I-SEARCH

Newsletter

Issue 4

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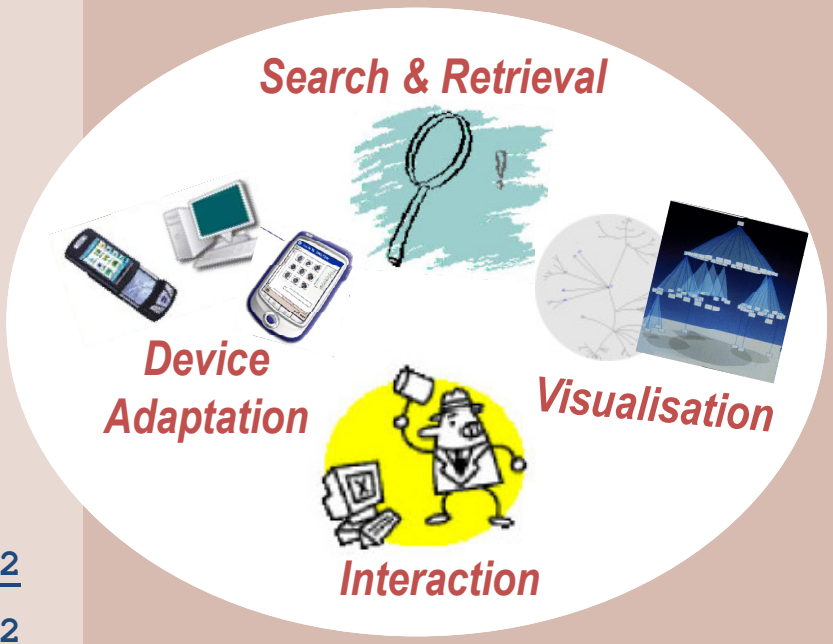
January, 2012



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A unIfied framework for multimodal content SEARCH

Welcome Note

Welcome to the fourth newsletter of the European project I-SEARCH. In this issue you will find description of latest status of the project, including RUCoD format, data transformation methods, adaptive presentation, as well as I-SEARCH dissemination activities from July 2011 to December 2011. Further information can be found on the project web site: http://www.isearch-project.eu

Newsletter Outline:

Publications

1. D. Glowinski et al., *"Toward a Minimal Representation of Affective Gestures",* IEEE Transactions on Affective Computing, accepted for publication.
2. D. Glowinski, et al. *"User-centered evaluation of the Virtual Binocular Interface",* INTETAIN Conference, May 2011, May 2011.
3. P. Daras et al, *"Search Computing: Business Areas, Research and Socio-Economic Challenges"*, Media Search Cluster White Paper, European Commission, ISBN 978-92-79-18514-4, doi:10.2759/52084, July 2011.
4. P. Daras et. al, "*Investigating the Effects of Multiple Factors towards more Accurate 3D Object Retrieval*", IEEE Transactions on Multimedia, Accepted for Publication.
5. G. Varni et al., *"Towards a Social Retrieval of Music Content",* 3rd IEEE International Conference on Social Computing, October 9-11, 2011, Boston, US.
6. T. Steiner et al., *"Adding Meaning to Facebook Microposts via a Mash-up API and Tracking Its Data Provenance",* 7th International Conference on Next Generation Web Services Practices (NWeSP 2011), October 19-21, 2011, Salamanca, Spain.
7. R. Verborgh et al. *"Efficient Runtime Service Discovery and Consumption with Hyperlinked RESTdesc",* Publication at 7th International Conference on Next Generation Web Services Practices (NWeSP 2011), October 19-21, 2011, Salamanca, Spain.
8. T. Steiner, *"Enriching Unstructured Media Content About Events to Enable Semi-Automated Summaries, Compilations, and Improved Search by Leveraging Social Networks"*, DC proposal at ISWC2011 doctorial consortium, October 23-27, 2011, Bonn, Germany.
9. T. Steiner (et al.), *"Integrating Data and Services through Functional Semantic Service Descriptions"*, W3C Workshop on Data and Services Integration, October 2011.
10. T. Steiner (et al.), *"Crowdsourcing Event Detection in YouTube Videos"*, Workshop on Detection, Representation, and Exploitation of Events in the Semantic Web (DeRiVE 2011), workshop in conjunction with the 10th International Semantic Web Conference 2011, October 2011.

