Selection of Web Services using Service Agent: An optimized way for the selection of Non-functional requirements

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Abstract

Web Services provide a promising results and solution according to the needs and requirements with fast & flexible manners for information sharing among different peoples and businesses. The major key issue in research in Web Services is the selection process which is most difficult & cumbersome because the increasing numbers of services that can not meet or fulfill all the non- functional requirements like performance, efficiency, reliability sensitivity etc. moreover for web services selection for Library System, the author suggests a model to select the searching material only related to books in hard copy form, softcopy form, read only and printable from. The Author suggests an agent for the selection of these books from the web. When any body else who wants to search a specific book from the web, then this service agent will show all the web sites where books will be available. The agent generates a list of books with their all user's needs and Non-functional requirements. On the basis of these non-functional requirements the user can pick the book according to the document provided by service agent.

Keywords: Service Agent, Non-functional requirement, Web services

1. Introduction

The web services selection is very cumbersome and tedious take fort the user; it is the open challenge for IT experts /professionals. The basic issues for the services selection are to identify the user

selection requirements at web and the assessment of the provided services [1]. The selection of corresponding of service located at web, if meet the functional requirements and criteria of discovered services fulfills the non-functional requirements of user, then these services are ranked in a proper way and a number of techniques are used to rank the required web services related to non-functional requirements. The ranking of web services is the major problem [2]. The effective selection of web service during run time is very important for the complete satisfaction of use/end user i.e. functional /non functional requirements & many methods or techniques are available for the composition of web services by means of different protocols [3]

The web service selection process is not so easy job for users that all his functional and non-functional requirements are fulfilled from a single domain, so to solve this issue author proposed a new model by the introduction of intelligent agent for the selection of web service. The intelligent agent will contained a database for all those web sites which will provide the facility of digital library. When any user make a request for his/her desired book or article with all non-functional requirements i.e. how much its cost what is its quality whether it is available in hardcopy form or not or it is available in downloadable from etc. The intelligent agent will match all these non-functional requirements provided by user to each web site stored in its database and when all these requirements are matched with any website by agent, then it will response to user collect, the desired item, i.e. book or article from that website. So in this way the selected / discovered web service will be fulfill the needs of a user.

1.1. Web Services

It is the method of communication between user and electronic devices or two or more than two devices over a network. There are a number of web sites like messaging, shopping, banking, to cut it short, all the business needs can be fulfill by web to all. These jobs over an internet are called web services. when a list of items is placed at a particular web site to get service from that web site user may compel to visit that again and again because the services provided by the web is the ending point of a connection and this phenomenon make services oriented Architecture (SOA) with the combination of internal & external services of an organization [4]. The required services of user's preferences is the preliminary task for deliverables and the final decision is performed for final execution of service for desired and available objects available at web [5]

1.2. Web Services Selection

The main objective of web service selection is to get the promising, feasible and optimal service for a particular job. The agent is used for this purpose in the middle for the selection of web services from different domain over an internet. [6].

1.3. Service Agent In Web Service Selection

Web service selection can be discovered by service agent. The service agent play a vital role for the selection of optimal and feasible service dynamically and real time without the interaction of human being at web.

2. Limitations in Web Service selection and proposed solution

Since the web service selection is very tedious task, so when the user make a request to web server for specific search item, may be the search item found but the users needs are not satisfied due to non-functional requirements. So the complete satisfaction related to the all parameters i.e. non-functional requirements of user documents are not satisfied completely. The functional requirements explain the actual issue of users and non functional requirements define the extra parameters by users like quality of service, criteria, response time and availability and throughput [7]. To overcome the problem related to the non-fictional requiems, the author suggests an intelligent agent which will contain the database for non functional requirement. Now according to this database which is totally up to the complete satisfaction of user, it will make all the parameters to each web server by that agent.

