An Efficient Semantic Web Through Semantic Mapping

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Abstract:
The outgrowth of web usage leads to the expectation of faster and easier access of web resources. Experts and even naïve users wish to have more advanced features on search schemes to acquire accurate results within a short time span. Semantic web can bring this expectation to real practice. To bring Semantic web in true, efficient Semantic Mapping is must. In this paper, a novel Two step Semantic Mapping algorithm and few related Semantic Mapping schemes are detailed with their functions and features. It helps one to acquire more knowledge on Semantic Mapping of concepts.

Keywords: Semantic web, WSDL,DAML-S,OWL-S.

1. Introduction

The Semantic web depends with machine interaction to acquire accuracy over information retrieval. The Conventional web resources includes syntactic discovery which could bring out related results not the relevant results. Thus it remains less efficient and needs an upgrade to the Semantic web. The Web 2.0 is termed for Conventional web today. To switch over web 3.0 (i.e) the Semantic web, a transition from WSDL (Web service description files) to OWL-S (Web Ontology Language for Services) files is must. This mode of transition is termed as Semantic Mapping of Concepts.

1.1 Mode of Semantic Mapping

The semantic mapping of concepts focuses towards the evolution of web 3.0 and the redefinition of conventional web resources in an efficient way. The ultimate goal of Semantic web is to bring an efficient Search scheme for retrieving related results. A novel Search discovery algorithm is must to be implemented for enabling the Semantic discovery of concepts.

To enhance the performance of this Search scheme, the conventional web services are mapped to Semantic web services. The Semantically mapped concepts are grouped into standard categories for enabling easier retrieval. On enabling rich semantics to the web resources through use of Web Ontology Language Services (OWL-S), the machine interoperability to understand the user's intention on information retrieval is enhanced.The Conventional Web services are prevalently XML based web services and it doesn't support efficient Automation of Web Services. The Automation of web services includes enhancing better mode of Discovery and Composition. The different modes of Discovery are Syntactic and Semantic Discovery. The Syntactic Discovery offers only Keyword based search Schemes.

The WSDL services that exist with the current web services provide only syntactic description of Data [1]. It analyses the supplied request from the user and finds a specific service based on the syntactical equivalence of input and output names. In Semantic Discovery, directory of Services be compiled which includes the ontological description for every service. It finds the suitable matching service from the compiled directory of services upon analyzing the user's requests.

2. Common Features Of Existing Semantic Mapping Tools

In semantic discovery, directory of Services be compiled which includes the ontological description for every service. The basic concepts on ontology modeling and various measures on extraction and matching of ontological concepts is shown. The different approaches on semantic mapping [2],[3],[4] applied are compared in the following Table 1.

Table 1. Common factors among the Semantic Mapping Approaches.

FEATURES	ASSAM	METEOR-S	WSDL TO DAML-S
Mapping Algorithm	Mapping the WSDL services using OWL-S are focused on Classification .	Mapping based on DAML-S ontologies.	Semantic mapping of concepts using DAML-S Annotations
Schemes on Classification	Using Iterative Relational Classifiers.	Use of Machine Learning Approach.	No Classification Schemes.
Support for Automation.	An Automated Tool for creating Semantic Data.	A Semi-Automated through use of schema matching.	An Automated Tool brings out Partial DAML-S file.
Standardized Concepts	Standardized concepts are absent.	Standardized concepts are absent.	Standardization of concepts is absent.
Performance Evaluation	Using Distance based Metrics.	Using Similarity Measures.	Using Edge base Metrics.

3. Semantic Mapping Algorithm

The Semantic Mapping of Concepts can be achieved through mapping the WSDL files into their corresponding OWL-S files. The DAML-S formats are earlier Semantic descriptions. The OWL-S supports more automation on complete generation of Information. Hence, it is more prevalent. The following Section details the sequences of Mapping in a two step Semantic Mapping algorithm over the WSDL and OWL-S files.

