DOMAIN-RESTRICTED GENERATION OF SEMANTIC METADATA FROM MULTIMODAL SOURCES pdf

1: Multimedia Semantics: Metadata, Analysis and Interaction

Domain-Restricted Generation of Semantic Metadata from Multimodal Sources Ontology-Driven Semantic Video Analysis Using Visual Information Objects Georgios Th. Papadopoulos, Vasileios Mezaris, Ioannis Kompatsiaris, Michael G. Strintzis.

This is an Open Access article: Abstract With the development of platforms enabling the use of routinely collected clinical data in the context of international clinical research, scalable solutions for cross border semantic interoperability need to be developed. Within the context of the IMI EHR4CR project, we first defined the requirements and evaluation criteria of the EHR4CR semantic interoperability platform and then developed the semantic resources and supportive services and tooling to assist hospital sites in standardizing their data for allowing the execution of the project use cases. The experience gained from the evaluation of the EHR4CR platform accessing to semantically equivalent data elements across 11 European participating EHR systems from 5 countries demonstrated how far the mediation model and mapping efforts met the expected requirements of the project. Developers of semantic interoperability platforms are beginning to address a core set of requirements in order to reach the goal of developing cross border semantic integration of data. Electronic Health Records, Biomedical Research, Terminology as Topic, Interoperability, Data Integration and Standardization, Knowledge representation 1 Introduction Electronic Health Records EHRs contain a large variety of patient-centric data and are gaining an important supporting role in different area such as clinical research, patient safety and comparative effectiveness [10 , 27]. However, because EHRs are not designed with a primary focus of cross-domain integration, initiatives for integrating EHRs and clinical research have been often limited to non-scalable, system or vendor -specific efforts [7 , 31]. In an expanding research landscape, cooperation infrastructures are now being built to allow research projects to reuse patient data from federated EHR systems from many different sites in different countries and therefore in a multilingual settings. Non-standard, and often conflicting, vendor approaches to representing EHR data pose challenges to infrastructure developers, who must build solutions to work with clinical data across multiple formats. The aim of the project is to reduce the cost of conducting clinical trials, through better leveraging routinely collected clinical EHR data at key points in trial design and execution life-cycle. These hospital EHRs collectively contain data from over 7,, patients. The EHR4CR platform is a loosely coupled service platform, which orchestrates independent services addressing semantic interoperability, data protection, privacy, security and end-user platform services to ease and speed the conduct of clinical trials, in particular during the phases of protocol feasibility study PFS , patient identification and recruitment services PRS and clinical trial execution CTE. Unfortunately, standards in clinical care and clinical research have often been developed through parallel - and therefore somewhat inconsistent - efforts. They do not yet fully address the needs of initiatives like EHR4CR that address the semantic barriers. To fulfill this need, the challenge is to provide semantic alignment of data collected in disparate contexts under different EHR systems connected from 11 disparate hospital information systems in the framework of EHR4CR. Our hypothesis is that cross-systems semantic interoperability is achievable internationally by implementing a consistent integrative semantic abstraction on top of existing application proprietary models. The mediation model provides a homogeneous view of the clinical data available in disparate EHRs so that data users can access these data using a library of standard queries that have been written based on the mediation model. Mediation models must be based on the adoption and integration of multiple standards themselves being aligned to be consistent, coherent, and cross-compatible [9 , 19]. Second, as part of the evaluation of the use of the EHR4CR platform across the participating 11 EHR systems, we evaluated how far the development of the mediation model and the standardization efforts met the expected requirements of the project. In any case, a controlled mediation model is required to support federated access to heterogeneous data sources. We identified a non exhaustive set of 12 desiderata for the development of a standard, reusable, multipurpose controlled mediation model. Used as part

