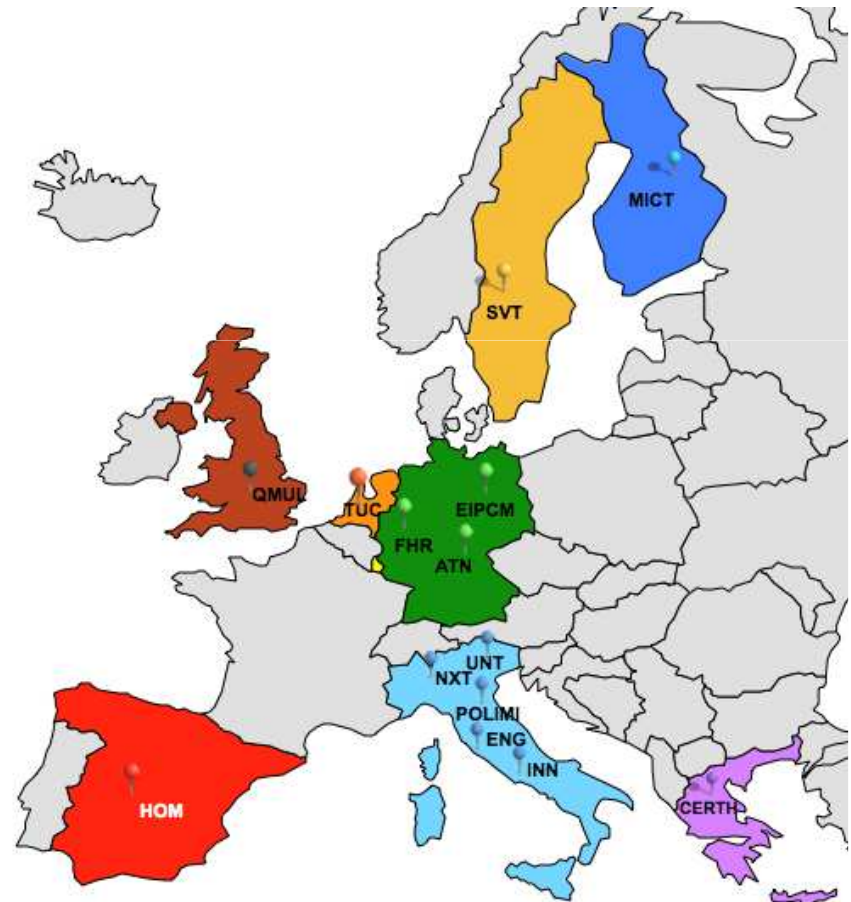# CUBRIK
Media Search Cluster meeting

Bruxelles - December 13, 2011

Vincenzo Croce– *Engineering Ingegneria Informatica S.p.a.*

CUbRIK at a glance

- **CUBRIK - Human-enhanced time-aware multimedia search**
- Large-scale Integrating Project (IP) funded by EU in the framework of FP7-ICT Networked Media and Search Systems
- Total Costs: 8.900 k€
- **Total EU contribution: 6.834 k€**
- Duration: 36 Months
- Start : October 2011
- Coordinator: Egineering Ingegneria Informatica
- Partners
  - Università di Trento
  - Delft University of Technology
  - Queen Mary, University of London
  - Gottfried Wilhelm Leibniz Universitaet Hannover
  - Politecnico di Milano / Web Model
  - Centre for Research and Technology Hellas / Informatics and Telematics Institute
  - Nexture
  - Microtasks
  - Attensity
  - Fraunhofer IDMT
  - Innovation Engineering
  - Homeria Open Solutions S.L.
  - Centre Virtuel de la Connaissance sur l'Europe
  - European Institute for Participatory Media

ENGINEERING

Cube Metaphor

"Business Ecosystem"
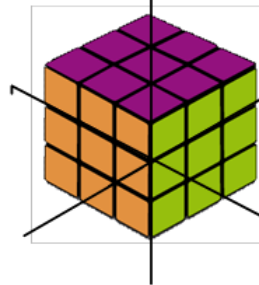the vision is to provide an **open stage for innovators**

