED WORK

Collaborative Filtering is one of popular recommendation algorithms. Breese et al. [6] introduced a classification of CF algorithms that divides them into two broad categories: memory-based algorithms and model based algorithms.. Memory based methods are more popular in service recommendation, partially because they are more intuitive to interpret the recommendation results. Memory-based collaborative filtering can be further divided into user-based approaches [2] and item-based approaches. User-based collaborative filtering methods recommend a user the items preferred by the users with similar interests, while item-based collaborative filtering methods recommend a user the items similar to those he/she preferred in the past. Shao et al. [6] proposed a user-based CF approach that uses PCC (Pearson Correlation Coefficient) to compute similarity between users in recommendation by combining both item-based PCC (IPCC) and user-based PCC (UPCC). They exploited not only similarity among users but also similarity among services for missing QoS prediction. Jiang et al. [2] improved the hybrid CF-based service recommendation approach of by taking the personal characteristics of users and services into consideration when measuring similarity among users and services using PCC. Zhang et al. proposed a context-aware service recommendation model, which simultaneously considered users' experiences, the target user's environment factor and his/her input factor to make recommendation decisions. Tang et al. [3] incorporated both users' and services' location information into QoS prediction, and proposed a location-aware CF method for service recommendation. Zhang et al. observed that QoS performance of services is highly related to the service status and network environments which are variable against time. They pro-posed a QoS prediction framework, called WSPred, to pro-vide time-aware personalized QoS value prediction for different service users. Wu et al. presented a neighbourhood based collaborative filtering approach to predict such unknown values for QoS-based service selection. Most recently, some CF based service recommendation approaches employed the matrix factorization theory to improve the accuracy of QoS prediction . Web service is a software system designed to support interoperable machine-to-machine interaction over a network.

III. PROPOSED METHODOLOGY

The proposed module implements the selection of web services through functional and non-functional evaluation using clustering.

A. Query Processing

Step I – Usage history dataset is mined to get the relevant web services related to the query

This is based on terms in WSDL (Web Service Description Language) documents of the available web service candidates can be looked upon as a corpus and therefore we employ the TF/IDF (Term Frequency/Inverse Document Frequency) algorithm. TF/IDF is a statistical measure to evaluate how important a word is to a document in the corpus. The term count is the number of times the word occurring in the document. This count is usually normalized to prevent a bias towards longer documents to give a measure of the importance of the term. Thus, the term frequency tf (tj, WSDLi) of the jth term of the WSDL document WSDLi in the corpus is calculated as follows:

$$tf(t) = \frac{freq(tj, WSDLi)}{|WSDLi|}$$

Where tj is the jth term in the corpus; WSDLi is the WSDL document of the ith web service WSi; freq (tj, WSDLi) is the occurrence number of tj in WSDLi; |WSDLi| is the total occurrence number of all meaningful terms in WSDLi.

Step II – Potential user interest is collected through collaborative filtering

Web service recommendation system not only takes user's usage history in consideration, but experiences of other web service users are also considered. Experience of other web service users can be used to predict the potential interest of the active user. Collaborative filtering approach is used to predict the potential interest of active user. In collaborative filtering approach, user similarity is calculated based on the web service invocation records of a set of users[7]. Similar users share the common interests, so likely to use the web services with same functionality. The more commonly invoked web services two users have in their invocation records, the larger the user similarity between them. User similarity is calculated as follows:

$$serSim(ui, uj) = \frac{2 \times Cij}{|Sui| + |Suj|}$$

Where Sui and Suj are the sets of web services used by user ui and uj respectively, CSij is the set of web services used by both user Sui and Suj. If |CSij| = 0, then user Sim(ui,uj) = 0. In collaborative filtering approach, web services used by similar users are recommended to the active user.

Step III – Clusters of web services which are closely related and similar to each other are created from historical user interest and potential user interest.

Step IV – Hierarchical association between the web services is calculated through the attribute based clustering.

B. Clustering Algorithm

Input: Query to be searched.

Step 1: Mine the dataset.
Step 2: Get the [url, mined words] related to the query.
Step 3: Stemming algorithm is applied to remove unwanted words.
Step 4: Group the [(url, mined words), c1] into clusters of closely-related and similar clusters.
Output: Clusters of web services.

C. Hierarchical Association

Input: Historical interest and collaborative filtered clusters.
Step 1: Select the clusters which are closely related.
Step 2: Checked the association between web services based on the attributes.
Step 3: Associated and most relevant web services are selected.
Output: Relevant web services which have some association between them.

