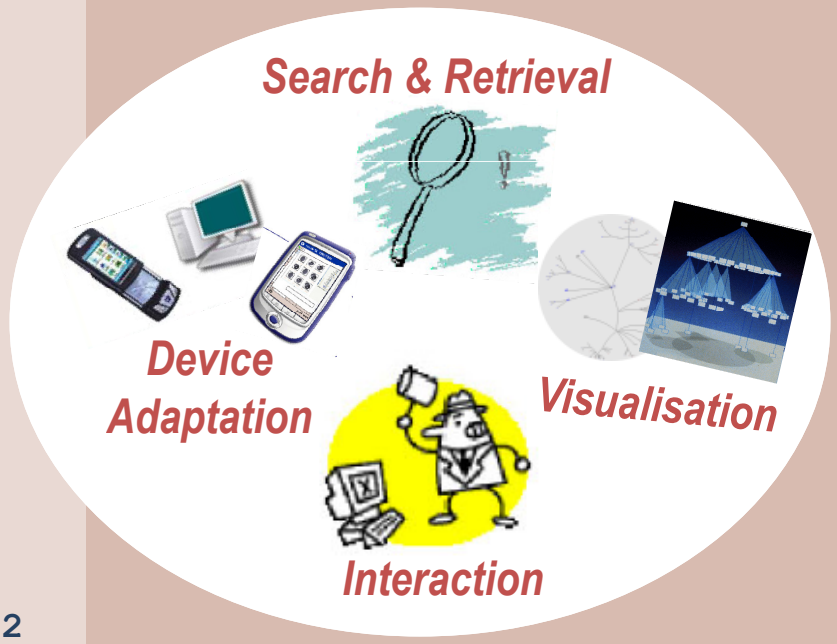
I-SEARCH

Newsletter

Issue 1

www.isearch-project.eu

June, 2010



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A unIfied framework for multimodal content SEARCH

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Welcome Note

Welcome to the first newsletter of the European project I-SEARCH. I-SEARCH is a Specific Targeted Research Project co-funded from the EU 7th Framework Programme and has started its activities since the 1st of January 2010.

Nowadays we are experiencing a dramatic change on the way we perceive the Internet, which is evolving towards providing richer and immersive experiences, where users interact seamlessly and transparently with digital and physical artefacts. Due to the widespread availability of digital recording devices, improved modeling tools, advanced scanning mechanisms as well as display and rendering devices, even over mobile environments, users are more and more empowered to live a more immersive experience with last-generation digital media, through experiencing audiovisual content.

Consequently, a clear need for a new generation of search engines able to handle at the same time multimedia and multimodal content is emerging, in order to support the experience in the form of real enjoyment of these media, in the sense of having true interaction with the media. The vision here is for a really context-aware search engine which could be able to collect and use any kind of information or content coming from the user for narrowing the search, matching finally what the user actually wants to search for.

Towards this direction, the I-SEARCH project aims to provide a novel unified framework for multimedia and multimodal content indexing, sharing, search and retrieval. The I-SEARCH framework will be able to handle specific types of multimedia (text, 2D image, sketch, video, 3D objects and audio) and multimodal interaction means (gestures, face expressions, eye movements) along with real world information (GPS, temperature, time, weather sensors, RFID objects), which can be used as queries and retrieve any available relevant content of any of the aforementioned types and from any end-user access device.

Furthermore, I-SEARCH will be able to integrate even non-verbal yet implicit, emotional cues, and social descriptors, in order to better express what the user wants to retrieve. Finally, I-SEARCH introduces the use of advanced visual analytic technologies for retrieved results presentation in order to facilitate their fast and easy interpretation and also to support optimal results presentation under various contexts.

