



Presentation at Petamedia Industry Workshop
Content based video search applications
Some examples from Quaero and Elsewhere

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Pieter van der Linden,
Program Manager
Thomson

The global picture



- An observation about the market and underlying trends:
 - ▶ The volume of universally available digital information has exploded
 - ▶ New consumer media (PC, TV, handheld devices, etc.) have proliferated and multiplied
 - ▶ Internet becomes the privileged information space.
 - ▶ Search tools are the standard for accessing and using content.
 - Video search is a reality today

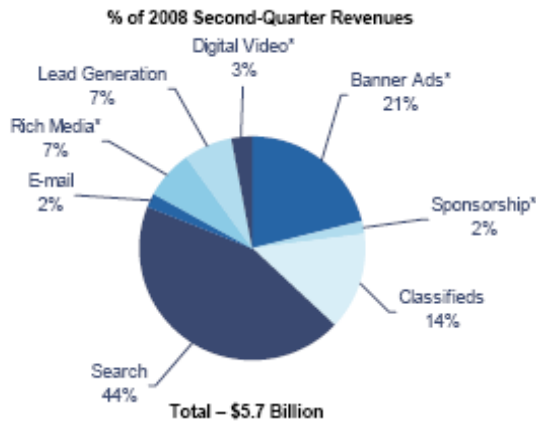


Why Bother about search



- Because it is useful to the public and to professionals
 - Preferred access means to information on the Internet, Intranet and professional environments.
- And because it generates tremendous economic value

Internet advertising



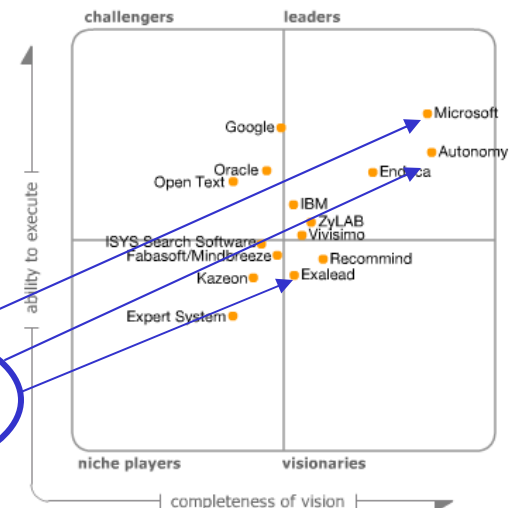
Source : PWC

Enterprise solutions

Forecast (M\$)	
2006	2010
717	1,219

Source : Gartner

In Europe..



Video and Image search

A reality Today

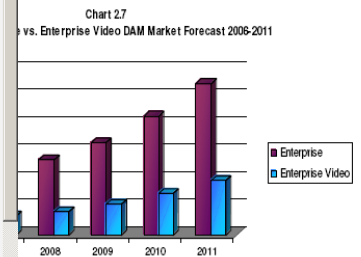


- Internet : the Youtube example
 - More then 59M unique US based visitors monthly