of a mediation model these semantic resources need to be based on standard domain knowledge and reference models provided by standard development organizations that are and will be used by EHR vendors, clinicians, and government mandates e. Meaningful Use Stage 3 in US. Possibly bound to different reference terminologies in order to allow end users to access semantically equivalent content through different terminologies e. Expressive enough to represent multimodal sign, symptoms, diseases, outcomes, procedures, care plans, etc. Expressive enough to specimen related information, family related information, etc. Represented using standard formal languages allowing semantic reasoning e. The editor need to support a collaborative editing process. The creation and update process shall be user-friendly and adapted to medical experts through user interface, but also through import of simple csv files used to capture medical knowledge in a format that is understandable for medical experts. The editor need to address the versioning issues for any type of semantic resource. Most of them rely on proprietary models. Furthermore, although the need for controlled vocabularies in EHR systems is widely recognized, system developers have often dealt with this need by creating ad hoc sets of controlled terms for use in their applications so that information in one system cannot be recognized and used by other systems. Differences between the controlled vocabularies of two systems exist even when both systems were created by the same developers. Efficient supportive mapping tools are required to enable terminologists to develop and maintain semantic mapping between the proprietary models and the mediation model. Mapping tools need to provide: Automatic mapping algorithms supporting terminologists in identifying corresponding concepts in the mediation model on one side and local models on the other side. These algorithms need to use the descriptions and synonyms of the concepts. Automatic mapping algorithms using existing mappings between reference terminologies e. Use case driven support for prioritizing the mapping effort. The terminologist needs to know within the list of the data elements of the mediation model that are not yet mapped to local data elements, the ones that need to be mapped in priority according to different criteria e. Standardized web-based access to mappings 3 Results A first version of the EHR4CR semantic interoperability platform has been designed and implemented to support the different actors in accomplishing their tasks during the data standardization process at both setup and execution phases of the EHR4CR use cases. Therefore achieving broad-based, scalable and computable semantic interoperability across multiple domains and systems requires a consistent use of multiple standards, clinical information models and terminology models. The common EHR4CR semantic resources consist of a shared set of standard-based templates and data elements with their associated value sets and concepts that enable to mediate across heterogeneous representations of patient-centric health information. FHIR resources were enriched in order to fulfil the requirements of the project and represent the required semantic content. Some specific value sets were defined for some data elements of the FHIR templates.

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2: CiteSeerX â€" Citation Query Automated speech and audio analysis for semantic access to multimedia

Bianca Falcidieno, Michela Spagnuolo, Yannis S. Avrithis, Ioannis Kompatsiaris, Paul Buitelaar: Semantic Multimedia, Second International Conference on Semantic and.

Published online May Find articles by Itziar Salaberria Antonio D. Received Apr 14; Accepted May This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license http: This article has been cited by other articles in PMC. Abstract The effectiveness of Intelligent Transportation Systems depends largely on the ability to integrate information from diverse sources and the suitability of this information for the specific user. This paper describes a new approach for the management and exchange of this information, related to multimodal transportation. A novel software architecture is presented, with particular emphasis on the design of the data model and the enablement of services for information retrieval, thereby obtaining a semantic model for the representation of transport information. The publication of transport data as semantic information is established through the development of a Multimodal Transport Ontology MTO and the design of a distributed architecture allowing dynamic integration of transport data. The advantages afforded by the proposed system due to the use of Linked Open Data and a distributed architecture are stated, comparing it with other existing solutions. Finally, a working solution of a semantic trip planner using actual transport data and running on the proposed architecture is presented, as a demonstration and validation of the system. Intelligent Transportation Systems, multimodal transport information, semantic middleware, Linked Open Data, context-aware computing 1. Introduction Progress made over the last years in the application of ICT to transportation systems is extensive, constant and diverse. With regard to the software services for transport, some of the elements that have evolved the most, providing a high added value to the user, are the multimodal trip planning solutions. In this area, solutions like Google Maps or OpenTripPlanner have made important progresses in facilitating trip management and planning to the users. Efforts are also being made at institutional level to provide the tools that allow citizens to opt for sustainable transport solutions. Thus, according to data from the International Association of Public Transport UITP [1], it is expected that public transport by will double its market share compared to , thereby completing the transition to a sustainable transport model. However, there is still much room for improvement in this area. Existing tools are not sufficiently interoperable due to the lack of a universal and consistent format to represent transport information. Moreover, in most cases these planning tools are closed so the access to its information becomes very costly. This paper proposes a novel software architecture to address the above-mentioned limitations by incorporating innovative technologies such as semantic middleware, context-awareness computing or Linked Open Data, given that they have already been successfully tested in other application areas. The article is structured into four sections. Section 2 provides an overview of the state of the art related to the technologies and knowledge areas covered in the proposed solution. Section 3 details the design and implementation of the Multimodal Transport Ontology MTO used for the management of transit information. Section 4 establishes the design of a distributed software architecture for semantic information provision allowing dynamic integration of transport data, detailing its components and characteristics. In Section 5 , the overall system is validated by the deployment of a trip planning solution running on actual transport data. Finally, conclusions and future work derived from the experimentation analysis are given. State of the Art The proposed architecture is based on several areas of knowledge. This section aims to show an overview of the state of the art within these areas. The main research field will be introduced first: Then, existing solutions for multimodal transport data management will be evaluated, as well as successful alternatives for semantic data provision. Advanced Traveler Information Systems Transportation systems efficiency is essential for economic development. Intelligent Transportation Systems ITS can be defined as a set of applications within computer science, electronics and communications that, from a social, economic and environmental point of view, are aimed at improving mobility, security and transport