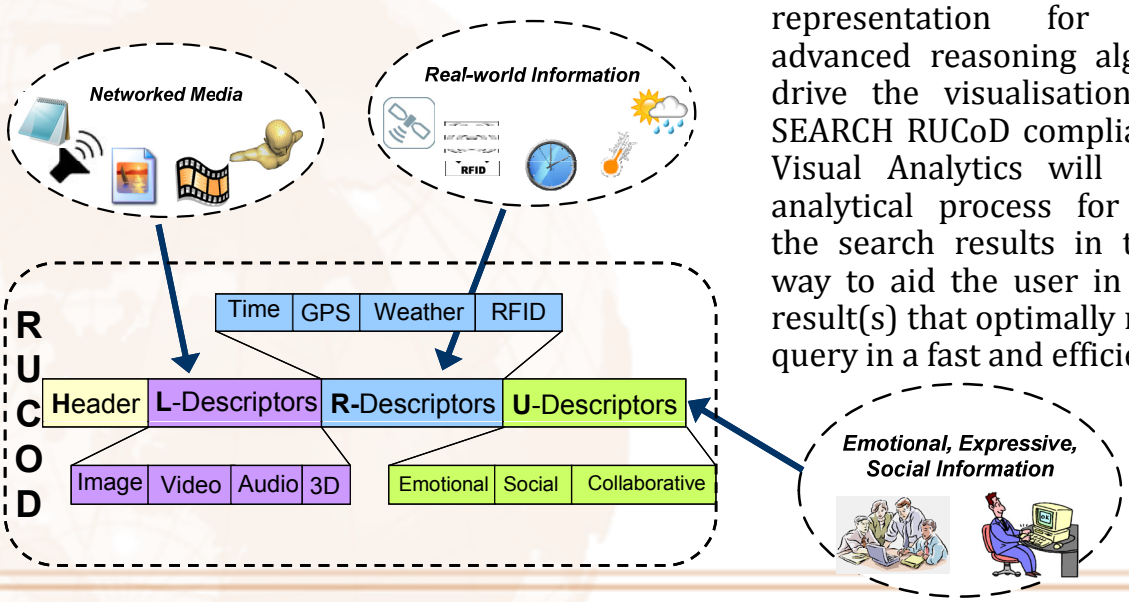
Please note that further information and contact points can be found on the project web site:
http://www.isearch-project.eu

Newsletter Outline:

Objectives

The aim of the I-SEARCH project is the development of the first search engine able to handle a wide range of specific types of multimedia and multimodal content (text, 2D image, sketch, video, 3D objects, audio and combination of the above), which can be used as queries and retrieve any available relevant content of any of the aforementioned types. In order to achieve this goal the following main objectives should be fulfilled:

- Research and development of an innovative Rich Unified Content Description (RUCoD). RUCoD will integrate content's geometrical, topological, temporal, multisensory and multimodal information, intrinsic properties of the content (static features such as shape, colour, texture, dimension, etc.), dynamic properties (temporal descriptors, how it behaves, in which activities it is normally used, who uses it, etc.), non-verbal expressive and emotional descriptors, social descriptors.



- Development of intelligent content interaction mechanisms so that only the content of interest will be delivered to the users. This will be achieved by providing users with natural, expressive and multimodal interfaces as well as through personal and social-based relevance feedback. In this context, social and collaborative behavior of users interacting with the content will be exploited at best, which will help users to better express what they want to retrieve.

- Provide a novel way for presentation of the multimodal data retrieved by the search engine, by utilizing visual analytics technologies. Research will focus on exploiting the unified content representation for generating advanced reasoning algorithms to drive the visualisation of the I-SEARCH RUCoD compliant content. Visual Analytics will provide an analytical process for presenting the search results in the optimal way to aid the user in finding the result(s) that optimally matches the query in a fast and efficient way.

