

MediaMixer: Innovative Multimedia Solutions ready for transfer to industry

Lyndon Nixon

MODUL University Vienna GmbH, Am Kahlenberg 1, 1190 Vienna, Austria
lyndon.nixon@modul.ac.at

Abstract

*MediaMixer¹ is a group of **expert organisations in innovative multimedia technologies**. We will present current trends in online media, the future media ecosystem that companies need to prepare for, and why this means new solutions are needed for media technologies. Through case studies and success stories, we reflect on how a combination of innovations in media analysis, annotation, rights and management, companies will be enabled to **better find and re-use online media**, and thus build **new business models and revenue streams**.*

1. Trends in Online Media

The media ecosystem that companies operate within is changing rapidly thanks to the greater ease of creating and publishing media assets, the growing scale and complexity of enterprise media, and the disruptions in the media value chain caused by media sharing and remixing. We believe there will be growing demand for fragments of online media in the future. This will be driven by the scale of media creation (online archives of broadcasters and producers hold >40m hours of footage), which leads to the need for reducing creation costs through flexible re-use of existing material (stock footage is a billion dollar market with >20% growth per annum). It is grounded in a cultural shift towards acceptance of media re-mixing, where new media contents are created out of the combination of existing media fragments ("Harlem Shake" is perhaps the most profitable user-sourced remix to date for a media owner). Finally, it will be facilitated by the interest of existing and emerging media owners to derive new value from their media assets, often archived and forgotten, meeting only the needs for the 'long tail', by being enabled to re-sell or re-distribute fragments of those assets in an open marketplace. Growing demand can only be sated by improved supply, and there are technological barriers in place to this today which need to be overcome by new innovation in enterprise media systems and workflows.

1 EU FP7 funded research project, <http://mediamixer.eu>

2. The future media ecosystem: a Hub of Media Fragments

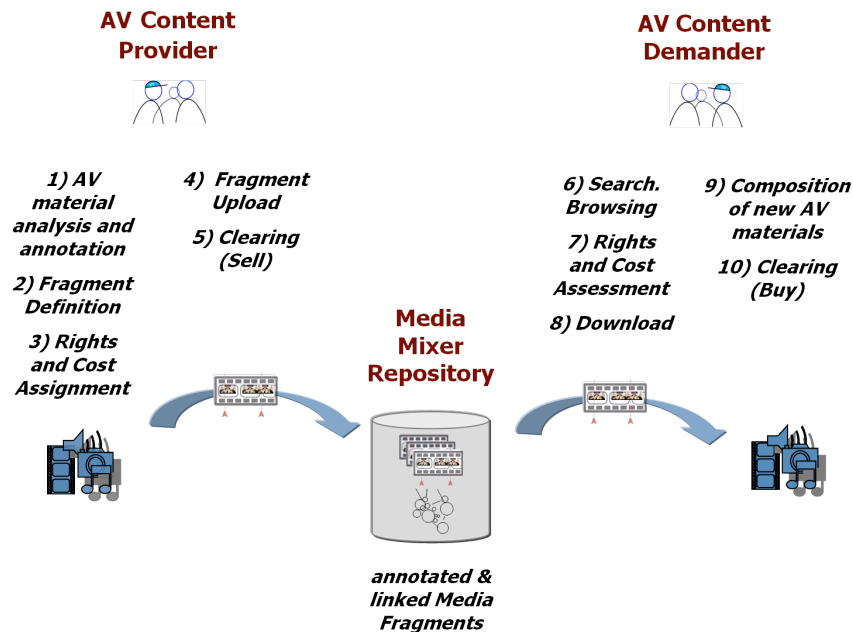


Figure 1. MediaMixer Hub as business mediator.

