Chapter 5
Ontology Modeling Framework

Abstract. We have defined a knowledge representation model in KnowledgeSeeker called Ontology Graph, which is used to represent domain ontology and it can support ontological information search and management. The proposed Ontology Graph is a graphical based knowledge generated by semantic relations of Chinese words, and that semantic relations are formed by the ontology learning process automatically. This chapter first overviews the KnowledgeSeeker system and then presents the background idea and the implementation details of the proposed Ontology Graph.

5.1 KnowledgeSeeker – The System Overviews

KnowledgeSeeker is a comprehensive system framework which defines and implements the components of: 1. Ontology Modeling (the ontology structure), 2. Ontology Learning (the learning algorithm), 3. Ontology Generation (the format), and 4. Ontology Querying (the operations), as shown in Figure 5.1.

![Fig. 5.1 Four modules in KnowledgeSeeker system framework](image_url)
The KnowledgeSeeker can be used to develop various ontology-based intelligent applications by using the four defined ontological components. These intelligent applications include such as knowledge-based information retrieval system, knowledge mining system, predication system, personalization system, intelligent agent system, etc. Therefore, the entire KnowledgeSeeker system framework breaks up into four modules for handling different kinds of ontological process:

**Module 1 – Ontology Modeling**

The ontology modeling module defines the conceptual structure that is used to represent the ontology data (knowledge) in the KnowledgeSeeker system. This is a kind of knowledge representation method and the knowledge is represented as Ontology Graph which will be described in the following of this chapter.

**Module 2 – Ontology Learning**

The ontology learning module concerns about the method of knowledge acquisition from texts. It defines the method of conceptualizing a domain of knowledge. The method is based on a statistical text learner, and the conceptualization process is about transforming knowledge of text into a machine-processable format, i.e. the defined Ontology Graph in Module 1. Figure 5.2 presents the knowledge components of ontology learning from text and the ontology learning module and its algorithm will be described in Chapter 6.

![Fig. 5.2 Knowledge components of ontology learning from text](image)

**Module 3 – Ontology Generation**

The ontology generation module formalizes the conceptual ontology model into a structural file format. The process uses a text corpus to generate domain ontologies in the form of Ontology Graph, and it visualizes the Ontology Graph in a graphical format. The ontology generation module and its definition will be described in Chapter 7.

**Module 4 – Ontology Querying**

The ontology querying module defines how system operates with Ontology Graphs. It is an important module that enables the use of KnowledgeSeeker...