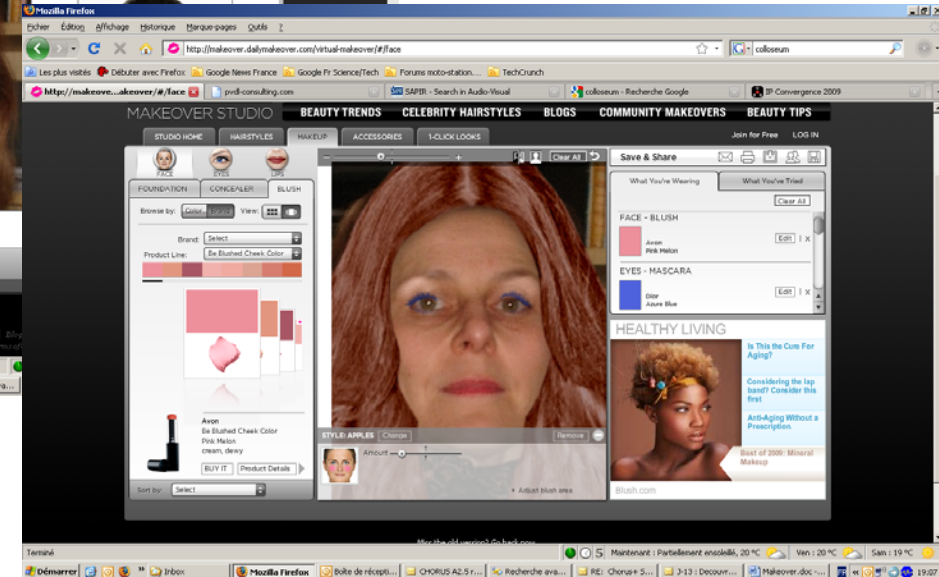
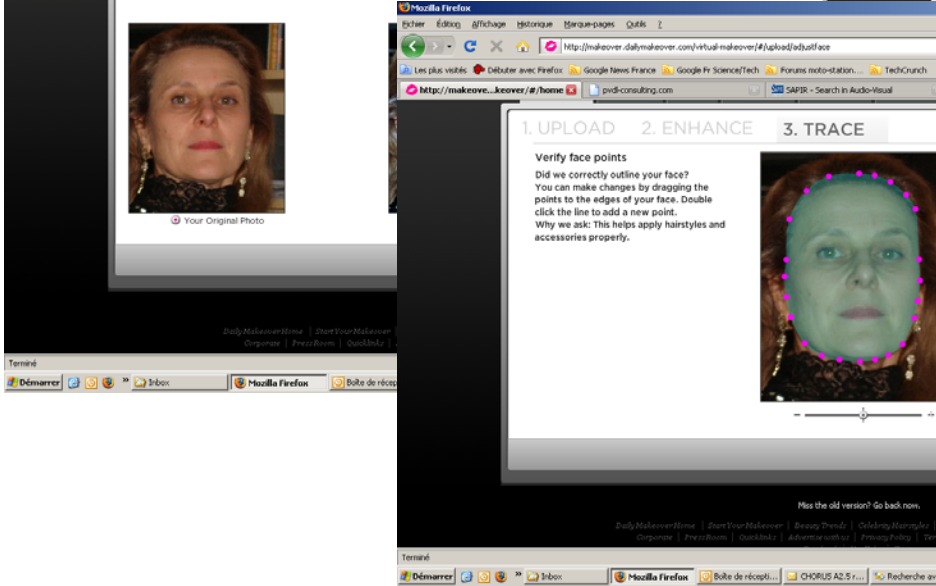
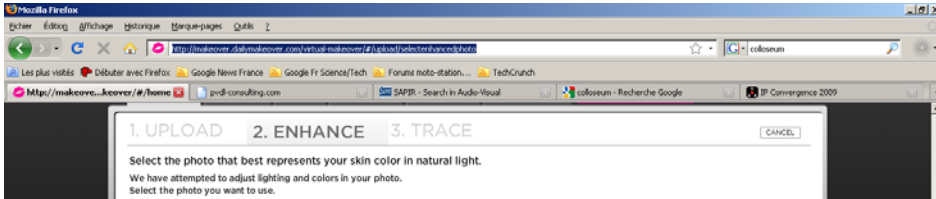
Search queries (MM) Aug-08	
Total Expanded Search	17,271
Google Sites	10,158
Google	7,594
YouTube/Other	2,564
ites	2,427
	2,393

The screenshot shows a Mozilla Firefox browser window displaying a Picasa Web Albums page. The address bar shows the URL: http://picasaweb.google.com/pb.vanderlinden/PhotosGrenouillere2009#. The page title is 'Picasa Web Albums - pb.vanderlinden - Photos Grenouillère 2009 - Mozilla Firefox'. The page content shows a grid of photos from a boat trip. The right sidebar shows the album's details, including the date 'Sep 13, 2009', the number of photos '40 - 28 MB', and the sharing settings. The bottom of the browser window shows the taskbar with various icons and the system tray.