Following the principles of the World Wide Web², and more recently with respect to annotations, the Semantic Web and Linked Data³, we imagine that media owners should annotate their own media assets and publish those annotations on the Web. This means, importantly, they can keep full control of their own annotations, i.e. which assets' descriptions are published, and retain responsibility for what those descriptions contain. Access to those descriptions is made possible via a public endpoint to their annotation repository, and assuming each media owner will follow MediaMixer specifications [1], there would be interoperability across each owner's repository with respect to the media description models, the controlled vocabulary used for concepts in the annotations, and the access modality to the annotation repositories endpoint. Our vision of the *MediaMixer Hub* is a technology ecosystem which can expose media asset descriptions to agents which are searching for relevant media fragments on behalf of a media consumer. Media owners may then choose to register their public endpoints at specific MediaMixer Hubs (and not the other way around) which are used by different groups of media consumers. The Hubs act as mediators for media consumer queries and

2 "Architecture of the World Wide Web, Volume One", W3C Recommendation 15 December 2004, <http://www.w3.org/TR/webarch/>

3 <http://www.w3.org/standards/semanticweb/> ; <http://linkeddata.org/>

aggregators for media owner results, as illustrated in Figure 1. Thus the supply side and the demand side for media fragments could be brought together online, to the benefit of both media owners and media consumers.

3. Why do we need innovative multimedia solutions?

Media assets today are generally stored in proprietary, offline databases with only very basic metadata and limited-to-none rights information. As such, the cost of making those assets available to other consumers at scale is too high and potential revenues or other benefits from asset redistribution or re-use are not realised. MediaMixer promotes technologies which can help media owners fragment their media content (into meaningful parts), annotate richly those fragments, attach highly expressive rights information, and publish information about their media assets online [1]. Media applications can access and query those published descriptions, easing the task to search for relevant media fragments, acquire them (negotiating rights and payment), and re-use them as appropriate. Figure 2 below illustrates the technology chain.

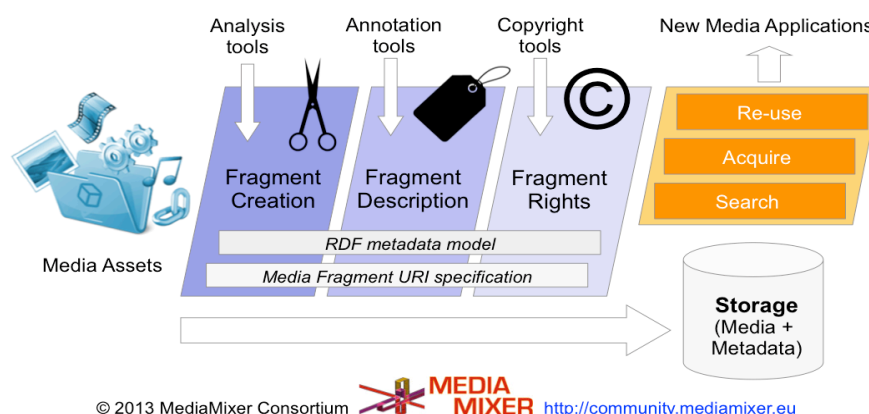


Figure 2. MediaMixer technology chain

4. Case studies and success stories

This can be foreseen in the use case of the 'Semantic Newsroom' [2] (Figure 3). The newsroom system is automatically finding matching video fragments for topics in the news story which the editor has selected. Right now, this is managed by the newsroom having access to a particular annotation repository where annotations of media assets have been stored, those annotations having been specifically created for that purpose using media content the newsroom has access to - e.g. for a broadcaster, they will have had to annotate video in their own archives. However, in the real world, the newsroom may be happy to re-use media fragments from any source, provided a certain level of trustworthiness has been determined and rights issues are resolved. Certainly, the newsroom may not have local access to all relevant media it could possibly need, while other media owners may well have fragments of media to match those topics. We can imagine a Hub acting as a

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mediator for commercial news wires which aggregate media assets whose media owners have permitted for re-use in news reporting.

