Personalized QoS-Aware Web Service Recommendation and Visualization

ABSTRACT:

With the proliferation of web services, effective QoS-based approach to service recommendation is becoming more and more important. Although service recommendation has been studied in the recent literature, the performance of existing ones is not satisfactory, since 1) previous approaches fail to consider the QoS variance according to users’ locations; and 2) previous recommender systems are all black boxes providing limited information on the performance of the service candidates. In this paper, we propose a novel collaborative filtering algorithm designed for large-scale web service recommendation. Different from previous work, our approach employs the characteristic of QoS and achieves considerable improvement on the recommendation accuracy. To help service users better understand the rationale of the recommendation and remove some of the mystery, we use a recommendation visualization technique to show how a recommendation is grouped with other choices. Comprehensive experiments are conducted using more than 1.5 million QoS records of real-world web service invocations. The experimental results show the efficiency and effectiveness of our approach.
EXISTING SYSTEM:

The objective of this paper is to make personalized QoS based web service recommendations for different users and thus help them select the optimal one among the functional equivalents. Several previous works has applied collaborative filtering (CF) to web service recommendation. These CF-based web service recommender systems works by collecting user observed QoS records of different web services and matching together users who share the same information needs or same tastes. Users of a CF system share their judgments and opinions on web services, and in return, the system provides useful personalized recommendations.

DISADVANTAGES OF EXISTING SYSTEM:

However, three unsolved problems of the previous work affect the performance of current service recommender systems:

1. The first problem is that the existing approaches fail to recognize the QoS variation with users’ physical locations.
2. The second problem is the online time complexity of memory-based CF recommender systems. The increasing number of web services and users will pose a great challenge to current systems.

3. The last problem is that current web service recommender systems are all black boxes, providing a list of ranked web services with no transparency into the reasoning behind the recommendation results. It is less likely for users to trust a recommendation when they have no knowledge of the underlying rationale.

**PROPOSED SYSTEM:**

In this proposed system we propose an innovative CF algorithm for QoS-based web service recommendation. To address the third problem and enable an improved understanding of the web service recommendation rationale, we provide a personalized map for browsing the recommendation results. The map explicitly shows the QoS relationships of the recommended web services as well as the underlying structure of the QoS space by using map metaphor such as dots, areas, and spatial arrangement.
ADVANTAGES OF PROPOSED SYSTEM:

The main contributions of this work are threefold:

- First, we combine the model-based and memory based CF algorithms for web service recommendation, which significantly improves the recommendation accuracy and time complexity compared with previous service recommendation algorithms.

- Second, we design a visually rich interface to browse the recommended web services, which enables a better understanding of the service performance.

- Finally, we conduct comprehensive experiments to evaluate our approach by employing real-world web service QoS data set. More than 1.5 millions real world web service QoS records from more than 20 countries are used in our experiments.
SYSTEM ARCHITECTURE:

MODULES:

1. Region Creation
2. QoS Value Prediction
3. User-collaboration Idea
4. Time Complexity Analysis
MODULES DESCRIPTION:

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. To simplify the description of our approach, we use response time (also called round-trip time (RTT)) to describe our approach.

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 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 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.

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, we employ the idea of user-
collaboration in our web service recommender system. Different from sharing in-
formation 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.

Time Complexity Analysis:

The time complexity of calculating the median and MAD of each service. Form
services, the time complexity. With MAD and median, we identify the region-
sensitive services from the service perspective. Since there are at most $n$ records for each service, the time complexity of each service. Therefore, the total time complexity of region-sensitive service identification.

**SYSTEM CONFIGURATION:**

**HARDWARE CONFIGURATION:**

- Processor - Pentium –IV
- Speed - 1.1 Ghz
- RAM - 256 MB(min)
- Hard Disk - 20 GB
- Key Board - Standard Windows Keyboard
- Mouse - Two or Three Button Mouse
- Monitor - SVGA

**SOFTWARE CONFIGURATION:**

- Operating System : Windows XP
- Programming Language : JAVA/J2EE
- Java Version : JDK 1.6 & above.
- DATABASE : MYSQL