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AN ENHANCED WEB SERVICE RECOMMENDATION SYSTEM WITH RANKING QOS INFORMATION

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ABSTRACT— A web service is a software system designed to support interoperable machine-to-machine interaction over a network. Web services have been widely employed for building service-oriented applications in both industry and academia in recent years. The number of publicly available Web services is steadily increasing on the Internet. However, this proliferation makes it hard for a user to select a proper Web service among a large amount of service candidates. An inappropriate service selection may cause many problems (e.g., ill-suited performance) to the resulting applications. This paper, propose a novel collaborative filtering-based Web service recommender system to help users select services with optimal Quality-of-Service (QoS) performance. QoS (Quality-of-Service) is an important topic in cloud computing. It is very difficult to make a decision on choosing the cloud services depending on QoS requirements. These requirements have to be satisfied by both cloud service providers and cloud users. So, Optimal Service Selection is needed to obtain high quality cloud applications. With the increasing number of Cloud services, Quality-of-Service (QoS) is usually employed for describing non-functional characteristics of Cloud services. The QoS performance of cloud applications becomes low due to unreliable Internet connections. In this paper, we have presented a widespread survey on QoS Ranking in Cloud Computing with respect to their Limitations and Inferences.

Keywords— *Cloud Applications, Cloud Services, Optimal Service Selection, Prediction, Quality-of-Service.*

I. INTRODUCTION

WEB services are software components designed to support interoperable machine-to-machine interaction over a network, usually the Internet. Web service employs WSDL (Web Service Description Language) for interface description and SOAP (Simple Object Access Protocol) for exchanging structured information. Benefiting from the cross-language and cross-platform characteristics, Web services have been widely employed by both enterprises and individual developers for building service-oriented applications. The adoption of Web services as a delivery model in business has fostered a paradigm shift from th development of monolithic applications to the dynamic set-up of business processes.

A web service enables communication among various applications by using open standards such as HTML, XML, WSDL, and SOAP. A web service takes the help of:

- XML to tag the data
- SOAP to transfer a message

A. Benefits of Web Services Web services provide several technological and business benefits, a few of which include:

- Application and data integration
- Versatility
- Coder-use
- Cost savings

B. Quality-of-Service (QoS) Quality-of-Service (QoS) is widely employed to represent the non-functional characteristics of Web services and has been considered as the key factor in service selection. Quality of service (QoS) is the overall performance of a computer network, particular performance seen by users.

Figure 1: QoS Requirements for Web Services.

With the proliferation of web services as a business solution to enterprise application integration, the QoS for web services is becoming increasingly important to service providers. Quality of Service (QoS) of a web service is an important factor that differentiates similar services offered by different service provider. The QoS requirements for web services here mainly refer to the quality aspect of a web service. These may include performance, reliability, scalability, capacity, robustness, exception handling, accuracy, integrity, accessibility, availability, interoperability, security, and network-related QoS requirements. The performance of a web service represents how fast a service request can be completed. Web services

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should be provided with high reliability. Reliability here represents the ability of a web service to perform its required functions under stated conditions for a specified time interval.

A web service [1] is a method of communication between two electronic devices over the World Wide Web. A web service is a software function provided at a network address over the web or the cloud, it is a service that is "always on" as in the concept of utility computing. "Web service" as software system designed to support interoperable machine-to-machine interaction over a network. It has an interface described in a machine process able format (specifically WSDL). Other systems interact with the Web service in a manner prescribed by its description using SOAP messages, typically conveyed using HTTP with an XML serialization in conjunction with other Web-related standards. Web services are distributed application components that are externally available. You can use them to integrate computer applications that are written in different languages and run on different platforms.

Web services are language and platform independent because vendors have agreed on common web service standards. Oracle is developing a java.net project called Metro. Metro is a complete web services stack, covering all of a developer's needs from simple "Hello, World!" demonstrations to reliable, secured, and transacted web services. For more information, see the Metro home page. Metro includes Web Services Interoperability Technologies (WSIT). WSIT supports enterprise features such as security, reliability, and message optimization. WSIT ensures that Metro services with these features are interoperable with Microsoft .NET services. Within Metro, Project Tango develops and evolves the code base for WSIT. To see how WSIT works, use the Advanced Web Service Interoperability tutorial. Several programming models are available to web service developers. These models fall into two categories, both supported by the IDE: REST-based. Representational State Transfer is a new way to create and communicate with web services. In REST, resources have URIs and are manipulated through HTTP header operations. For more details, see Restful Web Services.

SOAP/WSDL-based. In traditional web service models, web service interfaces are exposed through WSDL documents (a type of XML), which have URLs. Subsequent message exchange is in SOAP, another type of XML document. For more details, see SOAP-based Web Services. The rest of the paper will be organized as follows: In section 2, we see about the web services. In section 3 we discuss about WRS function. In 4, 5 and 6, we see about objective of our system, system design and algorithm respectively. In 7, we see about the disadvantages of the existing system and advantages of our proposed system. The conclusion of our paper is in section 8.

