

QoS Driven Service Recommendation and Visualization

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Abstract— Some of the software components that are designed to support interoperable peer to peer interaction over a network are the web services. With the proliferation of web services, the QoS based approach is becoming more important to service recommendation (SR). The present SR performance is not satisfactory. Collaborating Filtering (CF) Algorithm includes two algorithms, memory based CF Algorithm and Model based CF Algorithm. The first algorithms utilize the entire user item database to generate prediction. Memory based CF system employs statistical techniques to find a set of users. The Model based Algorithm provides item recommendation by developing a model of the user ratings. The problem is that the existing approaches fail to recognize the QoS variation with user's physical locations and also online time complexity of memory based CF recommender systems. The proposed work in this paper takes a probabilistic approach and then it uses the collaborating filtering process as computing the expected value of user prediction. Finally, the proposed scheme is compared with the existing scheme and the comparison results are depicted.

I. INTRODUCTION

Web services [1] are characterized as a product frameworks intended to help the interoperable machine to machine cooperation over a system. They are approximately coupled, reusable programming segments that embody discrete usefulness and are circulated and automatically open over the Internet. They are self-contained, measured business applications that have open, web situated; guidelines based interfaces [7]. Diverse undertakings like matching, positioning, revelation and arrangement have been seriously mulled over to enhance the general web administration process. Consequently, web administrations group has proposed distinctive methodologies and systems to manage these undertakings. Also, the quantity of have that offers accessible web administrations, through particular motors like Axis2, is altogether expanding. Such documents contain a distinctive sort of data like text based portrayals, straightforward and/or

complex sorts, traits, and so forth. In opposition to recreation based methodologies, certifiable administrations inherit the multifaceted nature of this present reality. With the expanding number of distributed Web services giving comparable functionalities, it extremely difficult for a user to settle on choice to choose the suitable one as per her/his needs. In this manner components and strategies are obliged to help user to settle on the best decision. In addition, the nature of representations has a critical effect on admin registries that give components to web service revelation, arrangement and suggestion.

Any World Wide Web assistance is a method of transmission between 2 gadgets in excess of online. Any World Wide Web assistance is an application functionality furnished in a community target above the World Wide Web as well as the actual cloud; this can be an assistance that may be "always on" such as the concept of utility processing. It offers a good user interface explained within machine- process able file format (specifically WSDL).

In general, web services are designed as a computational component to develop service oriented distributed systems, such as multimedia services, etc. With the number of web services, it has been an urgent task to make an operative selection from the large amount of web services which equivalent to each other. Since there is a demand on web service users have many web services available, so that users have to optimally select the perfect one. To understand the effectiveness of the web service, it is not only sufficient to combine all the other services and match them, but also the Quality of Service properties of particular Web Service can be known. A service which cannot provide an effective QoS results, it must be useless service which cannot perform the process.

II. RELATED WORK

Although numerous techniques can often locate and discover World-wide-web solutions on the web, users get focused the research around the services' popularity as well as development issues. Each net services colleagues having a WSDL document which has the outline of the services. A great deal of research attempts is already focused throughout, employing WSDL files [3, 6, 7, several, a couple of, as well as 5]. Dong et 's. [3] Recommended the net solutions google search that may be competent at delivering World-wide-web solutions similarity lookup. Liu as well as Wong [4] implement wording mining strategies to extract characteristics, including services, content, framework, web host label, as well as a label, through World-wide-web services outline documents in order to group World-wide-web solutions. These people recommended a built-in characteristic mining as well as clustering approach with regard to World-wide-web solutions being a predecessor to help development, expecting to help you throughout building a search engine to help investigate as well as group non-semantic World-wide-web solutions. Elgazzar et 's. [2] Recommended an identical approach, which in turn clusters WSDL files to improve the non-semantic net services development.

The bunching results can be utilized to enhance the nature of web administration list items. In [8], the creators proposed a structural plan for Web administrations separating and grouping. The administration separating instrument is focused around client and application profiles that are portrayed utilizing OWL-S (Web Ontology Language for Services). The adequacy of the channels is focused around a bunching investigation that analyzes administrations related groups. The destinations of this matchmaking procedure are to spare execution time and to enhance the refinement of the put away information. An alternate comparable methodology [9] focuses on Web administration revelation with OWL-S. The OWLS is initially joined with WSDL to speak to administration semantics before utilizing a grouping calculation to gathering the accumulations of heterogeneous administrations together. At long last, a client inquiry is matched against the groups, to give back where its due administrations. By the by, the creation and support of ontologies may be troublesome and include a gigantic measure of human exertion [6, 7].

A few components have been proposed to catch and manage unscrupulous inputs by utilizing devoted observing operators to channel purchaser's assessment [11], or communitarian separating strategies focused around shared arrangement [12]. In the writing, a rating of an administration is a vector of character qualities. The processed notoriety rating may be a paired worth (trusted or un-trusted), a scaled number (e.g. 1-10), or on a ceaseless scale (e.g., [0, 1]). Subsequently the fulfillment level of web administrations is

for the most part a standardized numerical quality, speaking to quantitative notoriety, utilized for element administrations positioning and choice.

