A Novel Web Service Composition Using Ant Colony Optimization with Agent Based Approach

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Abstract— **The aim of the research work presented in this paper is to develop a system for automatic web service composition with agent based approach to provide QOS aware services to different users according to their requirement. Grid computing is increasingly considered as a promising next-generation computational platform that supports wide-area parallel and distributed computing. In this approach we provide web service composition through workflow model and use new version of ant colony optimization algorithm called multi objective ant colony optimization algorithm (MOACO) that is being used to decompose composite services into parallel execution path. In this we can get services through one or more agents from service composition algorithm according to users requirement. The main advantage is that in this system user only have to give higher level goals and they can get services.**

Keywords **Web Service, Web Service Composition, Quality of Service, Multi-Agent System, Service-oriented architecture, Multi Objective Ant Colony Optimization**

I.INTRODUCTION

Web Services are based on distributed technology that provide standard means of interoperating between different software applications across and within organizational boundaries with the use of XML .Basically web services can be used to provide data to user level application from server side.

As with the growing number of alternative web services that provide the same functionality but differ in quality parameters, the service composition becomes a main problem on which component services should be selected so that user's end-to-end QOS requirements (e.g. availability, response time) and preferences (e.g. price) are satisfied.

Web Services technologies allow interaction between applications. Sometimes a single service given alone does not meet user's needs. In this case, it is necessary to compose several services to achieve the user's goal. In web service composition, a repository of services is given in that input and output parameters of each service are annotated with a concept from ontology.

Ant colony optimization (ACO) is a population-based meta heuristic which is used to find approximate solutions to difficult optimization problems.

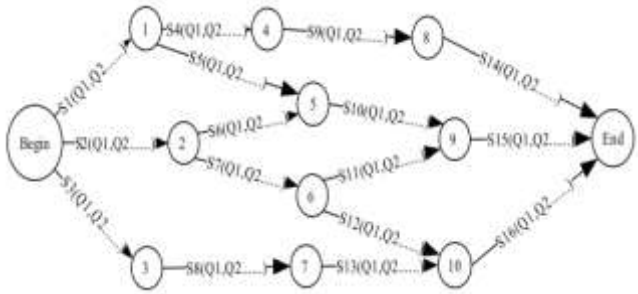
In ACO, a set of software agents called *artificial ants* search for good solutions to a given optimization problem. To apply ACO, the optimization problem is transformed into the problem of finding the best path on a graph. The artificial ants incrementally build solutions by moving on the graph.ACO can be used in many composition optimization fields but there exist inherent limitation like slow conversion and poor performance. There is only one kind of pheromone in ACO, which can't satisfy question of multiple attributes in web services composition.

So, to overcome these disadvantages DACO is put forward to fit for the dynamic services composition optimization and to promote the algorithm's effectiveness. In DACO After a round of optimization, we compare the weights of all paths, only updating the pheromone of the path with maximum pheromone. This proves that the convergence rate and the probability of finding optimization of the DACO have increased greatly.

In previous system graph based model for web service composition is being done and in this QOS parameter can be achieved from users according to their requirement and then we have to apply DACO for dynamic web services composition optimization.

1) Model Building

The services composition graph is one direction and simple connected graph, each path in the graph denotes a complete services composition, each node denotes a services orchestration, each arch represents a service, the beginning point denotes the input of the services composition, and the ending point denotes the output of the service composition.



A service has multiple QOS and each user has different preference weight on each QOS .The preference value of each QOS will be obtained respectively after which the preferences of multiple QoS will be further compounded to express users' preference to this service. Different QoS have different attribute like

'>' attribute, which means that the bigger the QoS value, the greater the preference tendency.

'<' attribute, which means that the smaller the QoS value, the greater the preference tendency.

'=' attribute, which means that the closer the QoS value to the preference constraint value, the greater the preference level

Section attribute means that when the chosen value is in a certain scope, the user will show the preference.

'>' attribute operation: $p_{i=\frac{q_i-l}{range}}$

'<' attribute operation: $p_{i=\frac{l-q_i}{range}}$

Where p_i denotes the preference of q_i ,l is the preference critical value of the user, and *range* is the range of corresponding QoS. '=' attribute operation: if the value is equal to the preference critical value of user, $p_i = 1$,else $p_i = 0$

2)Use of DACO in Dynamic web service composition

There are certain limitation in ACO like convergent to local optimization, slow convergence etc., we use the following improvement rules to improve performance of ACO

1. After round of optimization, by comparing all paths we have to update pheromone of the path with maximum pheromone

2.To avoid prematurity, stagnancy and converging to local optimization of the algorithm we set variable *L* as the optimization path list and *l* as the length of the list. In optimization proceeding, The *l* maximum pheromone paths generated by Comparing with the maximum pheromone path in each round are saved. When the algorithm reaches Maximum round count, we have to compare the maximum Pheromone path with the paths in *L* compute the QoS of the corresponding services again and get the QoS services composition with higher preference as Optimized findings.

II. LITERATURE SURVEY

There are various techniques have been developed for signature verification (SV) and recognition. Here are some suitable approaches and optimized methods are discussed below. This paper characterizes a brief survey of current work on off-line signature verification and recognition system. Different existing approaches are discussed and compared.

1. Feed Forward Method:
The quality of the images is improved by using image processing followed by further extracting certain unique standard statistical features in its feature extraction phase. This output is given as the input to the above proposed NN Model to further improve its decision making capabilities. The performance of the proposed model is evaluated by calculating the fault acceptance and rejection rates for a small set of data. Further possible developments of this model are also outlined [1].

2. Back Propagation Method:
The system is based on the extraction of the characteristics of the neural network and its ability in distinguishing different patterns. Back-propagation algorithm has been specifically used as it provides the flexibility to use any number of layers. In order to test and evaluate the system, a set of 900 signatures were collected from various sources to train the system. The experimental results for the accuracy speed and throughput showed excellent measurements that are comparable to the benchmark algorithms in the domain.

3. Virtual support vector machine:
Offline Signature Verification Using Virtual Support Vector Machines. Support Vector Machines (SVMs) are machine learning algorithms that use a high dimensional feature space and estimate differences between classes of given data to generalize unseen data [1].For virtual support vector machine, the support vectors found during the course of the training of an SVM classifier are sent back to the image processing module to undergo invariant transformation before retraining [6].

A. **Survey Table**

No.	Definition	Technique	Description
1	Offline Signature Verification Using Neural Networks[1]	Feed Forward Neural Network	Unsupervised learning method for verification. Disadvantage is that it works in only one direction
2	Signature Recognition & Verification System Using Back Propagation Neural Network[5]	Back Propagation NN	It works in Both directions. Disadvantage is that it is supervise learning.
3	Off-line Signature Verification with Concentric Squares and slope based Features using Support Vector Machines [6].	Support Vector Machine	It solve multi-class problem, The main task is to find a hyper plane between two classes.
4	Signature Verification Using the Discrete Radon Transform and a Hidden Markov Model [7].	Hidden markov method	Using Local and Global features extracted from the image

III. CONCLUSION
Signature verification becomes an attractive topic for computer vision community. Many researchers do a research in signature verification system to classify signature as valid or forgery. There are two phases for the project. First part is to detect the features from signature images and second part is a classification and verification of signature. There are many methods for signature feature detection and signature verification. The results obtained in signature recognition and verification is not very high and more research on off-line signature verification is required.

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