Combining context and contents description in multimedia archives

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(Extended abstract)

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1. Characteristics of Metadata

Metadata in its broadest sense is data about data. A library card collecting selected features of a book is metadata, as it describes the attributes and contents of a specified (data) item. Concern with the organisation of metadata is traditional in the documentation sciences, for the purposes of organisation and retrieval. The problem has changed in nature when it has crossed the border of the specialised documentation professionals and the (respectably large) amount of data items they were called to handle to the undifferentiated searcher on the electronic networks and the virtually unmanageable quantity of information presently available to them. To make things worse, the notion of document has also crossed the textual limits and may now include a wild variety of data, media and formats. Further more the concept of administrative document or record requires increasing effort on description of its production context and environment, which raises needs of recovering information not only through its content but through its context as well. Nowadays, multimedia records are an increasing fact within public agencies and private companies: GroupWare packages, such as teleconference or Internet/Intranet video meetings, are recurrently adopted as standard administrative procedures. It is esteemed that presently some 300 million objects are available on the Web. Search engines are some of the most popular tools for network users, but they are limited, in the most part, to using statistical techniques on the textual content of documents. The generalised lack of description information restricts conceptually based search to areas where metadata is to some extent standardised.

Metadata, or structured data about data, improves discovery of and access to globally distributed information. The effective use of metadata among applications, however, requires common conventions about semantics, syntax, and structure. Individual resource description communities define the semantics, or meaning, of metadata that address their particular needs. Syntax, the systematic arrangement of data elements for machine processing, facilitates the exchange and use of metadata among multiple applications. Structure can be thought of as a formal constraint on the syntax for the consistent representation of semantics.

The challenges of defining metadata standards are quite clear by now [1]. It is necessary to accommodate information in different forms and media: textual, image, video, audio. It is in the best interest of effective search that metadata is not specialised by media: to retrieve items on a specified topic, it is useful to obtain a textual document and a video sequence in response to the same query. It is necessary to query, locate and retrieve documents by the production environment, according to what were their functional purposes or organic context. It is necessary to balance functionality and simplicity: if a complex metadata description is required for simple

items, the person or application that produces the item will not be willing to generate it. A crucial topic is interoperability: metadata descriptions for different purposes will have different specifications, but common grounds can be established to ensure interoperability. Extensibility is also required: the rapid growth of information needs imposes it. The intensive use of electronic communication imposes the obvious requirement of metadata being manageable by both humans and machines. It is necessary to consider appropriate languages for representing and handling metadata.

The current efforts to establish agreements on core metadata specifications concern many different communities with different requirements for the definition of metadata features, and different standards for the processes involving their creation, administration and access.

2. Project Goals

It is clear from the state-of-the-art in metadata representation that there is considerable work on the concepts involved and the requirements for several specialised areas. The need for metadata specification cannot be overemphasised either: it is presently the main issue in electronic information retrieval. It is therefore the right time for exploring the application of the vast conceptual work already accomplished to concrete tasks and concrete domains.

The project Metamedia aims at joining people and expertise from two rather separate areas into the common goal of describing metadata. The first area of expertise of the team is archival description. The experience of several of the team members with the historic archives at Porto and Braga has motivated the interest and opportunity of applying richer metadata structures to the problems they have been handling. This work has been largely based on the principles established by the International Council on Archives on ISAD(G) [2] (General International Standard Archival Description). The second area is video processing. The team members who come from the video processing area have felt the need to explore metadata concepts when dealing with video archives.

The opportunity for working on metadata for video objects is also present due to a very significant fact: The ISO Technical Committee for Coding of Motion Pictures and Audio (nicknamed MPEG) is currently working on Multimedia Content Description Interface – what will constitute the MPEG-7 standard. Although a very specialised working group, the MPEG-7 cannot afford to ignore all the ongoing work on metadata standardisation, on penalty of becoming a specialised standard for an area where information growth and dissemination is rapidly growing. In the area of metadata description, the separation of textual and video metadata is quite artificial: most resources tend to be multimedia in nature and the distinction makes even less sense for non-specialists. Furthermore, the proposed structure for the metadata descriptions of the MPEG-7 preliminary documents is quite compatible with ongoing work in the metadata description community.

The team will be therefore committed to two main goals on this project:

- To participate and closely follow the ISO MPEG-7 work.

- To specify, implement and test a metadata description system that can be used in a multimedia environment.

The accomplishment of the second goal requires expertise in a third area: description languages. The team includes people with background and experience in this area. Three sub-goals have therefore been identified and further detailed: the study of metadata description requirements for multimedia applications, the choice of convenient languages for representing and querying the proposed descriptions and the evaluation of the expressiveness and appropriateness of both in realistic applications.

A similar reasoning can be applied, mutatis mutandis, to textual document archives, be it a traditional historical archive, a newspaper archive, or a Web site.

3. The Description Scheme

One of the results so far obtained by the project is a metadata model, or Description Scheme, for Text, Still Image, and Video documents. The Description Scheme aims at providing a structural description and a set of descriptors that can be used in classical textual documents and on pictures and video.

The rationale behind this proposal can be summarised by the following remarks:
- the archive is organised as a containment hierarchy with a top level usually called *fonds*, and a varying number of connected sub-levels, depending on the actual material and how far the description work has gone;
- the set of attributes used to describe each level is the same, with the advantage of making it easy to add or remove a level in the hierarchy;
- the actual description must follow the rule of generality, asserting each element as high in the hierarchy as appropriate and avoiding redundancies at lower levels where only more specific information, relevant for the respective level, should be explicitly added; generic information can be obtained by searching higher in the hierarchy;
- there are separate representations for the structural and external characteristics and for the detailed description of the image or document contents;
- the production context is important and induces the overall organisation of the archive.

References
[1] RDF: http://www.w3.org/RDF/Overview.html
[2] *International Council on Archives*, "ISAD(G): General International Standard Archival Description" , adopted by the Ad Hoc Commission on Descriptive Standards Stockholm, Sweden, 21-23 January 1993.