

GeoOntology-based Spatial Semantic Description of Web

Page for Semantic Web Spatial Inference

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Abstract

With the publication of OWL, the Web Ontology Language, semantic web is becoming a hot field in recent years. It is supposed that semantic web would be the foundations of next stage of the web^[1]. By searching and merging RDF data and utilizing associated ontology, the intelligent agents in Semantic web can infer knowledge that user inquire. However, compared to HTML page, RDF page is relatively very few. So there is an urgent need to make semantic descriptions for each HTML page.

This paper focuses on the field of geographic information. It aims at exploring an adaptable approach to generate the RDF file that reflects the geospatial knowledge occurred in HTML page. It contains three parts, namely the descriptions of geographic entities, the relations among these entities, and the associations between geographic entities and non-spatial information. The common approach of extracting semantic information is to analyze the semantic roles that are annotated in the sentence. But the semantic roles defined in current semantic annotation system are not competent to express the complex spatial relation^[2,3]. So we expand a series of spatial semantic roles based on geographic ontology and analyze each sentence that spatial semantic roles appeared. Moreover, since spatial relations described in natural language are relatively rough, RDF or OWL inference cannot reason about qualitative spatial relations. So we take advantage of GIS to computer the relations between each two geographic entities. The relations include three kinds: topological relations (equals, disjoint, intersects, touches, crosses, within, contains, and overlaps), direction relations (North, NorthEast, East, SouthEast, South, SouthWest, West, NorthWest), and distance relations.(withinMetersOf)^[4]. The result is saved as RDF file. Therefore, the semantic web search engine can infer more specific information which is related to geographic space by means of RDF or OWL reasoner.

The paper is structured as follows. First we introduce the significance of spatial semantic description of web page. In second section we mention some related works. Section 3 introduces the methods, including spatial semantics extraction, spatial relations computation, and RDF result generation. Finally, we present the conclusion and future works.

[Reference]

[1] <http://www.w3.org/TR/2004/REC-owl-features-20040210>

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[4] Kaoru Hiramatsu, Femke Reitsma. GeoReferencing the Semantic Web: ontology based markup of geographically referenced information.