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WSRCG: A Framework for Location_Aware Web Service Recommendation and Community Generation

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Abstract: ***Service computing plays an important role in business automation and now a days, there is a rapid increase in web services. Everyone is familiar with different kinds of web service recommendation systems and a number of commonly available web services are steadily increasing on the internet. However, Service users are not aware about availability of the different types of Web Services. Hence the recommendation system has to provide different quality of service. Existing approaches are mainly based on semantic similarity of the service interface and quality of service combined with collaborative filtering techniques. But most of them do not provide exact location-aware recommendation services, because user's tastes are different. Also, it is impractical for users to acquire quality of service information by evaluating all service candidates by themselves. So this paper provides an effective, personalized and location aware recommendation service with improved prediction accuracy, reduced computational complexity compared to previous CF-based techniques.***

Keywords: Web service, Collaborative Filtering, QoS prediction, Similarity Computation, Similar Neighbor Selection, Cosine similarity, PCC.

1. Introduction

Web service defines a framework with standard –based infrastructure model and protocols to support service – based application over internet. Large no of users in the world choose web service from different users and hence the selection of high quality web service among millions of users is non-trivial task. Usage of improper web service in other hand makes lots of problems in the business networks. The web service recommendation is one kind of promotion method for a particular web services. However, service computing plays a critical role in business automation.

Existing web service approaches are based on all-time statistics of usage pattern and overlook temporal aspects. Ongoing recommendation methods are based on semantic similarity of the service interface and quality of service combined with collaborative filtering. The web service system has to provide Quality of services to the users. But for most of the web service, the quality of Quality of service is widely employed to represent the non-functional features of the web services and has been considered as the key factor in service selection. [1], [2], [3] typically a user with a good web service knowledge prefers only good quality of service information .Although user may find different value for the same service. I is impractical to acquire quality information by evaluating all service candidates by himself. The real world web service invocation is time consuming. Moreover, some properties are difficult to compute when long time observation is needed. To rectify these challenges here proposed a new personal aware & localized collaborative filtering framework for web service recommendation.

- The novel location aware web service recommendation approach, fairly improves the recommendation accuracy and the time complexity compared with existing service recommendation approaches.
- Develop a user community that represents the users who are using the typical web service.

2. Related Topics

2.1 Web Service Recommendation

Recommendation systems become extremely common in recent years and are applied in a variety of applications. The most popular are probably movies, news, books, research articles, search queries, [1], [3] social tags and products in general [6]. The recommendation system typically produces a list of recommendations in one of two ways; through collaborative filtering or content based filtering.

2.2 Collaborative Filtering

[1], [4], [6], Collaborative filtering is a well defined prediction method. That is used to find the interest [10] of user on particular item or other services. Collaborative filtering widely employed in commercial service recommendation system such as Net fix and Youtube. The fundamental idea behind this prediction method is to predict and recommend potential favorite items for a particular user employing data.

3. Proposed System

3.1 System Architecture

Architecture shown in Figure 1 represents the advanced web service recommendation framework. The basic intention is that, by contributing the individually observe web service

quality of service information to WSRCG System. Then only service users can get better web service recommendation service. Apart from the user contribution mechanism, web Service Recommender System also controls a number of computers

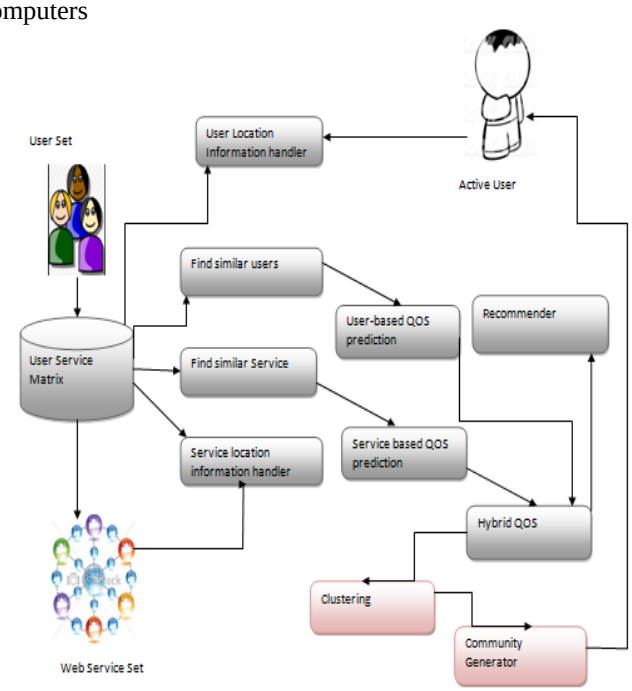

Figure 1: Architecture of WSRCG framework

Most of the web service are monitoring by distributed computers. The system architecture of WSRCG system, which includes a sequence of steps: First an active service user provides the individually collected web service QoS information to the WSRCG system. Then the Input Handler in the web Service Recommendation System processes the input data. Finds for the active user using collaborative filtering algorithm [1] and saves the predicted values and the WSRCG employs the predicted QoS values to recommend optimal web services to the active user .Also the framework gives some additional functionalities. One is generate service user community, with provision of viewing feedback and giving feed backs about their experience on particular service. The other facility is provide fast recovery of recommendation results with a new computation method called Cosine Similarity Formula.

3.2 Module Description

a. Administrator Module

The administration part is the controlling authority of the entire system. It is starting its job from user profile attachment to web service recommendation .user profile is controlled by admin ,that is the user information like location ,IP address ,AS number are required for other computation. There are other sub modules associated with administrator module.

