Advanced Science and Technology Letters
Vol.99 (ITCS 2015), pp.79-82
http://dx.doi.org/10.14257/astl.2015.99.20

An Integration of Augmented Information for Video Content

Hee-Kyung Moon[1], Ju-Ri Kim[1], Sung-Kook Han[1], Jin-Tak Choi[2]

[1] Department of Computer Engineering, Wonkwang University, Korea
{ybnjcw, cyanic, skhan}@wku.ac.kr
[2] Department of Computer Engineering, Incheon National University, Korea
choi@incheon.ac.kr

Abstract. This paper presents a method to realize smart media by means of the integration of augmented information into video content. Ontology model to represent the diverse types of augmented information is briefly described. This paper also presents the conceptual architecture to implement smart media system using augmented information and the usability of the proposed method.

Keywords: augmented information, ontology, video content, smart media

1 Introduction

As they declared “Content is king”, content is at the heart of today’s information and communication technology (ICT). It is safe to say that the practical aims of ICT are to develop the effective ways for content generation, delivery and management. The textual documents are usually used as the main type of the content so far. However, the structural contents such as image and video contains fruitful information than textual documents, they have been only used to view the content by ignoring their real values. Since video content becomes the mainstream of the current ICT, the effective way to apply the versatile capability of video content will be the key factor to develop the diverse service applications and improve the quality of services.

For the structural description and the visual specification of the content, various methods have been widely used. As a typical example, HTML to link the related documents in the Internet had become the core element to present the content and bought Web technology. For the more effective description of the content, XML that separate the structure and the representation of the content have become the basis of content management. The stylesheet such as XSL is used to define the additional layout information. However, we need more proper way to conjoin augmented information into video content.

In this paper, we will present a method to integrate augmented information for video content to enhance user experience. We will propose an ontology to describe the presentation structure of augmented information and the architecture of integrated smart content system.

ISSN: 2287-1233 ASTL

2 Related Work

Metadata such as Dublin Core, LOM (Learning Object Metadata), MPEG-7 and RDFa used in the diverse areas is standard system for tagging additional information and providing interoperability of the content management [1]. The complicated metadata system would form a descriptive language like WSDL used for Web services. Ontology usually defined by an explicit and formal specification of a shared conceptualization of a domain is the generalization of metadata concepts by means of logical semantics [2]. According to its functions, ontology can be used to describe the various aspects of the content.

For the video content, there are two types of video metadata. One is operational, automatically gathered video metadata, which is typically a set of automatically-generated information about the content, such as the used equipment, the created date and the location. The other is human-authored video metadata aimed at providing more search engine visibility, audience engagement, and better advertising opportunities for online video publishers [3]. RIFF (Resource Interchange File Format) similar to EXIF, is widely used for the format that describes the usage of metadata in many video and audio files [4]. These types of metadata for video content are for search, copyright and management of the videos, not for append augmented information. In case of subtitles that are simple kind of augmented information for video content, a plain file formats such as SRT and SAMI are used. At the moment, it is hard to find more compelling and capable representation scheme that can be used in the diverse areas to integrate augmented information into the video content

3 Description Ontology for Augmented Information of Video Content

The aims of this paper is to integrate the diverse types of augmented information that can be used from simple subtitles to interactive communication into video content. The conceptual description of our approach to integrate augmented information into video content is shown in Fig. 1.

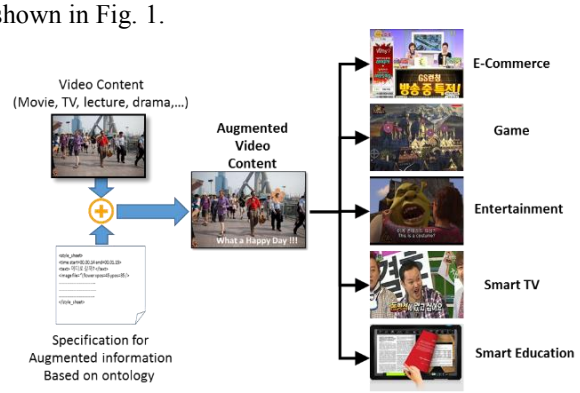

Fig. 1. The Conceptual Diagram of the applications of augmented information.

