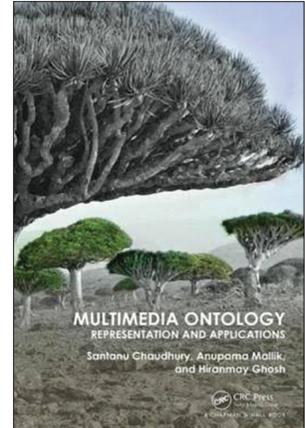


# Multimedia ontology: Representation and applications

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Ontology is a holistic study of the nature of being, becoming, existence in past, as well as the basic categories of being and their relations. The subject ontology classically belongs to the broad discipline of philosophy also known as metaphysics. It deals with questions concerning what entities exist or may be said to exist, and how such entities may be grouped, related within a hierarchy, and categorized in accordance with similarities and dissimilarities. As a branch of philosophy, the basic approach of ontology is theoretical. However, it also has practical applications in various subjects such as information science and technology, basic sciences, and logic. Ontology has different connotations in computer science and information science. Ontology is a formal naming and definition of the types, properties, and interrelationships of the entities that fundamentally exist in a particular subject domain. Another concept that precedes ontology is taxonomy, which is the basic science of classification of objects and entities. The fields of artificial intelligence, neural networking, the semantic web, systems engineering, software engineering, biomedical informatics, library science, enterprise bookmarking, and information architecture create ontologies to limit complexity and to organize information.

This book covered different aspects of multimedia ontology and its applications. The contents are presented in eleven chapters here. The Chapter 1 gives brief introduction of semantic multimedia web and Web Ontology Language (OWL). The Chapter 2 provides a concise outline of the evolution of web with an emphasis of semantic web technologies. It also presents ontology representation schemes (RDF schema) and their roles in

creating domain models and semantic interpretation of information on the web. This chapter describes OWL with suitable example [Figure 2.9]. In Chapter 3, the semantics of multimedia instances is characterized. The section 3.2 entitled “A first look at multimedia semantics” needs bit more clarification in describing how the concept of “Media instances” is connected with the “Interaction between the objects and the role of context.”

The next chapter, i.e. Chapter 4 gives an account of the recent research on ontology for multimedia data processing. An overview of MPEG-7 and MPEG-21, a multimedia content description standard, and ontology representation in OWL are provided here. Different applications of ontology, for example, museum ontology is provided here. The requirements for an ontology representation scheme are provided in Chapter 5. A new ontology representation language, i.e. Multimedia OWL (MOWL) with illustrations is presented here. The syntax and semantics of this new language are also presented here. In Chapter 6, different semantic analysis techniques are examined. It is found that data driven techniques are useful for semantic characterization of low level features. But, concept association with multimedia content is a more complex problem. In Chapter 7, the techniques for learning ontology from text and data are discussed. Different networked learning techniques are described, i.e. Bayesian Network Learning, FBN Structure Learning, CPT-Tree Learning, etc. The authors also discussed a novel technique to populate a collection of videos from a knowledge domain. In Chapter 8, the authors discussed the exploitation of deep semantics of multi-media artifacts in some real-life applications. Three major classes of applications are dealt,

i.e. information retrieval, content recommendation, and information integration.

The multimedia ontology together with an agent-based architecture is explained in Chapter 9. The Chapter 10 illustrates the application of multimedia ontology and its representation through the MOWL in preserving tangible and intangible heritage through improved access of digitized heritage artifacts. Three applications preserving cultural heritage with examples from Indian history and culture are discussed. The authors discussed ontology of Indian classical dance, the theme of *Girija Kalyana* (mural paintings of Karnataka), and *Virupaksha* temple concept. The Chapter 11 summarizes the major contributions in the book and presents some open problems in the representations and applications of multimedia ontology. The authors argued and opined that MOWL has several desired properties to become the ontology language for the semantic multimedia web for future.

This book treats the subject ontology from a multi-disciplinary approach. No individual contextual discussion is provided. The ontology in the context of different subjects appears differently, i.e. the concept of domain ontology or domain analytic approach is important in the context of library and information science. Every major science subject (life science, cognitive science, space science, etc.) includes an ontology facet. This book treats the subject from fundamental view. The illustrations used in this book picturesquely described the salient features that would be helpful to the beginners in the subject ontology from diverse disciplines. The language is very simple and lucid. The chapterization follows logical

sequence that is helpful to the beginners and other readers too. The terminological control and algorithms presented are mnemonic for the readers. The sequence of chapters presented in the content is in details and the list of figures is very useful. The figures and schematic diagrams presented in this book are very much advantageous for all. The cover design is very nice and the quality of pages is up to the mark. This publication is a high value addition to the subject ontology for both beginners and advanced learners too. We expect more such value additions from the authors in future on ontology and related areas also. The discussion of ontology in different major disciplinary contexts however needs more elaboration in details.

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