productivity, optimizing the use of infrastructures and energy consumption and improving the capacity of the transport systems [2]. Within the ITS field, this work is focused on providing enriched transport information to the user through the integration of information sources and the generation of new knowledge. The most relevant research works in this area are focused on ATIS, designed to assist travelers in planning their trips and route optimization [3 , 4]. Research done in these concepts has been instrumental in the development of software tools and commercial applications for journey planning, one of the areas with greater acceptance within the ATIS. Transit Information Formats and Standards Transportation companies have their own information about service planning related to routes and schedules made by their fleets of vehicles. But as Campbell et al. The two main existent solutions as to their widespread use and community support for transit data modelling and publishing are GTFS, from Google, and WFS from the Open Geospatial Consortium OGC along with several ad-hoc solutions defined by transport agencies themselves. The details of these solutions are described below. GTFS defines a common format for public transportation schedules and associated geographic information, having established itself as the de facto standard for the representation of transit data, thanks in large part to the support received from Google and its maps services. However, the format relies on comma-separated value CSV files to represent the information which is then compressed and stored. This leads to isolated and outdated data that is neither easily queryable nor extensible. The WFS specification defines interfaces for describing data manipulation operations of geographic features. Implementations of the WFS standard are however scarce, mainly due to the complexity of the data model and the verbosity of the required queries. One of the most prominent is TransXChange used in the United Kingdom and Australia to interchange bus service planning information. Therefore, various systems coexist in order to represent transit information. Ad hoc solutions are optimal in their domain but they are not interoperable. GTFS is the de facto standard, however, the treatment and consultation of its data is not trivial, because they are not structured and do not allow the inclusion of qualitative attributes of the route like ecological or tourist interest which are increasingly relevant when making schedules. Table 1 shows a schematic comparison between the aforementioned formats and MTO, the proposed solution for the management and provision of multimodal transport information. A set of features, considered relevant for data integration and interoperability are presented. Table 1 Comparison between formats for transport information provision.

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3: dblp: Semantics and Digital Media Technologies

SECTION: Domain-restricted generation of semantic metadata from multimodal sources Ontology-driven semantic video analysis using visual information objects Georgios Th. Papadopoulos, Vasileios Mezaris, Ioannis Kompatsiaris, Michael G. Strintzis.

