

User scenarios and user requirements from media professionals

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ABSTRACT

This paper explains a brief summary of user requirements and scenarios in the media industry, and of how R+D collaborative projects have helped CCMA, the Catalan Public Broadcasting Corporation, improve their in-house developed media asset management. European and national co funded projects are valued as positive by industrial media companies as they give the possibility to get in contact with the latest state-of-the-art, to network with relevant European partners and, somehow, to be able to improve their existing technological products. However, the experience also shows that their “Research to Business” road-map is normally diffuse and hard to achieve. On one side, there exists a gap between commercial needs from industrial partners, and research centres and universities objectives and needs. Besides, what normally happens is that we all generally focus too much on invention but hardly manage the innovation, while this is a stimulating and profitable challenge we should also consider.

The paper explains a brief introduction of CCMA, the Catalan Broadcasting Corporation, and its own-developed Media Asset Management, named Digion. It also shows some considerations about the media sector where this Corporation competes. The most interesting parts, though, are the ones that explain some of the results of SEMEDIA[1], an FP6 project co-funded by the European Union. This project has shown an example of how the bridge between research and industry can be narrowed with a simple formula: letting user feedback guide technical research. The process of user requirements and scenarios gathering is explained, as well as some of the most relevant requirements from users of the Broadcast, Postproduction, and Social Web Scenarios. These requirements are general and wide enough to be considered whenever dealing with the development of a Multimedia search system, engine or service. These requirements were discovered in SEMEDIA thanks to a 12 month process that implied up to nearly 2.000 surveys. The paper ends explaining how integration and testing of SEMEDIA technologies was conducted, and the benefits that could be obtained from this effort.

General Terms

Management, Measurement, Performance, Economics, Reliability, Experimentation, Human Factors, Standardization, Verification.


Keywords

User requirements, use scenarios, media, broadcast, research to business, predicting success of a system.

1. INTRODUCTION

This abstract explains a brief summary of user requirements and scenarios in the media industry, and of how R+D collaborative projects have helped CCMA, the Catalan Public Broadcasting Corporation, improve their in-house developed media asset management. European and national co funded projects are valued as positive by industrial media companies as they give the possibility to get in contact with the latest state-of-the-art, to network with relevant European partners and, somehow, to be able to improve their existing technological products. However, the experience also shows that, although there are some best practices that can be considered when defining a “Research to Business” road-map, there still exists a gap between commercial needs from industrial partners, and research centres and universities objectives. The good news is that, probably, both point-of-views can converge on a mutual benefit: CE research projects establish an excellent common framework with logical and known rules, but an extra attitude must be encouraged by all partners in order to work on a common dialogue and consensus basis.

2. WHAT IS CCMA’S PROFILE?

 The Catalan Broadcasting Corporation is the public group that manages the radio and television broadcasting services of the Catalan government. It is a public Broadcaster with more than 26 years of experience, that currently publishes contents not only by means of 5 TV channels and 4 Radio stations, but also by means of new media: Internet, mobile phones, PDAs, DTT, etc.

The ICT Department is at the present involved in two research projects: SEMEDIA and I3MEDIA[2]. SEMEDIA focused on developing tools that improve access, search and retrieval of media content. I3MEDIA focuses on developing technologies that will allow automatic intelligent media creation and management.

Both projects are related to CCMA’s Media Asset Management (from now on, MAM) system [3]. To give the reader an idea of the importance of this MAM, this system allows the workflow to be fully digitized at TV3 and Catalunya Radio. The MAM has been operating since 2003. It manages more than 100.000 digitized hours (increased at a rate of 28.000 digital hours per year), has 3 petabytes of robot storage capacity, and copes with more than 1,850 users. Besides, what makes it unique is that it integrates all the needs of a Broadcaster: ingest, playout, editing, archiving and assets management. It also integrates archive and production environments in a single system.

3. BRIDGING THE GAP: RESEARCH NEEDS VS INDUSTRIAL NEEDS

From our experience in R+D projects, we have been able to identify a clear gap between researchers' needs and objectives, and industrial partners' needs and objectives.