3.1 Two step Semantic Mapping Algorithm

The 'Semantics' is a sense of meaning which is added to the conventional web. It brings machine understanding and achieves more efficiency on information retrieval. This novel Semantic mapping algorithm includes a mapping process that maps the WSDL descriptions into upper ontologies called OWL-S. Normally the WSDL files are acquired from the Service Providers. Here, the WSDL descriptions are obtained from certain freely available web service sites. Those websites act like a repository for web services which can be applied for the Specified applications on research work.

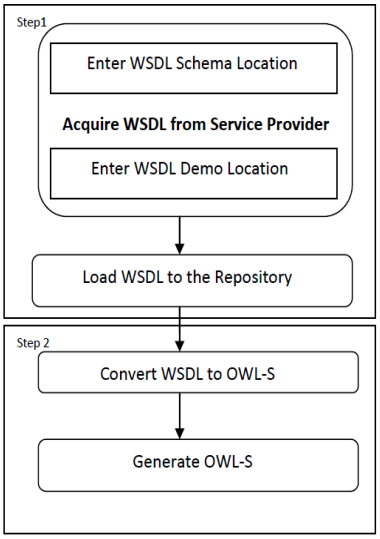

Fig.1: Mapping of WSDL to OWL-S

The Semantic Mapping Algorithm includes three main phases as (i) Loading WSDL file, (ii) Conversion using WSDL to OWL-S mapping and (iii) Generation of OWL-S files. The Mapping phase begins

at the stage of acquiring WSDL files as input from the service providers. As shown in Fig.1 the WSDL files are acquired from the freely available host websites through specifying the WSDL Demo and WSDL Schema locations of those WSDL files. On specifying the locations of the WSDL Schema, the WSDL descriptions are added to the repository and maintained as the input for mapping process. The WSDL files are converted to OWL-S through the conversion function using WSDL Translator.

3.2 WSDL to OWL-S Mapping

The Conversion function admits WSDL files into WSDL Translator for type conversion. This WSDL Translator is responsible for converting WSDL types into OWL format. In general, the WSDL components are of two types either Abstract definition or Concrete definition. The message and operation parts of WSDL Abstract definition are mapped into Service Information of OWL-S files. The Atomic process and Input-outputs of OWL-S comprises the Service Profile Information of OWL-S Files. The Service Profile Information helps to identify the type of Service, [6].

The Loading and mapping of abstract parts of WSDL components into OWL-S Components are clearly shown below with the following Fig.2. The mapping process shown in this algorithm is a simple process through use of WSDL Translator. The WSDL files are acquired from the Service Providers and the admitted to conversion function for mapping. Hence, this two phases leads to generation of OWL-S Files.