First one is similarity computation module, user-service matrix generation is the responsibility of this module. The matrix represent the similarity between each user and their choose services. In the existing system similarity computation is done with PCC formula. But it fails to consider user's personal influence in to the web service. Therefore here establish a new formula for computing similarity .I.e., cosine similarity formula .When comparing cosine with Pearson Correlation, former incorporates similarity of user into personal influence of web service.

Second sub module is Similar Neighbor Selection module. For predicting missing QoS values, it is necessary to select neighbors right similar to active user. Here the technique used for such prediction is Conventional Collaborative Filtering [8],[10].In some case users give their QoS experience on small number of web service .So when predicting similar neighbor system use this historical QoS similarities.

Third one is QoS prediction and web service Recommender. The major activities are similarity calculation and neighborhood selection for find missing QoS values. For that QoS prediction divided in to two methods.[9] User base QoS prediction and] Item based QoS prediction .In both cases methods used are user based collaborative filtering and item based collaborative filtering respectively. After completing this task the suitable web service with high QoS value is recommended to service user through active users.

b. User Module

In user module, they are responsible for performing a few tasks like profile making, provide their required service features and suggest service for other user. Active user is a part of it .This kind of users provide their own individual web service experience to other service user .Each user in user module controlled by admin module.

c. Service Provider Module

The query as part of user's search for services is first goes to service provider. They are responsible for attaching user information to WSRCG ad-ministration panel. Service provider are of many kind, that is chosen by users.[5]They also collected IP address from user for loc-centre formation [7].Loc-centre contain group user with similar region information. After getting recommendation service from the WSRCG system, service provider configure that service for service users.

4. Algorithm

Here we use Top-K similar neighbor algorithm for finding similar neighbors. Here use conventional CF-based K-similar algorithm and with this algorithm right neighbor similarity to service user is generated [10].

In this paper try to incorporate location of both user and service in to neighbor selection .Sub set of similar neighbor is constructing through several steps. First step, Obtain subset of user within same AS number, if the result is fewer than K-user proceed to second step. Obtain subset of user within same country, if fewer than K-user found proceed to step 3.Third step says that Find subset of user who invoke particular web service.

In each step system search for a mass range of user set , if enough similar user is not found in the previous step[1].From the observation the local users interested to observe similar QoS on co-invoked Web service this algorithm has high

probability of finding similar with active user in his/her local area.

5. Evaluation

Based on the proposed method, here conducted several experiments according to different factors. Here the focus is on the analysis of the following factors;

1) Do correlation between location of QoS affect the frame-work.
2) Change the sparsity condition.
3) Clustering algorithm affects the number of generated users

In addition experiment results are generated with comparison test that done between PCC calculation and Cosine Similarity Calculation. As shown in Figure 2 the graph represent the PCC based similarity range and the Cosine Similarity based similarity range .For plotting graph use similarity values as y-coordinates factor and user id as x-coordinate factor. Similarity measurement is taken by each user's generated PCC value and same user's Cosine similarity value. When analyzing both graphs for each user the cosine similarity value is higher than PCC similarity value. Hence we can conclude that using Cosine Similarity computation gives more accurate similarity results so that service user gets a fast recommendation from the proposed system.

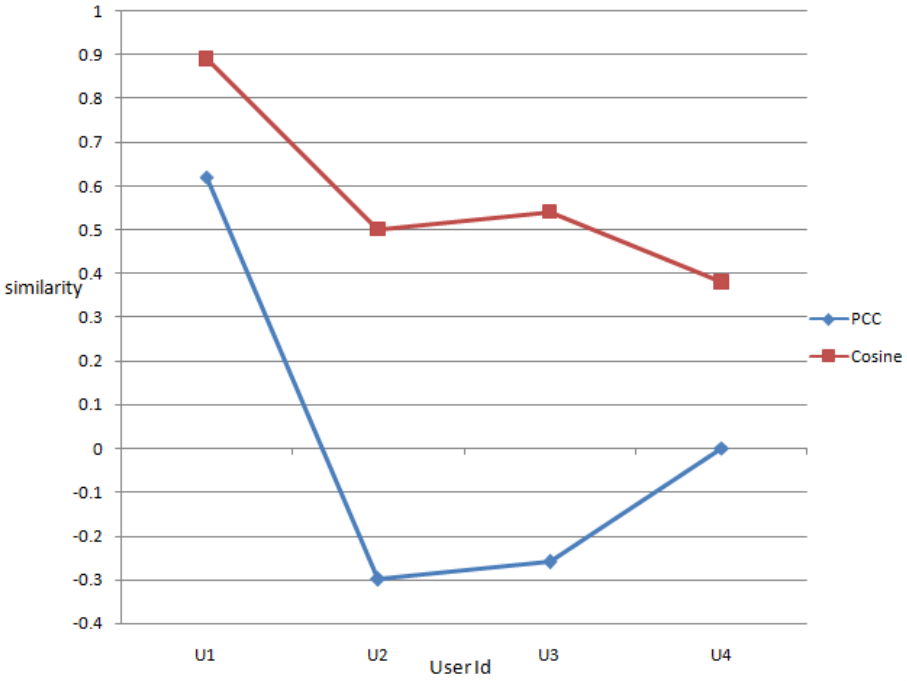

Figure 2: Performance comparison between PCC and Cosine similarity Computation

6. Conclusion

Here represents a collaborative filtering method for location aware web service recommendation and community generation framework. Much improved QoS prediction performance is aiming from this work. For that, take in to account, the personal QoS characteristics from both user and web service cluster .Achieved the incorporate locations of both web services and users into similar neighbor selection for both web services and users.

Experiments on previous techniques (especially on PCC calculation) indicate that our method significantly outperforms previous CF-based web service recommendation methods.

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