



Related Standards Study

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1 Executive Summary

This document provides a brief overview of some standards and projects related to either the objectives of MEPCO ontology or to the intended domain of research – media domain and advertising domain. The document lists the important standards and projects that model media presence, the semantics of media content and provide media-related metadata. The standards and projects are presented together with their objectives, results achieved and intended field of application. Note is made on their relatedness to MEPCO objectives.

2 Introduction

2.1 Purpose of this document

This document is a brief overview of some important metadata standards that model two partially related domains – that of media and the domain of advertising. Most of the standards make use of content-independent elements, i.e. aim at describing features shared by wide range of items within a collection –author, title, etc. There are few standards that in order to enable semantic annotation and retrieval utilize content-dependent elements, i.e. descriptions derived directly from the content of the item. Of the standards and projects presented, only few use ontology in a way similar to the ideas envisaged in Media Campaign project. The objectives of Media Campaign Project are to discover, interlink and track new media campaigns and to this end the project will exploit the use of ontology as Semantic Web technology as well as other advanced technologies.

2.2 Scope of this document

This document covers the standards and projects that show relatedness to MEPCO either in the intended domain or in the pursued objectives. The document presents some conclusions drawn on the basis of a comparison between the related standards and MEPCO and puts some emphasis on the various approaches for automatic extraction of semantic description in media domain.

2.3 Related Documents

The related standards study and analysis presented briefly in this deliverable is used as a direct input in the process of designing MEPCO ontology and for the deliverable MC-D32-ONTO-02-MEPCO-Design [MD].

3 Related Standards and Projects

3.1 Related Standards

Media Campaign is an ongoing project with the objective to automate to a large degree the process of detecting and tracking of media campaigns on television, Internet and in the press. A media campaign is defined as the universe of measures taken in order to fulfil a specific objective [MC]. The identification and tracking of a media campaign relies on the prior identification, recognition and interrelating of the creatives that made up the campaign. This means that various analyses of the different media are to be performed in order to extract features related to campaigns of all types [MC]. Four modalities will be analyzed and cross-linked – image, text, audio and video. In addition, media campaigns and media presence will be formally modelled by means of MEPCO ontology. The use of ontology for the identification and for the tracking of ads and campaigns is an innovative approach within Media Campaign Project comparable to some degree to the approach used within MediaSeeker and DirectInfo Project.

3.1.1 On Metadata

There are several definitions in Internet of what metadata and ontology are and of their usefulness for multiple tasks addressed by the semantic web community. One simple way in defining metadata is by means of listing its possible uses - metadata is structured information that describes, locates, or facilitates the retrieval and management of an information resource [NISO]. Besides its various other uses, metadata facilitates cataloging of information. Ontology, from the other side, is a description of the concepts and relationships in an area of interest and is especially valued because it enables knowledge sharing and reuse [Gruber]. Thus, the ontology is more sophisticated approach comparing to that using metadata, because it provides means to represent and use the relationships that exist between the objects in the area of interest and it enables reasoning about these objects. Within Media Campaign Project some of the complex tasks of detecting and tracking of media campaigns could be more easily approached by means of using ontology and not just metadata.

There are various classifications of metadata, however for our purposes we are interested only in those which consider the elements that made up a given phenomenon in the domain of interest. One widely used classification in [Stiles] and [Boll] distinguishes the following types:

- Content-dependent vs. content-independent. Content-dependent metadata is derived from the content while content-independent metadata describes features shared by wide range of items in a collection – i.e. having an author, title, etc. In media domain content-dependent metadata usually refers to low-level features like color, shape, size which are relatively easily extracted automatically. Sometimes as content-dependent metadata within media domain are considered high-level semantic features like man, fish, boat etc. whose automatic extraction pose a real challenge.
- Direct content-based vs. content-descriptive. Content-descriptive metadata is metadata based on the content but which cannot be extracted by means of textual indexing techniques and requires the use of human knowledge. An example is denoting the fragrance of an image containing a flower. [MDM] Examples of direct content-based metadata are full-text indices.
- Domain-independent vs. domain-specific. Domain-independent metadata describes wide range of phenomena common across domains. Such kind of metadata is conveyed by upper-level ontologies. Domain-specific metadata, in its turn, models the domain-specific information and can be formalized with domain-specific ontologies.

