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Augmenting the SWS Discovery by Categorization of Web Service

[I]Pradeepha.S, [II]Lakshmipathi.B
[I]PG Scholar, [II]Assistant Professor
[I,II]Dept. of CSE, Anna University Regional Centre, Coimbatore, India

Abstract
Semantic web services promises the combination of semantic web with web service technology in order to overcome the limitations of current web services by adding explicit semantics to them. Semantic Webservice technology is to improve the machine to machine interaction via web3.0.It also aims to describe the web Service and its functionalities clearly which facilitates the discovery of services efficiently. Due to the evolution of the technology, the annotations for web Service are semantically defined using the OWL instead of WSDL. Semantic annotation of Web services capabilities with ontological information aims at providing the necessary infrastructure for facilitating efficient and accurate Service discovery. In existing,the discovery mechanism proposed the mapping algorithm for redefining the web Service description in WSDL to OWL-S. The local ontology archive and standardization engine are the prominent part of this algorithm. The objective of both the part is to define any type of data based on ontology concept during mapping. After registering all the available semantic definitions in the "Unclassified Profiles" database perform the classification to make the cluster in the services.But in existing system there is no specific algorithm used for classification,proposed system introduces SVM based classification algorithm to classify the profiles that are derived from the WS to SWS into the database creation phase. Classifying these data into prepared clusters to make the discovery easier and faster.

Keywords
Semantic Web Service, Ontology, WSDL, OWL-S, Classification

I. Introduction
Web services are autonomous, modular applications that are described, published, located, and invoked via network. Discovery of web service[1] is the process of finding the appropriate service from set of available service from centralized or distributed service repository. Service repository is constructed using the advertisement of semantic and non-semantic web services. The service repositorycomprised of service profile which describes the service characteristics. Semantic Web Services[2] technology will enrich and facilitate discovery, composition and collaboration with web services. Semantic Web Services architecture[3] facilitates the process of composing several web services to build a more complex service, while it exposes and perform as one single service to a client agent. In Semantic web, web services are renovated semantically. For this intent, ontologies are used whichprovide the foundation for machine to process able data and allow to exchange information between and machine by both syntactic and semantic means.

A. Conventional WSDL
Basically service description is to express the information required to invoke the service properly .The information in WSDL[4] partitioned into two part :an abstract part, which describes the web service in terms of messages it sends and receives and an concrete part which specifies the details of how to access the particular service. The WSDL description of web service consists of following elements.
Messages: Client agent handles the messages to communicate with service.
Types: Complex data types used in WSDL description.
Port Types:These are similar to interfaces definitions.
Operations: Operations are described by means of messages that are used to call up on them.
Bindings:Bindings define encoding and transport protocol for messages used in operations.
Services: Service insists the end point or location where the operation dwelled on the web.
WSDL[5] lacks the semantic description of meaning of input and output makes it impossible to develop software clients without human intervention, dynamically find and successfully invoke a service. WSDL description of service in XML[6] format must be unravelled by programmers to integrate specific services with its client application. Hence we move on to ontology for service description.

B. Ontology for Web Service
Ontologies[7],[8] play a prominent role in semantic description of web service. They are used to define semantics of terms in various domains. Ontology ensured that the information in any instance of communication is interpreted consistently.

II. Research Background and Objective
With the advancement of Web technology in order to make the web service discovery convenient, description of web service in WSDL is updated to semantically[9]. The semantic web service hallucination is to label the web service capabilities and content in unambiguous computer interpretable language and upgrades the quality of existing tasks such as discovery and invocation. To describe the web service semantically OWL-S[10] is employed. OWL is the Web Ontology Language stands on artificial intelligence knowledge representation work in description logics.
OWL-S[11] is a set of notations for exhibiting such specificationsrest on the semantic web ontology language OWL. It includes three correlated parts:
Service profile: Used to describe what the service does,
Service process model: used to describe how the service is used;
Service grounding: used to describe how to interact with service.
OWL-S can be used to automate variety of service related activities involving service discovery, interoperation and composition.Since the focus is on discovery here the profile is considered. Specially

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the OWL-S profile allow service provider to advertise what their service do, and service requester to specify what capabilities they expect from these service they need to use. Crucially the profile provides explicit definition of those capabilities. By exploiting the structure of OWL-S profiles and their references to OWL concepts, a discovery process can retrieve those services that are most likely to fulfil the requester needs.