Context Aware Semantic Metadata Management: Interdisciplinary Applications Editors Dr. June 10, Full Chapters Due: Current software tools that look at metadata are not sufficient to handle these problems. What is needed is semantic metadata from disparate sources that reveal context as well as non-obvious insights. A new concept which is known as context aware semantic metadata is paving the way to finally realize the full value of enterprise and scientific information. Once documents are properly annotated, it is possible for applications to automatically understand the context and meaning of the content thereby correct decisions can be made. Syntactic metadata focuses on elements such as size of the document, location of a document or date of document creation which do not provide a level of understanding about what the document conveys or implies. In contrast, semantic metadata describes contextually relevant or domain-specific information about content, based on an enterprise-specific custom metadata model or ontology. Context aware semantic metadata management certainly includes traditional data management issues such as modeling, specification, generation, curation, storage and retrieval. Additional properties that are specific to metadata and its context, however, have an impact on its management. Therefore it will also include context and semantics based tasks in annotation, retrieval and management in the context of business, society, healthcare, geology, culture and so on. Information on demand ensures that real-time information is readily available for superior service and increased user satisfaction. This edited book aims to address the current research and near future trends in metadata management in the dimension of semantics and contexts with the target of achieving the best information on demand interdisciplinary applications and services. Objective The objective of the proposed book is to compile a reference reading which encourages and facilitates the transfer of technologies and methodologies that intersect the three areas - Metadata, Semantic Web and Context Awareness. In order to do that, each book chapter would constitute an illustrative technique or a specific kind of application or a generic system that interplay with one or more of these three dimensions. Intended Audience This edited book will be an ideal reference book at university levels to bachelors, masters, research students and faculties in several areas spanning from computer science, business management, information science and knowledge management. Also, it is a must read source for database practitioners and managers who want to unlock the hidden contextual knowledge from the voluminous unstructured data. Topic Areas This reference handbook will invite submissions describing ongoing innovative work and applications on these interdisciplinary areas coving metadata, semantics and context awareness. Specifically, book chapters include, but not limited to:

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A Multimodal Approach to Semantic Annotation and Retrieval of the unique source for a accurate semantic Adding Semantic Metadata to Audio-Video.

In an advantageous but non-limiting embodiment, the device 10 comprises a camera phone or other mobile terminal with image capture capabilities. While the particular architecture and functional elements of the device 10 will vary as a function of intended purpose, as contemplated herein the device 10 includes a processing apparatus 12, for generating annotation tags for a digital image. The processing apparatus 12 comprises an electronic circuit implanted, e. The processing apparatus 12 includes or is associated with a memory 14, for maintaining a library 16 of human-meaningful words or phrases organized as category entries according to a number of defined image description categories. The processing apparatus 12 further includes an abstraction processor 18 that is configured to receive context metadata 20 for a given digital image The context metadata 20 is associated with capture of the digital image 22, and the abstraction processor 18 uses it to select particular category entries from the library 16 as vocabulary metadata 24 for the digital image Detailed examples of this mapping process appear later herein, but mapping can be understood broadly as determining which image description categories are implicated by the context metadata, and, more particularly, determining which category entries within the implicated categories correlate with the context metadata. The rules 30 are predicated on the defined image description categories. For example, each rule includes a conditional expression predicated on one or more image description categories, and corresponding category entries from the vocabulary metadata 24 are substituted into these conditional expressions for logical evaluation. With this basic understanding in place, it will be appreciated that the device 10 may be used to capture a digital image 22, and that the processing apparatus 12 advantageously generates one or more annotation tags 28 for that captured image, wherein the generated annotation tags 28 may be relatively complex, human-meaningful words or phrases that are abstractions logically deduced from the context metadata 20 associated with image capture, according to the vocabulary metadata 24 abstracted from the context metadata 20, and as processed by the rules Particularly, one or more embodiments of the device 10 include an image capture system 52, which may operate under control of a system processor The image capture system 52 includes an image sensor 56, e. As a non-limiting example, the context sensors 62 include one or more of the following sensors: In at least one embodiment, the abstraction processor 18 is configured to receive at least one of temporal data, location data, ambient temperature data, image capture device orientation data e. Context sensor data may be provided to the processing apparatus 12 directly, or through interface circuitry 74, which provides analog-to-digital domain conversion, level shifting, formatting, buffering, etc. Thus, in at least one embodiment, the device 10 captures a digital image 22 and obtains corresponding context metadata 20 from one or more context sensors 62, where the context metadata 20 identifies contextual data or parameters that are associated with the image capture and can be processed abstracted to obtain richer, more sophisticated annotation information for the image. Of course, in the same embodiment, or in one or more other embodiments, the digital image 22 and context metadata 20 may be transferred into the device 10 through a communication transceiver In other embodiments, the transceiver 76 comprises or otherwise includes a local data interface e. Of more interest regarding annotation tag generation, FIG. In the depicted embodiment, the library 16 is maintained in the memory 14 as one or more hierarchical sets of words or phrases for each defined image description category. Each such hierarchical set represents a series of words or phrases at increasing levels of abstraction. More particularly, each hierarchical set is depicted as an image description category 70 e. Indeed, in one embodiment, a given category entry x sits at a given level of abstraction, and may be implemented as an array of values. Likewise, the category entry may be an array of European countries. In an alternate embodiment, each category entry x is a given word or phrase, rather than an array of such words or phrases, but given category entries x may individually represent a given level in the