It is relatively easy to model content-independent metadata but it is not that easy to model direct content-based elements, i.e. the elements that convey the narrative content. There are attempts to provide useful means for the semantic descriptions of namely the narrative elements, for example in ABC Ontology or within OntoMedia project. But there are doubts as to the success of any such attempt and some regard these attempts as lacking the prospects of a successful implementation. [Hauptmann] [Calic] [Snoek]

What concerns the nature of content-dependent elements; there are three types of them not yet clearly distinguished, to our knowledge. The first kind is the layer of objects which are easily encoded in an ontology or metadata standards such as persons, things, places. The second layer that contributes to the semantics of content is that of the narrative content. It comprises of objects as events, agents, roles, etc. and it is not easily described by means of metadata. The third layer, to our knowledge, has not yet been encoded but the creatives make extensive use of it. The layer comprises of objects like happiness, feeling of parenthood, loyalty, etc. If we target at describing the content of a creative it is important to consider which of the elements, classified above, are to be included in the resulting description and whether or not it is easy to formalize such a description. For example some cars are branded by encoding luxury, prestige, etc. in the ad message but a useful description of a creative of a car might do well without any appeal beyond the visible elements like brand, colors used, and accompanying text.

3.1.2 On MEPCO Ontology

From a broader perspective, the media domain models often refer to models of other sub-worlds (e.g. geographical ontologies). Significant effort is put not only in creating domain-specific ontologies, but also in creating shallow models of the world that would accommodate all phenomena. They are called upper-level ontologies. Although they might be quite sophisticated, they are widely used in integrated applications that need a single upper-level model to accommodate several domain-specific ontologies under a common “hood”. This motivates us to create MEPCO as domain-specific ontology that models partially media domain and advertising domain. MEPCO was designed as an extension of PROTON upper-level ontology.

In designing MEPCO ontology, we considered several domain-specific ontologies and metadata standards that model media domain, and respectively, the advertising domain. The results of the survey were taken into account in the design of MEPCO ontology. MEPCO is designed so as to meet the objectives of Media Campaign Project, to represent the targeted domain as fully and accurately as possible, and to allow an easy mapping to any other media and advertising ontology of interest. The objective of Media Campaign project are the detection and tracking of media campaigns on television, Internet and in the press. This means that specific metadata is needed to meet that objective, namely, Media Campaign Project requires description of media, of events that make up a campaign and of their interrelations. It also requires a list of the respective features of a campaign and of a creative. Since one of the subordinate objectives of the Project is the recognition that a campaign or any of its constituent events is a new one and also the tracking of the same campaign across media and across countries, it is also required that list of features which would help in doing this is also present.

Below we present the major metadata standards in advertising and in media domain. Most of the standards are developed on the basis of XML (Extensible Markup Language) - a protocol defining markup languages that establish common syntax for structuring data. The XML specification defines a standard way to add markup to document contents. XML is defined by the World Wide Web Consortium [W3C] and it is used as a base for transition and exchange of structured data between the applications keeping it media-independent. Because XML is extensible, it can be made to handle every requirement for publishing classified ads across various media. A markup language is a method to specify structures in a document.

One of the XML specifications widely used in advertising domain is a Document Type Definition (DTD). DTD defines syntax rules for a common XML tag set. These rules reflect on the tags that can be used in a document; the relationships between the tags and their order; which tags can be nested; which have attributes; and so forth. In essence, the DTD is an agreement between people exchanging documents on how they will use XML to describe common document architecture [NAA CREST[®] V2.0]

The standards below are divided in two groups according to their applicability in advertising and in media domain. There are notes of what type of metadata they utilize and to what extent they are suitable for the purpose of MEPCO Ontology.

3.1.3 Standards in the advertising domain

IFRA adConnexion 2.0

AdConnexion is an XML based specification that standardizes the e-commerce between advertiser and ad-space provider such as newspapers [IFRA 2006]. AdConnexion was created by the Swedish Newspaper Publishers' Association in 2000 and currently is owned and maintained by Ifra. The adConnexion specification is capable of representing the main share of newspaper print advertising orders including data fields for colors, placements, sizes, prices, insertion dates and more. [IFRA]. It is applicable for ads appearing in print, mainly newspapers [IFRA 2001]. The latest update, version 2.0, was released in June 2004. It is succeeded by AdsMLBookings that supports different media not just newspapers. Next generation standard is AdsML described below. Most of the objectives of MEPCO are not related to those of AdConnexion. Nevertheless some of adConnexion metadata elements can be considered and easy to either map or include in MEPCO ontology if necessary. To sum up, AdConnexion targets management metadata, as well as content-independent, low-level descriptions of an ad.

