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Service Discovery and Selection using the Bio Inspired Approach

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----------**ABSTRACT**----------
The Swarm intelligence is a search field that provides the collective behaviors of Insects or animals in that particular swarm. Many algorithms raised from this models have been proposed to solve complex problems. In this project, an oval swarm algorithm called the Social spider Optimization (SSO) is proposed for solving selection tasks. In the proposed algorithm, Individual stimulate a group of spiders which interact between each other based on the biological laws of the cooperative colony. The algorithm considers two different each agents (spiders): male and Female. According to their category, each individual is conducted by a set of different evolutionary operators. In order to explain the efficiency and robustness of the proposed approach, it is compared to their well-known evolutionary methods. By modifying the proposed approach we can attain a better result in the field of web service selection as well as discovery. The outcome shows a high performance of the proposed method for searching a global optimum with several benchmark functions.Web service technology has gained more important role in developing distributed applications and systems on Internet. Continuous growth of explored Web services makes their discovery and selection process more and more complicated. There are many web services which have similar functional characteristics. The aim of Web service selection is to search services into internet i.e. registry and to fetch the related services according to the requestor needs and providing it to them. The user sends an request to the registry and the registry selects all the related services in it and provide it to the user and make the user to select from it based on his/her queries.The Objective of this proposal is to embed the bio inspired algorithm technique (SSO) into the web service selection process to make that process an efficient one and also to provide the related response to the user's request. The result which is achieved is of dynamic web service response to the service requester.

KEYWORDS :*ABC, Dominant value, SOAP, SSO, UDDI, WS, WSDL, WSIL, XML.*

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I. INTRODUCTION

The web service as the major impact in the research field of current trend and the usage of bio inspired algorithm along with the web service will leads to efficient and effective result in the searching and selection related processes[1].

1.1 WEB SERVICE

Web services are designed to standardize interactions between heterogeneous applications using Internet . Our work involves identifying the methods to make selection to an appropriate service using Web Service Description Language (WSDL) documents, which can be used as the interaction formats for all expected data's, supported protocols. This survey extends current selection research through use of the UDDI sub-dividing searching, and user preference with the feedback mechanism selections resulting in a very high percentage of successful selection. The goal is to find the appropriate documents for the given name and parse and to automatically invoke the Web service. Were in traditional models Web service do not provide the user with a GUI. Were in modern technology the developer can add the required Web service to GUI and also to add some additional features also to users.Web services allow different applications from different sources to communicate with each other without time-consuming custom coding, and because all interaction is in XML, Web services are included with many operating system or programming language. For example, Java may have communicate with Perl. Web services can also be active without browsers or HTML. Web services are also called as application services.

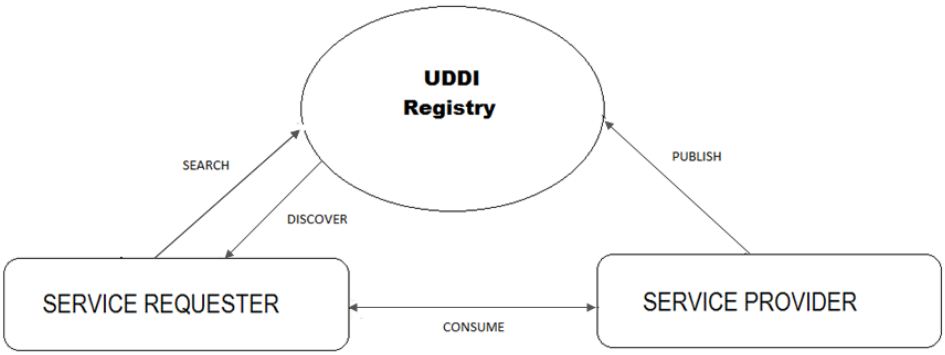

Figure 1.1 Web service Architecture

The goal of this project is to enhance discovery of Web services through design of automated discovery using Bio-Inspired Algorithms to provide a foundation for utilization of Web services in enhancing -search engine capability. Web services have the potential to significantly enhance several aspects of meta-search engines. A known problem is the difficulty of incorporating search results from HTML search engine pages. Parsing and extracting the output (i.e. search result records) accurately is complex due to the lack of semantic tags in HTML documents. In contrast, description of the service and details of invocation and response are well defined with Web services. Service specifications are defined in the WSDL document for a service via XML-Schema based system.

