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RESEARCH ARTICLE

A STUDY ON INTERROGATION SYSTEM FOR GEORESOURCE USING RESOURCE DESCRIPTION FRAMEWORK

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Abstract- Ontology's use standard machine-readable languages to explicitly define the formal semantics of concepts and their relationships in a domain. Resource Description framework for interrogation system will require the domain expert knowledge and data owner authentication as well as the appropriate ontology prediction. For Spatial Data Ontology based information retrieval will be complex due to the nature of ontology. So the new mechanism is proposed for the ontology frame work for geo-spatial data's. For this one, the resource description Framework (RDF) ontology for accessing the geo spatial data. Due to the complexity of RDF access, the application of N-Triple algorithm for Convert the RDF data's in to the subject, Object, Predicates is applied. This will improve the accuracy of the Information retrieval from the both domain expert and the data owners based on flexible query from user.

Index Terms- Resource Description Framework (RDF); Ontology; Ontology Web Language (OWL)

1. INTRODUCTION

An interactive search provides a better way of dealing with uncertainty in geographical search. Instead of providing a pre-calculated route, the route can be gradually constructed while taking into account, in each step, the possibility of a positive or a negative feedback. Query evaluation is hard because the number of possible feedback scenarios is exponential in the number of entities.

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It begins with the goal of finding the shortest interactive route taking into account constraints on the order by which the entities may be visited. It then extends the solution to find the fastest interactive route, taking into account temporal constraints on the candidate geographical entities. Ontologies use standard machine-readable languages to explicitly define the formal semantics of concepts and their relationships in a domain.

The RDF data model is similar to classic conceptual modeling approaches such as entity–relationship or class diagrams, as it is based upon the idea of making statements about resources (in particular web resources) in the form of subject-predicate-object expressions. These expressions are known as triples in RDF terminology. The subject denotes the resource, and the predicate denotes traits or aspects of the resource and expresses a relationship between the subject and the object. For example, one way to represent the notion "The sky has the color blue" in RDF is as the triple: a subject denoting "the sky", a predicate denoting "has the color", and an object denoting "blue". Therefore RDF swaps object for subject that would be used in the classical notation of an entity–attribute–value model within object-oriented design; object (sky), attribute (color) and value (blue). RDF is an abstract model with several serialization formats (i.e., file formats), and so the particular way in which a resource or triple is encoded varies from format to format.

This mechanism for describing resources is a major component in the W3C's Semantic Web activity: an evolutionary stage of the World Wide Web in which automated software can store, exchange, and use machine-readable information distributed throughout the Web, in turn enabling users to deal with the information with greater efficiency and certainty. RDF's simple data model and ability to model disparate, abstract concepts has also led to its increasing use in knowledge management applications unrelated to Semantic Web activity.

A collection of RDF statements intrinsically represents a labeled, directed multi-graph. As such, an RDF-based data model is more naturally suited to certain kinds of representation than the relational model and other ontological models. However, in practice, RDF data is often persisted in relational database or native representations also called Triple stores, or Quad stores if context (i.e. the named graph) is also persisted for each RDF triple. As RDFS and OWL demonstrate, one can build additional ontology languages upon RDF.

RDF is being used to have a better understanding of road traffic patterns. This is because the information regarding traffic patterns is on different websites, and RDF is used to integrate information from different sources on the web. Before, the common methodology was using keyword searching, but this method is problematic because it does not consider synonyms. This is why ontologies are useful in this situation.

Ontologies use standard machine-readable languages to explicitly define the formal semantics of concepts and their relationships in a domain. Ontologies can be considered semantic reference systems that allow humans and machines to share common definitions for semantic interoperability and knowledge inference. For example, the terms used to describe GI services can be referred to using the same definitions as those in the ontologies for semantic interoperability, and the worktops used to solve geospatial problems can be conceptualized in ontologies for knowledge reference, re-use, and inference.

The Web Ontology Language (OWL) is a standard ontology language that is recommended by the World Wide Web Consortium (W3C). The basic elements of OWL include individuals, classes, and properties (i.e., relationships). Individuals represent real instances in a domain, whereas classes represent collections of individuals of the same type. Properties are binary and directional links that connect individuals from one class (called the property domain) to another (called the property range). The properties can be classified on the basis of this range into object (i.e., link individuals) and data-type (i.e., link an individual to an XML schema data type; e.g., an integer or string) properties.

OWL Description Logic (OWL-DL) is a sublanguage of the OWL specifications that includes all OWL language constructors but uses the description logic to logically express the use and restrictions of the constructors for knowledge descriptions and inferences. This uses property restrictions, including has value and quantifier restrictions, to express the characteristics of the geospatial classes by limiting the values of the individuals along with the given. The has Value restriction limits the individuals of a class to specific values. For example, the term ‘‘buffer’’ can be set using the has Keywords property in the Buffer class to ensure that all individuals in the class have the keyword ‘‘buffer.’’ In contrast, the quantifier restriction targets the restriction of individuals of a class using quantifiable values .

