

A Position Paper for W3C workshop on Web and digital marketing convergence

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Introduction

We have been conducting a project with Dart Media, a commercial media service company in South Korea, to build an effective commercial service for digital signage. Powered by the giant size at specific walls on hot places, digital signage has been approved as a very attempting media to expose commercials upon their purpose. However, the range of the demographical characteristics of the subjects who could be exposed to the digital signage lay upon and the effectiveness of its exposure is hard to be measured. Figure 1 shows a list of requirements from the major digital signage service providers for enhanced digital signage service. It says that the service needs to be more targeted and traceable at the same time along with the cost-effective system that holds interoperability and extendibility over any service environments.

Requirements for enhanced digital signage service	
1	Targeted commercial exposure
2	Measurements for the exposure to effectiveness analysis
3	Interoperability on heterogeneous H/W environments
4	Linkage with mobile and customer devices
5	Wide adaptability on the screen size by content size
6	Cost-effective system build-up
7	Particular content delivery for emergent situations
8	Robustness operation along with legacy systems

Figure 1 Service and system requirements from major service providers

With the requirements in mind, we designed an adaptive smart commercial delivery service on

digital signage by utilizing sensor data through the Web. Based on the sensor data gathered from the walls, servers, and the Web (e.g., open APIs for weather forecast, traffic, etc.), the system decides which one or which part of the commercial to be exposed by the rules that have been set up by the service providers. A simple use case is as follows:

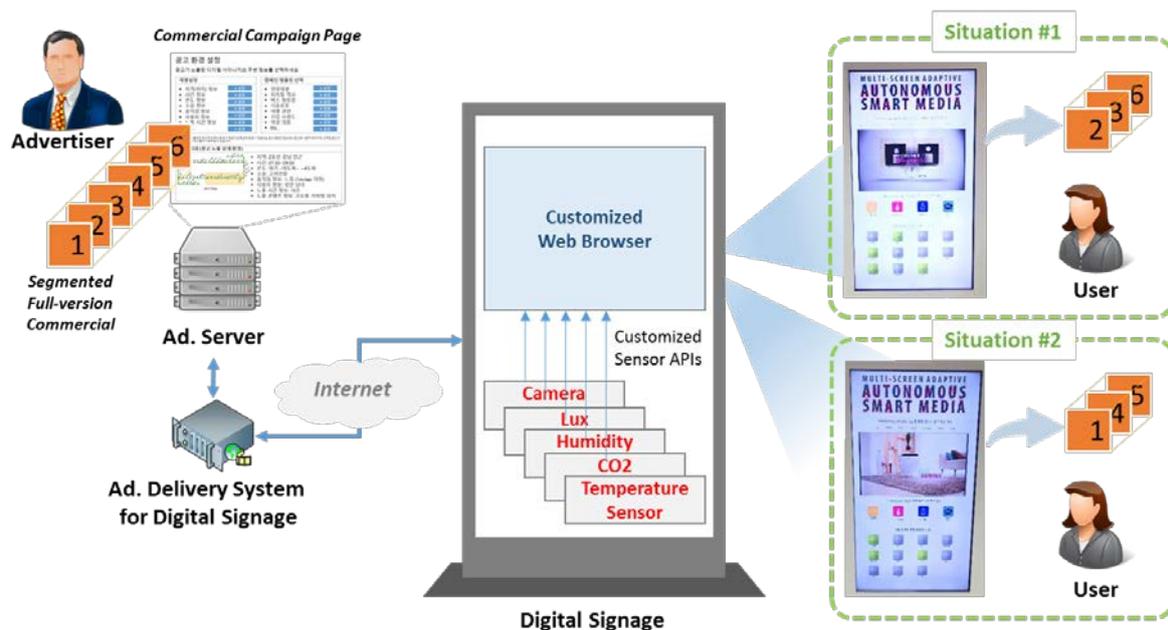


Figure 2 A use case of the adaptive smart commercial delivery service for digital signage

When advertisers register their commercial campaign with a segmented full-version commercial video, they pick not only the keywords but also the environmental conditions that could be recognized by the sensor data. Then the advertisement server sets up the rules and controls its delivery and exposure based on the almost real time sensor data. For example, let's say there's an advertisement for an air cleaner. When the weather is clear but the CO2 density is high, then the system displays the segments that emphasize its air-pollution- filtering functions. On the other hand, when it rains and the lux is low, then they display the segments that emphasize on its dehumidification function with very low noise level.