Maximilien and Singh [15,16] proposed a multi-executor based structural engineering where operators help in quality based administration choice utilizing an organization to scatter notoriety and underwriting data. Every substitute operator is self-governing additionally teams up with different executors to gather different sentiments and thusly amplifies its data to enhance its choice making. Liu, Ngu and Zeng [17] proposed a calculation about how to join diverse QoS measurements to get a reasonable general rating for a web administration. The proposed notoriety can be characterized as the normal positioning given to the administration by end clients. Majithia et al. The considered evaluations of administrations in diverse connections and a coefficient (weight) are appended to every specific connection. This coefficient reflects its imperatives to a specific set of clients.

III. PROPOSED SYSTEM

The new technique used in the proposed work will show an accurate performance compared to Xi Chen [1]. A brief overview is shown below.

3.1 Hybrid Collaborative Filtering (HCF):

Goal of collaborative Filtering Algorithm is to suggest new items or to predict the utility of a certain item in particular used based. In this prediction is numerical. In general, memory based CF utilize the entire user item database to generate a prediction. In this statistical techniques are used to find a set of users. In this, neighbors that having the history of agreeing to the target user. This is also called as nearest neighbor or user based CF.

The proposed scheme also have a model based CF which provides the recommendation and also the developing a model based on user ratings. It takes a probabilistic approach and imagines the CF process as the computing expected value of user prediction.

Both the models can be combined in this as said the application can be run by using the location of the user, i.e., location is used as a metric and the process flow can be shown in fig1

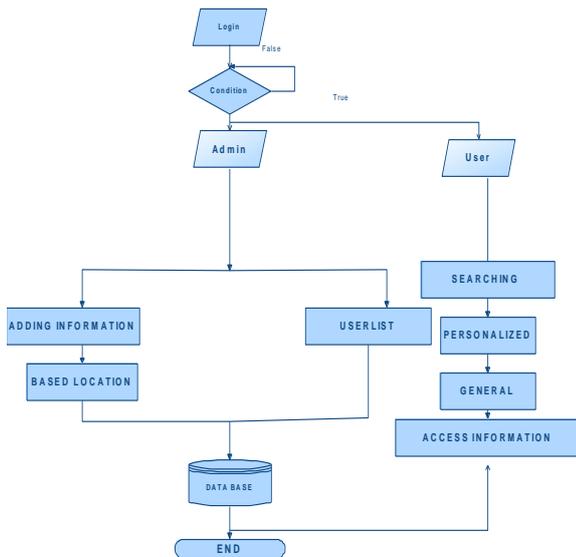


Fig: 1 flow of the proposed system

The input design is the connection between the user and the information system. It comprises the developing procedures and specification for data training and those steps are essential to put transaction data into a functional form for processing can be achieved by inspecting the computer to read data from a written or printed document or it can occur by having people keying the data directly into the system. The design of input focuses on controlling the amount of input required, controlling the errors, avoiding delays, avoiding extra steps and keeping the process simple. The input is designed in such a way that it provides security and ease of use with retaining the privacy.

3. 2 Region Creation:

In web service recommender system, users usually provide QoS values on a small number of web services. Traditional memory-based CF algorithms suffer from the sparse user-contributed data set, since it's hard to find similar users without enough knowledge of their service experience. Different from existing methods, this scheme employs the correlation between users' physical locations and QoS properties to solve this problem. The proposed scheme focuses on the QoS properties that are prone to change and can be easily obtained and objectively measured by individual users, such as response time and availability. To simplify the description of our approach, this scheme uses response time (also called round-trip time (RTT)) to describe the performance of the proposed scheme.

3.3 QoS Value Predictions:

After the phase of region aggregation, thousands of users are clustered into a certain number of regions based on their physical locations and historical QoS similarities. The service experience of users in a region is represented by the regional center. With the compressed QoS data, searching neighbors and making predictions for an active user can be computed

quickly. Traditionally, the QoS prediction methods need to search the entire data set, which is rather inefficient. In our approach, similarity between the active user and users of a region is computed by the similarity between the active user and the regional center. Moreover, it is more reasonable to predict the QoS value for active users based on their region, for users in the same region are more likely to have similar QoS experience on the same web service, especially in those regions-sensitive one.

3.4 User-collaboration Idea:

The basic idea of our approach is that users closely located with each other are more likely to have similar service experience than those who live far away from each other. Inspired by the success of Web 2.0 websites that emphasize information sharing, collaboration, and interaction, this scheme employ the idea of user-collaboration with our web service recommender system. Different from sharing information or knowledge on blogs or wikis, users are encouraged to share their observed web service QoS performance with others in our recommender system. The more QoS information the user contributes, the more accurate service recommendations the user can obtain, since more user characteristics can be analyzed from the user contributed information

IV. ANALYSIS

To show that the proposed scheme is better in all possible ways these new techniques considered performing analysis from two points one is to test the software usability and to compare the performance of the proposed scheme with that of the scheme in [1].

4.1 Software Usability Analysis:

The usability of the software is the ease of use and learn ability achieved by the software system while interacting with the user.

