

Part-Whole Relations in Object-Centered Systems: An Overview

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Abstract

Knowledge bases, data bases and object-oriented systems (referred to in the paper as Object-Centered systems) all rely on attributes as the main construct used to associate properties to objects; among these, a fundamental role is played by the so-called *part-whole* relation. The representation of such a structural information usually requires a particular semantics together with specialized inference and update mechanisms, but rarely do current modeling formalisms and methodologies give it a specific, “first-class” dignity.

The main thesis of this paper is that the part-whole relation cannot simply be considered as an ordinary attribute; its specific ontological nature requires to be understood and integrated within data modeling formalisms and methodologies. On the basis of such an ontological perspective, we survey the conceptual modeling issues involving part-whole relations, and the various modeling frameworks provided by knowledge representation and object-oriented formalisms.

1 Introduction

Despite their different purposes and the tendency to mutual isolation, knowledge base, data base and object-oriented communities heavily rely on conceptual models which have a lot in common. They can be collectively classified as Object-Centered Systems, since they all organize the knowledge around the unifying abstract notion of *objects*. *Classes*, *attributes* and *individuals* could be considered as the main conceptual building blocks. A class is a description which gathers common features within a collection of *individuals*. From a logical point of view, it is a unary predicate which denotes a set of individuals.

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Partwhole Reasoning In An Objectcentered Framework

**Luigia Carlucci Aiello, Jon Doyle, Stuart
Charles Shapiro**

Partwhole Reasoning In An Objectcentered Framework:

Part-Whole Reasoning in an Object-Centered Framework Patrick Lambrix,2000-02-23 In this book the author develops an object centered framework with specialized support of the part of relation based on description logics These logics are a family of object centered knowledge representation languages tailored for describing knowledge about concepts and is a hierarchies of these concepts In addition to the representation and reasoning facilities provided by description logics for is a representation and reasoning facilities are introduced for part of Finally the feasibility and the usefulness of the approach is demonstrated by applying the framework to various areas including domain modeling agent oriented scenarios document management and retrieval and composite concept learning *Logic Versus Approximation* Wolfgang Lenski (Ed),2004-10-27 Nowadays knowledge based systems research and development essentially employs two paradigms of reasoning There are on the one hand the logic based approaches where logic is to be understood in a rather broad sense usually these approaches are used in symbolic domains where numerical calculations are not the core challenge On the other hand we find approximation oriented reasoning methods of these kinds are mainly applied in numerical domains where approximation is part of the scientific methodology itself However from an abstract level all these approaches do focus on similar topics and arise on various levels such as problem modeling inference and problem solving techniques algorithms and mathematical methods mathematical relations between discrete and continuous properties and are integrated in tools and applications In accordance with the unifying vision and research interest of Michael M Richter and in correspondence to his scientific work this book presents 13 revised full papers advocating the integration of logic based and approximation oriented approaches in knowledge processing *Formal Ontology in Information Systems* Carola Eschenbach,Michael Gruninger,2008 Since its start ten years ago the International Conference in Formal Ontology on Information Systems FOIS has explored the multiple perspectives on the notion of ontology that have arisen from such diverse research communities as philosophy logic computer science cognitive science linguistics and various scientific domains As ontologies have been applied in new and exciting domains such as the World Wide Web bioinformatics and geographical information systems it has become evident that there is a need for ontologies that have been developed with solid theoretical foundations based on philosophical linguistic and logical analysis Similarly there is also a need for theoretical research that is driven by the issues that have been raised by recent work in the more applied domains FOIS is intended to be a forum in which to explore this interplay between the theoretical insights of formal ontology and their application to information systems and emerging semantic technologies Themes emerging from this volume give a snapshot of current issues within the fields of formal ontology and ontological engineering as well providing a glimpse of future research directions Book Jacket **Conceptual Modeling of Information Systems** Antoni Olivé,2007-08-15 It is now more than fifty years since the first paper on formal specifications of an information system was published by Young and Kent Even if the term conceptual model was not used at that time the

basic intention of the abstract specification was to a large extent the same as for developing conceptual models today to arrive at a precise abstract and hardware dependent model of the informational and time characteristics of a data processing problem. The abstract notation should enable the analyst to organize the problem around any piece of hardware. In other words the purpose of an abstract specification was for it to be used as an invariant basis for designing different alternative implementations perhaps even using different hardware components.

Research and practice of abstract modeling of information systems has since the late fifties progressed through many milestones and achievements. In the sixties pioneering work was carried out by the CODASYL Development committee who in 1962 presented the Information Algebra. At about the same time Berje Langefors published his elementary message and file approach to specification of information systems. The next decade the seventies was characterized by the introduction of a large number of new types of as they were called data models. We saw the birth of for instance Binary Data Models, Entity Relationship Models, Relational Data Models, Semantic Data Models and Temporal Deductive Models.

Foundations of Intelligent Systems, 2002 *Information Modelling and Knowledge Bases XIII* Hannu Kangassalo, H. Jaakkola, E. Kawaguchi, 2002. This is a collection of papers presented in the 11th European Japanese Conference on Information Modelling and Knowledge Bases held in Maribor, Slovenia. This annually organized conference brings together the leading researchers from Europe and Japan to introduce the latest results of their research.

