

Multimedia ontology meeting

1 December 2005 : IEE London, 14:30 – 16:30

Present

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1. Meeting objectives

The meeting aims to discover if it is feasible to build an overall multimedia ontology, re-using existing work and current approaches, and to identify how we might harmonise and share multimedia ontologies.

2. Presentations of related ontologies

Jacco van Ossenbruggen described the W3C multimedia taskforce (MMTF) which is in the Semantic Web Best Practice WG, which has a charter until February 2006.

<http://www.w3.org/2001/sw/BestPractices/MM/>

The first deliverable is a document describing the state of the art in vocabularies and tools, focusing on some specific use cases. Work is also ongoing to show how non-RDF metadata approaches can be made interoperable with RDF/OWL approaches and vice versa, considering relevant standards e.g. MPEG-7, IPTC, EXIF, XMP, VRA etc.

The emphasis is on images, not audio visual material, and A/V could be considered in a next step, if W3C were to support work beyond February 2006.

Raphael Troncy presented some work on multimedia ontologies based on MPEG-7. The problem is that MPEG-7 descriptors and description schemes form a huge set. Attempts have been made to reformulate MPEG-7 for the Semantic Web :

- Jane Hunter and Suzanne Little : an MPEG-7 ontology developed in RDFS, then converted into DAML+OIL and now OWL (OWL-Full ontology). This covers the upper level of the MDS including some basic visual descriptors. It is available at <http://maenad.dstc.edu.au/slittle/mpeg7.owl>
- Chrisa Tsinaraki is also working on a mapping of MPEG-7 to OWL. The objectives are to create an ontological infrastructure, methodologies for interoperability between MPEG-7 and OWL, and an underlying MPEG-7 Repository. It is available at : http://elikonas.ced.tuc.gr/ontologies/av_semantics.zip
- Raphael Troncy and Antoine Isaac investigated different uses of AV Document Descriptions. They have considered different metadata sets including TVAnytime, ProgramGuideML and MPEG-7. Tool for upper level categorisation of programmes and sequences have been created. The INA ontology is linked to the DOLCE ontology and is available at: <http://www.cwi.nl/~troncy/MPEG-7/>

Oscar Celma described a proposal to re-use MPEG-7 in OWL Full, with mappings from XML Schema to OWL. This covers the whole MPEG-7 and the upper level of the Classification Schemes. It is available at: <http://dmag.upf.edu/ontologies/mpeg7ontos/>

Yannis Avrithis explained the visual descriptor ontology developed in the aceMedia project. There are visual descriptors as found in MPEG-7 as well as meta concepts not in MPEG-7. This has been built in RDF(S) and a tool to extract visual descriptors has been created, which links the descriptors to

domain ontologies. It is available at <http://www.acemedia.org/aceMedia/reference/resource/index.html>

Tobias Burger presented the knowledge content object approach taken by the Metokis project. The objective of the definition is to discover how to exchange semantically annotated content between different semantics based content systems.

Michaela Spagnuolo reported on the models and tools created in the aim@shape project. The focus is on 3D shape description – ontologies and metadata for multidimensional media. Ontologies have been created in OWL and Protegé. They are available via <http://www.aimatshape.net/resources>

Matthias Hemmje described the VIKEF project's methods for image annotation at an object level. There is also work in Uni Hagen on information visualisation and visual data mining. The objective is to achieve an information visualization ontology.

Ovidio Salvetti reported that the MUSCLE project is starting to investigate multimedia ontologies. It has previously studied vision, speech, text at a signal processing level. There is interest in automatic retrieval of image processing algorithms.

Lyndon Nixon referred to his presentation at EWIMT on resource description and multimedia creation workflow. A presentation is available at <http://page.mi.fu-berlin.de/~nixon/>

3. Building an overall multimedia ontology

Yiannis explained that we need to look at the definition of what would constitute a multimedia ontology and what it would be used for. Multimedia ontologies are used for many purposes including annotation, analysis, reasoning and retrieval.

Ontologies of multimedia content represent characteristics at high (semantic) and low (signal) levels, workflow, user preferences, algorithms etc.

