

Isomorphic Model based Verification of Semantic Web Service Annotation of Ontology Annotations

N.Sathish , M.Karthikeyan

Abstract— Semantic annotation is the process based on ontology annotation concept class, attribute and other metadata for cyber source and its various parts. Ontology mapping is to calculate the similarity between two ontology elements. Ontology merging is two or more source ontology merging into a goal Ontology. The basic principle of the concept lattice isomorphic generating is isomorphic to the background of the isomorphic concept lattice, and as concept lattice isomorphic background can generate the concept lattice. This paper analyzes the methods of ontology mapping and merging based on rough concept lattice isomorphic model and presents semantic annotation of ontology by using rough concept lattice isomorphic model. Experiments show that this method is better than the traditional method in semantic annotation accuracy and breadth.

Index Terms— Rough concept lattice; Ontology mapping; Ontology merging; Semantic annotation; Isomorphic model

I. INTRODUCTION

Ontology mapping is the key technology to solve the information exchange between heterogeneous and distributed ontologies, ontology mapping is to calculate the similarity between ontology elements on the two elements, the similarity between ontology instances, and the definition of ontology and ontology rules or constraints, so the mapping method is also divided into methods, with the ontology structure and examples correlation and related methods and fields.

Ontology mapping language is used to represent the ontology mapping in M language. Similar in different substantive norms, the mapping language is important [1]. Here said the entity (entities) refers to the ontology itself and a real ontology mapping. Although an ontology mapping truly illustrates the relationship between ontology entities, ontology similarity of common standards for substantial similarity credibility to characterize (usually in 0 to 1 between the values). This is a typical precise specification; simple measurement of similarity is more powerful than it.

Ontology merging is two or more source ontology merging into a goal. For ontology merging, the use of traditional editing tools for manual and time-consuming and laborious, but also prone to error. According to the traditional theory, the

usual method ontology integration can be divided into manual, semi-automatic and automatic method. Although artificial ontology fusion accuracy is higher, but time-consuming, so the industry is looking for semi automatic and automatic solutions. The working principle of automatic method basically is with semantic knowledge and text similarity calculation as the foundation, by calculating the concept similarity and similarity to achieve integration of original instance.

Semantic annotation is the process based on ontology annotation concept class, attribute and other metadata for cyber source and each part, is the foundation of semantic inference. Semantic annotation of the input is to be annotated document and Ontology (ontology is domain ontology user defined and can also be an upper ontology general), the output is the result of semantic description of the document, namely semantic content of Semantic Content. Add semantic information in the traditional Web, the Web state from machine readable to machine understandable, is the basis for the realization of the semantic Web. The development of semantic annotation technology will promote the practical application of semantic Web. This paper presents research on semantic annotation based on ontology mapping and merge.

II. ONTOLOGY MAPPING AND MERGING BASED ON ROUGH CONCEPT LATTICE ISOMORPHIC MODEL

In the study of domain ontology construction, ontology based on UNSPSC core, on the one hand into the field of expert knowledge, on the other hand, considering the existing of structured and unstructured data (relational database, business forms, access log etc.), the model building method semi automatic extension of the core ontology. In the research of ontology mapping, the rough concept lattice model research, introducing the trapezoid fuzzy number similarity calculation of Complex Multi Strategy between ontology concepts, early focus on previous achievements on similarity in fuzzy decision problems, and the purpose is to improve the matching effect.

Ontology merging method based on rough concept lattice isomorphic generating: its core technology is to be merged ontology into attribute order independent semantic ontology background block number less, according to the similarity between the positioning module to module, according to the word UNSPSC in the hierarchy to ontology merging module.

Dr.N.Sathish , HOD/Information Technology, Mahendra College of Engineering, Salem, India

M.Karthikeyan , Department of Information Technology, Mahendra College of Engineering, Salem, India

A. Research on Rough Concept Lattice Isomorphic Model

The basic principle of the concept lattice isomorphic generating basis is isomorphic to the background of the concept lattice is isomorphic, i.e. based on concept lattice isomorphic background can generate new concept lattice. The method requires the presence of homogeneous background, must the system as background, the isomorphism identification become the core problem of this method is to consider, therefore, the variable precision rough reduction of formal context, analysis the isomorphic model based on rough formal context.