IV. PROPOSED SYSTEM ARCHITECTURE

The proposed module implements the selection of web services through functional and non-functional evaluation using clustering:

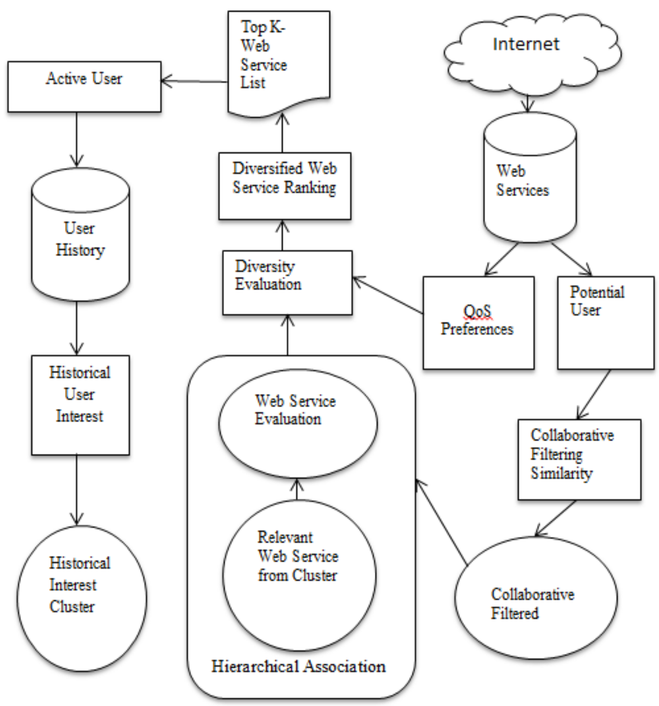

Figure 1. Flow diagram of Proposed Method

The data flow can be explained as following:

Step 1: User inputs the query.
Step 2: Usage history is checked.
Step 3: Historical user interest is collected.
Step 4: Clusters of historical interest data are created.
Step 5: Internet is searched to get the QoS preferences and potential user interest.
Step 6: Potential interest is calculated through collaborative filtering.
Step 7: Clusters of web services are created from collaborative filtered web services.
Step 8: Historical interest cluster and collaborative filtered cluster are now combined in hierarchical association to get associated web services.
Step 9: Diversity is evaluated of the collected web services taking QoS preferences into consideration.
Step 10: Diversified web service ranking is calculated.
Step 11: Top-K diversified web service list is returned to the user.

V. RESULTS AND DISCUSSIONS

The simulated outcome of new proposed improved clustering algorithm based diversified web page recommendation is shown in below.

A. Outcomes

The Graphical Representation of expected outcome of proposed method is shown in the figure 2. The proposed simulated graph .

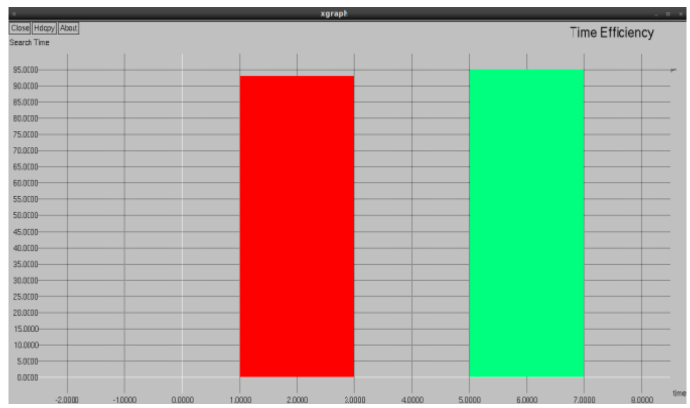

Figure 2. Graphical Representation of Expected Outcome

The new proposed improved clustering algorithm based diversified web page recommendation shown in graphs red color as compare to diversifying web service recommendation [1] denoted by green. The improvement of the proposed method better as compare to diversifying web service shown in figure 2. The outcome compresion is based on acqurecy and precession that is shown in figure 2.

VI. CONCLUSION

In the existing system, a Web service recommendation approach is presented, with diversity to find desired Web services for users. Here incorporate functional interest, QoS preference, and diversity feature for recommending top-k diversified Web services. A diversified Web service ranking algorithm is proposed to find the top-k diversified Web service ranked list based on their functional relevance including historical user interest relevance and potential user interest relevance, non-functional relevance such as QoS utility, and diversity feature.

In the proposed system, the concept of clustering is employed for improving selection of the web services. The clustering is combined with the hierarchical association. In hierarchical association, the web services are associated with each other, to check the association between the input query and the selected web services.

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