BUSINESS PLATFORM
1. Open Source
2. Open Innovation
3. Open Community

TECHNOLOGICAL PLATFORM
1. Components
2. Core Services
3. Pipelines

HUMAN PLATFORM
1. Social Computation
2. Human Computation
3. Implicit Computation

"Technology"
CUBRIK vision is to provide a **platform for definition and execution of multimedia processing pipelines** and "mix and match" of technologies and rich set of open components.
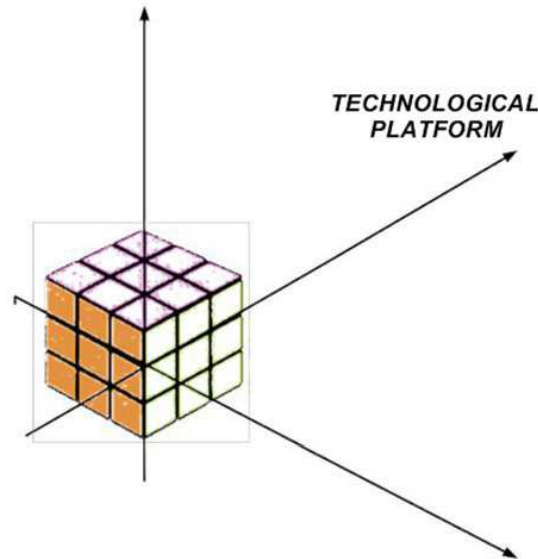
"Human"
CUBRIK vision is to **incorporate rather than emulate human capacities and social interaction** in all the processes and at all levels in an open multimedia search platform.

CUbRIK Main Objective

- Advance SoTA in the multimedia search domain"
  - Advanced time and location-aware and concept-based search
- Open the search box
  - Enabling development of *tailor-made* multimedia search driven applications
- Put humans in the Loop
  - Empowering multimedia exploiting user behaviour analysis, crowdsourcing, social network and trust analysis and gaming with a purpose.
- Start up a search business ecosystem
  - Building up of a business ecosystem
  - Validation of the Cubrik platform in real world conditions

Technological Platform –first dimension

TECHNOLOGICAL PLATFORM

"Tech "

3 small cubes for **integration of data, processes and human computation**

- *Pipelines* - programmable processing workflows conceived to control and orchestrate components and tasks execution
- *Components* off-the-shelf (as much as possible open source) content processing components
- *Platform Built in Core functions* process orchestration, task management, scalable content and metadata storage, design tools

To be used by **multimedia Developers** to freely mix and match their technologies with a rich set of open components and artefacts from past collaborative research projects, research networks and open source projects

Multimedia Application Developers

CUbRIK Rationale

- **Multimedia search results depend on three coordinated processes**
  - **Content processing:** multimedia contents acquisition, knowledge extraction and indexing
  - **Query processing:** sensible responses to users information needs
  - **Feedback processing:** quality feedback derivation on appropriateness of responses and retrofitting
- **Humans and machines can cooperate in all the three processes at three levels**
  - **Implicit,** where the computerized system harnesses the sensity capacity of humans
  - **Decisional,** where the computerized system exploits the explicit rationality of individuals
  - **Social,** where the computerized system exploits the capability of humans to work cooperatively

SOTA Advancement (1)

- **Advance SOTA in the multimedia search domain**
  - Content enrichment
  - Query processing
  - Relevance feedback

- **Put humans in the loop**
  - Human computation
  - User behaviour analysis
  - Crowdsourcing
  - Social network and trust analysis
 - Gaming with a purpose

SOTA Advancement (2)

Temporal and Spatial Entity Based Search

- **Time-aware search** - search framework time-aware enabling multimedia search with respect to time as it is perceived by humans and not just as a timestamp

- **Temporal and spatial entity-centric multimedia search** - special emphasis on extracting and indexing entities in domains of time and space, by computing co-occurrence of concepts and entities belonging to extensions of these concepts

- **Large and accurate entity repository** by importing data from high quality resources such as YAGO o WorldNet. People will have an important role in increasing the quality of facts about the entities, while human computation and crowdsourcing algorithms will be developed to allow collections of new facts

- **Trend prediction**: trend prediction algorithms to be used for recommendations, ranking algorithms, and storage and caching mechanisms. Trend prediction algorithms will take in account similarity metrics between the available multimedia contents.