Researchers usually focus on basic or applied research and measure their success by means of published papers, conference talks, and especially by being the first to invent or reinvent an idea. Besides, they have also pressure to get funding for "feeding" the research group. On the other side, the Companies, public and private, measure success by profit and loss results, that is, they get involved in projects because of greed (they want to develop or improve products so that they can get money out of it) or because of competitiveness (they need to be more efficient). So companies see innovation as a way of surviving. Innovations in products, processes, marketing or business models are necessary to feed the mid-long term prospects of the company. Well managed innovations provide more sales income and benefits, and make the company more competitive and efficient.

In fact, innovation is a three step process: invention should lead to innovation, which at the same time should flow into dissemination. What quite often happens is that researchers focus too much effort on the first step of the process (invention, the most interesting and exciting step), while commercial firms too often anxiously ignore the initial two steps.



Figure 1. The 3 steps innovation process.

However, innovation must follow the full, properly timed process: the invention (create, invent a new idea) must be followed by an innovation (the idea must be correctly managed and brought to market, i.e. must be reshaped so that it can bring business revenues). In the case of a final B2B or B2C product, a final step must also be accomplished: dissemination (create demand). In this last case, dissemination is necessary because if a new product that comes from a new idea is not copied by others, i.e., if it does not have followers or imitators, then there will be no demand for it, no business success. What normally happens is that we focus too much on invention but barely manage the innovation. In the author's opinion, refocusing on innovation is a very stimulating challenge we must consider.

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4. SEMEDIA AND I3MEDIA EXPERIENCE

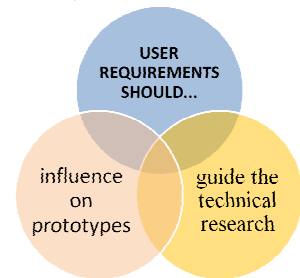
We have realized that co funded projects allow companies to conduct research with less financial risk and in an open, international collaborative manner. However, they imply two major drawbacks: a lot of paperwork, and, even worst, encountering the gap between needs and objectives of researchers and industrial partners.

We have tried to close this gap by managing our participation in the joint research projects in a practical and end-user focused approach. Our ICT department has always considered that there is no sense in developing any system or application unless done on a co-design and user centred basis.

We have tried to close this gap by adding value, with our data and information and with our expertise. As experienced Broadcasters, our main contributions are providing content/datasets, partially guiding technical research by defining user requirements and scenarios of use in the Broadcast environment (and others), helping in the specification of standards and social and industrial requirements, and integrating technologies in our own Media Asset Management system. Integrating technologies has been crucial. We have taken advantage of the fact that we are the developers of our own M.A.M. It has given us the chance to control a prototype that we have used for Quality Evaluation purposes; this way, we have been able to transmit the requirements of our users, and provide researchers real feedback and valuable advice on their technologies and tools.

4.1 Understanding user requirements

As described in the SEMEDIA work plan, our first tasks in the project were to lead involved understanding user requirements and user scenarios. This was a two phase process. First, most of SEMEDIA's industrial partners (Yahoo!, Smoke&Mirrors, the BBC, and CCMA) conducted surveys (634 questionnaires were completed) and discovered which technologies were interesting for professional users in the Broadcast, Postproduction and Social Web Scenarios. This discovery was the start of a dialogue between researchers (FBM-UPF, JRS, UG and UPC) and industrial partners. SEMEDIA partners used this knowledge to direct the technical research towards what were likely to be the most useful outcomes. In other words, we clarified the three scenarios and selected 15+ technologies that would be developed within SEMEDIA's scope: events detection (e.g. goals or clapping); visual recognition (logo detection, OCR detection); camera motion detection; textual annotation (write annotations for a selected part of a video), visual



content clustering; video interaction package (video marker, video hotspots, video summarization let the user interact easily with videos); automatically generated video summaries; object highlighting and keyframe selection; retake detection (recordings of the same scene); content browsing using stripe images; user mining and user activity (capture user's or system's activity in order to extract underlying information, i.e. not explicit information). These 15 technologies all fulfilled the following two conditions: they were considered relevant by the users of at least

one of the three scenarios, and they were feasible (considering the time and budget restrictions of the project).

After this first stage, we had converted general objectives to specific objectives, in other words, we had identified the technologies we would be tackling in SEMEDIA, considering time and budget restrictions. Now that the project is nearly over, we can say in retrospect that most of these technologies were considered, although the quality of the results have varied depending on the technology and the partner.