While search engines are also more homogeneous in grouping data, Web services allow groupings of functionality that is heterogeneous in nature. For example, a meta Web service for travel-related Web services grouped into an overall plan including airfare, hotel, and rental car. Web services allow for expansion of existing search engine technology and access to greater depths of the Internet offered information while providing data in a highly structured format.

1.2 UDDI REGISTRY

UDDI has the definition of Universal Description, Discovery and Integration . A UDDI registry is a directory for storing information about Web services. A service provider makes its services available to public users by publishing information about the service in a UDDI registry[2]. Individuals and businesses can then locate the services by searching public and private registries. It is design for the interrogation done by SOAP messages and to provide accessibility to WSDL documents which describes the bindings of the protocol and format of the messages required to communicate with the web services categorized in the registry. UDDI creates a standard platform that activate companies and its applications to access quickly, easily and dynamically to discover and use Web services over the network. The information about Web services in a UDDI registry includes a description of the business and organizations that provide the services, a description of a service's business function, and a description of the technical interfaces to access and manage those services.

UDDI plays an vital role within the service-oriented and web service approach to enterprise software design. UDDI supplies an unique infrastructure for systematically addressing needs such as discovery, manageability and security of Web services. Service consumer can uses the UDDI to discover and to find services that suites their requirements and also to obtain the service metadata. The metadata is needed for the consuming process of those services. UDDI provides the flexibility with respect to the dynamic change in the run time that occur during in the life-cycle of web services and to the evolution of web service application requirements. UDDI helps the process of drive better code reuse and developer productivities. The UDDI specifications defines a registered service for the Web services and also for other electronic and non-electronic services. Service providers can make use of the UDDI to publish and also to advertises the services they offer.

Conceptually, a business can register three types of information into a UDDI registry.

White pages:

Basic contact information and identifiers about a company, including business name, address, contact information, and unique identifiers such as D-U-N-S numbers or tax IDs. This informational lows others to discover your web service based upon your business identification.

Yellow pages:

Information that describes a web service using different categorizations (taxonomies). This informational lows others to discover your web service based upon its categorization (such as being in the manufacturing or car sales business).

Green pages:

Technical information that describes the behaviors and supported functions of a web service hosted by your business. This information includes pointers to the grouping information of web services and where the web services are located.

[1] Web Services are mainly classified into Two Categories:
[2] Web Service Composition
[3] Web Service Discovery

1.3 Web Service Composition

The aim of Web service composition is to arrange multiple services into workflows supplying the user requests continuously. Because of more number of Web services the need to supply more dynamically and they also have to make composite automatically.This discovery research targets any kind of Web service that currently exists and is accessible from the Internet. Google and Amazon represent the broad range of search services for which Web service interfaces are currently available. The project includes search of any type of Web service, since discovery techniques should be applicable to future Web services developed for search engines. In researching Web service discovery standards we found that other than those based on a central registry service; no standard is currently widely implemented. Proposed standards include Microsoft's Web Services Dynamic Discovery (WS-Discovery) [3], which is a dynamic discovery specification that defines a multicast-based ad-hoc protocol to find Web services on internet. It is an old Microsoft standard, Discovery of Web Services (DISCO) [4], is a static standard using .disco documents for a domain to identify the WSDL documents.