Source : Comscore



Source : Frost&Sullivan



Content understanding challenge

Describe into words that are useful for search



A screenshot of a Windows Internet Explorer browser window displaying a YouTube video page. The address bar shows the URL: http://www.youtube.com/watch?v=RdtA0BEkE18. The page title is "pwned". The video player shows a person being hit by a fireball. The video is from the channel "stuyq4u", added on May 02, 2006. The category is "Comedy" and the tags include "pwned". Below the video player, there is a "Post Video" section with social media sharing options. To the right of the video, there are "Related" video suggestions, including "Tower of Pisa PWNEED" and "Pwned (Part 1)". A large, stylized purple text overlay "Search: Pwned?" is positioned over the bottom right of the video player and the related videos section.

*) Pwned :
88700 results
on Youtube

Source : Alex Hauptmann

Highlight on video search.

How much progress is realistic?



- **Current deployments mainly rely on keyword search using textual context for web and editorial metadata for media applications**
 - ▶ Some pioneering applications using audio transcription search from Blinkx, Exalead, Google....
- **Over the next years significant progress is expected on base technologies**
 - ▶ A result of the combination of algorithmic improvement, enhanced methodologies and international cooperation, researcher genius and increasing computer power.
 - ▶ Nevertheless technologies are expected to remain far beyond human brain.
 - ▶ Some examples :

Sample technology	Status	5 year likely improvement
Object recognition	90% success on rigid objects/random results on non rigid objects.	Non rigid objects to catch up with rigid object.
Scene segmentation	<60% success best case.	20-25% improvement.
Speech transcription	50-60% success on conversational speech	Improvement by 20-25%
Translation	30-35% score BLEU	10% increase.

Source : Quaero

Most of these technologies have been investigated for a long time*. Targeted solutions combining multimedia analysis, social tags and editorial information, on precise needs or opportunities are expected to succeed.

*) In 67 Marvin Minsky assigned a student to solving the computer vision problem over the summer.



The Quaero Program



- A **collaborative** research and development program
 - ▶ Focused on automatic extraction, analysis, classification and use of multimedia, multilingual content
 - ▶ To facilitate access to content
- **6 application** projects lead by industrial “champions” aiming at identified business targets
 - ▶ So far ... other applications may be added later.
- A **shared research** structure
 - ▶ A broad research scope
 - ▶ Systematic evaluation of scientific and technical progress
 - ▶ Extensive resources for annotating large collections of multimedia data

Six projects with application targets

From content providers to consumers

Sharing resources and know-how



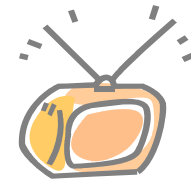
1- Digitisation and content enrichment



2- Digital media asset management



3- Media monitoring & analysis of social impact



4- Personalised video



5- Search engines



6- PC, Mobile portals

Who steers

Jouve

Thomson / INA

Yacast

Thomson

Exalead

**France
Télécom**

Expected results

Software and services for editors, patent offices and libraries

Software for broadcasters, media companies, audiovisual archives

Cross media platform and B2B services to analyse media social impact

Software for telecom operators, retailers and enterprise video

Multimedia search engine

New generation of access services to audiovisual content



**Shared research structure
Coordinated by CNRS and RWTH**



Technologies for analysing audio, music, image, video content.
Technologies for natural language analysis and translation
Content protection technologies

Brief status



- Following the European approval, the Quaero core developments started in May 2008.
 - ▶ Research and development program stretching over **five years**
 - ▶ A budget of about **€200 million**
 - ▶ Assisted by the French State through the public agency  **oseo**
 - ▶ Involving **24** partners
- **First year achievements**
 - ▶ Project launch : about **300** people at work
 - ▶ More than **100** scientific publications
 - ▶ Exalead and LTU **face detection** in images service
 - ▶ Orange **2424actu.fr** Beta service
 - ▶ And several other technology **demonstrators** available
 - Voxalead, Face recognition, Translation, Image search, Celebrity search

Partners



- Private enterprises

- ▶ Bertin, Exalead, France Télécom, Jouve, LTU Technologies, Synapse Développement, Thomson, Vecsys



- Public research laboratories

- ▶ CNRS-LIMSI, CNRS-IMMI, CNRS-INIST, INRIA, IRCAM, IRT, Institut Telecom, LIPN, MIG-INRA, Université Joseph Fourier, University of Karlsruhe, RWTH university, Aachen,