Newsletter Outline:

I-SEARCH Dissemination

Interview with Thomas Steiner in semanticweb.com: "The Future of Video on the Web". A discussion with Googler Thomas Steiner about the I-SEARCH Project, San-Francisco, USA.

Workshop "Mensch & Computer", Efurt, Germany: Presentation of I-SEARCH project by HSF, current Use Case Mock-Ups and the first demos for the interface.

ICCV2011, Barcelona, Spain: I-SEARCH project poster was presented at Exalead boost. Particularly, technical discussions were held with representatives of Apple Cupertino, Google Zurich, University of Surrey and others.

Article publication in agelioforos.gr: The I-SEARCH project was published in a Greek newspaper (online and hard-copy), more specifically the 3D search and multimodal search technologies. http://www.agelioforos.gr/default.asp?pid=7&ct=1&artid=100033

Conference **Riga Meetings Transmedia**, in Riga, Latvia, where I-SEARCH was presented to North Europe and Baltic game design companies. I-SEARCH game development use case (*see 3rd Newsletter about use cases*) was presented and several agreements for trial testings with multimodal search end-users (game designers and content providers) were made.

HHI/EMC2 International Industry Workshop on: "The Future of 3D Media", Berlin, Germany: The I-SEARCH project was presented by CERTH in this workshop along with demos related to multimodal search and retrieval from both desktop PCs and smartphone devices.

Workshop "SMILA Hackathlon", Keiserslautern, Germany: During this workshop, the I-SEARCH project, especially the RUCoD multimedia description framework was presented by CERTH and the opportunities to integrate RUCoD as a decription scheme for SMILA and CUBRIK were discussed.

Publications

11. A. Axenopoulos and P. Daras, "3D Object Retrieval: Challenges and Research Directions", IEEE Communications Society MMTC E-letter, Vol. 6, No. 11, November 2011.
12. Castellano, G et al. *"Expressive Copying Behavior for Social Agents: A Perceptual Analysis"*, IEEE Transactions on Systems, Man and Cybernetics, Part A: Systems and Humans, November 18, 2011.
13. P. Daras et al. *"Search and Retrieval of Rich Media Objects Supporting Multiple Multimodal Queries"*, IEEE Transactions on Multimedia, Accepted for Publication.
14. Jonas Etzold et al. *"Context-aware Querying for Multimodal Search Engines"*, Proceedings of the 18th International MultiMedia Modeling Conference (MMM2012), 4-6 of January, 2012,Klagenfurt, Austria.
15. A. Axenopoulos et al., *"Optimizing Multimedia Retrieval using Multimodal Fusion and Relevance Feedback Techniques"*, Proceedings of the 18th International MultiMedia Modeling Conference (MMM2012), 4-6 of January, 2012,Klagenfurt, Austria.

Newsletter Outline:

RUCoD Format Specification

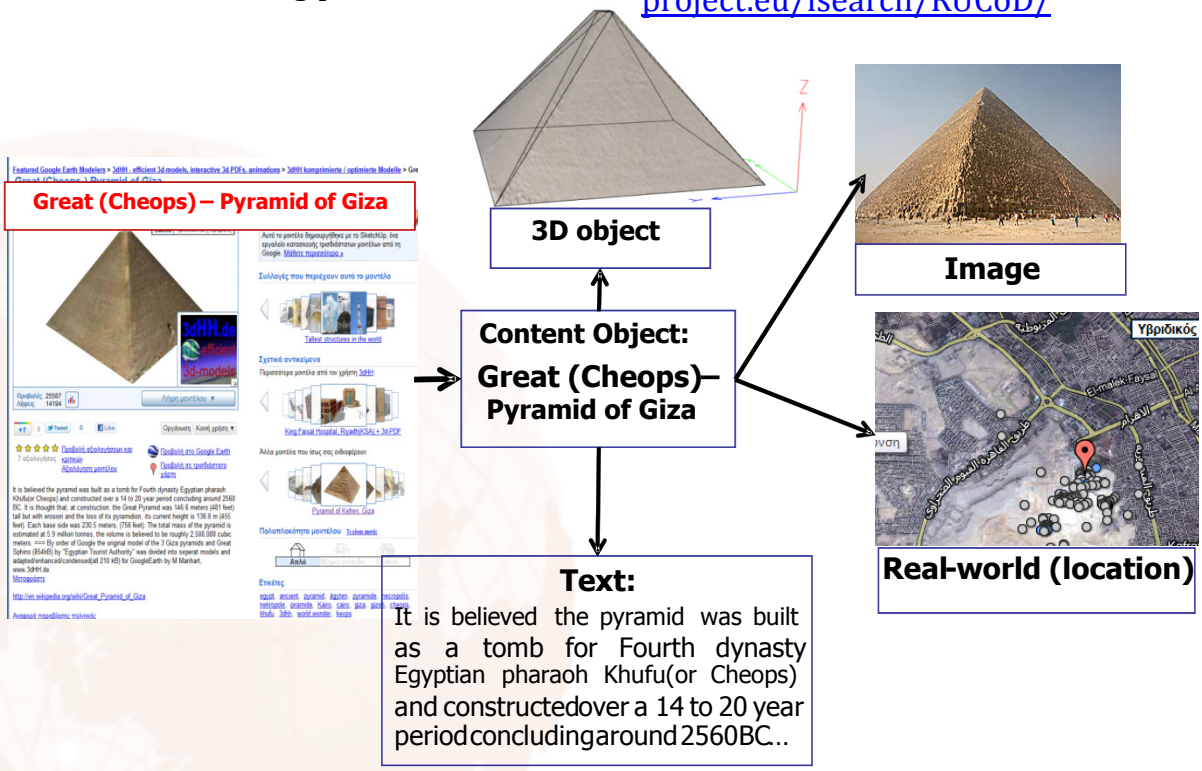
I-SEARCH has introduced a novel framework for description of rich media content: the *Rich Unified Content Description (RUCoD)*. RUCoD consists of a multi-layered structure, which integrates intrinsic properties of the content, dynamic properties, non-verbal expressive, emotional and real-world descriptors.

RUCoD will serve as a formal representation of Content Objects (COs). A CO can span from very simple media items (e.g. a single image or an audio file) to highly complex multimedia collections (e.g. a 3D object together with multiple 2D images and audio files) along with accompanying information. An example of CO is given in the figure below.

The RUCoD descriptions of COs will be expressed as valid XML files, which consist of the following parts:

Header: includes general information (type, name, ID, creation)
L-Descriptors: low-level descriptors, extracted from each separate media (3D, images, sounds, videos, text)
R-Descriptors: descriptors extracted from real-world sensors (time, weather, location, etc)
U-Descriptors: related to user behaviour (emotions, expressions)

In October 2011, the first complete version of RUCoD Schema was finalized. The schema files *RUCoD.xsd* and *RUCoD_Descriptors.xsd* are available at: http://www.isearch-project.eu/isearch/RUCoD/