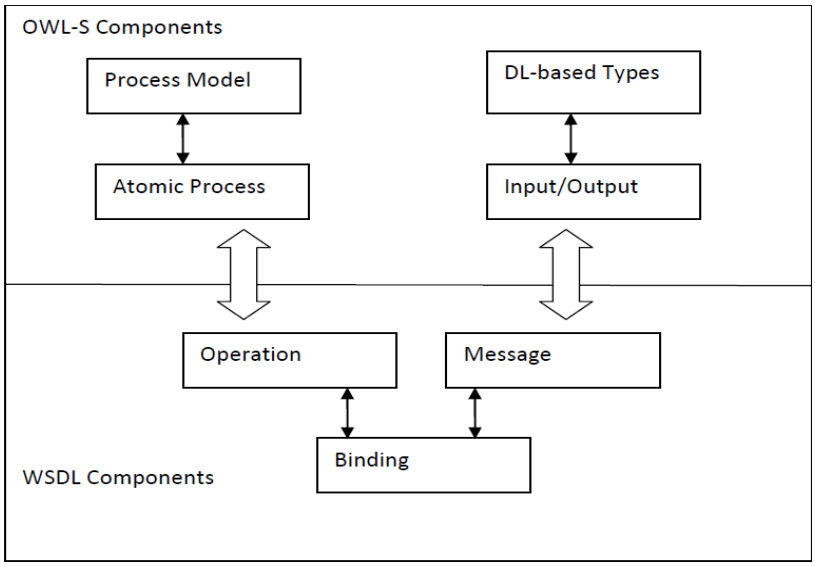

Fig.2: WSDL to OWL-S Mapping

The existing mapping schemes depend with schema matching and standardization before mapping. Though these schemes prove efficient, it leads to more time consumption due to lack of Standardization,[5]. However, the Standardization of mapping is more important and this proposed mapping algorithm extends further to add classification over the mapped web services in the enhancement work. A Simple Classification scheme can be applied to group the web services, which could achieve more efficiency on higher speed over information retrieval. This Simple Mapping Algorithm could achieve redefinition of Conventional web resources into Semantic Definitions with less time consumption and Efficiency on Information processing can be improved through adding a Classification scheme.

The Binding part of WSDL specifies the interface and style of SOAP binding. The Operation part specifies the type of Function being carried with the Web service. On mapping these concepts to Service Information, the OWL-S file is generated and added to the repository. Thus three phases of this Mapping algorithm could achieve redefinition of web 2.0.

4. Results

The following section shows the results for Semantic Mapping of Concepts. The admitted Web service description language files (WSDL) for semantic mapping undergoes two step of Semantic mapping phase. The Message parts of WSDL file be mapped into Grounding part of OWL-S file. The Operation parts of WSDL file be traced into Service Profile Information of OWL-S File.

