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Development of Dining Ontology Based On Image Retrieval

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Abstract - This paper presents an Ontology development based on images. A set of question patterns, called *predictive questions*, which are predicted to be asked by users in a domain, were generated on the basis of a domain ontology. Their corresponding query templates, which can be used to extract answers to the predictive questions from a knowledge base, were generated as well. The process of producing these question patterns and query templates is described.

To retrieve images from a database using pattern matching techniques, but usually textual descriptions attached to the images are used. Semantic web ontology and metadata languages provide a new way to annotating and retrieving images. This paper considers the situation when a user is faced with an image repository whose content is complicated and semantically unknown to some extent. We show how

ontologies can then be of help to the user in formulating the information need, the query, and the answers. As a proof of the concept, we have shown photos of restaurant. In this system, images are annotated according to ontologies When generating answers to the queries, the ontology combined with the image data also facilitates.

In survey of the technical achievements in the research area of Image Retrieval, is especially Content-Based Image Retrieval.The survey covers image feature representation and extraction, multi-dimensional indexing, and system design.

Keywords - Content-Based Image Retrieval, Ontology, RDF, Semantic web, query template.

I. INTRODUCTION

The semantic web, which encodes some semantics of web resources in a machine-readable form, is regarded as the future in the evolution of the World Wide Web. It offers, sophisticated forms of Question Answering (QA), where ontologies play a crucial role . The common feature of such ontology-based QA systems is that they require the representation of both natural language user questions and information sources using formats compliant with a common ontology. Once unstructured information sources are marked up semantically and transformed into structured knowledge bases, well-structured queries, often written in a certain standard query language are often used to retrieve data from underlying knowledge bases. In order to draw correct answers from such sources, a natural language question needs to be precisely translated into such a query. However, this is a difficult task involving complex semantic annotation and knowledge representation.

Modelling ontologies is a tedious and costly task, it is always important to demonstrate the advantages by applying ontologies in Software Engineering. So the logic-based formalisms in the context of the semantic web effort is an important factor. Activities by the W3C and others have helped by the standards like RDF or OWL.

Another important factor is the flexibility of ontologies,. ontologies are well-suited to combine information from various sources and infer new facts based on this. Also, the flexibility allows to extend existing ontologies very easy, thus fostering the reuse of existing work. In contrast to traditional knowledge-based approaches, e.g. formal specification languages, ontologies seem to be well suited for an evolutionary approach to the specification of requirements and domain knowledge.

Ontology is the specification of a concepts. Conceptualization is a simplified view that represent the purposes. Every ontology includes a dictionary with explanation of the terms and indications and shows relations. The ontology represents conceptual description of the specific content, to identify appropriate terms and relationship in a given knowledge

domain. Ontologies show a hierarchical dependents of the terms together with descriptions, explanations and definitions. New user able to understand its use and incorporate the concepts in a knowledge domain. Ontology gives graphical representation by ontoviz and owlviz.

Software modelling languages and methodologies can benefit from the integration with ontology languages such as RDF and OWL in various ways, e.g. by reducing language ambiguity, enabling validation and automated consistency checking .

Here, ontologies provide a unified representation for both problem domain and source code, thus enabling easier cross-references among both information spheres. Moreover, it is easy to create arbitrary views on the source code. Reasoning is applied to create those views, e.g. to find all places where a variable is accessed either directly or indirectly. Ontologies provide a mechanism to capture knowledge about the problem domain.

Using RDF ontology, every provider is free to add or subclass concepts from the initial version without being at risk to become incompatible. The ontology document is present in RDF languages. Query templates used for data extraction. RDF is an abstract model with several serialization format, so particularly resource are triple is encoded varies from format to format. The RDF data model is based on a class diagram, and it make statements, about resources in the form of subject-predicate-object expressions. This expressions are known as triples. The subject denotes the resource, the predicate denotes aspects of the resource and expressed a relationship between the subject and the object.

This project deals with creation of ontology for restaurant operation ,that is service of the restaurant may be called as **dining**, hence dining ontology is created.

Content-based image retrieval (CBIR), also known as query by image content (QBIC) and content-based visual information retrieval (CBVIR) is the application of computer vision techniques to the image retrieval problem, that is, the problem of searching for digital images in large databases .
These two research communities study Image Retrieval from different angles, one being text-based and the other visual-based.
A very popular framework of Image Retrieval is annotating the images by text and then use text-based Database Management Systems (DBMS) to many advances, such as Data Modeling, Multi-Dimensional Indexing, Query Evaluation have been made along this research direction.