AdsML

The Advertising Markup Language, AdsML is an XML standard supported by IFRA (International Association for media publishing), the Newspaper Association of America (NAA) and IDEAlliance (<http://www.adsmml.org>). AdsML is an XML-based framework for unifying and extending the advertising workflows, e.g. the exchange of specific types of advertising information. [overview] The existing standards such as adConnexion focus on specific parts of the overall advertising process while AdsML specification is designed to extend their reach [IFRA 2004].

The objectives behind AdsML are to cover information necessary in the exchange of advertising business documents and advertising content among advertisers, intermediaries, and media distributors, but also to provide means for the description of the creative content of an ad. In its current state it is applicable to print media. The structured descriptions, part of AdsML, were originally developed for CREST V2 (a standard for classified advertising, described below) and expanded to support all classes of advertising. It is envisaged that in the future, the standard would allow for the content-dependent description of an ad (the objects appearing as well as the textual content). The supported vocabularies at the moment are for the classified ads like that of transportation, real estate, recruitment, travel. Of all related standards mentioned in this section, AdsML is the most elaborated. [AdsML] [AdsML, V2] [AdsML, Brochure] [AdsML, Sample]

AdMarkup

AdMarkup is a standard, developed by Zedak Corp., an agent of New York Times. AdMarkup is XML DTD for advertising. It contains elements necessary for the description of content-independent information (domain-specific) and of the physical representation of ad content, ad placement. It also contains elements for the description of the advertiser (contact information, etc.). The purpose of AdMarkup is to allow a standardized description of classified advertisements and therefore it was only partially useful for the design of MEPCO. It was useful as far as it gives an insight of what elements of an ad are to be included in the ontology. [NAA1] [CP 1,2] [Draft] [Sample]

AdXML online DTD version 1.0

adXML is XML-based specification whose development was initiated by Mediaplex as part of the attempt to automate the online advertising market. [BW] adXML addresses both the worlds of online and off-line (e.g., print, magazines, TV) advertising [CP 3]. By the year 2002 when it was defunct, it was focused on and had means for the description of online forms of advertising only. In its current stage, MEPCO is focused on off-line advertising, and so AdXML does not provide any useful insight.

CREST Markup

CREST Markup is NAA standard for classified ads for publishing on Internet but it is applicable also for classified ads in print media. The standard attempts to provide web-based searching and to be media-independent. Its focus is primarily on real estate, transportation and employment categories, which represent the bulk of all print classified advertising. To enable web searches, the content of an

ad is associated with keywords and this makes it a relatively advanced approach which can be situated somewhere between the approaches using metadata and those utilizing the use of an ontology. Crest markup provides a common classified advertising data structure. The markup consists of command lines for formatting and typography. Though, this makes it a different kind of technology comparing to what MEPCO attempts to implement, the markup is still useful as it provides insights as to the description of low-level elements of an ad in a unified manner. [NAA 2]

SPACE/XML

Specifications for Publisher & Agency Communications Exchange (SPACE) XML are a standard electronic format, primarily meant to serve for the purpose of the exchange of business type information between the participants in the ad channels. It is intended to cover all types of advertising but its first release in 2002 is complete only in regards to the print advertising (magazine, newspaper, pop-advertising, and other print channels) [Idealliance, 2002]. The predecessor of Space/XML is Space/X12. X12 contains specifications for the description of electronic data file with ad copy. The creators of SPACE envisage the possibility to maintain different ontologies for different media (print, television). SPACE XML currently has a standardised XML coding for: (1) Space reservations; (2) Insertion orders; (3) Material job tickets; (4) Change order; (5) Confirmation. The standard consists of several vocabularies, some of which are useful as regards MEPCO and a direct mapping between parts of SPACE/XML and MEPCO are possible. In its current stage of development, MEPCO is not as specific as the vocabularies in Space/XML standard.