Concept lattice and rough set is analyzed and processed two powerful tools for data mining, this project will be the reduction in variable precision rough set of β , distribution reduction method is applied in the form of background, proposes to construct the concept lattice model based on variable precision rough set [2]. Its core idea is the variable precision rough set strong ability on attribute reduction for the reduction of concept lattice, which enhances the number of nodes in concept lattice generated is greatly reduced, the robustness of the system and the ability of resisting noise.

B. Analysis of Ontology Mapping based on Concept Similarity

Ontology mapping (ontology mapping): an ontology mapping M is a set of two OS Ontology (ontology) and OT (target ontology) (released) semantic overlap between specifications. This mapping can be unidirectional or bidirectional. In an injective mapping rules and it is how to use OS in terms of the expression of OT in terms. In an injective mapping, the expression of OT in terms of the OS in the use of terminology, and can act in a diametrically opposite way.

This paper introduced the trapezoidal fuzzy numbers fuzzy similarity, put forward the distribution mapping method, combined with attribute and Multi Strategy at the same time, in order to improve the effect of sample space mapping by using variable precision rough set model fitting attribute deletion.

Ontology mapping / fusion (Specifying Mapping/Merging) is found between ontology (potential) similarities, mappings between ontology need to be specified. The formulation of the standard is usually rely on manually, but can be by PROMPT tools. For example, come up with specific suggestions for fusion operation, so that in many operations, the user only need to say "executive" can, instead of having to explain the complete operation. Do not have to spend time mapping between them in the calculation, if the two ontology is only a part of the described in the field, it only needs to establish mapping relations between relevant parts.

The similarity between ontology concepts, needs many ontology model in the complex feature information into consideration, and the method of fuzzy similarity to the said, according to the characteristics of different information will be a series of expressed by different types of fuzzy similarity calculation between results obtained, these intermediate results need to be unified fuzzy similarity definition and description

method, the fuzzy similarity in different types of calculation indicates that the intermediate results are transformed into fuzzy similarity unity, then the comprehensive weighted, non fuzzy operation, finally get the composite similarity between concepts of heterogeneous based mapping strategy is mainly based on the semantic similarity. Similarity between ontology and the element name (using Word Net as the vocabulary, the edit distance calculation of the two words in the dictionary to calculate semantic similarity); structure based mapping strategy, the main idea is that adjacent nodes two concept node is similar, they also tend to be similar, the similarity flooding algorithm to calculate similarity of ontology elements in the structure; example based mapping strategy is to calculate the similarity between ontology elements examples from the perspective of text types, properties of the naive Bias classifier to calculate the similarity, the attribute value types using KL distance the similarity calculation, categorical attributes (properties with two or more than two attribute values) using mutual information to compute similarity.

In this paper, using the characteristics of rough set and concept similarity algorithm was improved on the existing ontology mapping approaches combined with semantic attributes and objects, the concept of attribute similarity in semantic, analyzed the properties of ontology representation and similarity method; then do further processing of the form background with the improved algorithm, the to retain the information more complete; the corresponding extension of the connotation of the concept of similarity to measure the similarity between ontology concepts.

III. SEMANTIC ANNOTATION BASED ON ROUGH CONCEPT LATTICE MODEL

Semantic Web, semantic Web content generation machine understandable semantic annotation and become a hot research field in. In the context of the semantic Web, many scholars are defined from different angles on the semantic annotation. From the perspective of ontology, semantic annotation is the ontology based metadata; semantic annotation based on Web content of the semantic category and semantic category relationship ontology based on semantic tagging is described; the Web content annotation ontology information.

Manual annotation as the name suggests is a specialized personnel as the core of tagging, tagging is determined using what kind of ontology personnel needs, how to parse Webpage content structure, choice of metadata elements, a semantic data RDF or HTML language tag. Manual annotation is intelligence intensive and labor -intensive process, only suitable for small range of Webpage annotation, facing the vast sea, changing cyber source, manual annotation is difficult to it. The manual annotation accuracy is generally higher than the automatic annotation, because, manual annotation is completed by the familiar ontology and professional knowledge.

From a labeled object is currently research focus in image semantic annotation method, annotation, semantic information of multimedia Web data annotation method; the first design of

an ontology based knowledge management system, it can be on the cognitive map labeling, and put forward an ontology knowledge map framework, shared cognitive map collaborative tagging. By using ontology cognitive map warehouse; then using extended ontology, especially the OWL-S service ontology, semantic annotation to solve problems; finally, the automatic induction of semantic role labeling methods projection to overall framework Tagging Based on this framework, using syntactic and semantic information model, some contents which is semantic annotation it.