The WS-Inspection Language (WSIL)[5] is a similar lightweight discovery standard promoted by Microsoft and IBM that merges their earlier efforts: IBM's Advertisement and Discovery of Services (ADS) and Microsoft's DISCO. WSIL documents contain locations of WSDL documents and pointers to other WSIL documents to create hierarchical lookups for services[6] .This work expands on the topic of Web service selection trying alternative methods to both current centralized and de-centralized standards and by proposing a consolidation of discovery methods. In this WSDL Selection method, we executed some technique for finding

WSDL documents:

[1] utilizing search engines to find web pages with WSDL documents;
[2] using search engines to find distributed lists of WSDL documents (WS-Inspection or WSIL documents);
[3] using web crawling programs to discover WSDL documents;
[4] querying UDDI registry structures using the common business name search and also using a category-type search; and running queries against a popular commercial registries.

An initial pool of 40 WSDL documents was used in developing these discovery techniques. Final experiments using a test base of 80 WSDL documents produced results with very good success rates in finding those documents using these methods. In developing techniques to achieve this success, numerous experiments were conducted, with minor variations in search terms used, types of queries, and sources.

II. BACKGROUND WORK

2.1Related Algorithms

The genetic algorithm has the problem of prematurity which obstructs the algorithm from further improving. Two immune algorithms were proposed in the paper to solve the premature convergence of genetic algorithms, and both of them were optimization methods for service discovery with global QoS constraints. The Difference between the mare than coding method and the Mutation process. Tabu search as a heuristic procedure for solving optimization problem can escape the trapoflocal optimality.The Tabu search was used to select the chromosome with best after the cross over and mutation operation by a genetic algorithm. The approach increased diversity of population and more search space, and also escaped the trapoflocal optimality.The Advantage of genetic algorithm is it solves problems with multiple solutions. It has a more effective memory capability. It is more efficient in maintaining the diversity. Genetic algorithm is a method which is very easy to

understand and it practically does not demand the knowledge of mathematics .Genetic algorithms are easily transferred to existing simulations and models.

According to D.Karaboga **and B.Basturk** have proposed the Artificial bee colony (ABC) algorithm is an optimization algorithm based on a particular intelligent behavior of honey bee swarms. This work compares the performance of BC algorithm with that of Differential Evolution (DE), Particle Swarm Optimization (PSO) and Evolutionary Algorithm (EA) for multidimensional numeric problems. The simulation results show that the performance of ABC algorithm is comparable to those of the mentioned algorithms and can be efficiently employed to solve engineering problems with high dimensionality. In ABC algorithm, while a stochastic election scheme based on the fitness (nectar) values, which is similar to ‘‘roulette wheel selection’’ in GA, is carried out by on looker bees, a greedy selection scheme as in DE issued by onlookers and employed bees to make a selection between the source position in their memory and the new source position have been searched.For the test problems carried out in this work, the colony size of 50-100 can provide an acceptable convergence speed for search. As mentioned before, the ‘‘scout bee’’ production is controlled by the control parameter ‘‘limit’’ in the ABC algorithm. In ABC algorithm, the colony of artificial bees contains three groups of bees: employed bees, on lookers and scouts. First half of the colony consists of the employed artificial bees and the second half includes the onlookers.Advantages of this algorithm is that the performance of ABC is very good in terms of the local and the global optimization. It is flexible and simple to use. It was used efficiently in the optimization of multi modal and multi-variable problems. Fast convergence and high flexibility

According to **Ángel Cobo and Rocío Rocha[7]** have proposed Ant Colony Optimization algorithm a document representation strategy and a bio-inspired algorithm to cluster multilingual collections of documents in the field of economics and business. The proposed approach allows the user to identify groups of related economics documents written in Spanish and English using techniques inspired on clustering and sorting behaviors observed in some types of ants. In order to obtain a language independent vector representation of each document two multilingual resources are used: an economic glossary and a thesaurus. The results demonstrate the usefulness and effectiveness of the ant clustering algorithm and the proposed representation.The web application implements an ant-based clustering algorithm. In the ant clustering algorithms [8], the clustering operation happens on a toroidal bi-dimensional grid, where the objects (documents) are placed randomly and a set of artificial ants explore the grid picking and dropping the objects.In our comparative study we used three external quality measures: purity, F-measure and entropy. The purity measures how much a cluster is “specialized” in a class or category; and is defined as the ratio of the number of documents in the dominant category to the total number of documents in the cluster.Advantages of this algorithm is worth observing the difficulty of a clustering process. The degree of purity in algorithm is high. The algorithm performs very well under all quality measures.