II. RELATED WORK

Our proposed system utilizes and enhances the following techniques and approaches to endorse the quality of web services for developer's business needs.

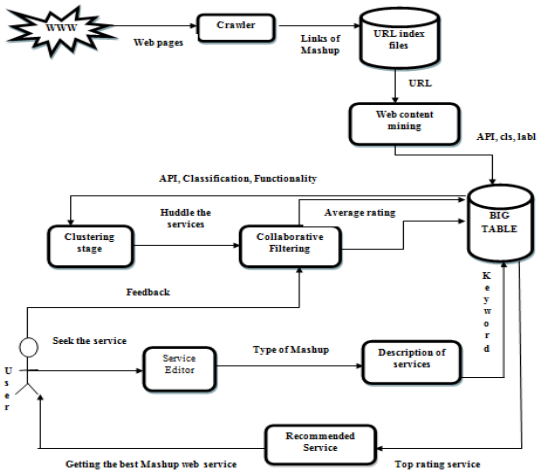

Figure 2: Architecture of background work

Web Crawler is a simple program or automated script that scans through internet pages to create an index of web pages. we crawl all the publicly available Web services from World Wide Web that are all web service relevant web pages' links are stored in to the database. Now, database contains the links of all the web service relevant web pages but each web page contains a lot of web pages that are hyperlinked inside a single web page then it also crawls each hyperlinked web page. The hyperlinked web page's links are also stored into the database.

Web Content Mining is used to extract the content of web services related Web page's links because of all the hyperlinked Web pages have superfluous text, images and also graphical data but we need only label of the web services, relevant APIs, classification, functionality from their links by using this web content mining technique. Web content mining is further divided into Web page content mining and search result mining. Web page content mining is traditional searching of Web pages with the help of content while search results mining is further search for pages found from previous search.

Clustering is the task of discovering homogenous group of data items. It is the partition of a set of data item into subsets. Data clustering is based on the similarity or dissimilarity measurements between data items. In data mining, hierarchical clustering is the most important method of cluster which builds the hierarchy of clusters. Service users have difficulties to finding our desirable services because of tremendously increasing the service relevant data

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so we will group the similar services based on APIs, functionality, classification by using clustering algorithm.

III. PROPOSED WORK

The proposed system, try to propose personalized QoS value prediction for service users by employing the available past user experiences of Web services from different users. This approach requires no additional Web service invocations. Based on the predicted QoS values of Web services, personalized QoS-aware Web service recommendations can be produced to help users select the optimal service among the functionally equivalent ones. From a large number of real-world service QoS data collected from different locations, we find that the user observed Web service QoS performance has strong correlation to the locations of users. To enhance the prediction accuracy, system propose a location-aware Web service recommender system (named LoRec), which employs both Web service QoS values and user locations for making personalized QoS prediction. Users of LoRec share their past usage experience of Web services, and in return, the system provides personalized service recommendations to them. LoRec first collects user observed QoS records of different Web services and then groups users who have similar QoS observations together to generate recommendations. Location information is also considered when clustering users and services. The main contributions of this work are two-fold:

- First, system proposes location-aware Web service recommendation approach, which significantly improves the recommendation accuracy.
- Second, system conduct comprehensive experiments to evaluate approach by employing a real-world Web service QoS data set.

A. Web Service Recommendation

Web service QoS prediction is used in different ways in LoRec to facilitate Web service recommendation. First, when a user searches Web services using LoRec, predicted QoS values will be shown next to each candidate service, and the one with the best predicted value will be highlighted in the search result for the active user. It will be easierfor the active user to decide which one to have a try. Moreover, LoRec selects the best performingservices (services with the best submitted QoS) and services with the best predicted QoS from the whole service repository for the active user so that he/she can quickly find potential valuable ones instead of checking the service one by one.

B. Advantages of Proposed System

1. Improves the recommendation accuracy compared with existing service recommendation.

2. Web service recommender system help users to select services with optimal Quality-of-Service (QoS) performance.

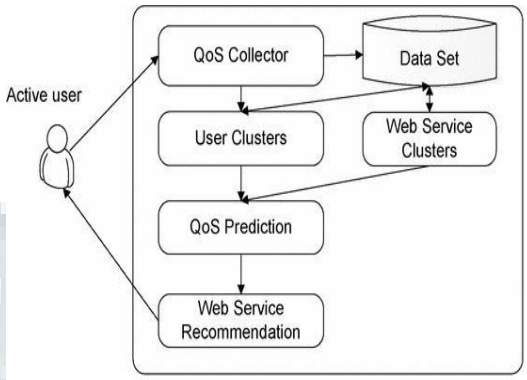

Fig.3 System Overview of LoRec

IV. SYSTEM DESIGN

5.1 SYSTEM ARCHITECTURE

This paper is intended to provide an insight of the annotation techniques and application of few techniques to provide the required results with the above stated advantages. A novel collaborative filtering algorithm [8] designed for large-scale web service recommendation. This collaborative filtering algorithm uses a rule-based mechanism to determine behavior consistent information based control strategies for route guidance in a dynamic vehicular traffic system. This approach employs the characteristic of QoS and achieves considerable improvement on the recommendation accuracy.