The field of document type definition (DTD) and document model of concept mapping and tagging. Because the DTD or Schema defines the document content structure and the content of element SGML and XML documents, we can establish mapping between certain concepts and specific DTD / Schema, which will automatically SGML / XML documentation for the DTD / Schema content element tags into the corresponding concept of metadata annotation. But due to the DTD / Schema application field and its architecture are often not coordinated is not compatible, so it is difficult to accurately map, also need to manually review and revise. The Semantic annotation based on ontology mapping and merging Structure diagram is shown by Figure 1 [9].

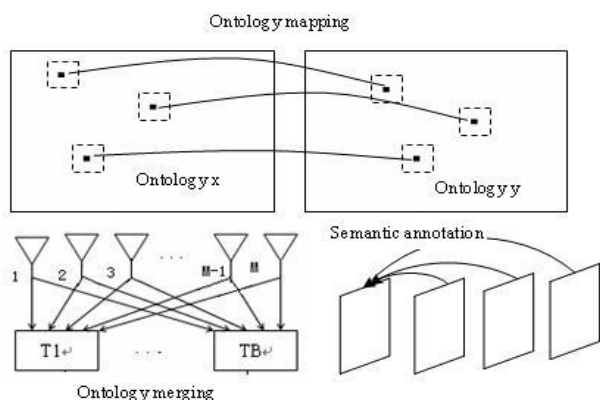


Fig.1 Semantic Annotation based on Ontology Mapping and Merging Structure Diagram

Existing problems: in the aspect of semantic annotation, supervision system need to learn from user labeled examples, but collect enough training examples is a very difficult task, unsupervised system uses a multi strategy learning how to mark, but its accuracy is limited.

In the semantic Web, Webpage and annotation information should be stored separately, because Webpage and annotation information belonging to different individuals or organizations, are put in different places. So the system uses storage method of philosophy knowledge engineering marking information, the tagging information and the original separation, which can not only share the annotation information, convenient document and annotation information updates, and provide the foundation for semantic retrieval. If the annotation information, this paper uses three tuple: (R, D, O) , B represents Webpage resources, D represents the ontology, E represents the concept ontology.

Semantic concept lattice model annotation will mark problems as classification problems based on the use of statistical learning methods, (such as: support vector machine Support Vector Machines (SVMs), concept lattice, etc.) to learn annotation model. The rough concept lattice is as an example to introduce the classification model team.

Automatic semantic annotation main thought origin of the information extraction technology, realize the automation mode can be divided into four categories. The most basic way is to use the hand crafted rules or wrapper to capture and annotation information corresponding to the model. To realize the tagging research includes two kinds of annotation system through learning: supervised and unsupervised system. A supervised system marking information learning from user labeled examples. But for the supervised method, collect enough training examples, construct the set of training examples is a difficult task. Semantic annotation based on rough concept lattice model is as be shown by Figure 2.

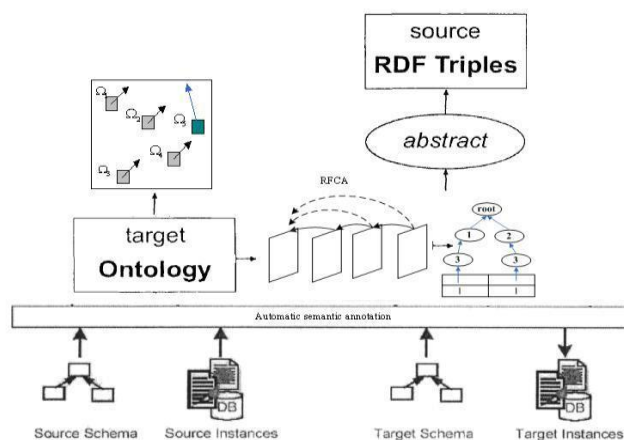


Fig.2 Semantic Annotation based on Rough Concept Lattice Model

IV. EXPERIMENTS AND ANALYSIS

This paper chose to test under closed conditions, data we used CoNNL 2012 as training, provide development and test set, the acquisition of electronic commerce a portal through the web crawler (website includes concept and various electronic commerce example) containing detailed product information and the corresponding web portal web site. In order to reflect the layout structure of an HTML document complex and rich in content characteristics, this paper extracted from sites with data. In the sample data set, the corresponding Ontology Conceptual HTML files, calculate 9 indices of each group Webpage, ingredients to portal Webpage with products and the corresponding Webpage.

