Ontologies: A Silver Bullet for Knowledge Management and Electronic Commerce

by Dieter Fensel
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Organization
The book has seven chapters and an Appendix. The first chapter is a general introduction to the book. The second is an introduction to ontologies. The third one talks about the role of ontologies in Knowledge Management. The fourth discusses applications to Electronic Commerce. The fifth one gives an overview of XML and some related technologies (XSL and RDF). The sixth one gives an overview of ontology languages, and the seventh chapter offers some conclusions. The Appendix offers a survey on standards, mainly ontology, WWW, multimedia and metadata standards.

Book Contents
The first chapter is an introduction to the rest of the book. The second one gives an introduction to the idea of ontology (including the by now standard definition by Gruber). The chapter gives very little technical detail, instead describing three systems: Wordnet, CYC and $(KA)^2$.

In chapter 3, after describing the shortcomings of current search mechanisms in the Web, the author gives a desiderata, i.e. a list of characteristics that a good search mechanism should have in order to avoid those shortcomings. Then, Ontobroker is presented as one system which fits the bill. The system is described by introducing the three languages that characterize it: an annotation language to add semantics to web documents; a representation language to write ontologies, and a query language. The inference engine is then described. The description is non technical and limited mostly to giving a few examples. The only time that a reference is made to technical questions (well-founded semantics, page 32), it is to mention the concept and give a citation. The chapter then concludes by introducing On2broker, the successor of Ontobroker, which addresses "significant complexity problems of Ontobroker". On2broker major design decision is the separation of the query engine from the inference engine, which were coupled together in Ontobroker. The On-To-Knowledge and IBROW projects are also introduced.

Chapter 4 discusses Electronic Commerce by dividing it into B2C (Business to Consumer, or Web Commerce) and B2B (Business to Business, or Electronic Business). This division into two subfields is very adequate, since each subfield follows separate models and has separate goals, which influences the technology needed to underwrite them. For B2C, shopping agents, on-line stores and on-line marketplaces are discussed. Then it is argued that standardization (possibly around XML) is a need for these areas to flourish. For B2B, a brief introduction to electronic marketplaces is given. It is argued that lack of standards to facilitate communication, translation and negotiation is the most serious obstacle for B2B. One way to achieve this standardization is to use ontologies, and 3 examples are given of portals that use this approach. Unfortunately, the descriptions are so brief (half a page each) that very few details are revealed about the contents of said ontologies and of exactly how are the ontologies used.

Chapter 5 is a brief introduction to XML. After mentioning the limitations of HTML, the basic concepts of XML, DTDs and XSL are introduced. RDF is also briefly introduced.

Chapter 6 describes ontology languages. The languages discussed are: CycL and KIF (as representatives of logic-based languages); Ontolingua and Frame Logic (as representatives of frame-based approaches); and description logics. Then XML and RDF are investigated as languages in which to express ontologies. DTDs come obviously short; RDF fares substantially better. Finally, OIL is described as an attempt to integrate the best characteristics of each type of language.

Chapter 7 offers some conclusions. The Appendix mentions a long list of standards, but the descriptions are limited to one paragraph (at the most) each.

Evaluation

This book is obviously meant to be a divulgative work, intended for an audience of non-experts. The book manages to overview the field nicely (although it is biased towards one of the project that the author has worked on, Ontobroker, this is understandable, and the book still surveys several other tools and techniques). Thus, the book is a light introduction for people who know (almost) nothing about the area. In this sense it succeeds, since it puts together a lot of information which is not easily accessible by the non-technical reader, and which is dispersed through the technical literature. The lack of formal content and the use of examples also help in this respect.

However, even as a divulgative book there are some shortcomings. First, this book is very short in contents. The book has 110 pages (without the Appendix), is printed in a large font and uses a small page size. Even if one does not want to give technical details, more detailed examples and explanations would help many parts of the book. This is especially true of chapter 3, where the connection between ontologies and Knowledge Management is not explained in enough detail. Knowledge Management is a rich and interesting field, and there are indeed many interesting connections between it and ontology research (see for instance [IEEE 00]). Some descriptions are so short that a reader with no previous knowledge in the area will hardly have a good grasp of the issues after reading the book.

Second, the book seems to have been put together hastily. Cut and paste errors are frequent. For instance, chapter 3 starts with an editing error. The first paragraph in the chapter has been cut and pasted from somewhere else and it is out of context now. This kind of mistake makes the reading experience less smooth than it should be.

One of the best parts of the book is the list of references, which is 15 pages long and provides a wealth of entry points to research in the area. By following these references, an interested person can become acquainted with the technical literature and learn more about some of the systems and ideas introduced in the book. It is a pity, though, that the author (a well known and respected researcher in the area) decided not to look at some issues in more depth, or not to make connections between ontology research and other, quite relevant areas of research, like integration of heterogeneous information (see, for instance, the excellent [ERS 97] for a good review of this area). Given that the area of ontologies is still in rapid evolution, it may be premature to attempt a complete, through overview and analysis just yet. This reviewer looks forward to the forthcoming second edition of the book, due at the end of 2002, in which the author will have the opportunity to address some of the concerns raised here.

References

[IEEE 00] IEEE Intelligent Systems, May/June 2000.

[ERS 97] R.M. Elmagarmid, M. Rusinkiewicz, and A. Sheth, Management of Heterogeneous and Autonomous Database Systems, Morgan Kaufmann, 1997