Chapter 6

Web Services Reputation Based on Consumer Preferences

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ABSTRACT

With the increasing application of web services in our lives, selecting the right web service is becoming unprecedentedly difficult. Indeed, before paying the price of a web service, the customer always tries to make sure of his choice. One of the mechanisms used to put the customer in trust is to make available the opinions of other customers who have already used this web service. In the literature, many solutions for measuring the reputation of web services have been proposed. Unfortunately, they ignore certain aspects that we find important to ensure a more meaningful assessment of the reputation. Firstly, consumers do not always have the same satisfaction criteria, and as a result, they can judge the same web service differently. Thus, without knowing the consumer’s preferences, it is almost impossible to give meaning to his opinion. Secondly, the qualities of a web service can be changed over time, and hence, the old ratings are no longer representative. In this chapter, the authors propose a novel reputation computation approach to deal with the problems mentioned above.

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1. INTRODUCTION

With the growth of SOC (Service Oriented Computing), the number of Web services on the Internet is increasing. As a result, it has become difficult for a customer to select the desired Web services from those available on the Web. Web service selection is the most important task in the Web services model because they are useless if they can’t be selected (Sharma & Kumar, 2011), for this, a major research effort has been undertaken to find effective solutions to select the best web services that meet the customers’ needs. The selection of Web services is based essentially on their functional aspects (Inputs and Outputs), however, given the large number of Web services available and the diversity of customers, other aspects must be considered namely QoS (qualities of services) and customer preferences. Quality-of-Service is widely employed to represent the non-functional characteristics of Web services and has been considered as the key factor in service selection (Zhang et al., 2007).

Given the nature of the SOC environment, social approaches can be used in Web services selection (Billionniere et al., 2009). The social dimension is applied when people buy a product or service from a Website, such as Amazon. For example, when searching for a book, a consumer can benefit from the opinions of other consumers. Consumer opinions can be used to define the reputation of this Website. With the proliferation of Web services-based applications and the consequent increase in the number of Web services, reputation systems should help address the recurring question that hinders Web service acceptance: How to find/avoid the “good”/“Bad” Web service based on past uses? (Sellami, 2011).

The reputation of an invoked Web service is a collective feedback rating of the consumers that have interacted with or used the service in the past (Wang et al., 2014). Once the Web service is invoked, the customer evaluates it by giving a rating that reflects its satisfaction with the QoS criteria of the used service. These ratings are then aggregated using an aggregation function to give a single value that estimates the credibility of the service provider or the quality of the services offered. This value, which represents the service reputation, influences the decision of other consumers when selecting services (Louati, 2015).

In the literature, many reputation systems have been proposed to accurately evaluate the reputation of Web services based on user feedback ratings (Noor, et al., 2013; Hendrikx, et al., 2015; Limam & Boutaba, 2010; Mármlol & Kuhnen, 2015). Most of these systems usually calculate the reputation of Web services as the sum or the average of all given ratings. Although these methods of calculation allow an understanding of all, but, they do not allow such a detailed management of the reputation: It is not known on the basis of what criteria of QoS, the customer gave his opinion. Customers do not always have the same satisfaction criteria, and as a result, they may judge the same Web service differently. For example, a customer gives a
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