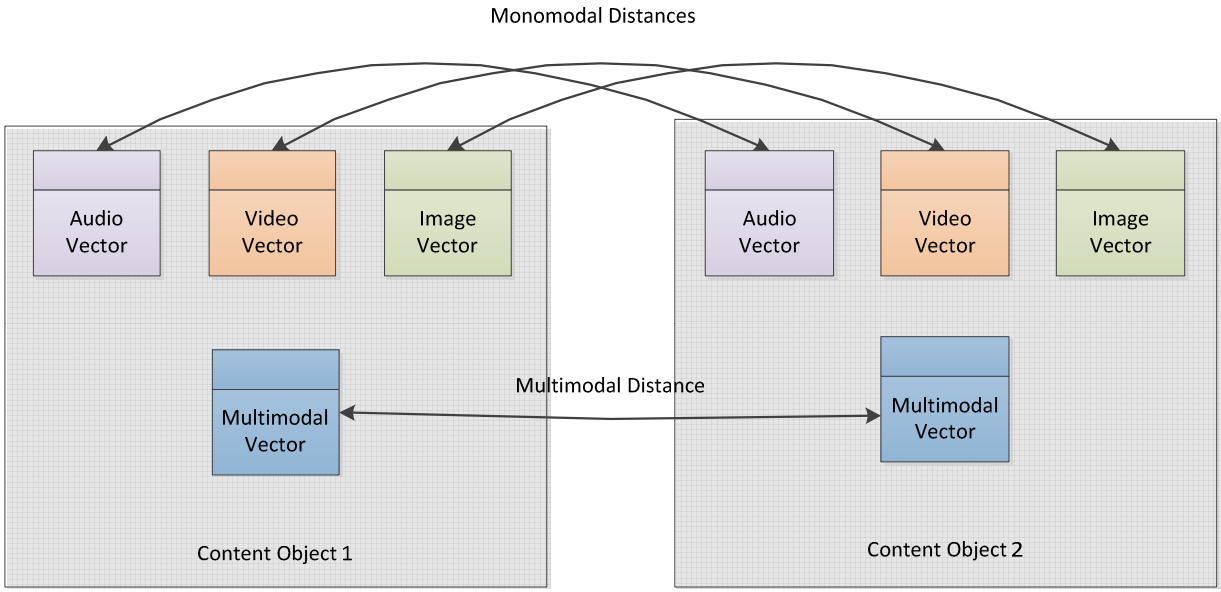


Newsletter Outline:

Data transformation mechanisms

I-SEARCH envisions cross-modal multimedia retrieval in large datasets, which can be described by complex and high-dimensional descriptors. Of outmost importance is the fact that the resulting dataset should be effectively visualised to the end users. Thus, I-SEARCH adopts data transformation mechanisms as the intermediate step between clustering of the results and visualising them to the users. It aims to transform the high dimensional structures describing the content objects (COs) into low dimensional representations, which can be easily projected and explored in 2D or 3D space.

The problem of data transformation in I-SEARCH is more complicated, as the dimensionality reduction algorithms have to be applied across all modalities comprising the COs. The classical approach for applying dimensionality reduction on a set of objects is based on the calculation of the distances between the "equal" objects comprising the set in one modality. In I-SEARCH, we go one step further and we calculate the multimodal vector, which describes the CO as a whole.



Thus, the dimensionality reduction is applied on the RUCoDs of the content objects, rendering two objects relevant across different modalities and enabling their retrieval in the respective query.