category hierarchy, or a group of category entries x, y, etc. Regardless of the particular implementation logic used for the image description categories 70 and category entries 72, FIG. Additional rules can be evaluated to further refine or expand the set of generated annotation tags More broadly, it should be understood that the defined set of deductive logic rules 30 comprise a set of conditional tests predicated on variable entries for one or more of the defined image description categories 72 from any number of image description categories Correspondingly, the rules processor 26 is configured to generate annotation tags 28 for a given digital image 22 by substituting the category entries 72 making up the vocabulary metadata 24 as values for corresponding ones of the variable entries, and then logically evaluating the set of conditional tests according to the substituted category entries In at least one embodiment, the processing apparatus 12 comprises one or more microprocessor-based circuits which implement annotation tag generation based on executing a corresponding series of computer program instructions that are stored in a computer-readable medium, e. Preferably, the memory 14, which may comprise more than one memory device, includes non-volatile memory, such as FLASH or EEPROM, which can be used to store the library 16 in a manner that allows for updating or other modification. In at least one embodiment, maintaining the library 16 connotes keeping the library updated responsive to user or other input. In any case, assuming that the library 16 is available to the abstraction processor 18, the method further includes receiving context metadata 20 and, optionally, receiving one or more image characteristics 80 image features extracted from the digital image 22 by the image processor 42, or otherwise received for the digital image 22 Block Thus, in at least one embodiment, the abstraction processor 18 includes or is associated with an image processor 42 that is configured to derive one or more image characteristics from the digital image In such embodiments, the abstraction processor 18 is configured to map one or more extracted image characteristics into the library 16, in addition to mapping the context metadata 20 into the library 16, to select particular category entries 72 as the vocabulary metadata 24 for the digital image Such mapping entails logically identifying the particular category entries 72 that are directly or indirectly implicated by the context metadata 20 or the image characteristics Specifically, such processing allows the abstraction processor 18 to abstract from the presence of water features in the digital image 22 to the more abstract concepts of water-related locations, such as beach, shore, lake, etc. In any case, the abstraction processor 18 selects particular category entries 72 from one or more image description categories 70 in the library 16, to form the vocabulary metadata 24 Block Processing continues with feeding the vocabulary metadata 24 and, optionally, one or more elements of the context metadata 20, into the rules 30, for generation of the annotation tags 28 Block That is, the selected category entries 72 are plugged into the corresponding variable locations in the individual rules making up the set of rules With those substituted values in place, the rules processor 26 evaluates the logical conditions of each rule, and generates the annotation tags 28 based on the results of those conditional evaluations. As noted, in at least one embodiment, at least one rule in the defined set of deductive logic rules 30 is additionally or alternatively predicated on one or more items of context metadata Thus, in one or more embodiments, the rules processor 26 is configured to generate annotation tags 28 for the digital image 22 by logically combining the vocabulary metadata 24 and the one or more items of context metadata 20, according to the defined set of deductive logic rules Still further, illustrates an optional extension of the processing of FIG. In the illustrated embodiment, the rules processor 26 generates the annotation tags 28, as described above. For example, if none of the generated annotation tags 28 is considered appropriate by the user, the user may enter a specifically desired word or phrase to be used as the annotation tag, or the user may modify one of the proposed annotation tags 28, and indicate that the modified tag should be used. Thus, the illustrated processing receives user feedback Block regarding the annotation tags 28 output to the user as proposed tags for the digital image 22, and detects whether the user modifies the proposed annotation tags 28 including substitutions Block The processing apparatus 12 may, for example, track the selection history for the user, such as by recording the selection frequencies for particular ones of the proposed annotation tags 28 Block For example, if the user corrects or modifies a place name or other category entry x of a given image description category y, the processing