According to **Moe Zaw and Ei Mon [9]** have proposed the Cuckoo Search Optimization algorithm is a recently developed optimization algorithm based on the obligate behavior of some cuckoo species in combining with the levy flight. In this paper, Cuckoo Search Clustering Algorithm based on levy flight is proposed. This algorithm is the application of Cuckoo Search Optimization algorithm in web document clustering area to locate the optimal centroids of the cluster and to find global solution of the clustering algorithm.

All Cuckoo Search optimization technique is introduced by Yang and Deb recently [10]. Cuckoos have a belligerent reproduction tactic that involves the female laying her fertilized eggs in the nest of another species so that the surrogate parents unwittingly raise her brood.

The two main idealized rules on which it is based are as follows
1) Each cuckoo lays one egg at a time, and dumps its egg in randomly chosen nest;
2) The best nests with high quality of eggs will carry over to the next generations;

Advantages is that it is flexible and simple to use. It is more efficient. Cuckoo Search algorithm is its simplicity

III. SOCIAL SPIDER OPTIMIZATION ALGORITHM (SSO)

The operational principles from the social-spider colony have been used as guidelines for developing a new swarm optimization algorithm. The SSO assumes that entire search space is a communal web, where all the social-spiders interact to each other. The interaction of female spider with male spider is consider as the major function in this process. According to the social spider environment the population of female spider is less than that of the male spider in the living social web. That is the population of the female spider is about 35-40 percent

only remaining are the male spider.so the female spider has the option to choose which of the male to communicate. In the paper, the male has been chosen by the female with the dominant value of the male[1].Initially each of the male in the communal web has the dominant value, the value differs with every male spider correspondingly. The dominant value is calculated by the female at that moment only. Every male spider has the capable of generating vibration with the help of a single web called as communal web which is in the social spider web and the vibration produced by the male spider is to attract the female spider in the web for the process of communication. The vibration is more when the male and the female are nearer and it is less when they are at longer distance. The female get into the communication process with the male having the best dominant value (the male nearer to the female). The process of communication between the spiders need not to be a same process i.e. the spiders can't communicate repeatedly. It states that the process is dynamic one due to the movement of the spiders in the web the process of communication also changes accordingly.

IV. PROPOSED APPROACH

With reference to the above process the web service discovery and the service selection can be achievable. By implementing this in the service discovery process we can apply it in the registry segment to calculate the best response service related to the requests. For this process we have taken the metrics like response time, availability and cost.Here in the paper, female who has the ability to choose the best is consider as the service requestor and the various related service to the keyword or the search word is referred as male spiders. At first, the service provider as send his/her services to the registry with the calculated values of the response time, availability and the cost. The registry stores the services and its values by ranking terminology or principle which has been followed till now the preliminary steps are been done then the main process get starts. The requestor sends a request to the registry this is the place where the process kicked off. During the request sending scenario the sender will define the needed metrics value. All the related services in the registry (only related to the keyword) get selected and then they all move towards the next process. During the next process the dominant value is calculated then the resultant values are to be yield.