In this paper we will devote our effort primarily to the Content- based Image Retrieval paradigm. There are three fundamental bases for Content-Based Image Retrieval, Visual Feature Extraction, Multi-Dimensional indexing, and Retrieval System Design.

Various visual features and their corresponding representation and matching techniques. are implemented. To facilitate fast search in large-scale image collections, effective indexing techniques need to be explored.

Feature Extraction

feature (content) extraction is the basis of content-based Image Retrieval. In broad sense, features may include both text-based features (keywords, annotations, etc.) and visual features (color, texture, shape, faces etc.).

Color
Color feature is one of the most widely used visual features in image Retrieval. Color Histogram is the most commonly used color feature representation.

Texture
Computational approximations to visual texture properties found to be important. In six visual texture properties were coarseness, contrast, directionality, linelikeness, regularity, and roughness.

Shape
In image Retrieval, depending on the applications, some require the shape representation to be variant to translation, rotation, and scaling. Shape representations can be divided into two categories, boundary-based and region-based.

Segmentation

Segmentation is very important to Image Retrieval. Both the shape feature and the layout feature depend on good segmentation.

2. SEMANTIC IMAGE RETRIEVAL

Images are a major source of content on the WWW. The amount of image information is rapidly raising due to digital cameras and mobile telephones equipped with such devices.
There are two basic approaches to image retrieval: 1) content-based image retrieval (CBIR) and 2) metadata based image retrieval. In CBIR [4] the images are retrieved without using external metadata describing their content. At the lowest level,

features such as color, texture, shape, and spatial location are used. At a higher conceptual level, images with an object of a given type or a given individual are searched and retrieved.

A typical way to publish an image data repository online is to create a keyword-based query[1,2] interface to an image database. Here the user may select filtering values or apply keywords to the different database fields.

Keyword-based search methods suffer from several general limitations [5,8] A keyword in a document does not necessarily mean that the document is relevant, and relevant documents may not contain the explicit word.
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Keyword-based search is useful especially to a user who knows what keywords are used to index the images and therefore can easily formulate queries. This approach is problematic, however, when the user does not have a clear goal in mind, does not know what there is in the database, and what kind of semantic concepts are involved in the domain.

Using the keyword-based approach would lead to the following problems:

Formulating the information need The user does not necessarily know what question to ask. One may only have general interest in the topic. How to help the user in focusing the interest within the database contents?

Formulating query The user cannot necessarily figure out what keywords to use in formulating the search corresponding to the information need. How to help the user in formulating queries?

Formulating the answer Generating image hit lists for keywords would probably miss a most interesting aspect of the repository: the images are related to each other in many interesting ways.

We argue that semantic web technologies provide a promising new approach to these problems. In the following, semantic ontology-based annotation and retrieval of images is discussed. After this the ontology used in our demonstrational system is presented, an annotation example is given, and the an ontology-based user interface to the image repository is illustrated. In conclusion, the contributions of this work are summarized.

3. SEMANTIC IMAGE ANNOTATION

Keywords - Controlled vocabularies are used to describe the images in order to ease the retrieval.

Free text descriptions - Free text descriptions of the objects in the images are used. The information retrieval system indexes the text for keyword-based search.
Semantic web ontology techniques [5] and metadata languages [9] contribute to this tradition by providing means for defining class terminologies with well- defined semantics and a flexible data model for representing metadata descriptions. One possible step to take is to use RDF Schema [3] for defining hierarchical ontology classes and RDF [11]for annotating image metadata according to the ontology. The ontology together with the image metadata forms an RDF graph, a knowledge base, which can facilitate new semantic information retrieval services.
Our idea is to first make ontological models of the concepts involved in the image repository. The ontologies form the core of the system and are used for three purposes:

Annotation terminology The ontological model provides the terminology and concepts by which metadata of the images is expressed.
View-based search The ontologies of the model, such as Persons,cost and Places provide different views into the promotion concepts. They can hence be used by the user to focus the information need and to formulate the queries.
Semantic browsing After finding a focus of interest, an image, the semantic ontology model together with image instance data can be used in finding out relations between the selected image and other images in the repository.

