Chapter 7
Concluding remarks and outlook

In any information infrastructure, the information retrieval components have a special relevance because they are the components that provide the first point of access to the contents. Improving these components involves an improvement in the entire infrastructure environment, making the resource holdings easier to find and access.

Ontologies are knowledge organization systems often used within the information retrieval context to improve the performance of systems. Terminological ontologies are the models most frequently used for classification and information retrieval. Thanks to their extensive use in digital and traditional libraries, these resources cover almost every area of interest.

However, existent terminological models are scarcely reused across different communities. Each organization has its own systems to interpret, use, and represent them, generating an heterogeneity that hinders their reuse. Ontologies are used to solve specific problems for different components without providing an integrated framework of ontology management.

Within this book, we have faced the problem of defining a common representation framework for terminological ontologies, together with a set of methods, architectural patterns, and guidelines for the development of accompanying artifacts that facilitate their creation, management, and access. In particular it has addressed the following issues:

- Homogeneous representation of terminological ontologies: The ontologies used by different components of an information infrastructure have to be managed in a harmonized way, using the same model and format. Due to the applicability to a wide range of application domains, there is a great variety of terminological ontologies with very different levels of specificity, language coverage, formalization, or size. Additionally, the need to relate different terminological models to improve semantic interoperability has created the additional need to analyze how to represent the defined mappings properly.
- Creation and reuse of terminological ontologies: Information retrieval systems need different terminological models depending on their purpose and required functionality. If the required terminological models exist but they are not rep-
resented in the desired format, they must be transformed and customized to the user requirements. However, if none suitable exists, a new terminological ontology must be built reusing, if possible, existent knowledge resources.

- **Management and access to terminological ontologies**: An information retrieval system must rely on an efficient and robust ontology management service to filter and select the most appropriate ontology for each specific context. It must consider many different types of terminologies for discovery, visualization, and access; each one with their own specific characteristics. In this context, a unified management system is required to simplify the access and control of the terminologies used along the infrastructure.

- **Applicability of terminological ontologies to information retrieval systems**: Last, this book has addressed the integration of terminological models in information retrieval components related to search and presentation of information (catalog services, user applications, structure of content repositories and data/service catalogs) with the objective of simplifying classification of resources and improving information retrieval. Three main areas where the terminological ontologies have applicability have been reviewed: classification, discovery, and browsing of resources.

Following this division of main issues in four categories, the rest of the chapter points out the concluding ideas and areas for future work that have been identified.

**A representation framework for terminological ontologies**

In order to provide a simple and harmonized integration of terminological models in an information retrieval system, a common representation framework has been proposed. The identification of the most suitable representation model and interchange format required the study of different existent ontology models described in the literature, analyzing their characteristics and structure to find the common elements that the different models share. The need to establish the context in which the terminological models fit created the need to review all the main types of ontologies and not only the terminological ones. It has been found that although each ontology type has usually associated a set of representation formats used to store and interchange the models, it is also very usual to have many different ad-hoc formats created for organizations to represent their models. As result of the analysis, the SKOS format [141] has been identified as the most suitable format for the representation of terminological models. SKOS has a broad coverage and it is simple to define extensions to adapt it to specific user requirements. In addition, as it is shown by Lacasta et al. [117], the SKOS format is very suitable for their integration in the discovery components of an information infrastructure, and it starting to be used for organizations and companies that publish relevant terminological models.

Additionally, the proposed representation framework also provides support for representing mappings between terminological ontologies. Nowadays, there is a need to relate the ontology models of the information infrastructures to improve their functionality. It has been required to integrate different terminological models.