The experimental hardware environment: Pentium (R) 4 CPU2.40GHz, memory 2GB; The experimental software environment: operating system using Windows 7, the algorithm is realized by Java language, running in the JDK1.6 environment, development platform using IBM's Eclipse open-source software, server using Bea, WebLogic10, and database system for SQL Server2008.

In order to eliminate the syntactic analysis and accuracy of the identification center word tagging, the effects on the

semantic, syntactic provide rough concept lattice isomorphic model dependencies and the center for the word semantic annotation based on the experimental results, as shown below.

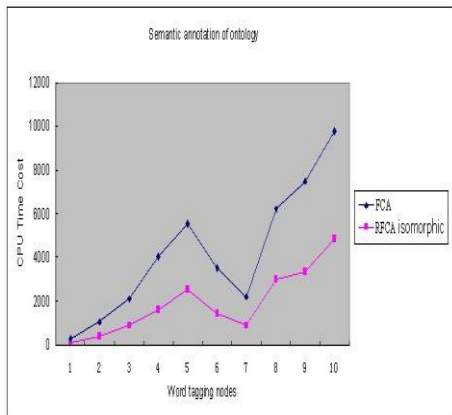


Fig.3 Experimental Results

V. CONCLUSION

We can see from the experimental results, the rough concept lattice isomorphic model semantic annotation relative to the concept lattice model is improved based on, mainly reflected in the annotation on the relationship between semantic roles of internal structure; to avoid the formal concept analysis model will cause the syntactic structure tree splitting process of semantic role deletion. Semantic role labeling coarse lattice isomorphic model with respect to the accuracy of the concept lattice model based on semantic annotation is improved, by introducing the support vector machine (T), according to the F function importance evaluation time adjustment support, then based on the SVM function $f(T)$ score improved proposed similarity between users, from the experiment can be proved, linear classifier is obtained by maximizing the concept lattice is isomorphic with minimal generalization error. Linear SVM through the kernel function (such as: Gauss or polynomial kernel function) is extended to obtain nonlinear SVM considering influence of grammar and syntax of the user similarity, semantic is superior to the traditional in terms of accuracy of the labeling algorithm.

REFERENCES

- [1] C.-C. Yeh, D.-J. Chi and M.-F. Hsu, "A hybrid approach of DEA, rough set and support vector machines for business failure prediction", *Expert Systems with Applications*, vol. 37, no. 2, (2010), pp. 1535-1541.
- [2] C. Calero, F. Ruiz and A. Baroni, "An ontological approach to describe the SQL: object-re-lational features", *Computer Standards & Interfaces*, vol. 28, (2006), pp. 695-713.
- [3] R. Navigli, Velardip and A. Gangemi, "Ontology learning and its application to automated terminology translation", *IEEE Intelligent Systems*, vol. 18, no. 1, (2003), pp. 22-31.
- [4] H.-s. Xu, X.-j. Shen and Z.-t. Liu, "Construction and Presentation of Ontology on Semantic Web Based on Formal Concept", *Journal of Computer science*, vol. 34, no. 2, (2007), pp. 171-174.
- [5] J. J. Jung, "Reusing ontology mappings for query routing in semantic peer-to-peer environment", *Information Sciences*, vol. 180, (2010), pp. 3248-3257
- [6] L-D. Wang and X-D Liu, "Concept analysis via rough set and AFS algebra", *Information Sciences*, vol. 178, no. 21, (2008), pp. 4125-4137.

- [7] A. Maedche and S. Staab, "Ontology Learning for the Semantic Web Special Issue on the Semantic Web", *IEEE Intelligent System*, vol. 16, no. 2, (2001), pp. 72-79.
- [8] H.-s. Xu and R.-l. Zhang, "Application of ART and concept similarity in E-commerce recommendation systems", *Journal of Computer engineering and Applications*, vol. 46, no. 7, (2010), pp. 213-217.
- [9] Y. Y. Yao, "Concept lattices in rough set theory", In: *Proceedings of 23rd International Meeting of the North American Fuzzy Information Processing Society*, (2004).
- [10] R.-l. Zhang and H.-s. Xu, "Building and mapping ontology of e-business based on fuzzy rough concept lattices", *Journal of Convergence Information Technology*, vol. 6, no. 9, (2011), pp. 81-88.
- [11] J. J. Jason, "Ontology mapping composition for query transformation on distributed environments", *Expert Systems with Applications*, vol. 37, no. 12, (2010), pp. 8401-8405.