4. ONTOLOGY AND ONTOLOGICAL KNOWLEDGE BASE

service of the Restaurant as DINING ontology. It involves address, contact detail of the restaurant and about catering details, that is beverages available with cost to the customers, beer, wine with price. Whether home delivery available, self service needed. This ontology give details about cuisine, whether it is coffee shop cuisine, winebar cuisine, ice cream parlour cuisine, Indian cuisine, vegetarian cuisine and also about the Atmosphere, whether it is business &casual atmosphere, dance floor available. dish details can be viewed and facility available as business dining ,children &baby facility available, baby chair, baby laundry, children meal, children game area.

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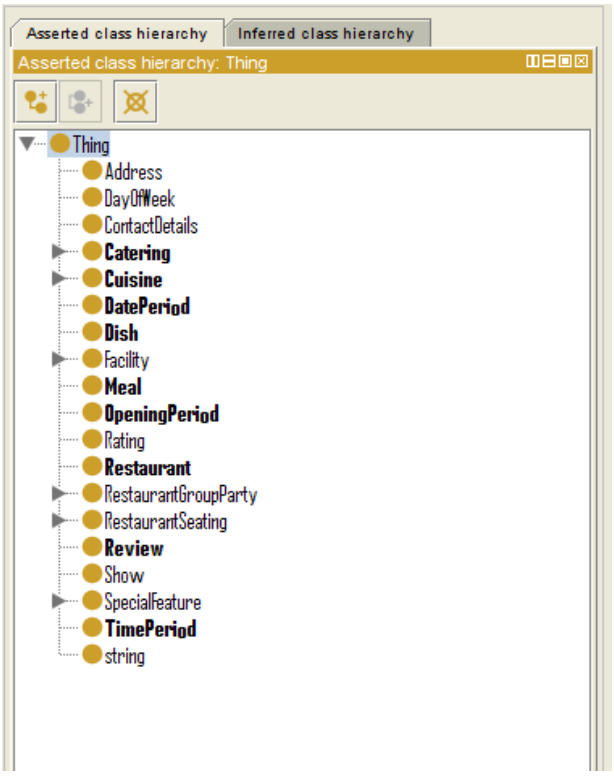