[Bibliographic Guide to Psychology](#) New York Public Library. Research Libraries, 2000

A Study on Moving Objects. Representation and Reasoning Yuniel Proenza, 2015-12-07. Scientific Essay from the year 2015 in the subject Business economics Information Management grade 7.0 language English abstract. There are some researches that explore and help to solve the representation of moving objects mainly focused on improving DBMS and Query Languages for support spatio-temporal information storing and processing. Some other researches present techniques to analyze trajectories using data mining indexing and math operations. More recently with the emergence of the Semantic Web the tracking of trajectories of moving objects became a fully applicational field and an open area for ontology applications. This paper explores moving objects representation and reasoning aiming to find out foundations for a semantic representation of moving objects approach for solving some existing problems when considering spatio-temporal aspects and semantically enrich query results over any stored information of moving objects.

ECAI 2000 European Coordinating Committee for Artificial Intelligence, 2000. This volume covers the whole spectrum of artificial intelligence including knowledge representation, automated reasoning, constraint based reasoning, machine learning, autonomous agents, human language technology, planning, vision and robotics and AI aspects of uncertainty and of creativity. The book further includes contributions on innovative application. All contributions are peer reviewed by an international Programme Committee.

Knowledge Engineering and Knowledge Management: Ontologies and the Semantic Web V. Richard Benjamins, 2003-08-02. This volume contains the papers presented at the 13th International Conference on Knowledge Engineering and Knowledge Management.

EKAW 2002 held in Sig enza Spain October 1 4 2002 Papers were invited on topics related to Knowledge Acquisition Knowledge Management Ontologies and the Semantic Web A total of 110 papers were submitted Each submission was evaluated by at least two reviewers The selection process has resulted in the acceptance of 20 long and 14 short papers for publication and presentation at the conference an acceptance rate of about 30% In addition one invited paper by a keynote speaker is included This volume contains 8 papers on Knowledge Acquisition 4 about Knowledge Management 16 on Ontologies and 6 papers about the Semantic Web This was the second time EKAW 2000 being the first that the event was organized as a conference rather than as the usual workshop hence the acronym European Knowledge Acquisition Workshop The large number of submissions 110 versus the usual 40 60 is an indication that the scientific community values EKAW as an important event to share experiences in the Knowledge Technology area worthy of being organized as a prestigious international conference Knowledge is the fuel of the upcoming Knowledge Economy Therefore we believe that conferences such as EKAW that focus on Knowledge Technologies will continue to play a major role as a platform for sharing and exchanging experiences and knowledge between key players in the area

Principles of Knowledge Representation and Reasoning Luigia Carlucci Aiello, Jon Doyle, Stuart Charles Shapiro, 1996

1997 IEEE Knowledge and Data Engineering Exchange Workshop Xindong Wu, 1997 This volume of proceedings from the Knowledge and Data Engineering Exchange Workshop includes grouping Web page references into transactions for mining World Wide Web browsing patterns and an agent based approach for intelligent and co operative systems

Implementing Application Frameworks Mohamed E. Fayad, Douglas C. Schmidt, 1999-10-11 Object Technology A gold mine of enterprise application frameworks Implementing Application Frameworks While frameworks can save your company millions in development costs over time the initial investment can be quite high This book CD ROM package helps you to reduce the cost of framework development by providing 40 case studies documenting the experiences of framework builders and users at major corporations and research labs worldwide Throughout the authors extract important lessons and highlight technical and organizational implementation practices that have been proven to yield the biggest payoff Focusing primarily on business systems and agent based application frameworks it covers frameworks for Data processing Agent based applications Artificial intelligence applications Object oriented business processes System application frameworks Programming languages and tools And much more The enclosed CD ROM gives you Example frameworks Documentation and manuals Framework code and implementation tips Sample framework architectures and models Design patterns and presentations Animated demonstrations

Transactions and Database Dynamics ,1999

The British National Bibliography Arthur James Wells, 2000

American Book Publishing Record ,2000-07

Proceedings American Association for Artificial Intelligence, 2004 Proceedings from the latest meeting of the leading AI conference includes theoretical experimental and empirical work The National Conference on Artificial Intelligence remains the bellwether for research in artificial intelligence Leading AI researchers and practitioners

as well as scientists and engineers in related fields present theoretical experimental and empirical results covering a broad range of topics that include principles of cognition perception and action the design application and evaluation of AI algorithms and systems architectures and frameworks for classes of AI systems and analyses of tasks and domains in which intelligent systems perform The Innovative Applications of Artificial Intelligence conference highlights successful applications of AI technology explores issues methods and lessons learned in the development and deployment of AI applications and promotes an interchange of ideas between basic and applied AI This volume presents the proceedings of the latest conferences held in July 2004 *Combinatorial Pattern Matching* ,2000 *Fundamental Approaches to Software Engineering* ,2000 *Logic-based Program Synthesis and Transformation* / ,1999

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