apparatus 12 may update or replace the word or phrase stored for that category entry x, based on the user input. Additionally, or alternatively, the processing apparatus 12 may add or modify the rules 30, to reflect user modifications of the generated annotation tags More broadly, in one or more embodiments, the processing apparatus 12 is configured to output one or more of the generated annotation tags 28 for inspection by a user, and to adapt at least one of the library 16 and the defined set of deductive logic rules 30, based on recording or otherwise detecting corresponding annotation tag selections or modifications made by the user. Thus, in at least one embodiment of the processing apparatus 12, it is configured to maintain the library 16 of human-meaningful words or phrases based on receiving or otherwise storing a default library, and dynamically updating or adding category entries 72 to the default library, in response to user selections and modifications to the generation of annotation tags 28 as proposed by the processing apparatus 12 for one or more digital images In this regard, the processing apparatus 12 is configured to output one or more of the generated annotation tags 28 to a user as proposed annotation tags for a given digital image 22, and to record in conjunction with the digital image 22 corresponding annotation tag inputs by the user. With the above method and apparatus examples in mind, those skilled in the art will appreciate that FIG. In the illustration, the context metadata 20 is fed into a classification process that may be implemented as pre-processing for the abstraction step s used to generate the vocabulary metadata Like processing is performed for extracted image characteristics, e. The resultant abstracted words or phrases comprise the vocabulary metadata 24, which is input as variable values into the rules 30, which are predicated on the vocabulary metadata That is, the rules processor 26 in one or more embodiments generates compound words or phrases by combining the selected category entries 72 in the vocabulary metadata, according to the conditional logic embodied in the rules In at least one embodiment, a user profile 82 is maintained in conjunction with, or as part of the library 16, and the user profile 82 is updated as a function of the feedback. Thus, one sees that the proposed annotation tag is a fusion of the category entry values in the vocabulary metadata 24, e. Notably, one sees in FIG. The abstraction processor 18 may evaluate features extracted for a given video-type digital image 22, e. As further examples of the logical fusion of words and phrases provided by the rules processing consider that the rules 30 in one or more embodiments are used to associate predicate facts to infer new facts, i. For example, high levels of ambient light can indicate a daytime outdoors location, or can indicate that the digital image 22 was captured in a well-lit room. Thus, the abstraction processor 18 has less than full confidence that the digital image 22 was captured indoors or was captured outdoors. Of course, the abstraction processor 18 in such embodiments is configured to relate or cross-check given items of context metadata 20, to make higher-confidence guesses about the most likely or appropriate category entries 72 to select for a given digital image Other data can be related to further refine the confidence weighting. For example, indicated high or low ambient temperatures further suggest an outdoor location rather than an indoor location. Perhaps of more interest, FIG. Thus, even if reliable date information is not available for a given digital image 22, the abstraction processor 18 can nonetheless make inferences about the season. Continuing with this confidence-weighted example, those skilled in the art will appreciate that the rules 30 and the rules processor 26 are, in one or more embodiments, configured to incorporate confidence weightings for more sophisticated rules evaluation and annotation tag generation. For example, confidence values for the category entries 72 included in the vocabulary metadata 24 are stored or otherwise maintained as part of the vocabulary metadata 24, and used by the rules processor 26 in its subsequent rules processing. In one such approach, the confidence values are used in the actual conditional testing of each rule, while in other embodiments, the rules are evaluated with full-weighted values e. Season probabilities based on the date may then be determined as: Season probabilities based on temperature may be determined as: The corresponding combined probabilities are given as: From these weightings, the rules processor 26 determines that it is most likely summer and hence ranks summer-related annotation tags higher in a ranked list of annotation tag proposals that make up the output annotation tags These ontologies are captured or otherwise embodied within the structure of the library 16, and, together with the rules 30, they are used to generate sophisticated annotation tag proposals for any given digital image Proposed abstractions and