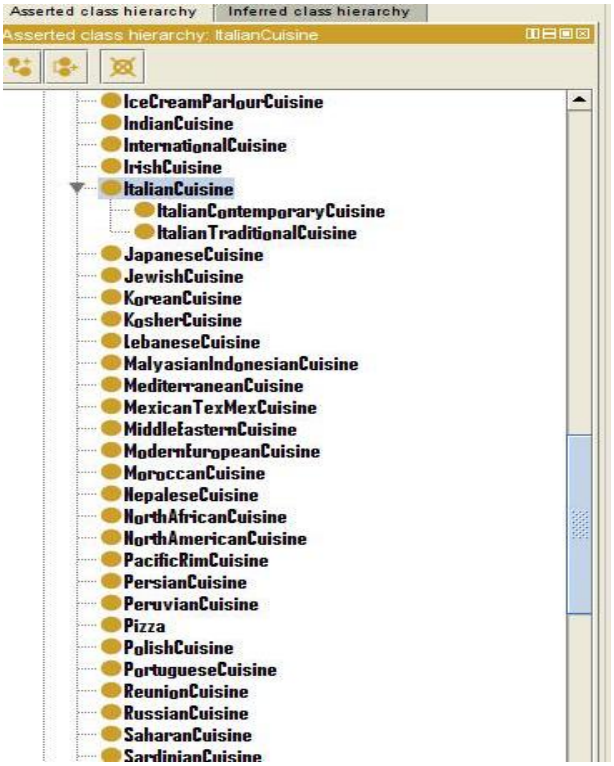

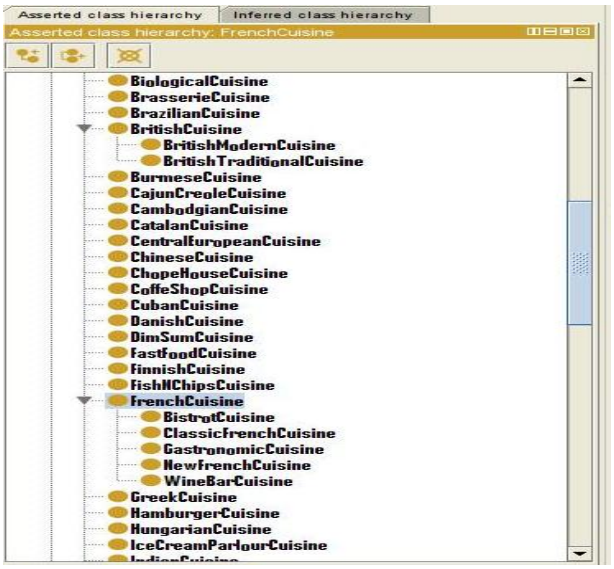

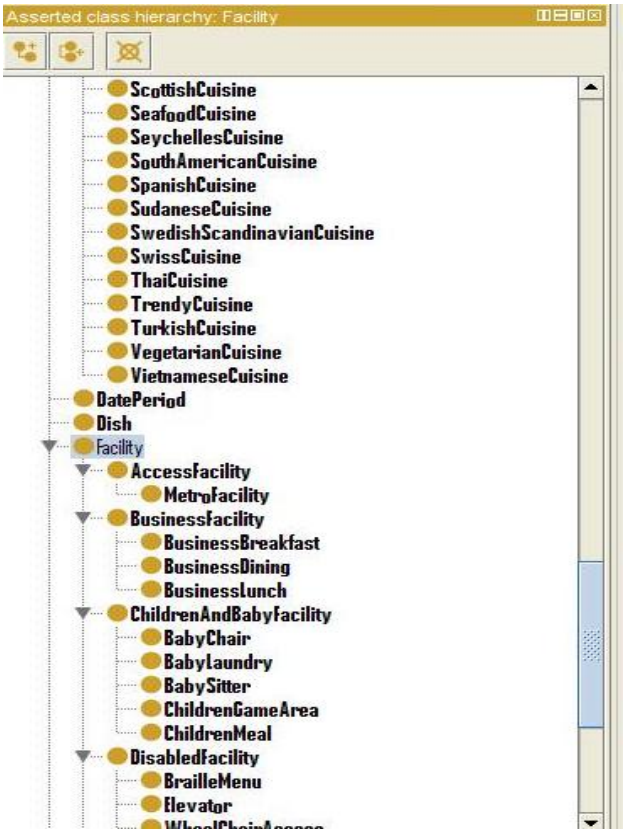

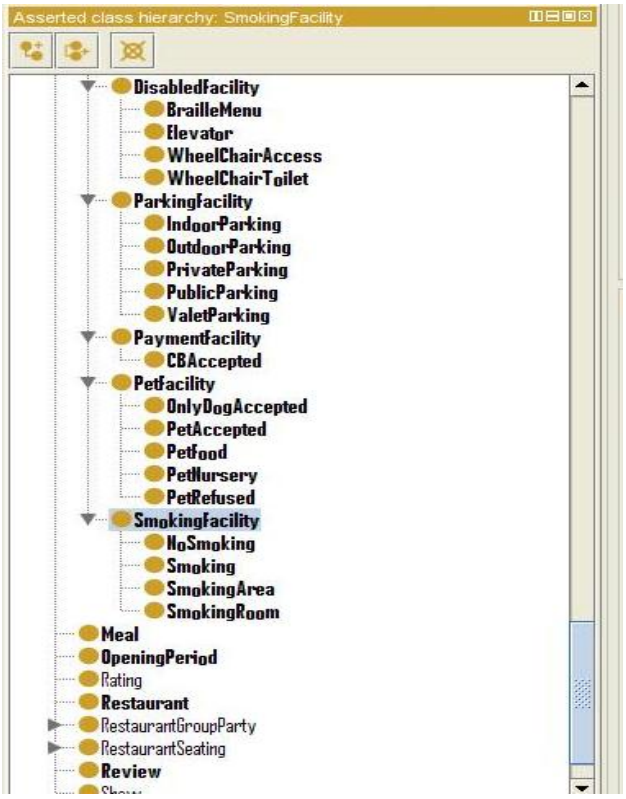

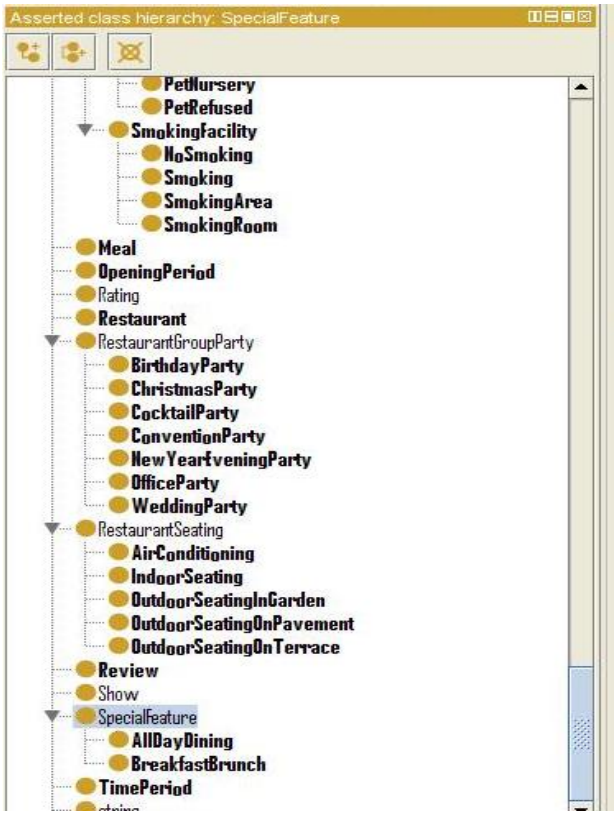

This ontology shows disabled facility, elevator exist ,wheel chair access, wheel chair toilet exist &also parking facility can be viewed as indoor parking, outdoor parking, private parking, public parking, payment facility is specified, wheather card accepted. whether pet facility exists, petfood, petnursery, smoking facility available, smoking room exists, smoking area exists, rating and restaurant group party &restaurant seating. In restaurant group party, birthday party can be arranged, Christmas party, wedding party, new year party. In restaurant seating,air conditioning is available, indoor seating, outdoor seating &also some special features are all day dining, breakfast brunch, time period and all these details can be viewed.

5. ANNOTATION OF THE IMAGES

We used the following annotation scheme: every image is associated with a set of instances of the promotion ontology. They occur in the image and hence characterize its content.

The ontology was created with the Protégé ontology editor, using RDF Schema as the output language. Protégé was also used for annotating the photograph.

Figures shows a Harbor Restaurant

Description	Image File
Textual description about image.jpg	Image.jpg

Figures shows instances of annotation classes

The photos come from the image database This database was transformed into a repository of images and RDF-instance data and annotated further according to the ontology.

6. SEMANTIC IMAGE RETRIEVAL

Ontology view selection	Image viewer and links
Ontology view	The selected image
Folder	Information about image
Images	Links to relate images

Based on the ontology, a web server was implemented to support se-mantic image retrieval. Figure illustrates its appearance on an ordinary web browser. The system provides the user with the following semantics-based facilities.

View-based filtering