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Innovation

I-SEARCH will provide new insight into the nature of next generation search engines for audiovisual content. More specifically, the I-SEARCH paradigm proposes a series of innovative solutions:

- Introduction of RUCoD, which will integrate: Intrinsic properties (low-level features) of the multimedia content, addressing several types of content (text, 2D image, sketch, video, 3D objects); non-verbal expressive and emotional descriptors; social descriptors.
- Enrichment of the RUCoD with additional contextual information (real world, user-related).
- Development of novel multimodal interaction mechanisms to describe and enable easy retrieval and access of multimedia content under a context-aware and user-centric framework.
- Research and development of novel interaction mechanisms that can capture the emotional expressive and social information conveyed by both individual and groups of expert and non-expert users.
- Development of individual, social-based and recommendation-based relevance feedback mechanisms, in order to improve the multimedia retrieval accuracy by taking into account user interaction.
- Research and development of a multimodal annotation propagation mechanism based on RUCoD.
- Novel techniques for the analysis and presentation of retrieved multimedia content utilizing Visual Analytics technologies.
- Provide device adaptation capabilities, addressing several types of end-user devices, such as PCs, mobile phones, PDAs and smart phones.
- Novel business cases clearly illustrating the contribution of I-SEARCH, i.e. the benefits from unified content representation when searching for multimedia content.

I-SEARCH Use Cases

Search for music content

The Accademia Nazionale di Santa Cecilia (Rome) possesses one of the most important ethnomusicological oral tradition collections from Italy and the Mediterranean area. In the this use-case scenario, users search the Accademia's ethnomusicological multimedia digital archives utilising the novel multimodal search and retrieval framework proposed by I-SEARCH. Several querying modalities will be utilised, such as music, image or video, as well as user-related information including gesture and emotional cues. The basic idea is to use more "natural" and expressive interfaces for narrowing and adapting the searching experience to what the user wants. By using the I-SEARCH technologies, the user will be allowed to express directly its own search criteria using natural yet expressive input coming from her real world.

Search and retrieval of 3D furniture models

In the area of furniture data modelling, content is available in explicit catalogues comprising 3D (and 2D) data models. Such catalogues are organized hierarchically and typically support verbal search queries for terms that are available in the commercial product data. I-SEARCH will implement several usage scenarios from the area of furniture model retrieval to demonstrate the added value provided by the novel RUCoD framework.

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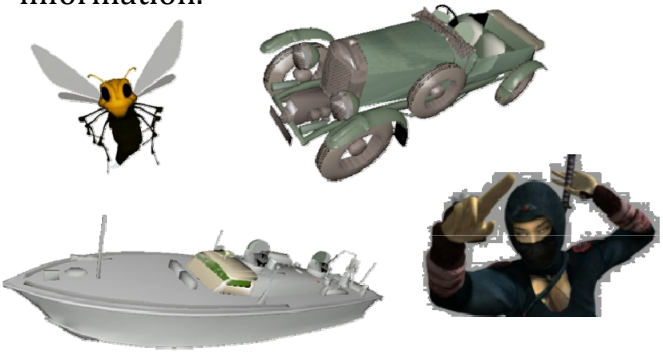
Several types of input data may be available, such as 3D models, photos and video material. Through the realisation of the I-SEARCH framework, all the above input types will be supported.

Search and retrieval of game models

In recent years the popularity of massively multiplayer online games is increasing on a steady pace. These games allow the user to customize a multitude of objects of the game world and there are online repositories on the internet that offer multimedia (especially 3D) content for those games.

The use of I-SEARCH would facilitate the retrieval and the exchange of game avatars, objects, levels and in general any multimedia object that could be added in a game. The I-SEARCH user can use as queries 3D objects (avatars, vehicles, scenes), 2D photos and retrieve other 3D objects along with additional information.