- Public institutions

- ▶ BnF, DGA, Ina, LNE



Coordinated by Thomson

Quaero R&D : Close interaction between research and industry

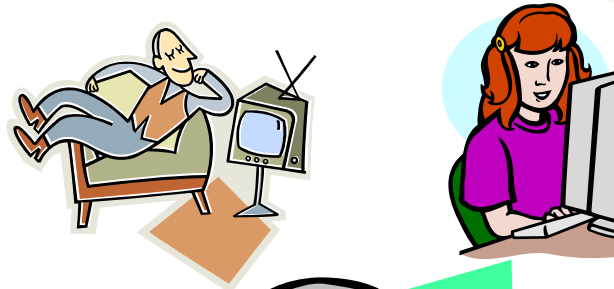


- Industrials and research organizations **cooperate** actively and effectively to develop demonstrators aiming at identified business targets and increase the state of the art in concerned technology domains
- **Objective measurement** of results through systematic benchmarking
 - ▶ Establishment of a objective assessment on the gap between industrial demand and capacities of technology supply.
- Strong investment in production of **large corpora**
 - ▶ Data representative of the target applications sectors
 - ▶ Manual and computer assisted annotation



Technology objectives

Facilitate access to content



The issue

Provide the user with *useful information* in spite of the fact that his request is possibly poorly formulated and typically *unanticipated*



Metadata is key

Exploit available metadata. And enrich it by combining editorial information, automatic annotation and social tagging.



Technology challenges*



Podcast and conversation speech transcription
Speaker identification
Audio track segmentation



Detection and identification of faces, persons, objects
Similarity classification
Handwritten O.C.R



Names entities detection and classification
Question Answering (who, why, how)
Translation of text and speech



Meter/rythm/key extraction
Genre/style classification
Music summarization



Scene detection
Action and event tracking
Person and object tracking



Multimodal fusion
Fingerprinting and protection.

*) A subset to be refined and adjusted in accordance to application needs.

Video Search in Quaero

First examples of results

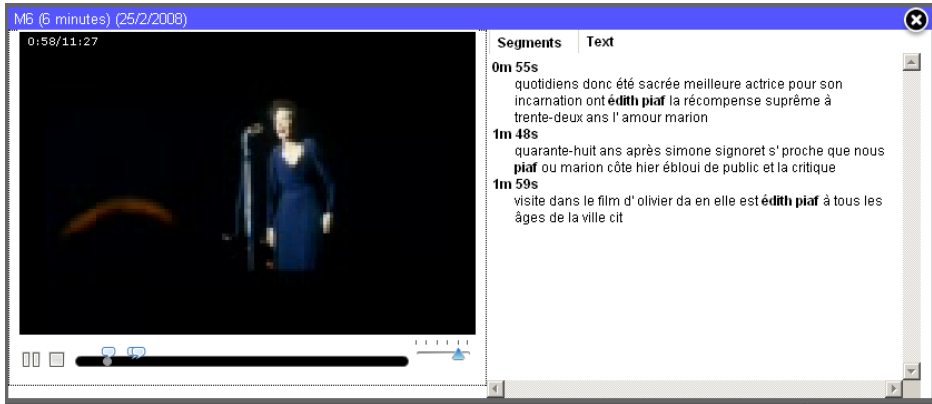
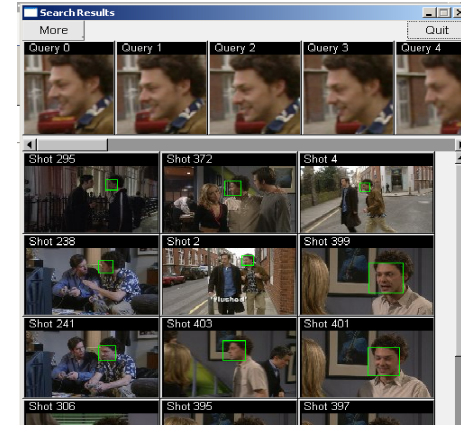
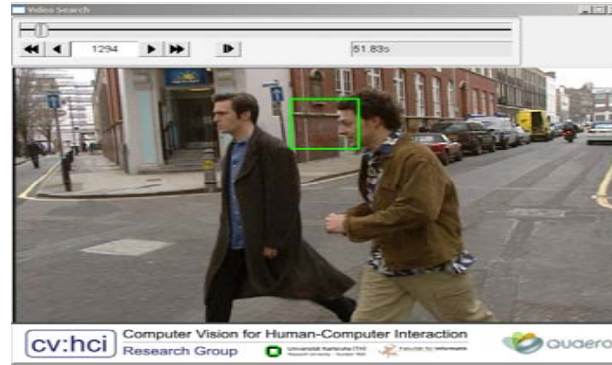