3.1.4 Standards in the media domain

IPTC Core Schema for XMP

Adobe's Extensible Metadata Platform is a technology that allows metadata to be embedded into the file right in the creation process. The schema captures information about titles, searchable keywords, and up-to-date author and copyright information.[CP 4] [Adobe] It is partially useful for the purpose of MEPCO, but since it is extensible and can accommodate existing metadata schemas, we keep an eye on its development.

SMIL

SMIL, the Synchronized Multimedia Integration Language, is XML-based language intended for interactive multimedia presentations. Most important features it has are the capability to describe the temporal behavior of a multimedia presentation, to associate hyperlinks with media objects and to describe the layout of the presentation on a screen. [SMIL] These features make some of SMIL elements, especially the ones used in the description of a layout, applicable also for the description of movies and commercials.

MDF

MDF, Multimedia Description Framework, intends to provide content description of audio and video documents and it accommodates different metadata (description schemes), i.e. both MPEG-7 and non MPEG-7 ones. [Xu] The framework is interesting for the purpose of MEPCO, because it provides useful insights as to the possible hierarchy of elements in the description of content. But what we regard as really useful properties of a media item and how to encode them is rather part of MPEG-7 standard.

MPEG-7

MPEG-7 Standard possesses well elaborated set of low-level descriptors for multimedia. Descriptors allow also partial encoding of semantic (high-level) metadata such as title, author, etc. Besides the low-level content descriptors, among the elements in MPEG-7 one can found such that allow localization of content as well as description of semantic concepts like time, places, persons, groups, etc. Textual annotations, classification schemes and controlled terms are also allowed. Outside the scope of the standard are functionalities like automatic extraction of features, indexing, annotation, etc. Low-level descriptors convey information about the media such as size, color, texture etc. Textual annotations serve to present metadata such as the author, title, creation date, or content description but not metadata for the narrative content. [Salember] [MPEG-7] If the descriptors for time, place, etc.

are taken from MPEG-7 standards still remains the necessity to organize them in a suitable hierarchy. Though it is said that MPEG-7 possesses such a hierarchy, the advantages ontology has are numerous. In principle it is possible to extend MEPCO to adopt elements from MPEG-7 standard.

EMMO

One of the approaches to access the content of a multimedia was implemented within EMMO project. It recognizes the usability of integrating semantic representation and domain ontologies. EMMOs, Enhanced Multimedia Meta Objects, are an approach for semantic multimedia meta modelling. EMMOs provide a model about the relationships between cultural artefacts, and describe three of the media content's aspects – media objects, semantic and functional aspect. EMMOs were elaborated as part of the CULTOS project [Zillner], and are interesting because of the utilization of an ontology (for the purposes of the project, the ontology is intended to refine the queries) and because it points to three of the aspects that create the semantics of a multimedia object. For the purposes of MEPCO, though, EMMOs are slightly over specific.

To sum up, there are several standards, most of which are intended for the description of media, not of its content. Of them, the most important and wide used is the MPEG-7 standard, whose elements are easy to integrate into MEPCO. As for the standards within the advertising domain, most of them aim to provide means for the description of low-level features of printed ads and as standards are well elaborated mainly for print ad, especially for classified ads. To convey the diverse semantics of advertisements and especially the semantics which would adopt printed as well as broadcasted creatives, it is suitable to combine the methods used by both ad markups and the standards for media description.

3.2 Related Projects

In what follows a brief overview of related projects is presented. The projects are chosen according to their relatedness to the goals pursued by MEPCO ontology. A short description of the objectives and technologies used within these projects is given. In addition some of the characteristics of media domain are mentioned.

There are three approaches when attempts are made to represent media of different type and their content. In [Calic] these approaches are discussed in brief. First, there is the ordinary approach that aims to map directly low-level features to high-level semantic concepts. Recent research focuses on utilizing the multimodal character of video media but it does not address the problem of appropriate multimodal representation. The low-level features to be encoded in a representation are chosen to be content-independent and this influences their semantics. Yet there is the top-down approach implemented in M-OntoMat-Annotizer. It makes use of the high-level knowledge of a given domain and constructs ontologies with both high-level domain concepts (prototypical instances) and formal specifications of corresponding visual descriptors. In effect, the interrelationship of high- and low-level multimedia concept descriptors is formalized. The third type of approach is seen in the emergent semantics. The approach is based on the assumption that the meaning of an image is derived from its being part of a collection and/or by the interaction with the end-user. Therefore the approach denies the usefulness of having predefined semantics and predefined representation.