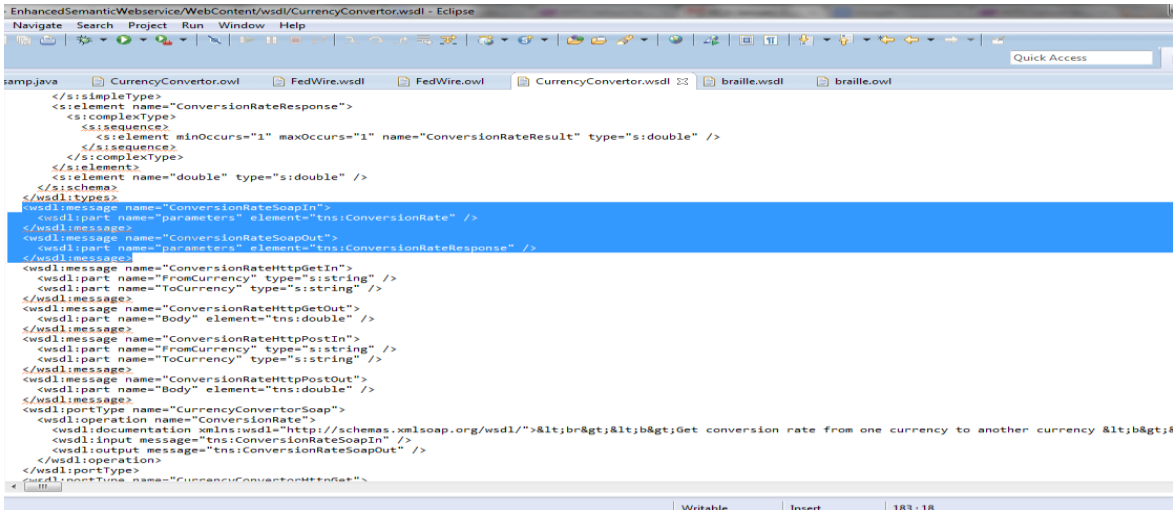

Fig 3.Message part in WSDL

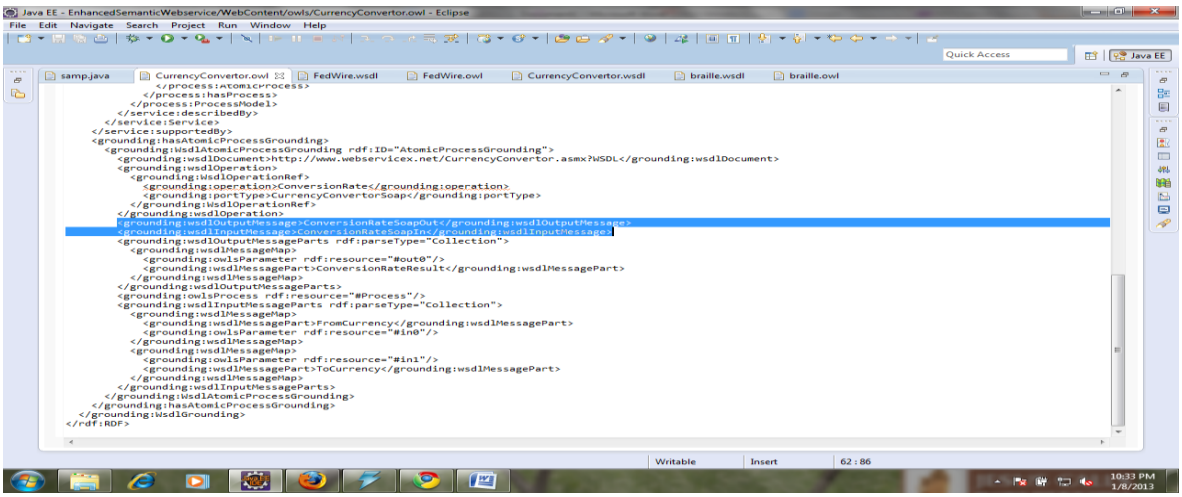

Fig 4. Grounding in OWL-S

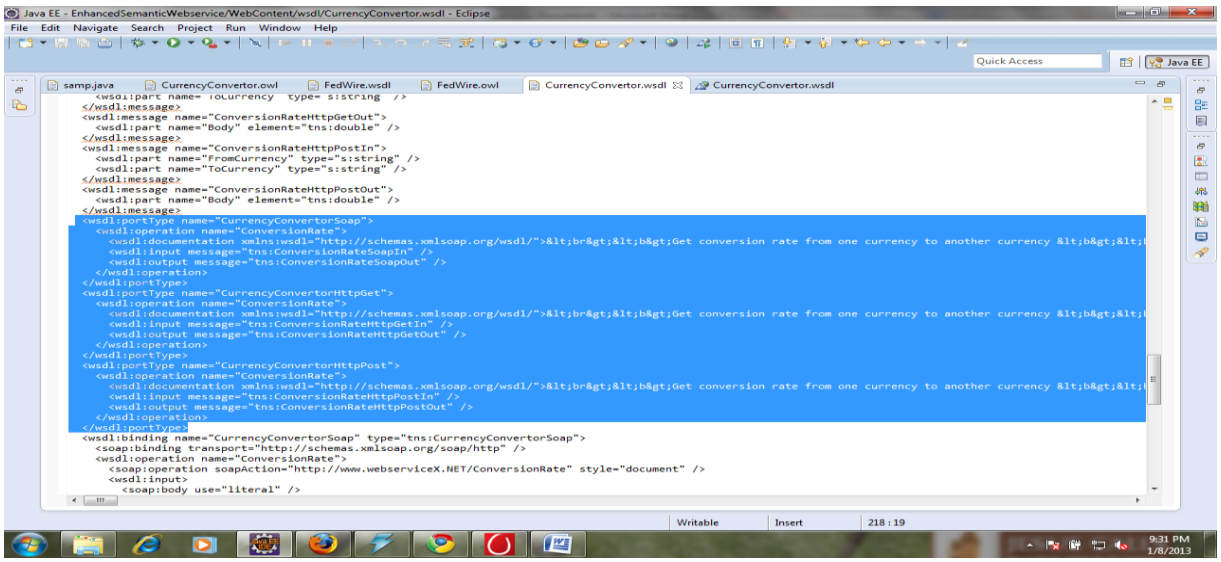

Fig 5. Operations in WSDL

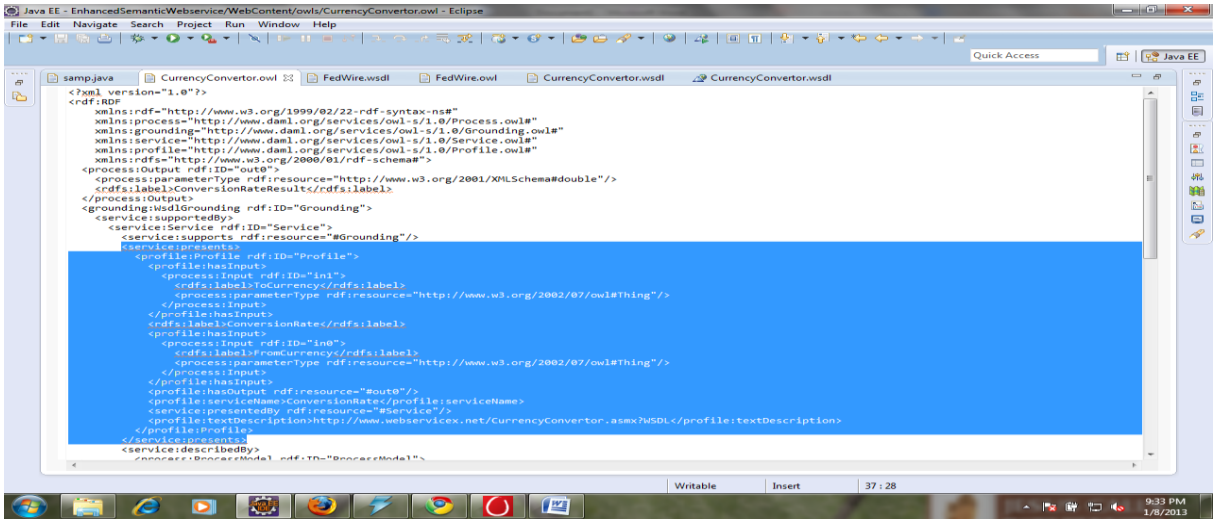

Fig 6. Service Profile in OWL-S

6. Conclusion

The semantic web is a dynamic field with enhanced approaches evolving everyday. It steps more higher on bringing a best model of Search. This paper proposes a novel scheme of mapping to generate semantic descriptions from the WSDL files. The special feature of this mapping algorithm is the simple automated mapping scheme with reduced time span. However, this mapping scheme can be made more efficient through addition of classification schemes for standardization.

References

[1]. Web Services Description Lang.,W3C,2001,Online: http://www.w3.org/TR/wsdl

[2]. Andreas Heß, Eddie Johnston and Nicholas Kushmerick, "ASSAM: A Tool for Semi-Automatically Annotating Semantic Web Services", 12th International Conference on Web Technologies, pages 470–475,2008

[3]. Abhijit A. Patil, Swapna A. Oundhakar, Amit P. Shethand Kunal Verma, "METEOR-S Web Services annotation framework", proceedings of the 13th international conference on WWW.ACM Press, 2004.

[4]. Massimo Paolucci, Naveen Srinivasan, Katia Sycara, Takuya Nishimura, "Towards a Semantic Choreography of Web Services: from WSDL to DAML-S", In Proceedings of the First International Conference on Web Services (ICWS'03), Las Vegas, Nevada, USA, pp 22-26, June 2003.

[5]. Tamer A. Farrag, A. I. Saleh and H. A. Ali," Towards SWSs discovery: mapping from WSDL to OWL-S based on ontology search and standardization engine", IEEE Transactions on Knowledge and Data Engineering,2012.

[6] Web ontology language for services W3CMemberSubmission,2004,Online:http://www.w3.org/Submission/OWL-S/