III. Proposed System

The main goal of semantic web[12] is to augment theirefficacy by overcoming the complaint in conventional standards is adding the explicit semantics to that is operational and understandable by computer programs. The work proposed analgorithm to map the WSDL file to OWL file. Themapping process consists of two phases. At first WSDL file is processed to extracts the service name, text description and other properties of web services. This all comprises automated phase. Then in manual phase the service precondition and non-functional properties are manually added by service provider which finally gives the owl service profile which is registered and stored in database. This process uses the following components.

A. Local Ontology Archive

The Ontology Archive is built based on the object oriented paradigm.OWLontologyclassesandpropertiesaredefinedasinstancesofappropriatebuilt-inclasses similar to OOP. The main problem is how to insert the new ontology to library and updating the existing ontology are overcome here. The main goal of adding new ontology is to collect two types of data (i) data related to logical structure is called Structure Extraction and (ii) keywords related to new ontology is called Keyword Extraction. Both are concurrent process. In Structure Extraction, data regarding the ontology concepts, properties and their relationships are obtained. In Keyword Extraction, the owl file undergoes tokenization and lemmatization. In tokenization, the text inontology file is separated into numbers, punctuation and words. The process of decreasing the inflectional form and related form word to common words such as is, are => be and colour ,colours => colour. Finally removing the stop words and calculating word frequency.

B. Standardization Engine

The major problem in growth of semantic web is the standardization is how to use ontology concept to define various object data type[13] (i.e.) no mutual exclusion for different definition of same concept and there is same definition for different concept. The standardisation engine uses the temporary ontology file from type converter as input. It includes three stages 1.Linguistic search 2. Structural refining and 3. Statistical refining which gives the list of ordered ontologies as output.

1. Linguistic Search

In this stage, it extracts the keywords. Then it finds all synonyms and related words to increase the list which uses the WordNet[14]. The ontology list for all important keywords is obtained. Here local Ontology archive is utilized to choose the ontology for extracted words.