RevealThis

The RevealThis Project aims at the Retrieval of Video and Language for the Home user in an Information Society. The tasks addressed by the project include organization of the content, filtering and creating content processing systems¹. The project addresses different media (radio, TV, web, etc. called platforms) and different modalities (speech, text, image, video called media) and in so far it is relevant to the objectives pursued within Media Campaign Project.

Within the RevealThis project the semantic description of a media is pursued by a creative approach. The approach is very useful in case of multimedia, because it exploits the possibility to find semantic equivalencies across different media which express the same information. [Pastra 2004 and 2006] [Piperidis] [Yakici] This approach proves useful also when questions of validity are addressed and

¹ <http://sifnos.ilsp.gr/RevealThis>

when some difficulties in automatic semantic description of the media domain are to be overcome. Yet, the approach is only partially useful in advertising domain, where different channels (text, video, image, etc.) do not overlap (provide same semantic content) but rather complement each other and thus cannot be used in disambiguation task as RevealThis project aims to solve. In its current state, MEPCO is concerned only incidentally with the content-dependent descriptions unlike RevealThis project.

OntoMedia

OntoMedia is ongoing project at Southampton University. The project aims at the representation of heterogeneous media through the description of its semantic content. A significant contribution of the project is the utilization of the narrative content of a media². For the annotation of multimedia documents, the project uses ontology as a specific form of a vocabulary. The ontology is designed as a general one, i.e. it is applicable across domains. In OntoMedia, a media item is described by making explicit the narrative elements of the item and their interrelations. OntoMedia is based on events and provides means for the placing of events and items within a temporal context. Compared to ABCOntology, OntoMedia has means for the specialization to fiction, i.e. of the narrative content. [Jewell]

In [Lawrence] the problem of the presence of heterogeneous data (in forms of photographs, sound, video and text) in the Internet is addressed – the problem being the presence of the complementary and often unrelated semantics added by each of the layers in a multimedia document. OntoMedia provides ontology for the annotation of multimedia documents where the resulting annotation (markup) is semantically rich description of the media.

M-Ontomat-Annotizer

M-Ontomat-Annotizer is a tool for semantic annotation of images and video. The Annotizer is developed within AceMedia project and as a tool allows a semantic annotation which is then after used for multimedia analysis and retrieval³. It combines two kinds of media descriptors - low-level descriptors (like dominant color) and the descriptors based on content (like person, vehicle etc). M-Ontomat-Annotizer links MPEG-7 visual descriptions and the semantic Web ontologies and annotations. The Annotizer serves to create a correspondence between the formally specified visual descriptions and high-level domain concepts. It formalizes the interrelationship between the high and low-level multimedia concepts. [Petridis, 2005] [Athanasiadis]

AceMedia

AceMedia project started in 2004. The objectives of the project are to create a framework which would assist the user to interact with multimedia content through innovative search technologies, automated indexing and cataloguing methods, and content adaptation to different devices and environments⁴. MPEG-7 does not provide functionalities for automatic extraction of metadata, much less at the semantic level. Within AceMedia project innovative technologies for automatic generation of metadata are developed⁵. Within the project, ontologies are extended so as to include low-level audiovisual features and descriptors to support automatic content annotation (to extract domain-specific features) and to model the higher-level semantics of the intended domain of sports and news broadcasting. [Petridis, 2002]. MEPCO development also envisages the possibility of using MPEG-7 capabilities and to combine them with ontology, and so to some extent AceMedia presents a relevant project and approach.

ABC Ontology

ABC metadata model developed within the Harmony international digital library project aims to provide a common conceptual model to facilitate interoperability between metadata ontologies from different domains. Later in collaboration with CIMI, the model was elaborated and has well grounded

² <http://ontomedia.ecs.soton.ac.uk/>

³ <http://www.acemedia.org/aceMedia/results/software/m-ontomat-annotizer.html>

⁴ http://www.acemedia.org/aceMedia/files/aceMedia_flyer_final.pdf

⁵ same

time and entity semantics⁶. The updated ABC model is capable to capture changes so that it is suitable for the description of entities and their interrelations where change is a substantial characteristic. ABC Ontology is designed to model physical, digital, and analogue objects in libraries, archives, museums and on the Internet, i.e. objects of all media types – text, image, video, audio, web pages, multimedia. [Lagoze]