Besides, we were also able to understand the differences and similarities of the requirements of Professional Users (Broadcast, Postproduction) versus On-Line users. They can be summarized as follows:

- SIMILARITIES:
 - Access security and media rights management is a significant issue for all
 - Media content labelling on ingest is a labour intensive, time-consuming process. Any automation of this function will have cost reduction and quality improvement benefits
 - Automatic annotation of metadata is considered by all scenarios as a priority
 - Speed, efficiency and accuracy of the search process are key criteria for all users
 - Broadcast/post production houses have their own internal systems, but significant use is still made of web based search engines (Y!, Google, You Tube) and email sharing.
- DIFFERENCES:
 - Storage is a real problem for all professional users, but not for on-line users
 - Video Workflows are extremely different (web users only use videos for sharing with relatives)
 - User is anonymous in on-line environment: security, spam, and copyright issues problems arise because of lack of traceability.
 - On-line scenario has higher query-load. Besides, it simultaneously multi-casts to a higher number of users
 - Speed is much faster on corporate network connections than in the on-line environment
 - CBIR, Content-based Image Retrieval is more suitable for On-Line users. Actually, producers (Broadcast & PostPro) another priority: metadata should be standardized and consolidated on ingest time, propagated through the whole production process, and kept on archive whenever desired.
 - However, Media Professionals see a great potential on CBIR tools.

4.2 Second round: Fine-Tuning requirements

Eight months later after the first study, the same SEMEDIA media industry partners conducted another survey (1.338 responses were gathered) by means of questionnaires, focus groups, interviews, observation, and an external user group meeting. Once again, this study was driven by the BBC and CCMA in TV Broadcast and Archive, Smoke&Mirrors (S&M), Ltd in Postproduction, and Yahoo!Iberia (Y!I) in on-line Web. Research partners were asked to collaborate in the questionnaire definition. This was the ideal opportunity for researchers to ask users specific questions about the technologies they were already developing or about to develop. They asked: *“How can we help you to do your work more efficiently? What do you need exactly? What are your typical daily tasks and what could we do to help you to perform them better? What would you like new tools to look like in the interface? How could they be integrated into your current system?”*. These might seem like obvious questions but, we tend to forget the end user and we, as technicians or researchers, normally zoom in excessively on technology when we develop an idea, a technology or a product.

The real needs of the users in the three environments can be summarised as follows:

- Thanks to the survey, SEMEDIA partners confirmed that user centred input is essential for the development of relevant and useful search tools.
- Even though some of the media management systems already have advanced functions for key frame display, low-quality pre-visualization, and IPR restrictions, all searches are still undertaken using text, and archivists manually input all text based metadata. There are no facilities for automatic index on ingest and users would welcome more advanced indexing, summarization and search functions.
- Textual annotation, events detection, video summaries and video material and search are the technologies which are most highly valued by users. Besides, there is a special interest for visual clustering from Web Users.
- Automatic recognition tools (events detection, object detection, logo detection, face detection, OCR, etc) are of general interest.
- However, Camera motion and retake detection are useful only for specific users (e.g. editors, and archivers).
- Users from the Broadcast and Postproduction scenario will not use the technologies unless they integrated in own MAM. However, Web users are more flexible.
- Users are highly receptive to new technologies as they expect them to save them time in their day to day tasks. Any effort for developing technologies is indeed justified as the ROI will be valuable in terms of the sum of saved hours..
- However, these technologies need to be integrated in the users' own systems, be scalable, and speedy or there will be no success at all. This is probably what researchers find more difficult to understand or cope with, as they are normally not overly worried about such concepts as modularity, scalability, and real-time processing.

- Accuracy is also a must in any automatic video and/or audio detection tool.
- The common research interests can be summarized by the following figure:

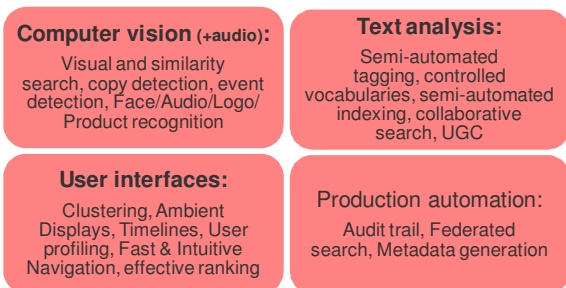


Figure 2. Common interests found on the three scenarios: Broadcasting, Postproduction and Web.