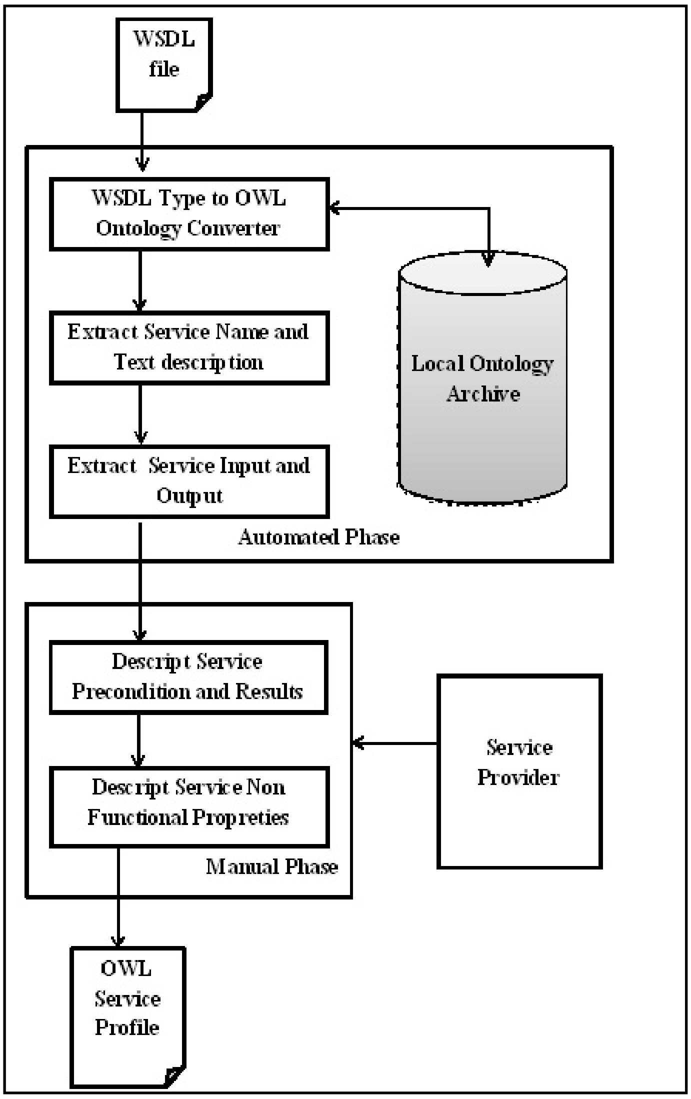

Fig. 1: Mapping Process

2. Structural Refining

Standardization engine perform structural refining by examining the each ontology in the list to find the concept related to the required concept. If does not find concept related then it remove that particular ontology from list.It relies on the data concerning the logical structure. The relationship between obtainedconcept 'C_o' and required concept C_r is follows,

- Identical: same properties for C_0 and C_r.
- Super: C_o is the parent of C_r.
- Sub: C_o is the child of C_r.
- Neighbour: Co and Cr share some common properties.

The engine looks for any of the relation and ranks the ontology based on the relation where Identical have highest rank followed by super,sub and neighbour.

3. Statistical Refining

The reordered list from structural refining further undergo statistical refining which uses the concept mapping history which consist of mostly used ontology and its concepts. If two ontologies having the same rank are refined and reordered at this stage. Finally the ranked ontology list is given to service provider to choose the optimal ontology.

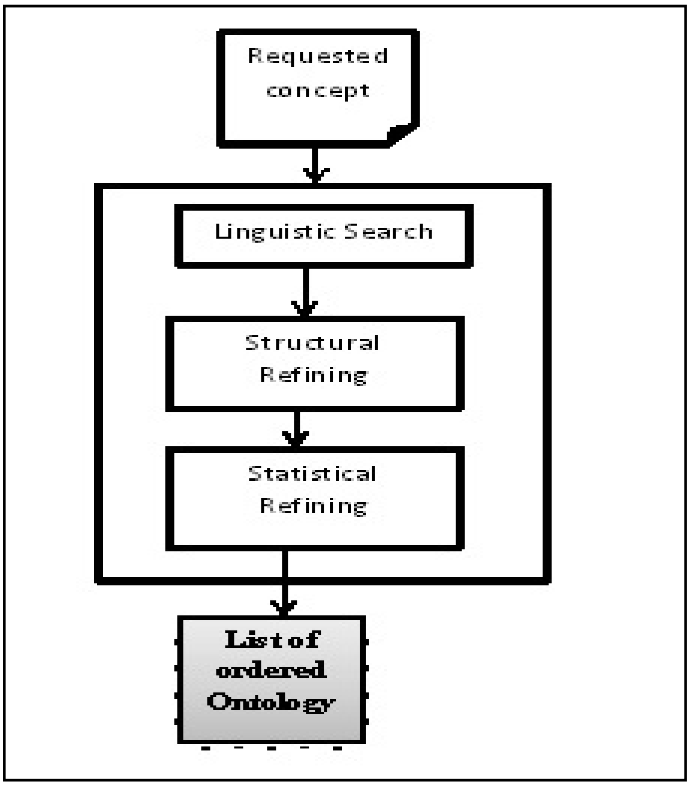

Fig. 2: Standardization Engine

C. Type Converter
Type Converter is the most vital component of mapping process which converts the WSDL types to OWL concepts. There are two XSD types such as primitive (string, integer, and char) and complex type. The Primitive types are used for service modelling directly. The complex types are converted to ontology concepts. For each complex type the temporary file is created which contains the ontology concepts and its properties. The temporary file is given as input to standardization engine which give back the possible ontology list withcorresponding rank.