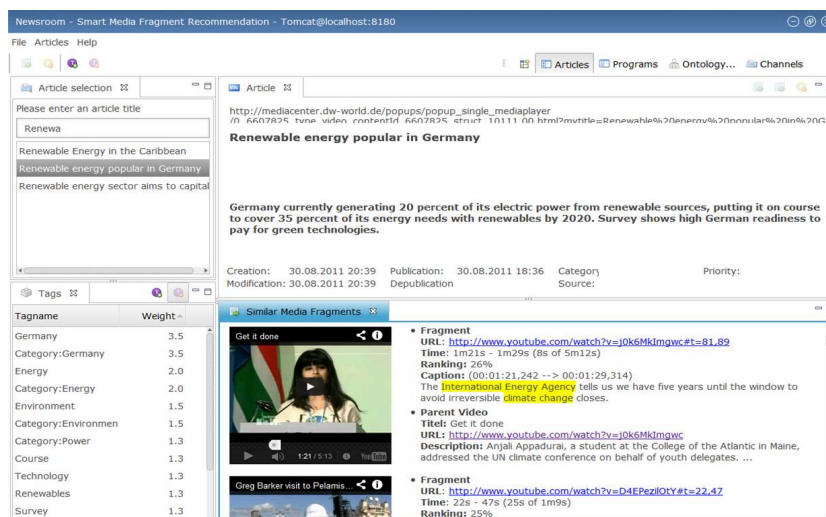


Figure 3. “Semantic Newsroom” success story using MediaMixer technology to suggest relevant video fragments to newsroom editors.

MediaMixer has also supported knowledge and technology transfer in use cases in other domains, including e-learning [3] and digital copyright management [4].

5. The MediaMixer Innovation Day

MediaMixer organized its Innovation Day to help fulfil its stated objective to “*focus on ways to address potentially limiting factors in the current market, simplifying aspects of content access, provision, remixing and repurposing, and tackling aspects potentially obstructive to obtaining rights for use, primarily of benefit to the established media industry, but in a way that also encourages wider access outside mainstream channels, such as in User Generated Content (UGC) portals and newer entrants monetising media production and consumption.*”

To support and promote this objective, MediaMixer chose to host the Innovation Day within a dedicated international conference, Innovation Through Knowledge Transfer, this year “InKT14”:

The conference will provide an important opportunity for knowledge transfer practitioners from Europe and further afield to meet and share experiences of university-business-interaction, commercialisation, and enterprise development.

MediaMixer is driven by a consortium of research and technology development institutions, and as such supplies technical expertise. MediaMixer fundamentally addresses the combination of the web and visual media, neither of which is purely a technical concern; however, the world of media is undergoing radical

transformation in “becoming digital”. Alongside its challenges to the media industry, the value the web can bring within the new “born digital” media arena is yet to be understood.

The successful creation and execution of the Innovation Day concept was an important opportunity to bring MediaMixer together in an interaction with key individuals representing aspects of industry and institutional sectors. To maximize the value and impact within industry, it was important that the event was limited in numbers and the agenda designed to actively promote open discussion, in contrast to paper presentations-oriented sessions common to academia.

The day was therefore organized according to a three stage flow of short talks and discussions to bring the most out the intentional diversity of invited contributors (each attendee was considered a contributor), broadly structured around promotion of MediaMixer’s offer, through to various statements from industry stakeholders impacted by digital transformation (to paraphrase from the event’s microsite):

Firstly, an overview of semantic multimedia was presented, from the perspective of MediaMixer’s technology partners and R&D expertise, with a summary of opportunities and outlook through MediaMixer’s knowledge and technology transfer offer;

Lyndon Nixon (MODUL University) opened the Innovation Day with a short presentation on what is this “MediaMixer” all about anyway? He looked at the trends towards digitalisation of media and it moving online, and the new challenges arising for any media organisation with regard to storage and maintenance of their digital media such that future retrieval and re-use is facilitated. The MediaMixer core technologies are a set of tools, services and specifications that will support future re-use of media through richer analysis, annotation, fragmentation and copyright management of online media content.

Secondly, short talks by early adopters of multimedia semantics within a variety of perspectives were given, using by way of example digital media copyright (Universitat de Lleida), semantic publishing (Ontoba), broadcast news (Condat); and the first panel of the Innovation Day was made up of representatives of early adopters of MediaMixer technologies, who reflected on industry uptake of the analysis, annotation and copyright management of media assets.

Rolf Fricke (CONDAT) spoke about technology transfer with TV broadcasters. They have learnt it is increasingly difficult to re-sell whole media assets later, when the content itself is no longer recent, but in cases of news and sport for example, customers in later time are interested in accessing specific parts, e.g. for specific persons or events. The Semantic Newsroom product developed by CONDAT shows how the MediaMixer technology allows newsrooms eased access to relevant video fragments for supplementing their news programming.

