Next Generation Multimedia Devices and the Semantic Web

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Abstract

Devices such as smart phones and next-generation game consoles are not expected substitute the PCs for task such as word processing, scientific computation or design among others, but to improve or complement tasks such as multimedia capture, storage, processing and retrieval as well as inter-user interactions such as communications and socialization, while improving the user experience in entertainment, education and ecommerce. This requires a personalized approach to the way users view, gather and retrieve data and multimedia, however it has become apparent that just as users are overwhelmed with the information presented in the Web, users will quickly become overwhelmed with the large amounts of information these new devices are capable of storing. Consequently, we propose to apply semantic web technology to the way users will employ these new devices to store and retrieve data such as email, contact information, scheduling, audio, music, pictures, video and others. We will demonstrate one application in the context of smart phones focusing on social networks and one application in the context of next-generation game consoles focusing on multimedia storage and retrieval.

1. Introduction

Since the introduction of the Web in the early 90s we have become ever more challenged with the overwhelming amount of content contained therein. Although search engine companies have come and gone and recently the market has been consolidating into a few search engine companies such as Google, Yahoo and Microsoft, these companies recognize that users also need help with finding information in their own PCs. This is true because not only CPUs have become faster, but the capacity of hard discs is always becoming large and users tend to save more and more data in their own hard discs. We argue that this presents and tremendous opportunity for the Semantic Web, which thus far has been viewed as too difficult to implement in the context of the Web, but could be implemented on the personal level for user's PCs and other devices such as smart phones, set-top boxes or game consoles. With this in mind we will demonstrate two applications which employ Semantic Web technology to improve user experiences in the contexts of social networks and multimedia storage and retrieval respectively.

2. Mobile Social Network Assistant

The first application is an implementation of a MObile SOcial Network Assistant (MOSONA). MOSONA allows next generation mobile users to actively create, find and interact with social networks over their mobile phones. MOSONA is standards based and fairly simple to use. MOSONA first helps users to create and maintain several FOAF profiles with various levels of security. These profiles are sent to other users or networks to which the user chooses to. As opposed to the way FOAF profiles are normally kept in a URI on the Web, MOSONA does not make the profiles available to a search engine. Instead, the profiles are kept on the user's device and sent either a phone call, infrared or Bluetooth when the user wishes to share it with a trusted party, a social network he or she wishes to join, or simply when searching for people with similar interests in a physical social context such as a conference, hotel, party or other venues.

Social Networks take a different personal meaning in the context of MOSONA as they can be maintained by each of the user's from their own perspective. For instance, as a user gathers FOAF profiles from other users his social network keeps on expanding locally in his own device. This social network is very personal in nature and could be compared with other user's social networks as long as the FOAF profiles contained therein provide permission for sharing with third parties. For example, it would be possible, for say John, to

share a social network, with say Jane, and discover that there are common acquaintances which they might want know be introduced to because of shared interests.

MOSONA, is not constrained to textual FOAF profiles as we are working on ways to also expand FOAF to allow multimedia information so that the profiles can be enriched with information about music, movies and other multimedia of interest. The key however, is to provide this information with minimal intrusion to the users.

3. Semantic Game Box

The second application we intend to demonstrate is called the Semantic Game Console (SemantiCon). SemantiCon is an application implemented in next generation game consoles. It is implemented using standards such as RDF/OWL and extended MPEG-7 [1].

As game consoles take the center stage on the home's living room and other rooms throughout user's home, makers are adding capabilities most commonly associated with personal computers and much more. As we can gather from recent announcements by Sony [2], Microsoft [3] and Nintendo [4], these machines will have computing power enviable by our current PCs, large hard discs, CD and DVD players, Ethernet, wireless, Bluetooth, phone jacks, and much more. We will demonstrate how we can use Media Frames a concept expanded from our earlier work on Data Frames [5] to allow these machines to generate personal ontologies useful to annotate multimedia content. The multimedia content will in turn be self organizing according to the personal ontology making it possible for the console to retrieve the content with minimal effort from the part of the user.

With SemantiCon the user will not need to remember where the content has been stored. Instead, through simple interactions such as humming a tune through a microphone or describing a movie scene or actors, or even the approximate date a picture was taken or who is in the picture, retrieve the content without having to browse through inconsistent directories.

All of this capabilities are possible by extending MPEG-7 with Media Frames as MPEG-7 already specifies many of the basic components needed to describe multimedia content such as pictures, audio, movies and even faces. Media Frames adds a layer of automation to the creation of personal ontologies similar to the way we generate ontologies from tables. In addition, media frames also allows us to recognize new content and organize it in the context of the ontology for easier later retrieval by the users.

4. Final Remarks

Although this is short paper describes early work in progress, we are confident that the applications we will demonstrate will spark much discussion with the poster/demo sessions attendants. We believe that much of this discussions are needed to further advance our work as so far the Semantic Web research community has focused on the existing Web on the context of traditional Web browsers running on PCs. Because of this much of the current criticism of the Semantic Web has been that traditional search engines already do the job or that the implementation of the Semantic Web is too difficult and will not scale up. However, if we focus on small applications such as those described here, we will gain more acceptance from the general public as these devices demonstrate the capabilities of Semantic Web technology on a personal level.

References

1. http://www.chiariglione.org/mpeg/standards/mpeg-7/mpeg-7.htm
2. http://www.us.playstation.com/PressReleases.aspx?id=279
3. http://www.microsoft.com/presspass/press/2005/may05/05-12360MTVUnveilPR.mspx
4. http://www.nintendo.com/techspecgcn
5. Tijerino, Y.A., Embley, D.W., Lonsdale, D.W, Ding, Y., and Nagy, G. Towards Ontology Generation from Tables. *World Wide Web: Internet and Web Information Systems*, **8**, 1-25, 2005.