Augmented information can be any of video, audio, image, animation, textual documents and other defined objects, as well as mixed objects of them. These augmented objects will play a role of independent information sources. The augmented objects will be realized at the designated location on the video scene with the defined interaction. The interaction usually can require another augmented objects such as pop-up window or alert sound. The interaction is an asynchronous activity initiated by the user while playing video content.

As augmented information will be associated with video frame, synchronization based on timeline will provide the convenient way for the integration of augmented information. The time slots in time line can compose a logical unit, called channel in this paper, that represent a certain scenario consisted of augmented information.

The environment for the integration of augmented information into video content briefly discussed above can be described as the ontological model shown in Fig. 2.

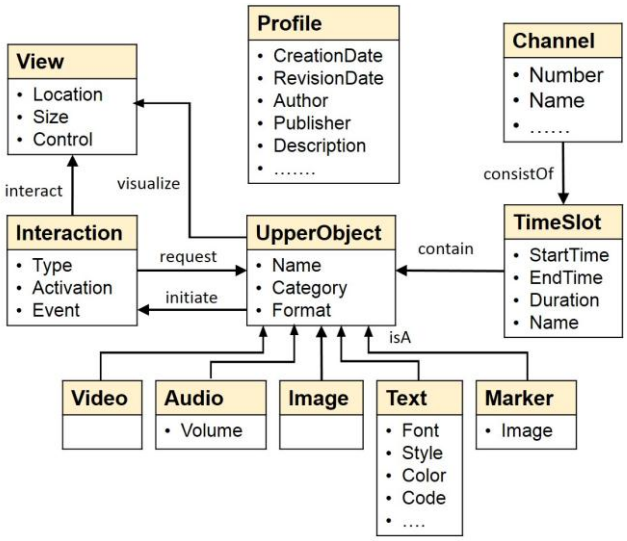

Fig. 2. Description Ontology for Augmented Information.

UpperObject: diverse types of augmented information. The Maker is a user-defined type of augmented information explicitly indicating the interaction such as mouse-click for further information.

TimeSlot: time interval in time line. A time slot can hold several augmented information.

Channel: logical unit for the management of augmented information A Channel can realize storytelling or scenario consisted of TimeSlots and UpperObjects.

View: view point of augmented information on the display while playing the video.

Interaction: interactive communication with the user to perform the related task such as viewing the linked information, ordering product, or sending message.

Profile: general description of augmented information.

Although the description ontology shown in Fig. 2 is simple, this can represent enough specification requested for the integration of video content and augmented information rather than other conventional metadata. Since the ontology can deal with diverse types of augmented information, it can be applied to all the fields.

4 Applications of Augmented Video Content

To implement the integration of augmented information by using the proposed ontology, we need several supporting tools: editor for writing a scenario using augmented information, more convenient authoring tool for writing a scenario, most importantly viewer of augmented video content. We can also develop plug-in or add-on module for the conventional browsers to view augmented video content.

As shown Fig. 1, we can apply augmented video content for e-Commerce, smart learning, real-time video broadcasting and more. Since augmented information supports interaction with the users, the diverse application can be implemented for any devices. This will make the video content smart media.

5 Conclusion

This paper presents a method of the integration of augmented information into video content to realize smart media. We present the ontology model that describes the action plan for augmented information. Since augmented information can handle asynchronous, dynamic interaction with the users, we can realize smart applications based on video content

References

1. Arms, W. Y., & Arms, C. R. Mixed content and mixed metadata: Information discovery in a messy world. In D. Hillman, & E. Westbrooks (Eds.), Metadata in practice, pp. 223--237, Chicago, IL: American Library Association. (2004).
2. Ghassan Beydoun, et al., Identification of Ontologies to support information Systems development, Information Systems, http://dx.doi.org/10.1016/j.is.2014.05.002 (2014)
3. Howard D. Wactlar, Digital Video Archives: Managing Through Metadata, In Building a National Strategy for Digital Preservation: Issues in Digital Media Archiving, Council on Library and Information Resources Washington, D.C. and Library of Congress (2002)
4. Christoph Meinel, Harald Sack, Multimedia Data and Its Encoding, in Digital Communication, X.media.publishing, pp 153--289 (2014)