Julien Everett (Ontoba) spoke about knowledge and technology transfer towards media publishers, having for example worked with the BBC on a number of

projects. He notes that online publishing is traditionally closed, and the frustration internally is largest with the product development people who have a new idea, the issue being this is tightly coupled with software development projects that raise new technology requirements. Between the groups within companies, data interoperability is still a barrier. There is still a need to break down content silos, the organisations are not interested in technology innovation but are in product innovation (so this drives any tech transfer). Data interoperability remains a key driver for uptake of semantic technology.

Roberto Garcia (Universitat de Lleida) addressed interest in new copyright management technology. He reported on a pilot with Sony DADC, noting that companies are realising there are new opportunities to monetize online media outside of the old model of selling a product at a unit price. Permitted re-use of IP on YouTube with revenue sharing, for example, but the ContentID solution is often not flexible enough for media owners who want to protect their content in some contexts while happy to monetize it in others. The Copyright Ontology can be a solution to flexible determination of contractual agreements in media re-use on the Web.

Moderator Lyndon Nixon asked if companies are coming to them, aware of the innovative solutions they provide. Technology transfer is still difficult, but Roberto reflected on starting small to show benefits when the companies already wanted something much bigger! Julien noted that there is some awareness of 'semantics' but progress is only made by integrating with development teams and 'learning by doing'. Rolf added that in the broadcast industry the awareness is more on the business side: that opportunities are being lost with valuable content 'sleeping' in their archives. When they hear there is a solution to monetize this content, they are interested – regardless of the technology.

Thirdly, short talks from industry looked at addressing challenges, possibilities and outlook, set within the wider content industry context, from publishing (Pearson), content (Getty Images), copyright (Hubert Best, legal advisor to FOCAL) and media archives (Netherlands Sound and Vision) – followed by a panel discussion moderated by Sue Malden (Chair, FOCAL).

This second panel on the other hand represented the "demand" side, industry representatives who need to be convinced of the MediaMixer technology (or convince others in their organization).

FOCAL Chair Sue Malden noted that typically technological solutions and ideas are pushing at product development without fully appreciating the nature of the business, which is the wrong way around. Archives are moving from B2B to B2C business models, which does need support how to facilitate retrieval and re-use of the media they have online.

FOCALs Legal Advisor Hubert Best added to this a strong reminder of the importance of copyright within this industry. This isn't an attitude that can shift as quickly as the technology changes around it, leading to today's disconnect

between seamless sharing online of (copyrighted) material and the industry struggles with protecting it at all costs. There is a need for international harmonisation of copyright law in a borderless (digital) world. There was also the timely reminder that semantics are useless if the meaning is taken out of them by lack of protection!

Bouke Huurnink (Sound and Vision) addressed the general issues with technology transfer processes within media archives. The technologists are moving much more quickly than the archivists they are working for! A Scrum methodology has proven effective for collaboration with regular meetings and updates – stakeholders test the progress every two weeks. Rights is indeed the biggest issue! Prototyping is using public domain materials. Semantic augmentation of archivists annotations is taking place, but the scale of the work quickly becomes an issue.

Jonathan Lockwood (Getty Images) presented the innovative new approach of Getty Images – Embed. This is a reaction to the realities of the online world: the ease of copying online imagery and re-using it on Websites, even though often this imagery is protected and re-use is prohibited without purchase, e.g. from Getty Image's large image repository!

A legitimate option to right click! Embed is an embedded viewer: an iframe to a gettyimages.com image with branding and attribution. Terms include right to collect data, remove at any time or place ads. Non-commercial use only. PicScout visual matching allows us to find unauthorized usage, so Embed is the only legal path to using Getty's content. Thus Getty proposes a new way to protect its content in an online world, ensuring frictionless licensing to encourage proper, legal conduct in re-using online media!