TAO-XML

The main idea behind TAO-XML project is that the model for multimedia ontology should adopt the use of multimedia content of the documents not only the textual information they contain. The ontology must contain spatial and temporal relations between the components of which a multimedia object consist as well as their semantic interrelations. TAO-XML provides a model for describing the structure and the content of multimedia ontology. The authors of TAO-XML model aim to provide a formal ontology for the multimedia domain, i.e. they propose a formalization of the multimedia ontology. TAO-XML can be rendered among the standards for the representation of multimedia domain. [Albanese]

MUMIS

MUMIS was carried out from 2000 to 2002. Its objective was the development of a technology for automatic indexing and retrieval of multimedia material, i.e. using different media sources⁷. To perform automated indexing of multimedia, annotations are coupled with domain-specific information. The integrated basic technologies generate formal annotations of events of the processed multimedia content. The project uses data from different media sources to build lexicons and ontology. [Declerck, 2000] By the year 2000, the project was tested in the soccer domain. The contributions of the MUMIS are numerous but for the purpose of MEPCO the following ones were considered – the multimedia indexing by means of IE techniques and query interface which integrates domain knowledge (ontology).

XEROX

Xerox Research Center Europe addressed the task of text and video categorization and retrieval within Lava and RevealThis projects. Within Lava, the approach to image categorization relies on content-based image retrieval and object recognition where a visual vocabulary is used for categorization of the objects within the image. The vocabulary is automatically created out of sample images [Willamowski]. One important insight relates to the fact that certain objects appear together with certain other objects. The set of accompanying objects is used for disambiguation and to reduce the error in automatic categorization and recognition. In its current state of development, the objectives of MEPCO are not related to those of Lava project. Nonetheless, the approach to object recognition as pursued at Xerox might be useful at a later stage.

MediaSeeker

MediaSeeker is a platform for automatic analysis of radio and TV channels, developed at Fraunhofer IGD [MS]. MediaSeeker automates the process of content monitoring. It provides a solution to the task of automatic analysis of broadcast data; and so among its multiple applications it could be used in market research. The system relies on content-based analysis which is carried out after a segmentation of the stream into meaningful entities was performed. All the elements that contribute to the semantics of a stream are taken into account [Cavet]. The extracted semantic elements are then after used to track new advertisements in broadcast media. Future development of the platform aims at tracking of new campaigns [MS]. MediaSeeker utilizes advanced recognition techniques and also attempts at the modeling of the narrative content. To achieve it, a combination of scenes is used based on the temporal order of events, type and absence/presence of events and importance weights [Cavet]. MediaSeeker is interesting and important approach to content analysis task. The objectives of MediaSeeker and Media Campaign Project are related as concerned the task of tracking new advertisements and new campaigns.

⁶ <http://jodi.ecs.soton.ac.uk/Articles/v02/i02/Lagoze/>

⁷ <http://hmi.ewi.utwente.nl/project/MUMIS>

DIRECT-INFO

DIRECT-INFO project aimed at creating a system for semi-automatic extraction of consistent and meaningful semantic information from multimedia content. This objective is subordinated to the goal of media monitoring and advertisement expenditure estimations based on the sponsorship or product presence occurrence tracking in a variety of media. Main contributions of DIRECT-INFO are the use of multimodal classification approach, objects and logo recognition, positive brand mentioning detection. [Kienast] [Rehatschek, 2004a, 2004b] [DI, D6, 8] [DI, 2005] DirectInfo project is the most relevant to the objectives of MEPCO.

To monitor the expenditures of advertising several issues should be taken into account. In [Gonelli] these issues are outlined. First, the concept of logo detection is to be extended to product/object detection. Then, there is the task of semantic meaning extraction using creatives as they appear in different media. To detect the occurrence of a massive advertising campaign, it should be possible to correlate the creatives with equal or similar semantic meaning. To achieve these goals several techniques and technologies are used. And yet, there are opposing views that doubt the success of all techniques outlined above.