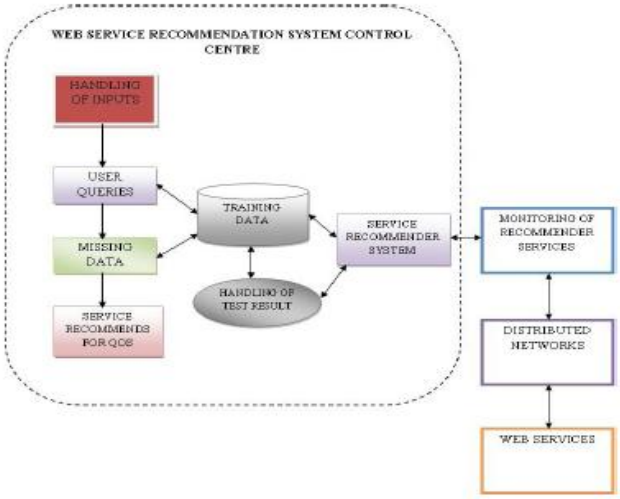

Figure 4 An Enhanced Web-service Recommendation System Architecture

In the presence of multiple Web services with identical or similar functionalities, Quality of Service (QoS) provides non-functional Web service characteristics for the optimal Web service selection. Since the service providers

may not deliver the QoS it declared, and some QoS properties (e.g., network latency, invocation failure-rate, etc.) are highly related to the locations and network conditions of the service users, Web service evaluation by the service users can obtain more accurate results on whether the demanded. The service recommender system component is answering the global user query. The latter has to be split local queries (i.e., sub-queries) and has to determine which peer is able to solve a local query. Each sub-query is expressed in SQL. SRS handles a Local Query Processing Engine component. Then, it carries out all the interactions between the composed services and generates a set of composition plans to provide the requested data. The basic function of this architecture is to obtain sufficient Web service QoS information from different service users crucial for making accurate Web service recommendations. The idea is that by contributing the individually observe Web service QoS information to Web Service Recommender System, the service users can obtain accurate Web service recommendation service. Apart from the user contribution mechanism, Web Service Recommender System also controls a number of distributed computers for monitoring the publicly available Web services. The system architecture of Web Service Recommender System, which includes the following procedures: An active service user provides the individually obtained Web service QoS information to the Web Service Recommender System, The Input Handler in the Web Service Recommender System processes the input data, The Find Similar Users finds similar users from the training data of Web Service Recommender System, The Predict Missing Data predicts [17] the missing QoS values for the active user using collaborative filtering algorithm [10] and saves the predicted values and The Recommender employs the predicted QoS values to recommend optimal Web services to the active user.

V. THE RECOMMENDATION APPROACH

A. Motivating Scenario

In this section, an online service searching scenario to show the research problem of this paper. The basic idea of this 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, we employ the idea of user-collaboration in our web service recommender system. The more QoS information the user contributes, the more accurate service recommendations the user can obtain, since more user characteristics can be analysed from the user contributed information. Based on the collected QoS records, our recommendation approach is designed as a two-phase process. In the first phase, we divide the users into different regions based on their physical locations and historical QoS experience on web services. In the second phase, we find similar users for the current user and make QoS prediction for the unused services. Services with the best predicted QoS will be recommended to the current user.

B. Phase 1: 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, we employ the correlation between users‟ physical locations and QoS properties to solve this problem. In this paper, we focus 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.

C. Phase 2: QoS Value Prediction

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 region center. With the compressed QoS data, searching neighbours 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 this approach, similarity between the active user and users of a region is computed by the similarity between the active user and the region center. Moreover, it is more reasonable to predict the QoS value for active users based on their regions, for users in the same region are more likely to have similar QoS experience on the same web service, especially on those region-sensitive ones.

V.CONCLUSION

This paper presents an innovative QoS-aware Web service recommendation approach .The basic idea is to predict Web services QoS values and recommend the best one for active users based on historical Web service QoS records. In order to better recommend Web services to users from amount of services with identical functions, this paper proposed a Web service recommendation approach based on collaborative filtering. Cloud computing aim is to provide scalable and adaptive to the diversity of end-users. Optimal service selection is important to obtain high quality cloud applications. A greedy algorithm treats rated and unrated items equally so it provides low quality cloud applications. Cloud Rank Framework provides the same quality in both algorithms. So, we suggest an optimal VM allocation is used to improve the quality of cloud applications. It also reduces the time complexity by providing an optimal value which ensures QoS-Aware Services. Our experimental result

showed that our proposed novel technique works efficiently when compared to previous methods.

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