3. Model For The Selection of Web Services

Since the discovery of web services is very difficult job, so to overcome this problem the authors proposed a model for web service selection by introducing service Agent. This Service Agent will contain the Database of the digital libraries web sites. When the user make a request for a specific book/article then this Service Agent will search that specific book from different domain from the web. This Service Agent will give feed back to user according to his demand with all non-functional requirements specified by the user in the form of document.

In the closed-words case, when the user requests to digital library agent for the searching of specific book from the web then the agent generates a list of books with their all user needs i.e. whether the book is downloadable, printable, readable & the most important issue is related to the purchasing of book from the internet, whether the cost of book is optimal for user or not. The agent shows all the details about that specific book. The agent generates a complete document and sent it to the user with all non functional requirements. If the document is not up to the satisfaction of a user then it will be cancelled and other request will be made by the agent to the next domain. Sine the ultimate goals are not to be satisfied according to the needs of user and these are not available from industrial point of view.
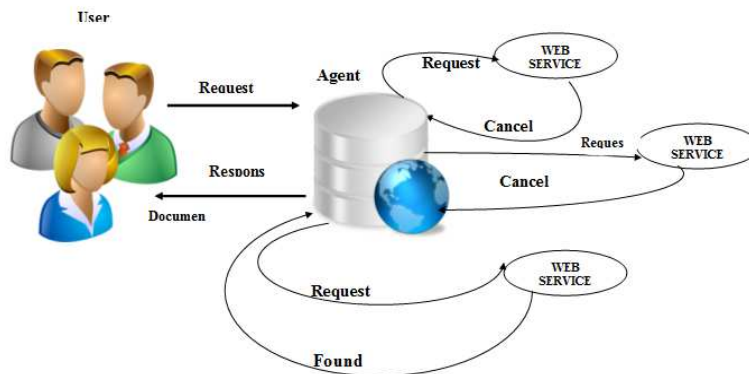

Fig-1.   The Service Agent for Digital Library System

So, the Author suggests an intelligent agent named as service agent which must contain the database for different web sites which can obey all the non-functional requirements which are ultimately the main objective of the user. When the user request is completed against the non-functional requirements then he will pick the book and if users needs are not fulfilled according to the provided document by the service agent then the whole process will be re-iterate up to the complete satisfaction of the user.

4. Service Agent document

After the complete search of service agent from different domains over an internet where digital libraries are available, if the specific book is to be searched then the service agent generate a document in the form of table-1 as shown below

Table 1. Document of desired Non-functional requirements and functional requirements of Users

Domain	Non-Functional Requirements				Functional Requirements
	Readable	**Printable**	**Downloadable**	**Cost**	**Exist or Not exist**
D-1	Y	Y	N	High	Y
D-2	Y	N	N	Very High	Y
D-3	-----	-----	-----	-----	N

D-4	Y	Y	N	Medium	Y
D-5	Y	N	Y	Low	Y
D-6	Y	Y	Y	Very Low	Y

Table-1 illustrates the required book found by the service agent according to above scheme of five different domains. The service agent makes a request for the given Book by the user , from this domain the required book is in readable form, printable form but the book can not be download and the cost of book is High. Then the service agent goes to the next domain D-2 here the book is only in readable form and the book can be purchased but the cost of book is very high and it is not satisfactory solution for the user. The service agent goes to third domain D-3 here the required book is not available in its digital library then the service agent goes to fourth domain D-4 here the required book is found and the book is readable, printable but the book is not downloadable and the cost of book is medium. Now the service agent goes to domain five here all non-functional requirements are satisfied except printable and cost parameters. Finally the service agent goes to the sixth domain D-6 where optimal solution is found where all non-functional requirements are meet and also the cost of book is very low which is the ultimate goal of user so the book can be purchased by the user.

5. Conclusion:

The service agent provides promising results and solution according to the user needs and requirements with fast & flexible manners for different web services related to functional and Non-functional requirements. The service agent is not only used for the searching of books from different digital libraries. The service agent can also be used for searching hardware, software, and other products launched by different companies with various cost. By using the same concept any customer can search his/her product with minimum cost which is the main objective of each and every user.

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