rules-based fusion include using location and date to propose annotation tags corresponding to known local events and holidays. Broadly, one or more embodiments of the processing apparatus 12 includes an abstraction processor 18 that is configured to assign a confidence or fuzzy logic weighting value to each selected category entry 72 making up the vocabulary metadata. The weightings are assigned based on the extent to which each particular category entry 72 can be reliably deduced from the context metadata 20 or, likewise, from image characteristics Correspondingly, the rules processor 26 is configured to logically combine the vocabulary metadata 24 i. For embodiments that use confidence weighting, such combining can be carried out by performing a weighted evaluation of truthfulness for the conditional tests based on the confidence or fuzzy logic weighting values, or full-weighted values can be evaluated in the rules, with the weightings used to rank individual tags comprising the resulting set of proposed annotation tags Further, in one or more embodiments, particular geographic coordinates may be mapped to famous landmarks, e. However, according to the teachings herein, further data may be processed, such as facial image recognition data, temperature, season, lighting, etc. If the user lives in Paris close to the Eiffel tower, sights such as the Eiffel tower might not be suggested since it is most likely not of interest of the user. Additionally, as noted, the processing apparatus 12 in one or more embodiments incorporates a historic perspective. For example, the annotation tags a user has chosen for either previous digital images 22 in a series vacation series, people in an image etc. With these and other examples in mind, those skilled in the art will appreciate the many advantages provided by the processing apparatus 12 and its associated method of generating annotation tags. Non-limiting examples of those inventions include much more automatic generation of much more sophisticated annotation tags, which is particularly useful given that camera phones represent a new class of networked media capture devices that are rapidly becoming ubiquitous, and may actually represent the most common devices for capturing digital images. As a further advantage, all or part of the processing apparatus 12 and its associated method may be implemented in the oftentimes considerable processing resources included in camera phones. For example, in referring to FIG. In at least one embodiment, the processing apparatus 12 is implemented in whole or in part using the CPU and memory of the host device Further, annotation tag generation as taught herein provides opportunities for telecommunication operators, such as in providing supporting content management features e. In other embodiments, the processing apparatus 12 is implemented as part of a network-based processing system, thereby allowing the network operator to provide annotation tag generation as a service. In such embodiments, digital images captured by users of mobile terminals can be transferred to the network for processing, or can be processed in the terminals via downloaded applets or other such software. Of course, the present invention is not limited to the examples detailed in the foregoing discussion, nor is it limited to the embodiments illustrated in the accompanying illustrations. Instead, the present invention is limited only by the following claims, and their legal equivalents. A method of generating annotation tags for a digital image characterized by:

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5: A Novel Software Architecture for the Provision of Context-Aware Semantic Transport Information

@prefix schema. @prefix umbel. @prefix genont. @prefix void. @prefix library. @prefix rdf. @prefix bgn. @prefix xsd. @prefix dcterms. @prefix wdrs.

This paper reports on the setup and evaluation of robust speech recognition sys-tem parts, geared towards transcript generation for heterogeneous, real-life media collections. Performance figures for this type of content are compared to figures for broadcast news test data. The potential of ASR-based indexing has been demonstrated most successfully in the broadcast news domain. Spoken document retrieval in the American-English broadcast news BN domain was even declar Multimedia Search Without Visual Analysis: Abstractâ€”This paper addresses the focus of this special issue by analyzing the potential contribution of linguistic content and other nonimage aspects to the processing of audiovisual data. It summarizes the various ways in which linguistic content analysis contributes to enhancing the semantic anno It summarizes the various ways in which linguistic content analysis contributes to enhancing the semantic annotation of multimedia content, and, as a consequence, to improving the effectiveness of conceptual media access tools. A number of techniques are presented, including the time-alignment of textual resources, audio and speech processing, content reduction and reasoning tools, and the exploitation of surface features. Index Termsâ€”Context, language processing, multimedia search, semantic metadata, speech and audio analysis, surface features. Show Context Citation Context Examples of such text sources are minutes of meetings or written versions of lectures and speeches. This technique for transcript enhancement can be applied independent of a search action, and is generally known as time-alignment. Access to historical audio collections is typically very restricted: Many spoken word heritage collections are n Many spoken word heritage collections are now being digitized, which allows the introduction of more advanced search technology. This paper presents an approach that supports online access and search for recordings of historical speeches. A demonstrator has been built, based on the so-called Radio Oranje collection, which contains radio speeches by the Dutch Queen Wilhelmina that were broadcast during World War II. The audio has been aligned with its original s manual transcriptions to create a time-stamped index that enables the speeches to be searched at the word level. Results are presented together with related photos from an external database. During a span of 4 years from to , a total of 9 lunar missions were launched and 12 astronauts walked on the surface of the moon. It was one the most complex operations executed from scientific, te It was one the most complex operations executed from scientific, techno-logical and operational perspectives. In this paper, we describe our recent efforts in gathering and organizing the Apollo pro-gram data. It is important to note that the audio content captured during the day missions represent the coordinated efforts of hundreds of individuals within NASA Mission Control, re-sulting in well over k hours of data for the entire program. It is our intention to make the material stemming from this ef-fort available to the research community to further research ad-vancements in speech and language processing. Particularly, we describe the speech and text aspects of the Apollo data while pointing out its applicability to several classical speech pro-cessing and natural language processing problems such as au-dio processing, speech and speaker recognition, information re-trieval, document linking and a range of other processing tasks which enable knowledge search, retrieval, and understanding.. We also highlight some of the outstanding opportunities and challenges associated with this dataset. Finally, we also present initial results for speech recognition, document linking, and au-dio processing systems. This paper reports on the setup and evaluation of robust speech recognition system parts, geared towards transcript generation for heterogeneous, real-life media collections. These difficulties are especially evident when palmtop devices are used for such purposes. Developing and integrating a set of algorith Developing and integrating a set of algorithms designed for extracting audio information is a primary step toward providing user-friendly access to multimedia information and developing powerful communication interfaces. Audio has several advantages over other communication media. A set of algorithms and processes