Madi Solomon (Pearson) is "Director of Semantic Platforms and Metadata". Not a common job title! Pearson was about (paper) books, but now its content is transmedia! So this is about organizations adapting to the realities of the world around them: consumers are switching to e-books, podcasts, and other digital media...Madi recounts how she is involved in getting Pearson to move to use of Linked Data in its metadata; there is still a need for 'good' data for this and all of the data has to be good! She reflects, "Semantics do make peoples eye glaze over – if I switch on a light, it should come on, I don't need to understand how the electricity got to the light."

The potential scope of the impact of the web on visual media is vast: it was important to structure the bringing in of further representative viewpoints. To support this, "lightning talks" were sought from key participants.

Todd Carter of Tagasauris spoke remotely from San Francisco about his start-up company, building a platform for semantic annotation of large media archives, already working with significant customers in the US.

Marko Samec presented his company Out of the Box, which holds events for research and industry. It has now started filming lectures, now working with VideoLectures.NET.

Karen Colborn spoke about "Shared knowledge, shared data". Technologists can't work with collections they don't know, collection owners can't work with technologies they don't understand. The Presto4U project is looking at bringing together communities (nine have been set up, e.g. research institutions, footage, production, learning). Each community has a core set of experts (committee). Anyone can join and participate - <https://www.prestocentre.org/4u>

Elitza Bantcheva presented the company Deluxe Media, which is involved in an EUproject TransLectures. Topics are: Speech recognition, multilingual translation. Machine learning is very ignorant of context and needs semantic analysis to improve. Deluxe Media has learnt a lot through participation – it is very important to be agile even in large organisations!

Dermot Frost described a big Irish project for digitising and preserving Irish archives like RTE and the Trinity Library. This is part of the Insight Centre, the recently set up National Centre for Linked Data and Analytics. They are planning Getty-like public access to streamed material to promote the content as well as using YouTube as the way to get revenue from popular content by adding some ads. As such, the project outcome strongly reflects MediaMixers vision of the future media industry online, with easier access to digitised media and use of semantics and fragmentation to improve the process.

Fourthly and finally, to wrap up, Lyndon Nixon invited ICM Reporting's David Willox to conduct an exercise with the attendees. David introduced the Theory of Constraints, which has the important maxim "technology can bring benefits if, and only if, it diminishes a limitation (E. Goldblatt)". He encouraged critical thinking among the technologists if their technology indeed is meeting a need for the industry.

- What limitation is diminished by the technology?
- How did we accommodate it in the past?
- How do we need to change these rules?

Lyndon Nixon closed the meeting reflecting that from the MediaMixer perspective, the takeout might be that the market has matured a lot in the last two years (when the project proposal was written) in relation with semantic data (linked data) adoption, media fragments, etc. In any case, a lot of work is still to be done ahead. From the point of copyright, it is clear that industry sees it as a big issue but not clear yet the best way to address it.

MediaMixer core partner and event coverage experts ICM Reporting were commissioned to interview contributors in order to succinctly capture, what MediaMixer represents, the contribution it has made so far to industry, and the

outlook hereon, with a record of the entire day's presentations made available by VideoLectures.NET.

All captured video material – from the talks and post-event interviews - is available from the Innovation Day webpage <http://mediamixer.eu/innovate>.

6. Conclusions

MediaMixer has reached out to several industries in its lifetime, through events such as the Innovation Day, and it is considered critical to maintain some momentum from the activities executed by MediaMixer. This includes continued cooperation with industry contacts gained during the project as well as re-use of the materials produced for the industry domains by MediaMixer through its Webinars (<http://mediamixer.eu/live>), Innovation Day (<http://mediamixer.eu/innovate>) and use cases. All MediaMixer partners have benefitted in the project from new and strengthened contacts to representatives of the industry who are working with media assets and are interested in the benefits of MediaMixer technology. Through specific use cases and demonstrators, real world solutions are demonstrable to media creators, media owners and media distributors, with all pointers to information and content collected on the Community Portal (<http://community.mediainixer.eu>), where interested visitors can find the Use Case White Papers and links to online demonstrators or demo videos. These will be re-used in the future by MediaMixer partners and the established contacts and collaborations continued, with the expectation that the next years will continue to show a growing uptake of innovative semantic multimedia technology within the industry domains such as media archives and media producers.

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