4 Conclusions

In designing MEPCO ontology, we considered several domain-specific ontologies and metadata standards that model media domain, and respectively advertising domain. There are several standards, most of which aim at the description of media, not of its content. Of them, the most important and wide used is the MPEG-7 standard, whose elements are easy to integrate (i.e. map) into MEPCO ontology. Most of the standards within the advertising domain aim to provide means for the description of low-level features of printed ads; as consequence, they are well elaborated mainly for print ad, especially for classified ads. In designing MEPCO, we made use also of real-world web and TV ads, in order to provide a relatively complete ontology of ads covered by Media Campaign Project. Moreover, in order to convey the diverse semantics of advertisements - printed as well as broadcasted and web creatives, we found that it is suitable to combine the methods used by both ad markups and by the standards for media description.

As stated in the W3G Use cases [see OWL], it is reasonable to use ontologies for multimedia collections, i.e. for their semantic annotation. Of the ontologies within multimedia domain, ones are media-specific, while others are classified as content-specific. Media-specific ontologies contain taxonomies of different media types and the necessary means for the description of their properties. The benefits of using content-specific ontologies are due to their reusability for other documents within the same domain. But as the projects presented above showed, it is beneficial to consider the use of content-specific ontologies when narrative content is an important element of the semantics of a media, i.e. in tasks such as object recognition, classification purposes, semantic annotation, and retrieval of documents with similar content.

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6 Glossary

Terms used within MediaCampaign project sorted alphabetically.

- Campaign** A campaign represents a number of creatives semantically belonging together. A campaign has a certain duration and can be cross country and cross media. See also "spot" and "creative"
- Creative** A Creative represents all the occurrences of a similar spot. A Creative is not cross media (e. g. TV and press) and not cross language. See also "spot"
- CPM** Collection processing manager. Central component which controls the analysis workflow via web services.
- DB** Database
- DBMS** Database Management System
- EMS** Essence management store – holds all essence of MC, i.e. TV spots, press images and meta essence such as extracted audio files.
- JAPE RULES** Extraction patterns used to identify new entities
- HTML** Hypertext Markup Language
- HTTP** Hypertext Transfer Protocol
- IDE** Integrated Development Environment
- IE** Information Engineering
- iFS** Internet File System
- ISO/ANSI** International Organization for Standardization / American National Standards Institute
- META-ESSENCE** Under this term we understand all essence and additional data which is generated by subsystems (e.g. lo-res videos, keyframes, OCR text, ...).
- MMS** Metadata Management Store – holds all data extracted by the analysis systems, i.e. low-level and mid-level features such as tagging of spots in connection with logos.
- OMG** Object Management Group
- OMS** Ontology management store – holds all semantic knowledge of MC, i.e. the MEPCO ontology and the campaign knowledge.
- OS** Operating System
- PL/SQL** Procedural Language/SQL
- Re-detection** The same creative is re-detected in a single media. E.g. the ad of Renault Megane appeared on 5 May 2005 on "TV ORF1" 5.00 pm and on 7 June 2006 on "TV ORF1" at 4.00 pm.
- Scene** A consecutive series of shots connected through transitions (hard cut, fade, panning, ...) that constitutes a logical unit of action in a video. It is defined by "bridging features" such as same visual/audio content, music/speech/noise segments or text overlays.
- SGML** Standard Generalized Markup Language
- Shot** A consecutive series of pictures representing coherent visual content, e.g. when having an interview with two persons, and the camera is changing between the two faces (depending on who is talking), each face would be a

shot.

SOAP Simple Object Access Protocol

SQL Structured Query Language

Spot An occurrence of a Creative, e.g. TV spot seen on a given channel at a specific time. The incoming material obtained from the Media Acquisition step is initially available as a spot and later attached to a new or existing Creative. See also "creative".

S&R Search and Retrieval

Tracking Tracking of creatives by means of history over media and countries. When a creative is re-detected (see also "re-detection"), it is inserted into a data structure which represents the history of this creative. This enables users to query the database for appearances of this creative in the past (e.g. it had appeared on 1 April 2006 in press "The Times" in US p.5 and on 3 April 2006 on "TV Sky 1" at 19.00 in UK).

WP Work Package

UML Unified Modelling Language

URI Uniform Resource Identifier

XML Extensible Markup Language

XPath XML Path Language

XSLT XSL Transformation

Partner Acronyms:

HSA HS-Art Digital Service GmbH

JRS JOANNEUM RESEARCH Forschungsgesellschaft mbH

NMR-UK Nielsen Media Research UK

ONTO Sirma AI EAD

SOF Softeco Sismat SpA

TNO Netherlands Organisation for Applied Scientific Research

USFD University of Sheffield

UT University of Twente