



A Lexicographic Approach to Compiling an Ontological Dictionary of Information Technology Terms

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Abstract

This thesis analyzes lexicographic approaches applied in the process of compiling an ontology-based dictionary of information technology (IT) terms. Ontological modeling enables the identification and systematization of semantic and conceptual relationships among terms. The study develops an ontological model for IT terminology based on the principles of hierarchy, semantic connectivity, and formalization, and conducts an applied analysis of 15 selected terms. As a result, a lexicographic structure of an ontological dictionary is proposed.

Key words: ontology, lexicography, information technology terminology, semantic network, knowledge base, ontological model.

Introduction

The rapid development of the field of information technology has led to the intensive formation of new terms. This, in turn, gives rise to the problem of ensuring their semantic accuracy, systematic organization, and conceptual interrelatedness. Traditional dictionaries are limited primarily to the explanation of terms and therefore cannot fully reflect their complex semantic relations. For this reason, the need for an ontological approach in contemporary lexicography is steadily increasing.

Ontological modeling is based on the approach defined by Thomas R. Gruber as a formal and explicit specification of a conceptualization. The works of Steffen Staab and Rudi Studer, in turn, establish the methodological foundations for the development of ontological systems. From a lexicographic perspective, the principles of systematicity, normativity, and consistency are of particular importance in the description of terms. The ontological approach expands these principles by enabling the formal representation of hyponymy (genus-species relations), meronymy (part-whole relations), and associative links among terms.

Identifying semantic relations among terms is a key stage in the creation of an ontological dictionary. In this study, information technology terms were classified on the basis of hierarchical and semantic connectivity. In the ontological model, “information system” was selected as the central concept, from which lower-level categories such as “software,” “hardware,” and “database” were derived. This approach makes it possible to consider terms not merely as lexical units but as elements of an interconnected system of knowledge.

During the study, an applied analysis was conducted on the basis of 15 IT terms. The relations among the terms were grouped according to “genus–species” (hyponymy), “part–whole” (meronymy), and associative links. In particular, it was determined that the term “relational database” stands in a hyponymic relation to the term “database,” while the units “table,” “record,” and “field” represent the constituent parts of the concept “database.” The terms “query,” “index,” “server,” and “network” were described through functional and associative relations.

The ontological classification is presented below:

Table 1. Classification of Terms in Information Systems

No.	Term	Category	Type of Relation	Explanation
1	Information system	Top-level category	Hierarchy	Core concept
2	Software	Hyponym	Genus–species	System component
3	Hardware	Hyponym	Genus–species	Physical component
4	Database	Hyponym	Genus–species	Core database
5	Relational database	Hyponym	Genus–species	Type of model
6	NoSQL database	Hyponym	Genus–species	Alternative model
7	SQL language	Part	Part–whole	Query language
8	Table	Part	Part–whole	Database element
9	Record	Part	Part–whole	Table element
10	Field	Part	Part–whole	Structural unit
11	Query	Functional	Associative	Data retrieval
12	Index	Optimization	Associative	Speed enhancement
13	Server	Device	Associative	Service provider
14	Client	Subject	Associative	User side
15	Network	Environment	Associative	Communication system

This ontological model serves as an effective tool for systematizing terms, identifying their conceptual relations, and developing electronic dictionaries. In addition, the ontological approach increases the efficiency of processing terminological data in knowledge bases, artificial intelligence, and computational linguistics systems. Ontological dictionaries are especially significant in semantic search systems and automatic translation processes.

Conclusion

In conclusion, the ontology-based lexicographic description of information technology terms is one of the promising directions of modern lexicography. The ontological approach enables a deeper disclosure of the semantic structure of terms, the identification of their interrelations, and the formal modeling of terminological systems. The proposed model may serve as a methodological basis for the future development of electronic ontological dictionaries and for the standardization of IT terminology.

Bibliography

- Berners-Lee, T. (2001). The semantic web. *Scientific American*, 284(5), 34–43.
- Cabré, M. T. (1999). *Terminology: Theory, methods and applications*. John Benjamins Publishing.
- Gruber, T. R. (1993). A translation approach to portable ontology specifications. *Knowledge Acquisition*, 5(2), 199–220.
- Guarino, N. (1998). *Formal ontology and information systems*. IOS Press.
- International Organization for Standardization. (2009). *ISO 704:2009 terminology work—Principles and methods*.
- Staab, S., & Studer, R. (2009). *Handbook on ontologies*. Springer.
- Wüster, E. (1979). *Einführung in die allgemeine Terminologielehre und terminologische Lexikographie*. Springer.