the user can open ontologies for filtering photographs of interest. In the figure, the ontologies have been opened. Additional views could be opened with the tool. The ontologies are the same that were used when annotating the images. They tell the user the relevant concepts related to the promotions and underlying images. In this way the ontologies help the user in formulating and focusing the information need.

Queries can be formulated by opening ontological views and by selecting their classes. A query is the conjunction of the selections made in the open ontologies. The metaphor of opening directory folders with images is used here. This view-based idea to information filtering along different index-ing dimensions

Image recommendations The answers to filtering queries are hit lists as customary in search engines, such as Google13 and AltaVista14 on the web. However, in contrast to such systems each hit is semantically linked with other images based on the ontological definitions and the annotations.

DISCUSSION

This paper showed that ontologies can be used not only for annotation and precise information retrieval [16, 17], but also for helping the user in formulating the information need and the corresponding query. This is important in applications such as the promotion exhibition, where the domain semantics are complicated and not necessarily known to the user. Furthermore, the ontology-enriched knowledge base of image metadata can be applied to constructing more meaningful answers to queries than just hit-lists. For example, in our demonstration implementation, the underlying knowledge base provided the user with a semantic browsing facility between related recommended images. The major difficulty in the ontology based approach is the extra work needed in creating the ontology and the detailed annotations. We believe, however, that in many applications – such as in our case problem – this price is justified due to the better accuracy obtained in information retrieval and to the new semantic browsing facilities offered to the end-user. The trade-off between annotation work and quality of information retrieval can be balanced by using less detailed ontologies and annotations, if needed.