Face tracking and recognition technology by University of Karlsruhe

Hazim Kemal Ekenel

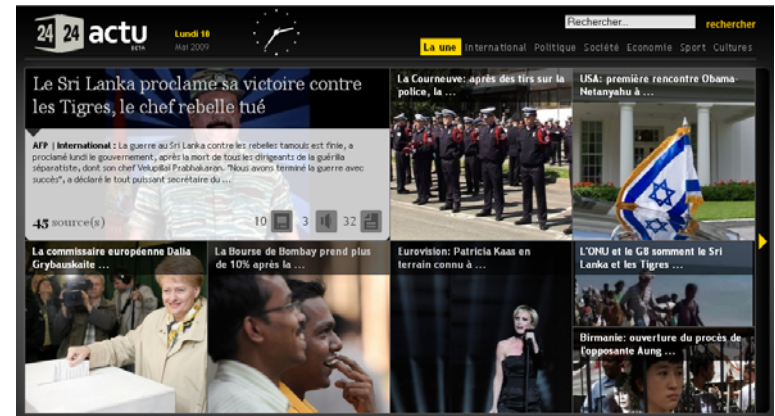
Event detection by INRIA

Ivan Laptev



Voxleadnews, Audio track transcription and search demo by Exalead.

2424actu.fr, News portal beta by Orange Labs.



Video Classification & Search

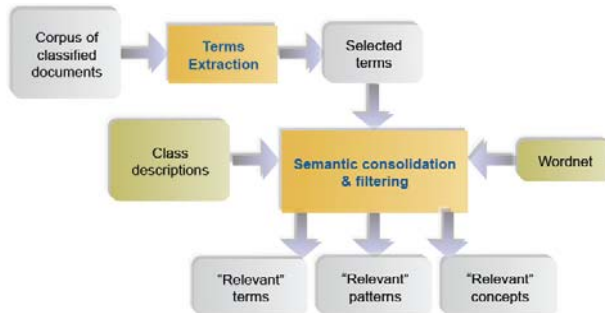
A peek into Future TV services.



Video recommendation and targetted advertising

Using Audience Characterization

- How many
- Who, Gender/Age
- Mood.....



And model based classification

Advanced Audio access

A glance on future developments



FM Premium

Powered by
yacast

The interface features a top control bar with a play button, volume sliders (Voix plus, Voix moins, Mute), and a search bar labeled "Recherche Artiste/Titres/tags :". The main content area is a grid of radio stations, each with a logo, a list of topics, and a featured artist. The stations shown are:

- Chérie FM**: Christophe Willem, Cafeine
- Europe 1**: Grèves, Taxes, Social, Départs, Partage, Education, Lutte rentrée, Economie, Sarkozy, Gouvernement, Reprise
- fip**: Regina Spektor, far
- info**: Pétrole, Social, Prix, Cibles, Volontaire, attentat, Lutte reprise, Koweït, Bachelot, Barack obama, Guerre
- inter**: Mntre, Prix, Alliot-marie, Mortel, Blague, Identité, Chirac, Justice, minima, meeting, Sanctions sévères, Relance
- fun radio**: Rokia traoré, Tchamantché
- NOSTALGIE**: Bénébar, Infrequentable
- RTL**: Duffy, Rockferry
- RMC**: Google, Monde, Irak, Mp3, France Télécom, Syndicats, Lutte, illégal, Iphone, Hadopi, Hortefeux, Guerre
- SKYROCK**: Lenny Kravitz, Love revolution
- SKYROCK**: Sheryl Crow, the very Best of
- SKYROCK**: Jane Birkin, Best of

At the bottom, there is a time display from 12h00 to 16h00, with a current time of 15h38 and a "Retour au direct" button.





Many Thanks

More information on

<http://www.quaero.eu>

(<http://www.quaero.org>)