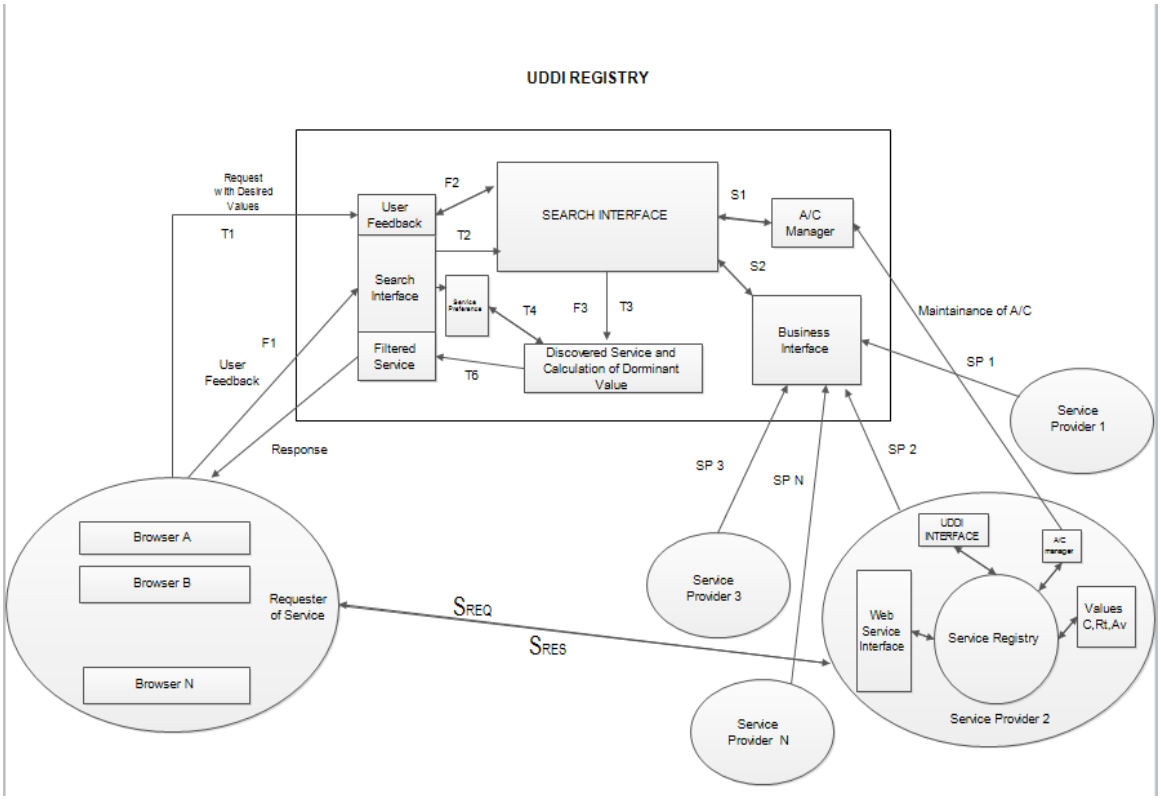

FIG 4.1 Architectural Diagram

After the calculation the result are been sent to the service requestor side. Thus it state that the process can be dynamically processed one due to the fact that the metric values are changed the response ranking process i.e. the dominant value calculation also change this leads to the new ranking order of services related to the

keyword and it shows the new result i.e. the altered services based on the dominant value are been shown as the result to the service requestor. As the SSO Algorithm deducts the best service in a static mode by applying this algorithm in the Registry we can get the process outcome as dynamic one . The registry can hold n number of data , by applying this social spider approach we can segregate the required services and the output is of efficient one.

SSO Model improves the discovery of various types of services available in the UDDI. This makes the response to a request as a dynamic one and the values can be fetched accurately according to the user or the service requestor criteria. Thus the searching or the discovery process in the registry can be minimized and it leads to an effective response generation.

V. CONCLUSION

In this paper has proposed a novel scheme of Discovering new services. The services that get scattered in the UDDI registry can be discovered by using SocialSpiderOptimization(SSO) technique. This project used the various techniques like male, female, fit, unfit, communal web, feedback mechanism to discover the exact service from the Registry. The SSO method can also be used to retrieve more appropriate service from number of services. The Quality of Service have been maintained in this project. The SSO algorithm can be used in the further future enhancement.

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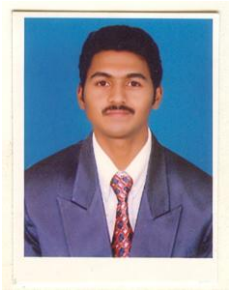
BIOGRAPHIES



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