REFERENCES:

i. M. Agosti and A. Smeaton, editors. Information retrieval and hypertext. Kluwer, New York, 1996.

ii. R. Baeza-Yates and B. Ribeiro-Neto. Modern Information Retrieval. Addison-Wesley, New York,1999.

iii. D. Brickley and R. V. Guha. Resource Description Framework (RDF) Schema Specification 1.0, W3C Candidate Recommendation 2000-03-27, February 2000. http://www.w3.org/TR/2000/CR-rdf-schema- 20000327/.

iv. J. P. Eakins. Automatic image content retrieval — are we getting anywhere? Page 123–135. De Montfort University, May 1996.

v. D. Fensel (ed.). The semantic web and its languages. IEEE Intelligence Systems, Nov/Dec 2000.

vi. D. K. Fields, M. A. Kolb, and S. Bayern. Java Server Pages. Manning Publications Co., 2002.

vii. W. Grosso, H. Eriksson, R. Ferguson, J. Gennari, S. Tu, and M. Musen. Knowledge modelling at the millenium (the design and evolution of protege-2000. In Proceedings of 12th Workshop of on Knowledge Acquisition, Modeling and Management (KAW-1999), Banff, Alberta, Canada, 1999.

viii. E. Hyv¨onen, K. Viljanen, and A. H¨atinen. Yellow pages on the semantic web. Number 2002-03 in HIIT Publications, pages 3–15. Helsinki Institute for Information Technology (HIIT), Helsinki, Finland, 2002. http://www.hiit.fi.

ix. Eero Hyv¨onen, Petteri Harjula, and Kim Viljanen, Representing metadata about web resources. In E. Hyv¨onen, editor, Semantic Web Kick-Off in Finland, number 2002-01 in HIIT Publications. Helsinki Institute for Information Technology (HIIT), MaY 2002 .http://www.cs.helsinki.fi/u/eahyvone/stes/semanticweb/.

x. M. Koskela, J. Laaksonen, S. Laakso, and E. Oja. The PicSOM retrieval system: description and evaluations. In The challenge of image retrieval, Brighton, UK, May 2000. http://www.cis.hut.fi/picsom/publications.html.

xi. O. Lassila and R. R. Swick (editors). Resource description framework (RDF): Model and syntax specification. Technical report, W3C, February 1999. W3C Recommendation 1999-02-22, http://www.w3.org/TR/REC-rdf-syntax/.

xii. B. McBride, A. Seaborne, and J. Carroll. Jena tutorial for release 1.4.0. Technical report, Hewlett-Packard Laboratories, Bristol, UK, April 2002. http://www.hpl.hp.com/semweb/doc/tutorial/ index.html.

xiii Steve Pepper. The TAO of Topic Maps. In Proceedings of XML Europe 2000, Paris, France, 2000. http://www.ontopia.net/topicmaps/materials/rdf.html.

xiv. T. Peterson. Introduction to the Art and Architecture thesaurus, 1994. http://shiva.pub.getty.edu.

xv. A. S. Pollitt. The key role of classification and indexing in viewbased searching. Technical report,University of Huddersfield, UK, 1998. http://www.ifla.org/IV/ifla63/63polst.pdf.

xvi. A. T. Schreiber, B. Dubbeldam, J. Wielemaker, and B. J. Wielinga. Ontology-based photo annotation. IEEE Intelligent Systems, 16:66–74, May/June 2001.

xvii. G. Schreiber, I. Blok, D. Carlier, W. van Gent, J. Hokstam, and U. Roos. A mini experiment in semantic annotation. In I. Horrocks and J. Hendler, editors, The Semantic Web – ISWC 2002. First international semantic web conference, number LNCS 2342, pages 404–408. Springer–Verlag, Berlin, 2002.

xviii. G. Shachor, A. Chase, and Magnus Rydin. JSP Tag Libraries. Manning Publications Co., 2001.

xix J. Sowa. Knowledge Representation. Logical, Philosophical, and Computational Foundations. Brooks/Cole, 2000.

xxi. J. van den Berg. Subject retrieval in pictorial information systems. In Proceedings of the 18th international congress of historical sciences, Montreal, Canada, pages 21–29, 1995. http://www.iconclass.nl/texts/history05.html.