A public document “D2.2 Revised Scenarios for Media Access, Search and Retrieval”[4] is available on the Semedia Web Page with further information.

4.3 Getting real feedback from end users

After we had finished the second survey, we clearly had in mind that, overall, when dealing with multimedia search systems, engines and services, the users’ key objective is to catalogue, annotate, index search, browse and retrieve as much archive content as possible as quickly as possible.

We found the best way to meet this key objective was by applying a –not obvious but- logical approach. It is not a secret that developing is an iterative process. And it is also known that any ICT development process needs an intensive dialogue between all the actors involved in the value chain of the technology. If companies count on engineering that concurrently implies all business areas (marketing, production, operations, and purchasing) and also end users from the beginning of product development, why shouldn’t we rely on the same close relationship between the different kinds of partners that can be found in a collaborative research project?

In order to “force” this close relationship, we put in place the mechanisms that promoted both dialogue and iteration. (The author thinks it was one of key factors for the success of SEMEDIA project). The procedure was in the following: CCMA established a group of test users, the SEMEDIA Broadcast testers. The test users group was composed of 5 technicians and 16 end users. We were especially grateful for the time and positive attitude of the end user group which was composed of 9 archivists, 5 News Department staff, and two people from the Sports Department. The ICT department had the duty to link them to researchers, to integrate the new tools in a prototype of their own system (CCMA’s MAM system named Digation), and to perform all the project management tasks. We asked the user group to test, to “play” with the prototype, and to then give us their unrestricted opinion about the SEMEDIA technology they were testing. During the tests, we mainly asked them about the usability and usefulness of the technology, and about whether it had been

integrated in the proper way or not. The feedback was forwarded to the researchers, but was also used by us to refine the integration.

Frankly, in the beginning, working with the end users was hard. We found it more difficult than expected to mobilize and to motivate professional colleagues that were always stressed and bothered with their every day problems. But at the end, they understood the project. They knew they were a part of it. They felt their opinion was important, and they voluntarily collaborated to improve the results of the project. So the effort was worth it, because the results were worth it. We were able to see our system and SEMEDIA technologies from the right point of view (users’ point of view!). We were even able to learn things we did not know about the system we, ourselves, had developed and, more importantly, we were able to give valuable feedback to the researchers and were able to help them improve and guide their academic or industrial research. That was a simple but effective way to minimize the gap between research and business.

The results are now clear and tangible: integration and testing has given us the chance, not only to improve our MAM, but also enough information to consider exploiting others technologies. For example, regarding SEMEDIA, we plan to exploit one SEMEDIA technology (tag suggestion tool developed by Yahoo!), and we are still open to exploit six other technologies (stripe images, Predominant colour, motion activity and camera motion from Joanneum Research Institute, Ranking technology from Yahoo!, Xtreme News and Ambient Display from Fundacio Barcelona Media Universitat Pompeu Fabra). Regarding I3MEDIA, we will for sure exploit four video processing technologies from UPC (object detection, logo detection, on-screen text detection, and query-by-example searching), and are open to exploit other technologies from other 2 partners (songs parameterizing tool by Noufer, and speech-to-text, speaker detection and language detection from Telefonica I+D). Users have the first and penultimatefinal word. If they find a project result useful (e.g., TV3 archivists consider that Tag Suggestion Tool can guide and save time when indexing an asset), and it is somehow mature enough to be brought to production, then it is the time to negotiate exploitation issues between partners.

5. REFERENCES

- [1] The SEMEDIA Project is  co-funded by the European Union
- [2] I3MEDIA Project is  co-funded by CDTI, a public entity that depends on the Spanish Science & Innovation Office
- [3] For more information, you can consult the article on November 2008’s edition of Broadcast Engineering magazine: http://broadcastengineering.com/newsrooms/tv_barcelona/index1.html
- [4] Five independent experts rated both technical quality and industrial relevance with a 4.6 over 5. You can find it at: <http://www.semedia.org/publications.html>