

Media Content for Multichannel

According to the user's needs content modelling and distribution is changing quickly. Users have easy access to digital content by a plethora of different devices ranging from the PC to mobiles, game stations and TV sets. This trend has had a large impact on both the life cycle of the digital content and the models and formats that are produced and can be recovered from the Internet. In this context, the production of content for multichannel and subsequently interoperable content formats and their inflexion for different devices are becoming more and more relevant. Multichannel and interoperable formats will be the major medium able to provide functionalities to users and to reduce complexity in their production and distribution. To this end, an analysis of the state of the art has been performed in order to identify the main innovation trends.

Objectives

The production of multichannel and interoperable media content is becoming more and more complex every day since the different channels (internet, broadcasting, mobile, satellite, etc.) are associated with devices (PC, STB, mobile phone, game stations) which, in turn, have different capabilities in terms of computational power, screen size, graphic user interface, storage, java virtual machine, connectivity, etc. Furthermore, the number of device models is growing quickly; they are continuously evolving in terms of capabilities and therefore content formats often do not exploit their full features, thus making practically impossible to create interoperable content. Due to these complexities, effective multichannel distribution is under exploited. The complexity of managing those solutions in terms of models, players and market is also reducing the velocity of transformation and increasing the costs. In contrast, users have wider expectations from any devices since the interactivity they experience from game stations and PCs is totally absent on other media, such as the traditional TV as DVB-T. For these reasons, models for accessing content are becoming increasingly dynamic, faster and more reactive to the user needs; while on the other hand the demand for traditional broadcasting is fading soon to be replaced by on demand solutions and models. On this context the newly issued challenge surrounds content models.

Content models

There is a large number of content formats ranging from simple files/resources/essesences such as documents, videos, images, audio, multimedia, etc. to integrated content models (multimedia and cross-media) such as SCORM/IMS, MXF, MPEG-21, MHP, AXMEDIS, NewsML, etc., and proprietary formats such as Macromedia and Adobe. Most of these formats try to offer advanced experiences to end users. Some of them wrap different kinds of digital resources/files in a container/package with their related pieces of information (e.g., content metadata and descriptors, relationships among resources, etc.) and they make such resources ready for delivery (streaming and/or downloading), in a plain (clear-text) and/or protected way. The presentation layer and user interaction are formalized with specific formats such as: SMIL, HTML, Laser, Java, SVG, BIFS, etc. The metadata are frequently defined together with ID codes. Among the metadata and descriptors: Dublin Core, MPEG-7, etc. and among the ID codes, ISBN, ISAN, ISRC, ISMN, etc. Only in few cases, the content behaviour is formalized in Java and/or Javascript.

Among standard formats, MPEG-21 focuses on the standardization of the content description related to digital rights management aspects. AXMEDIS is an extended version of MPEG-21, proposing content packing and integrating presentation aspects in HTML, FLASH and SMIL. SCORM is a comprehensive standard for the organization and delivery of learning packages. MHP enables the reception and execution of interactive Java-based applications on a TV-set. Interactive MHP applications can be broadcast together with audio and video

References and Further information

- [1] AXMEDIS framework portal
<http://www.axmedis.org>
- [2] ACEMEDIA
<http://www.acemedia.org/aceMedia>
- [3] MHP
<http://www.mhp.org>
- [4] SALERO
<http://www.salero.info/en/project/index.html>
- [5] X-MEDIA
<http://www.x-media-project.org>
- [6] Intelligent Content Model based on MPEG-21
 P. Bellini, I. Bruno, P. Nesi, M. Spighi
 AXMEDIS 2008, IEEE Press Proceedings

streams. The applications can be on information services, games, interactive voting, e-mail, SMS or shopping. MXF has been designed as an exchange format, to address a number of problems related to non-professional formats. MXF has full time code and metadata support, and it is meant to be a platform-agnostic stable standard for future professional video and audio applications.

Content formats which are more focussed on semantics and descriptors can be: ACEMEDIA, X-MEDIA, AXMEDIS, SALERO. ACEMEDIA defined a new format of content to enable the creation of personalized content collections. The X-MEDIA content model is mainly focused on semantic aspects in content managed by ontologies and RDF. SALERO is aimed mainly at cross media-production for games, movies and broadcasting. AXMEDIS accepts cross media annotations and any kinds of descriptor. Some models also add intelligence through content logic behaviour formalisation such AXMEDIS, EMMO and KCO. In most cases, the intelligence is added by means of logic rules and/or java script capabilities. These new forms of content are opening a new road for an increasing set of new applications and markets, going far beyond the limitations of physical media or limited interactivity.

With the combinations of digital content formats and digital distribution channels, they are creating new applications including: user content, shared content, IPTV, DVB, VOD, POD, WEBTV, etc., for PC, PDA, mobiles and STB/PVR. Recent distribution models have been enabled by a set of new technologies grounded on content formats, content processing and adaptation capabilities, content protection models and solutions, hardware capabilities and new solutions for Digital Rights Management, DRM, such as OMA for mobiles, MPEG-21 in AXMEDIS, and CC in IMS.

The most relevant and ongoing challenges to be addressed by the future content models have been discussed in [6] and can be classified as follows:

- structural
- metadata and descriptors
- multiple IDs and persistent identifiers
- presentational, as 2D, 3D or more
- annotation and semantics
- user interaction models
- distribution format and models
- file format, binary and XML
- interoperability and scalability
- digital rights management, IPR management
- behavioural and processing capabilities
- context and profile aware
- links and relationships among elements
- tools for complex content

Conclusions

This paper has provided a short overview of state of the art on intelligent content for cross media, multimedia for multichannel distribution. The analysis allowed us to identify a number of topics on which the future models should evolve and the major drawbacks in other very diffuse models and formats. According to the analysis here, multichannel interoperability and intelligence aspects are the most innovative features to be integrated together with semantics, IPR modelling, etc. Another key factor to be taken into account for the selection and modelling is the openness of the solutions and the standardization that in some cases may result in conflict each other. The complexity of managing these aspects and related authoring tools are the most relevant challenges to be faced in the coming years.