

# Semantically Enhanced Authoring of Shared Media

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## INTRODUCTION

The rapid evolution of digital technology, among others, has revolutionized multimodal content production and distribution processes, propelling novel mediated communication services. Interactive media authoring and sharing technologies are currently being launched, bringing forward new ways of audiovisual (AV) content exchange. Web documentaries (web-docs) and hypermedia have appeared as a natural extension of filmed documentaries and digital TV, inheriting also some of their advantages. Narrative documentaries adopt AV mediated communication mechanisms that humans have been accustomed to be informed and communicate with each other, so that they are more informative and vivid compared with other documents (books, web-pages, multimedia, etc.). Thus, AV-documentaries, web-docs and generally interactive videos and hypermedia can be more easily distributed and attended from most ages and social groups (Dimoulas, Veglis, & Kalliris, 2015; Dimoulas, Kalliris, Chatzara, Tsipas, & Papanikolaou, 2014a; Kotsakis, Kalliris & Dimoulas, 2012; Matsiola, Dimoulas, Kalliris, & Veglis, 2015; Veglis, Dimoulas & Kalliris, 2016). Moreover, the continuous evolution of the computing power and the digital storage media favor digital video production and distribution. This is also fueled by the increased network speed, the efficiency of compression algorithms and the continuous

decrease of the corresponding costs (Kotsakis et al., 2012; Dimoulas, Kalliris & Veglis, 2014b). High quality AV capturing equipment is currently available at low cost and size as part of smart phones and other mobile computing terminals with inherent networking capabilities, allowing easy AV-content production, contribution and sharing (Atzori, Delgado & Giusto, 2012; Dimoulas & Symeonidis, 2015; Dimoulas et al., 2014a; 2014b; 2015; Sidiropoulos, Konstantinidis, Kotsakis & Veglis, 2015; Veglis et al. 2016; Vrysis, Tsipas, Dimoulas & Papanikolaou, 2015). In this context, more and more users are involved in the AV production and consumption chain, so that creative experience and AV media culture are cultivated. Nevertheless, AV media related achievements are still far from the progress that has been made in textual information management during the outspread of social media and Web 2.0 services.

Interactive services have also been introduced into the AV production industry, aiming at augmenting human-machine interaction (HMI). AV content is enhanced in functional and informative level, further stimulating users to actively participate in arousing interactive scenarios. While the transition from Web 2.0 to Web 3.0 is ongoing, intelligent AV-content processing and management services are pursued, facilitating users' involvement on media sharing, commenting and multichannel publishing. In this context, semantic annotation, social tagging and meta-

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processing can be part of collaborative media syncing, editing and multimedia management, thus propelling more sophisticated authoring (and sharing) of semantically-enhanced media. Although these technologies are rapidly evolving, there are still open challenges regarding upcoming semantic web services (De Bra, Freyne, & Berkovsky, 2013; Dimoulas et al., 2014a; 2014b; 2015; Dimoulas & Symeonidis, 2015; Matsiola et al., 2015; Monaghan, Handschuh, & O'Sullivan, 2011; Veglis et al. 2016). This chapter examines current trends and future perspectives of semantically-enhanced media /multimedia (SeMM), considering all forms of non-linear storytelling, sharing and authoring (web-docs, multichannel media publishing, interactive videos, adaptive hypermedia and generally multimedia services). Background is presented providing basic definitions, involved technology, achieved progress and limitations. Recommendations and future research direction are then stated, aiming at serving a two-folded target: firstly, to present new, user-friendly forms of collaborative creativity, multimedia authoring and storytelling that current technology allows to be successfully deployed; secondly, to suggest innovative adaptation mechanisms that can be utilized in both the media production and consumption ends, allowing for intelligent media management and augmented semantic interaction services to be launched. In this context, the importance of SeMM toward the transition to the Web 3.0 era is revealed.

## BACKGROUND

Nowadays, hybrid models of mixed Page-Based Media (PBM) and Time-Based Media (TBM) are the most common multimedia web content, combining both spatial and spatiotemporal arrangement of all media entities (i.e. text, images, audio, video). These so-called Multimodal Media Assets (MMA) (Veglis et al., 2016; Dimoulas et al., 2015) may include multichannel audio and video,

non-linear animations and photos, titles and more elongated textual descriptions that offer versatile presentation of information, enabling different views and audio-tracks selection, multilingual narration and subtitling. MMA schemes have many similarities to the early digital versatile disc (DVD-video) and are closer to the content entities and structures that contemporary web-docs and hypermedia utilize. The term hypermedia refers to hyperlinked multimedia, the same way that hypertext is about grouping relevant information in the form of hyperlinked PBM nodes. It is known that, while the term appeared in the early '90s, it was put aside since then, an issue that is associated to the broader meaning that the multimedia definition received. Thus hypermedia can be considered as a subcase of multimedia web services. Today, both terms are used somewhat as synonyms, with the multimedia definition to be wider, incorporating both TBM and MMA compositions with linear and non-linear navigation, but also referring to new, more sophisticated forms of creativity, digital storytelling and interaction. For this reason, the terms media and multimedia are mostly used in this chapter, instead of hypermedia. Obviously, there are still many technical issues and limitations associated with the involved diversities (i.e. different content types, formats and publishing channels, encoding and reproduction compatibilities, HMI and authoring technologies, semantics and meta-data management, etc.), so that SeMM is more than simple combinations of shared MMA entities.

One of the key terms of hypermedia is interactivity, which has advanced with the evolution of hypertext technology. Along with interactivity, new forms of digital storytelling are considered and pursued, aiming at providing rich media experience through highly valued Quality of Experience (QoE) media services having appropriate emotional impact on the users' side, thus stimulating their active engagement (Kalliris, Matsiola, Dimoulas & Veglis, 2014; Kotsakis, Dimoulas, Kalliris & Veglis, 2014; Matsiola et al.,

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