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The property of geospatial technology advancement results in a diverse array of geospatial data formats and naming conventions across online GIS. The challenges include standardizing spatial syntax and formalizing spatial semantics. Spatial syntax refers to the ways GIS operations and functions (web services) may be combined or chained to create well-formed spatial query (or analysis).

Spatial semantics provides domain-oriented definitions and describes the relationship. These challenges can hamper geospatial data sharing and information discovery and can ultimately undercut the grand vision of a cyber GIS web. Rooted in the concepts of geospatial semantics, this research aims to address geospatial semantic interoperability by developing an ontology-based framework to enable the support for problem-based spatial inquiries for data search and information generation across a cyber infrastructure of GIS.

2. LITERATURE SURVEY

2.1 Ontology-driven Problem Solving Framework for Spatial Decision Support Systems

The SDSS contain several components: spatial databases, GIS models, domain knowledge bases, map display capabilities, report capabilities, and user interfaces. These SDSS components can be combined in two types of system architectures: "loose coupling" or "tight coupling". The Framework for GIS resides within the combined use of ontologies and workflows to facilitate acquisition of data pertinent to a user-defined downside statement except for the standard GIS, the planned framework leads the user to structure a retardant statement associate degreed automatism information search and information analysis.

In support for problem solving, many geospatial problems share common data and analytical tools. Therefore, data, tools, and workflows may be reused across applications in cyber GI services. For example, wildfire management and air pollution impact analysis may both use "census data" to estimate the number of residents at risk and a "buffer" function to estimate the influenced areas.

The workflow for using the buffer function and census data may be also the same. Thus, a knowledge base will be desirable to store workflows along with web resources for data services and function services in a standard format to automate geospatial data search and analysis to facilitate future users to discover suitable GI services for problem solving.

The task-oriented way is similar with a workflow, which define solutions (e.g. what GIS data and functions are needed and how to compose these needed GIS data and functions in a sequence). Thus, when decision makers submit a geospatial problem in the web portal, the corresponding solution in the task ontology can be inferred to answer the problem. Additionally, the semantic of keywords that decision makers inputted, and what GIS data and functions are needed in the task ontology can be inferred automatically by machines. When discovering GI services in SDCI, using inferred semantic search can improve traditional keyword search, since the result of keyword search is usually nonsense and large in quantity, with high recall and low precision. Discovered GI services can also be automatically composed as a workflow to generate an initial result for decision makers to evaluate. Therefore, the framework contains four parts (e.g. a web portal, an ontologies engine, SDCI, a service chain mediator) to provide a knowledge-based search and to entail GI services in a service chain for automatically generating results.

By this framework, geospatial semantic interoperability and a problem-oriented framework for Web SDSS to solve geospatial problems can still be achieved. It not only presented a knowledge-based and GI services-based SDSS, but also provided a flexible and extensible architecture for storing knowledge contributed by domain experts and solving geospatial semantic impediments.

2.2 Query Processing Using Distance Oracles for Spatial Networks

The concept of an approximate distance oracle has been proposed for a variety of graph networks. It is possible to construct an approximate oracle of size for general graphs that can answer approximate distance queries in order of one time. Advantage of the path coherence in spatial networks by decomposing the spatial network into sets of coherent source vertices and coherent destination vertices such that the network distances between them are represented by a single value that approximates them.

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The strategy that is adopted reduces the space requirements and is based on the ability to identify groups of source and destination vertices for which the distance is approximately the same within some. The reductions are achieved by introducing a construct termed a distance oracle that yields an estimate of the network distance (termed the approximate distance) between any two vertices in the spatial network. The distance oracle is obtained by showing how to adapt the well-separated pair technique from computational geometry to spatial networks. Initially, an approximate distance oracle of size is used that is capable of retrieving the approximate network distance using a B-tree.

Any spatial query that is expressed using SQL can be converted into an operator tree, which is a computational tree made up of spatial and nonspatial relational operators. Fig. 5a is an example of an operator tree of an SQL query that performs region search on a spatial network. In other words, there are several ways of arriving at the correct answer and the job of generating all possible strategies and choosing among them is typically done by a query optimizer. Even though there are many ways of answering a query, they typically have different associated costs. The database system chooses the one with the least cost.

The retrieval time can be theoretically reduced further to time by proposing another approximate distance oracle of size that uses a hash table. Experimental results indicate that the proposed technique is scalable and can be applied to sufficiently large road networks. The fact that the network distance can be approximated by one value is used to show how a number of spatial queries can be formulated using appropriate SQL constructs and a few built-in primitives.