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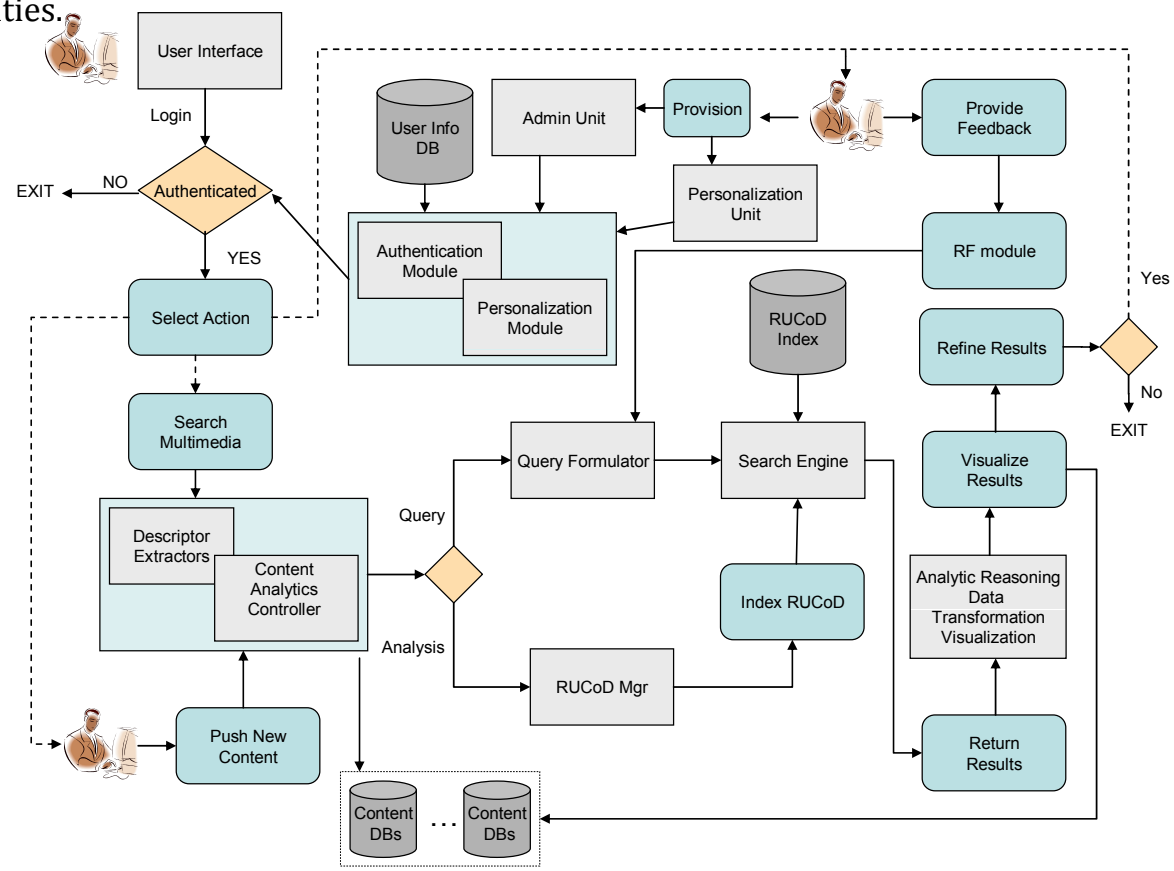
Project Results

First Draft of I-SEARCH Architecture

During the first six months of the project, a first draft of the system architecture has been compiled. A conceptual diagram is depicted below, which clearly outlines the module interactions along with the user activities.



Publications

1. G. Petkos, V. Darlagiannis, K. Moustakas and D. Tzovaras, Utilizing treemaps for multicriterial search of 3D objects, EuroVAST 2010, Bordeaux, France, June 8, 2010
2. V. Darlagiannis, K. Moustakas and D. Tzovaras, On Geometric and Soft Shape Content-Based Search, ICIP 2010, Hong Kong, September 26-29, 2010.
3. A. Axenopoulos, P. Daras, D. Tzovaras, Towards the Creation of a Unified Framework for Multimodal Search and Retrieval, 2nd International ICST Conference on User Centric Media, Palma de Mallorca, September 1-3, 2010.

Newsletter Outline:

Consortium

INFORMATICS & TELEMATICS INSTITUTE	Centre for Research & Technology Hellas – Informatics & Telematics Institute
JCP C	JCP – Consult
INRIA	INRIA
eATC	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 2nd issue of the I-SEARCH Newsletter will be released on January 2011 presenting the progress of the project for the period since the first issue.