CUbRIK Architectural Approach

CUbRIK architecture principle is to *perform content, query and feedback processing by means of open, distributed and expandable pipelines able to orchestrate both human activities and computerized system components*
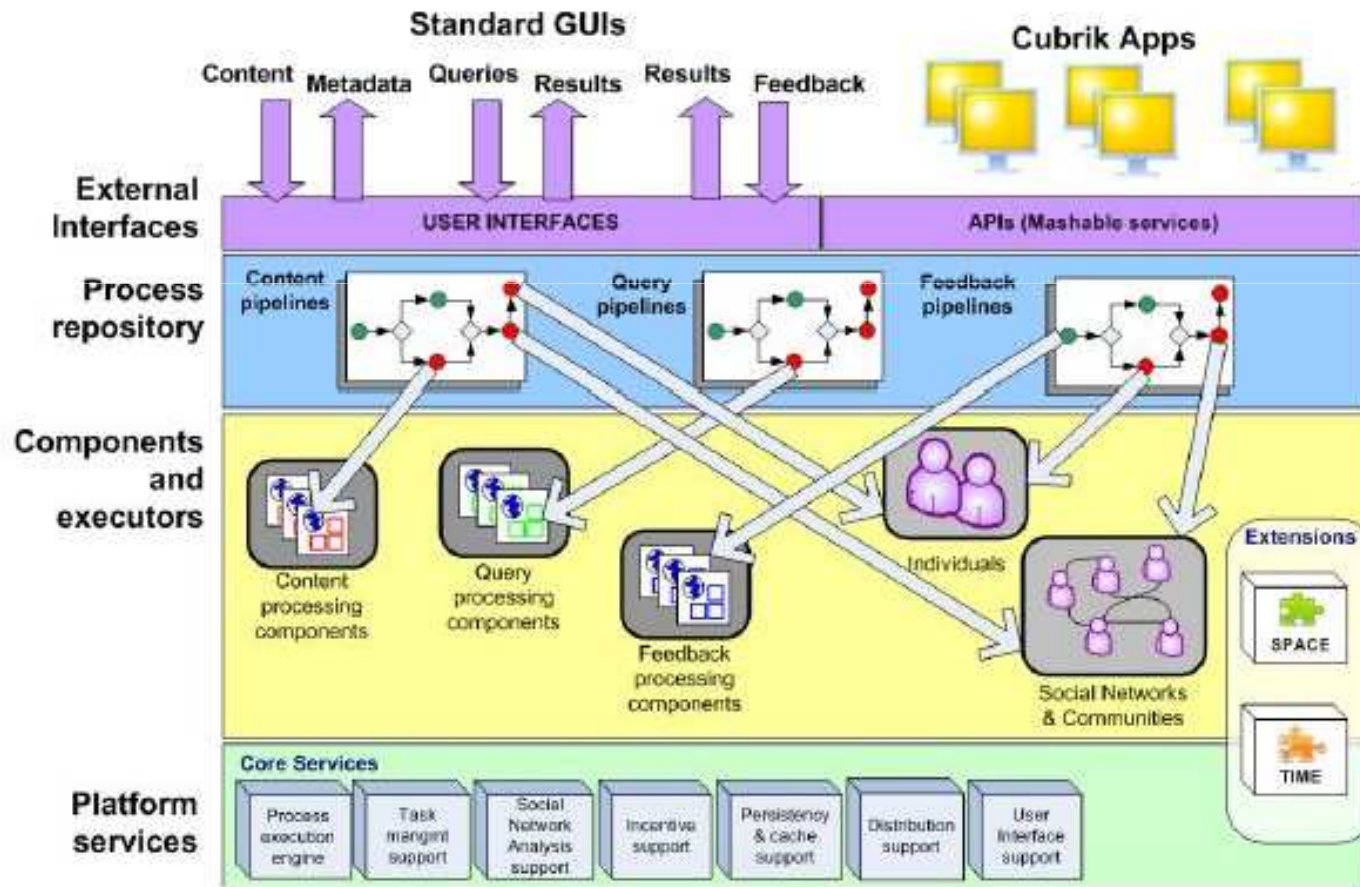
CUbRIK Shop Window

- ## www.cubrikproject.eu