The System Usability Scale (SUS) provides a "quick and dirty", reliable tool for measuring the usability. It consists of a 10 item questionnaire with five response options for respondents; from strongly agree to strongly disagree.

4.1.1 The System Usability Scale

When a SUS is used, participants are asked to score the following 10 items with one of five responses that range from Strongly Agree to strongly disagree:

- I think that I would like to use this system frequently.
- I found the system unnecessarily complex.
- I thought the system was easy to use.
- I think that I would need the support of a technical person to be able to use this system.

I found the various functions in this system were well integrated.

I thought there was too much inconsistency in this system.

I would imagine that most people would learn to use this system very quickly.

I found the system very cumbersome to use.

I felt very confident using the system.

I needed to learn a lot of things before I could get going with this system.

4.1.2 Interpreting Scores

Interpreting scoring can be complex. The participant's scores for each question are converted to a new number, added together and then multiplied by 2.5 to convert the original scores of 0-40 to 0-100. Though the scores are 0-100, these are not percentages and should be considered only in terms of their percentile ranking.

The proposed scheme is tested for SUS using Morae Tool which is usability testing software that uses the above SUS process for calculating the Usability of the proposed scheme. Using Morae Tool the user experience of is recorded and the SUS Score is calculated for every user, fig 2 depicts the average SUS score of the proposed system.

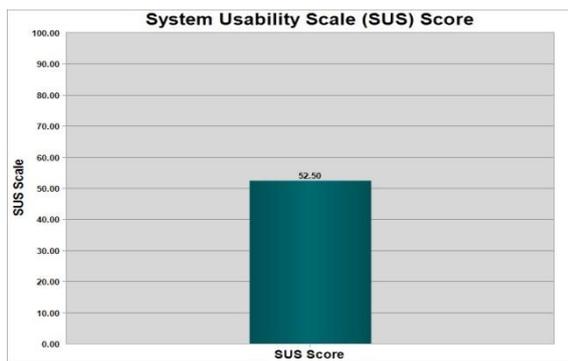


Fig 2: Average SUS Score

The SUS Score indicates that how well a system can be used by the user without any external help. The average SUS score of the proposed scheme is 70.98 which is pretty good and indicates that the scheme is well used without any effort by the user.

4.2 Performance analysis:

The proposed work uses Mean Absolute Error (MAE), the well-known statistical accuracy metric, to measure the prediction accuracy. MAE is the average absolute deviation of predictions to the ground truth data. The Proposed Scheme is compared with Chen.et.al scheme [1]. Fig3 shows that the number of predictions for the proposed scheme is lower than the Chen.et.at Schema.

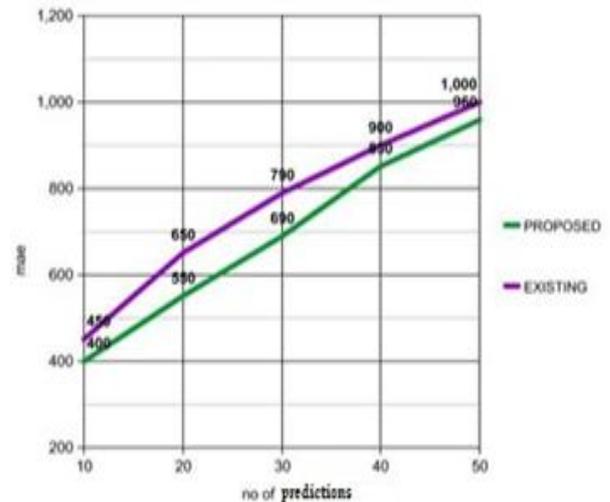


Fig3: comparison of predictions

Since the user location has taken as a metric and by using it we can easily access the services provided by the web. Fig3 shows the example comparison between the application. So the predictions in the proposed scheme can be reduced and the performance will be increased compared to the Existing one.

EQU 1:

$$MAE = \frac{\sum_{u,s} |R_{u,s} - \hat{R}_{u,s}|}{L}$$

Where $R_{u,s}$ denotes the actual round trip time and $\hat{R}_{u,s}$ denotes the predicted value, and L number of predicted values.

V. CONCLUSION

The proposed scheme is to increase the accuracy, which allows user to choose the optimal one service from best predicated services. Thus, performances of the web services are improved. Here we have proposed an innovative approach to web service visualization and recommendation. The proposed algorithm employs the characteristic of QoS by clustering users into various regions, when compared with previous work. Depending on region feature, a filtered nearest- neighbor algorithm is proposed to generate QoS that is predicated. The last service recommendations are kept on a map to reveal the internal structure of QoS space. This helps users accept the recommendations. Previous results show that our approach significantly improves the accuracy of prediction than the existing methods. These are independent of sparseness of training matrix. The online time complexity of our approach is better than the traditional CF algorithms. It also provide more informative and user friendly by allowing user to visual the best service and can do

zoom in, zoom out, search the services, etc. The proposed scheme is analyzed in two ways to depict the performance and usability benefits of the scheme and compared the results with the scheme in [1]. The results show a better improvement in the performance and the usability.

VI. REFERENCES

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