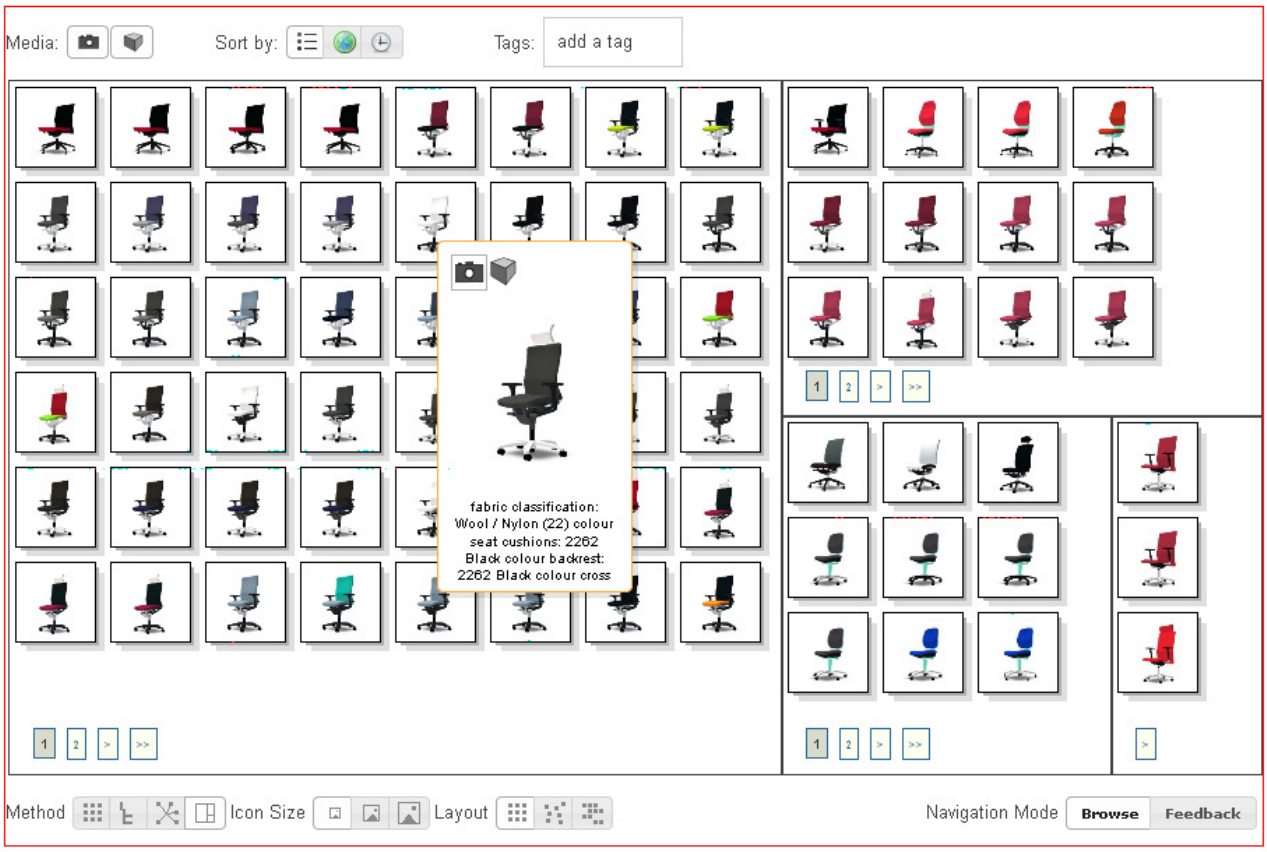
Two algorithms, the Multidimensional Scaling (MDS) and Self Organising Maps (SOM), have been implemented to the I-SEARCH pipeline. The selection has been made on the grounds that they are global enough to better process the resulting dataset, they are commonly used in content retrieval processes for maintaining low complexity in their execution and can be efficiently used in the visualisation of high dimensional content structures.

Newsletter Outline:

I-SEARCH Adaptive Presentation

I-SEARCH supports sophisticated information visualisation techniques that target not only querying information but also browsing techniques for effectively locating relevant information among largely non-relevant results. Presentation of search results is guided by analytic processes such as clustering and dimensionality reduction that are performed after the retrieval and intend to discover relations among the data. This additional information is subsequently used to present the results to the user by means of modern visualisation techniques such as Treemaps and zoomable spatialized displays.

We have designed a visualisation interface that is able to seamlessly mix results from multiple modalities on the same display, support content objects with more than one modality and provide data views that are based on real-world information such as geographic location and time. The overall design supports: a) different application scenarios and problem domains, b) user preferences and experience, c) seamlessly switching between different visualisation techniques and metaphors, d) scalability to different devices and screen sizes.



Newsletter Outline:

Consortium

INFORMATICS & TELEMATICS INSTITUTE	Centre for Research & Technology Hellas – Informatics & Telematics Institute
JCP C	JCP Consult SAS
INRIA	INRIA
ATC ATHENS TECHNOLOGY CENTER	Athens Technology Center
ENGINEERING INGEGNERIA INFORMATICA	Engineering Ingegneria Informatica S.p.A.
Google	Google
dist	University of Genoa
exalead connect the dots	Exalead
FHE FACHHOCHSCHULE ERFURT UNIVERSITY OF APPLIED SCIENCES Angewandte Informatik	Erfurt University of Applied Sciences
ACCADEMIA NAZIONALE DI SANTA CECILIA	Accademia Nazionale di Santa Cecilia
EasternGraphics visualize your business	EasternGraphics

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Project Data Sheet

Acronym:	I-SEARCH
Full Name:	A unIfied framework for multimodal content SEARCH
URL:	http://www.isearch-project.eu
Programme:	FP7-ICT-2009-4
Strategic Objective:	ICT-2009.1.5: Networked Media and 3D Internet
Start Date:	1 January 2010
Duration:	36 Months

The 5th issue of the I-SEARCH Newsletter will be released on July 2012 presenting the progress of the project for the period since the 4th issue.