for extracting semantic and syntactic information from audio signals, including voice, was defined. The extracted information was used to access information in multimedia databases, as well as to index it. More extensive, higher-level information, such as audio-source identification speaker identification and genre in the case of music , must be extracted from the audio signal. One basic task involves transforming audio into symbols e. The purpose is to search for and access any kind of multimedia information by means of audio. To attain these results, digital audio processing, digital speech processing, and soft-computing methods need to be integrated. Audio and video are very rich insinformation content, but audio is part of the video so thatsvideo information is also related to audio. In this paper, a complete architecture for knowledge-assisted cross-media analysis of News-related multimedia content is presented, along with its constituent components. The proposed analysis architecture employs state-of-the-art methods for the analysis of each individual modality visual, audio, The proposed analysis architecture employs state-of-the-art methods for the analysis of each individual modality visual, audio, text separately, and proposes a fusion technique based on the particular characteristics of News-related content for the combination of the individual modality analysis results. Experimental results on news broadcast video illustrate the usefulness of the proposed techniques in the automatic generation of semantic video annotations. Over the past century alone, millions of hours of audiovisual data have been collected with great potential for e. The actual re- use of these collections, however, is severely hindered by their generally limited access. In this paper a framework for improved access to spoken content from the cultural heritage domain is proposed, with a focus on online user interface designs that support access to speech archives. The evaluation of the user interface for an instantiation of the framework is presented, and future work for the adaptation of this first prototype to other collections and archives is proposed. In this context, audio proves to be the most advantageous media for interacting with embedded systems and In this context, audio proves to be the most advantageous media for interacting with embedded systems and their content. The use of embedded systems to seek information stored locally or on the web points up several difficulties inherent in the nature of multimedia-information signals. These difficulties are especially evident when palmtop or deeply embedded devices are used for such purposes. Developing a set of digital-signalprocessing-based algorithms for extracting audio information is a primary step toward providing user-friendly access to multimedia information and developing powerful communication interfaces. The algorithms aim to extract semantic and syntactic information from audio signals, including voice. Extracted audio features are employed to access information in multimedia databases, as well as to index it. To attain these results, digital audio-processing, digital speechprocessing, and soft-computing methods need to be integrated. Neural networks are used as classifiers and fuzzy logic is used for making smart decisions. Audio and video are very rich in information content, but audio is part of the video so that video information is also related to audio. Videos can be more extensively indexed by means of audio For this purpose we introduce a first prototype of a fully integrated semantic analysis system based on an ontology which automatically detects new creatives and campaigns by utilizing a multimodal analysis system and a framework for the resolution of semantic identity. Performance levels that are state-of-the-art for large vocabulary data, e.

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