2.3 The Semantic Geospatial Problem Solving Environment: An Enabling Technology for Geographical Problem Solving Under Open, Heterogeneous Environments

During the past several decades, geospatially referenced information (or geospatial information in short) of various kinds has become a key resource for human analysts, including both academic researchers and practitioners from other fields, to observe, model, and understand different geospatial phenomena. GI technologies, including GIS, are a collection of computational tools that support the creation, management, manipulation, analysis, and presentation of geospatial information.

The term "geographical problem solving", therefore, can be generally defined as any activities that use GI technologies to process geospatial information, with the purpose of attaining certain geographical application goals. This reviews the relations of GIS, GI technologies, and GISci from a historical perspective, and then describes the challenges faced by existing GI technologies in supporting today's GISci and geographical problem solving.

It initiates a first step towards removing the technical details that obfuscate and hinder the analysis of geospatial information. The development of an integrated framework that synthesizes a number of different approaches that can represent and reason with the semantics of geographical analysis within the context of geographical problem solving.

Semantic model is created for geographical problem solving, which examines the roles of semantics in geographical applications, defines a solid framework to model geographical problem solving semantics, and extends the scope of semantic integration to the level of software functionalities. The Algorithms are Geographical Problem Solving and Semantic Geospatial PSE. It only suitable for heterogeneous environment. Problem solving not dents the on user query.

2.4 Task ontology: Ontology for building conceptual problem solving models

Conceptual LEvel Programming Environment (CLEPE) provides three major advantages as follows. (A) It provides human-friendly primitives in terms of which users can easily describe their own problem solving process (descriptiveness, readability). (B) The systems with task ontology can simulate the problem solving process at an abstract level in terms of conceptual level primitives (conceptual level operationality). (C) It provides ontology author with an environment for building task ontology so that he/she can build a consistent and useful ontology.

The main role of task ontology author is to analyze the problem solving knowledge and to build the task ontology which can be easily acceptable to end-users. To support the ontology author's work, CLEPE provides Task

Ontology representation Language (named TOL) and an environment for editing and browsing the ontology. It is a quite time consuming work for end-users to describe their own problem solving processes in a rigid form.

To lighten the load of end-users, it is important for task ontology to reflect their common conceptual understanding of problem solving. On the other hand, from computers standpoint, the description of the problem solving process should be rigid enough to specify the computational semantics

In general, the causal relation underlying a problem solving model is quite complicated and entangled. If one tries to draw the figure to show the causal relation of a certain problem solving model, he/she will find that it is too complicated to draw it on one plane. Thus, it is quite difficult for end-users to describe the causal relation explicitly by themselves, even if it is obvious for them.

So, in order for end- users and CLEPE to share the common understanding of the problem solving model, it cannot expect that end-users to express their intention by themselves as input to CLEPE. Instead, CLEPE accepts rather simple description of problem solving process, such as GPNs, and then reconstructs the object flow model and reveals the causal relation underlying it based on task ontology.

Problem solving causality is specified as axioms among concepts of task ontology. In the conceptual level execution, CLEPE explicitly presents the process of how the domain objects changes through problem solving based on the causality. Thus end-users can easily understand the behavior of their own GPN by observing the conceptual level execution.

2.5 Ontologies in Support of Problem Solving

The recurring patterns of reasoning are observed such as heuristic classification, It identifies the high-level generic tasks ubiquitously performed with knowledge, such as hypothesis assessment and data abstraction. It compares the different role-limiting methods, such as propose-and-revise and cover-and-differentiate, in the goal of characterizing a taxonomy of methods to guide system modeling.

Problem solving methods were proposed as standard reasoning procedures for addressing generic tasks in a domain-independent way. They have certain demerits which are they do not support recent emergence of Web Service and other distributed-reasoning resources on the World-Wide Web renew the interest and potential impact of a PSM- centered, ontology-based approach to the construction of Web-enabled applications.

Ontologies provide a structured framework for modeling the concepts and relationships of some domain of expertise. Ontologies support the creation of repositories of domain-specific reference knowledge—domain knowledge bases—for communication and sharing of this knowledge among people and computer applications. In particular, ontologies provide the structural and se- mantic ground for computer-based processing of domain knowledge to perform reasoning tasks. In other words, ontologies enable the actual use of domain knowledge in computer applications. It provides an overview of different means to specify and perform reasoning on a knowledge base. It retains one of these means, Problem-Solving Methods, because they provide reusable reasoning components that participate in the principled construction of knowledge-based applications.

3. CONCLUSION

In this paper we have done literature survey for analyzing the georesource data using the resource description framework and providing the query solution. It synchronizes from various ontology and establishes the solution. The query processing also uses the query parser to split up the query and eliminate the unwanted data. It also uses the Domain expert who predicts the classes and properties. Thus it provides flexibility and time reduction for the user.

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