บทคัดย่อ

รหัสโครงการ: MRG-5380245

ชื่อโครงการ:
บริการการประมวลผลโดยอัตโนมัติเพื่อการออกแบบฐานความรู้สำหรับ Semantic Web

ชื่อนักวิจัยและสถาบัน

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ระยะเวลาโครงการ: 24 เดือน

บทคัดย่อ:
In the current world of globalization, information—and more importantly, knowledge—is vital not only to large institutions with globally dispersed organization but also to individual persons. It is not exaggerating to say that those who first get access to knowledge and better manage it are in an advantageous position and more likely to succeed. To achieve this goal, a good approach to knowledge representation and management has to be developed and employed properly.

One of the most prominent approaches is the conceptual knowledge representation approach, in which conceptualization of the real-world knowledge about a particular domain is formally specified. Interesting example domains include biochemistry, healthcare, or even tourism. Relevant real-world entities, their properties, and relationships among themselves in the domain under consideration can be conceptualized, for instance, one may be interested in the concepts ‘appendicitis’ and ‘boutique hotel’ in the healthcare and tourism domains, respectively. Semantic networks, as well frame systems, were developed in the early days to specify such a conceptualization, in which concepts are represented as nodes and their relationships as arcs in a semantic network. Despite its promising name, the main pitfall of this approach is ironically the lack of formal semantics. This means that different systems may interpret the same semantic network differently, which is obviously not a desired characteristic of a knowledge base, in particular for interoperability reasons. An attempt to resolve this problem has resulted in a logic-based knowledge representation—called Description Logic (DL). The benefits of employing DL in knowledge systems are twofold: its formally well-defined semantics

allows to represent knowledge in an unambiguous way; and automated reasoning allows to infer implicit knowledge from the one given explicitly. Due to these merits, DL has been adopted as the logical underpinning of the Web Ontology Language (OWL), which is recommended by W3C as the ontology language for the Semantic Web.

Reasoning support in DL can roughly been categorized into standard services and supplemental services. Standard reasoning services make implicit conclusion in the knowledge base explicit by means of logical inference. For instance, one can draw subclass relationships between two classes or detect inconsistent classes, which is vital information for quality assurance of ontologies. Research on services of this kind is relatively mature, and various reasoning techniques have been implemented in working DL systems. However, it is widely accepted now that standard reasoning services alone are insufficient to manage large-scale knowledge bases. Simply detecting the existence of an error—may it be unintended subclass relationship or inconsistent class—does not help remove it. The supplemental reasoning support of explanation and debugging plays an important role here. Also, professional ontologies are often very large as they are designed to be comprehensive. Without additional support, one would need to import the entire ontology for fear that the meaning of terms in it will be altered. The supplemental reasoning support of modularization can help alleviate this issue. Unlike the first category, these reasoning services are relatively new and still need research and evaluation. The aim of the proposed research is to investigate reasoning techniques for supplemental reasoning services and to evaluate their effectiveness in design and management of large-scale knowledge bases.

คำหลัก : จำนวน 3-5 คำ

Semantic Web; Description Logic; Ontology Development

Abstract

Project Code : MRG-5380245

Project Title : Automated Reasoning Services for Semantic Web Ontology Modeling

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Project Period : 24 months

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Keywords : 3-5 words

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