The objective of the discussion is to identify if we can realise a reference or standard multimedia ontology or ontologies framework. If we have multiple ontologies, we need to identify how we might map between them.

The first step is to investigate requirements in which we need multimedia ontologies such as

- Scope (annotation, analysis, retrieval)
- Multimedia characteristics (low level, features, structures)
- Media (image, video, audio, multimodal, 3D)
- Languages - standards
- Links to domain models - vocabularies
- Tools (e.g. annotation, reasoning)

We agree that an ad-hoc working group could be beneficial, and could feed into the W3C MMTF. This could be useful because not all participants of our meeting are W3C members. If we make sufficient progress during 2006 to

consider future standardisation in W3C, it would be necessary to have our approach well developed and mature before starting the W3C processes.

We discussed a starting place as consideration of application domains, research needs (research scenarios), and use cases. The MMTF is starting from current use cases but is not predicting forward use cases, so such future looking use cases could be useful input to the MMTF.

Requirements from various directions are to be considered including scientific research, music, workflow, commercial applications, artistic applications etc. If we can define a unified meta ontology, we can imagine a future where there is a harmonised framework, into which the individual multimedia ontologies can be plugged.

Concern about the magnitude of the task we are embarking on was expressed. Multimedia ontologies are already used in a number of applications ranging from low-level features description to policies management. We don't want to repeat mistakes from other standards e.g. trying to build something too big. Harmonisation is not easy, since we find it difficult to understand how we might re-use each other's ontologies when we have built them with specific applications in mind. We agree that it is hard to re-use someone else's ontology in multimedia applications, but this is not a problem unique to multimedia, but is common to many Semantic Web problems.

An alternative approach is to aim to agree on a set of core features and specifications which is a "minimum set" to be used as a basis for all applications to build on and extend. In this case a meta-modelling approach could lead to a meta- or core ontology. A successful example is the CIDOC CRM ontology for the cultural heritage domain.

A further alternative is to engage in profiling and contextualization such that we can envisage a large-scale, ambitious ontology, with levels starting from a basic core and building up. Could we define a core multimedia and a number of levels which can be organised in a hierarchy?

4. Next steps

Within 2006, we aim to draft a document with requirements, definitions and objectives. We may need to set up a working group, in collaboration with the MMTF where practical.

We have repositories available for sharing multimedia ontologies. aceMedia offers a resource and Jacco is collecting them also¹.

Completion of the requirements document would be followed by the analysis of the available ontologies to see where they relate to the requirements.

We will send out a call for requirements (e.g. requirements as listed above in section 3), then collect requirements, identify which could be in the core and which are in the various hierarchical levels, and feedback to the group for discussion.

¹ We will need to discuss the maintenance of the repository after the end of the aceMedia project (end of 2007). It was suggested that K-Space could look after this.

The action points are :

- a) Create the call for requirements (all at today's meeting to contribute)
- b) Send it (aceMedia will do this) by 31 December 2005 to all at the meeting and also as widely as possible to allow people not attending the meeting to contribute. We should also post the call on our project web sites.
- c) Collate the results (aceMedia will do this) and send out to all who contributed.
- d) Carry out a first analysis (all who contributed to the document will need to participate in this exercise).
- e) Hold a further meeting to identify the outline harmonisation documentation.

Since the Semantic Web multimedia annotation workshop on 23 May conflicts with the ISCAS Special Session on personalisation of multimedia content, it may not be feasible to hold a follow up meeting at either event. An alternative which we will consider is the ESWC to be held in June 2006 in Montenegro. Other options will be discussed by email.

A mailing list multimedia-ontology@iti.gr will be created for all communications regarding this activity.

Appendix : agenda

14:30 - 14:40	1	Introduction	Paola Hobson
14:40 - 15:10	2	Presentations of related ontologies	
15:10 - 15:20	3	Sharing multimedia ontologies	Yiannis Kompatsiaris - aceMedia repository
15:20 - 16:20	4	Discussion for building an overall multimedia ontology : objectives, definition, requirements, specifications, timeplan	Yiannis Kompatsiaris - objectives Raphael Troncy - harmonisation research
16:20 - 16:30	5	Agreement of actions and next steps	
	6	Next meeting	