Problem Statement

To build an adaptive commercial delivery service that utilizes the environmental condition information which is generated from the sensor data at the digital signage device through Web, the Web browser needs to be able to read the sensor data in real time. Current Web standards published by W3C, however, fall short of the following functions.

- 1) The APIs to provide the sensor data from digital signage to the Web browsers
 - The interfaces that enables the Web browser to access to the various sensors (camera, proximity, CO2, lux, temperature, humidity, etc.)
 - Besides the APIs that has been dealt at the Device APIs WG, the standard interfaces that can support the content rendering on the public device environment like digital signage
- 2) Description of content distribution condition for digital signage
 - A. Ontology description for each content or segment which can be selectively exposed by the environmental conditions
 - B. Interoperability with the legacy W3C Media Ontology to be able to interoperable with current Web [1]

Our approach

So far, the Web browsers had been operated on PCs, tablets, and mobiles which are not designed for mass users but for personal usage. In that, the digital signage is a very new novel environment for Web browsers to operate on. Also, issues stated above can hardly be handled by existing methods or any Web standards. Therefore, in our project, we defined customized device APIs and metadata sets for the segmented or distinguished content to be distributed by the rules based on the W3C Media Ontology.

The table below shows some of the distribution condition property description.

Metadata for Distribution Condition		
Name	Type definition	Description
userObjCount	(attName="minUserObjCount", attValue="Integer"), (attName="maxUserObjCount", attValue="Integer")	- Describe the expected number of users - Describe the recognized number of users from the digital signage device
userObjBehavior	(attName="minUserObjBehavior", attValue="Decimal"), (attName="maxUserObjBehavior",	- Describe the motion data of expected users

	attValue="Decimal")	
temperature	(attName="minTemperature", attValue="Decimal"), (attName="maxTemperature", attValue="Decimal"), (attName="unit" attValue="String")	- Describe the expected temperature data.
lux	(attName="minLux", attValue="Decimal"), (attName="maxLux", attValue="Decimal")	- Describe the expected lux data.
soundLevel	(attName="minSound", attValue="Decimal"), (attName="highSound", attValue="Decimal")	- Describe the expected level of sound data.
co2	(attName="minCo2", attValue="Decimal"), (attName="highCo2", attValue="Decimal")	- Describe the expected CO2 density data.
proximity	(attName="proximity", attValue="String")	- Describe the expected distance proximity data.

Suggestions

In the IoT era, the ability to read various sensor data is essential to the Web. The ability to describe the environmental conditions is also essential for the Web to execute the services by the new information. When it comes to the digital marketing, this can change the way they advertisers plan, deliver, measure, and execute campaigns. Also, the data collection, description, and communication for marketing will also face a new phase to embrace and fertilize more precisely designed commercials. In addition, supporting the new marketing channels in new environment with new capabilities is also an important mission for the Web to become a key information infrastructure. This will also expand the marketing channels, which in turn meets the high expectations from various stakeholders.

For this, the Device APIs need to be extended to be able to support wide range of media, from various sensors to the new execution environment like digital signage. The metadata for environmental condition description and content distribution condition are also required. Cooperation with current WGs to keep the consistency and interoperability with legacy standards and technologies is needed as well.

Reference

[1] Ontology for Media Resource 1.0, W3C, <http://www.w3.org/TR/mediaont-10/>