D. SVM Classification
Support Vector Machine is a learning algorithm based on structural risk minimization. For a given training samples SVM classifier finds the optimal hyper planethat correctly separate the largest fraction of data points while maximizing the distance of either class from hyper plane the desirable feature of the SVM is that the number of training points which are retained as support vectors is usually quite small thus providing a compact Classifiers.

The SVM classification is a supervised learning that uses training set with preclassified set of documents. This creates a model which is further used to predict the class of services to which it belongs. For each service an ordered list of classes may obtain and the service is designated as particular class having highest likelihood to which it belongs. Support vector machines are less prone to problems of over fitting.

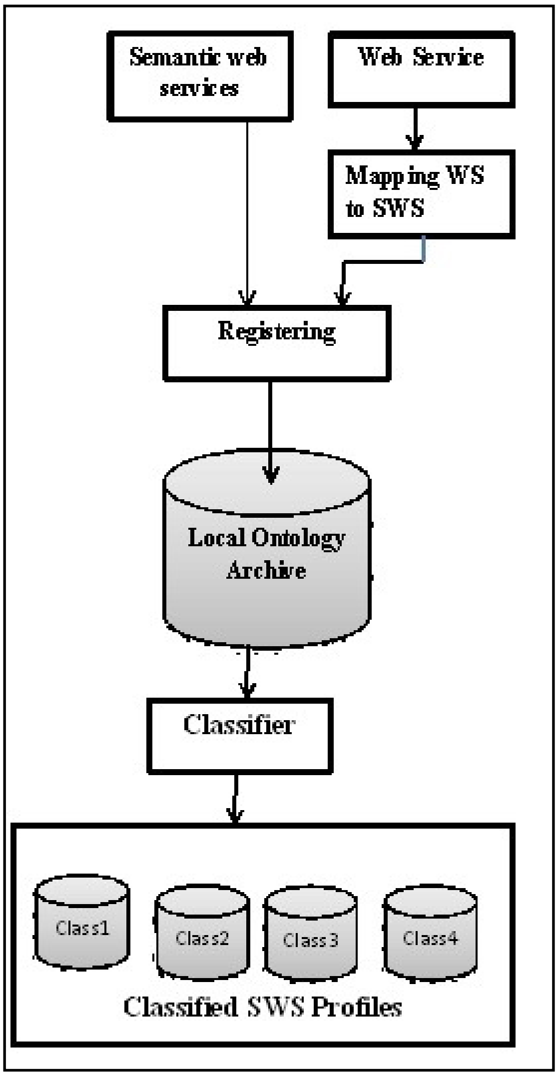

Fig 3: Overall Process

IV. Conclusion
This paper covers the new approach for classifying the profile of the web services which are semantically defined. It increases the efficiency and accuracy of discovery process. The future work should concerns the including other form of web service file such as WSMO, WSDL-S and implementing the further components of discovery mechanisms.

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S.Pradeephareceived B.Tech degree from Department of Information Technology in Kalasalingam University, Virudhunagar, India.She is currently pursuing M.E Computer Science and Engineering in Anna University Regional Centre, Coimbatore.

B.Lakshmipathireceived Diploma in Computer Technology, B.E in Computer Science and Engineering from Crescent Engineering College, Chennai and M.E in Computer Science and Engineering from Sathyabama College of Engineering, Chennai, India. He is pursuing Ph.D in Computer Science and Engineering in Anna University, Regional Centre, and Coimbatore. Currently, He is Assistant Professor in Department of Computer Science and Engineering, Anna University Regional Centre, Coimbatore. His research interests are in Data Mining, Artificial Intelligence, Formal Language and Automata Theory.