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An Implementation of Content Management Systems for Augmented Reality Advertising

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Abstract

Augmented Reality (AR) technology is a human computer interaction that combines real world environments with computer-generated virtual objects. With the proliferation of mobile handsets over the years, AR has been actively integrated into mobile advertising. As an extension of a previous study that implemented CARDA(a content management system with dynamic annotation) to manage interactive augmented reality apps, CARDA is redesigned and implemented for managing AR advertising apps. A scenario editing module was added to the AR editing module of CARDA in order to create an AR advertising app which runs in an active interactive mode

Keywords: CMS, augmented reality, augmented reality advertising, dynamic linking

1 Introduction

Augmented reality (AR) is a technology that combines real world environments with computer-generated virtual objects such as sound, image, video and graphics[1]. AR is a kind of human computer interaction and is a growing trend in mobile computing. Due to the immersive and interactive experience effect offered by 3D representation

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of objects, AR technology is receiving a lot of attention in various fields including medical, education, military, games, tourism and advertising[1,2,3].

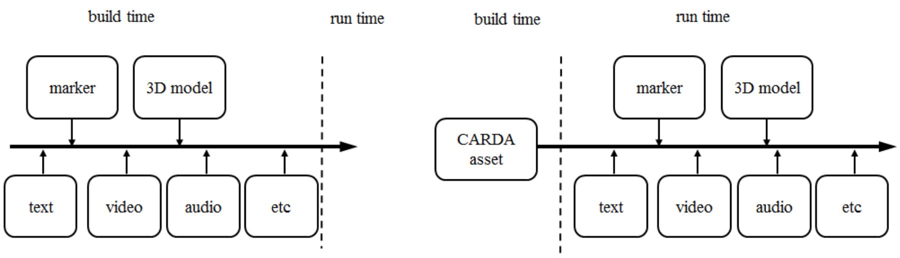
AR technology-based advertising is different from traditional print advertisements in that it allows a consumer to control manually a virtual 3D representation of products displayed on a screen. The purpose of AR advertising is to introduce customers to products in more interactive ways so that they may have an improved retention of the product information. Even though AR technology has great potential to have a significant role in future advertising, AR advertising is not yet mature enough to replace traditional advertising methods[4]. One of the reasons preventing AR advertising from being widely spread is that AR advertising needs a special device to display the 3D graphics content. Fortunately, smart mobile handsets are becoming an attractive AR advertising platform[2,5,6]. Most modern mobile handsets are equipped with the capabilities needed for running AR-apps such as an advanced CPU, GPU, GPS sensor, network interface and video camera. It is no surprise that lots of AR-apps have already been developed and published on app markets such as Google Play and Apple's App Store. Another reason for the limited presence of AR is that it is not easy to create and/or manage AR-apps. AR-apps consists of a 3D framework and AR components: 3D graphics models and auxiliary components such as video, audio, image, text, and graphics effect. Lots of time and effort are necessary in the AR-app production process in comparison with the production of traditional print advertising. A Content management system (CMS) plays a key role to overcome such a difficulty because it allows an administrator with no professional programming skills to create, publish, modify and manage AR apps with ease[5].

Most AR-apps run in a passive mode, that is, once the AR-app displays some AR content on the screen it waits for user interaction information. If no user interaction information is input, then it will not show other content. At times, AR advertising apps need to display AR advertising content autonomously regardless of the user interaction, which is called active interactive mode in this paper. For the creation and management of active interactive mode AR advertising apps, we modified the architecture of CARDA[7] to add a scenario editing module. Using this scenario editing module, an administrator is able to arrange any AR components in a timeline.

2 Overview of the Conventional CARDA

2.1 CARDA Architecture

Typical AR content consists of a marker or target, a 3D model to be displayed by being registered with the marker or target, and auxiliary components such as text, image, audio and video. A static linking-based service mode is generally used for the AR content service as shown in Fig. 1(a). To combine a 3D model and auxiliary components in the AR content production process, some specialized programming skills are necessary. This requirement for specialized personnel and the time taken for this step in the process is a significant drawback in the adoption of AR. To efficiently solve such a problem, the CARDA system uses a dynamic linking-based service mode as demonstrated in Fig. 1(b). In this service mode, auxiliary components are linked dynamically at run time



(a) Static linking structure (b) Dynamic linking structure

Fig 1. Comparison of AR content service modes based on dynamic linking and static linking

To realize the dynamic linking service architecture, we need to build an AR-app with a CARDA Asset as shown in Fig. 1(b). A CARDA Asset includes interfaces that can mutually combine auxiliary components at run time. The interfaces are designed to be accessible to both customers and the operator.

The structure and design characteristics of a dynamic linking–based CARDA system include a component database module, an ACI(auxiliary components interface) module and an AR Editor module which is a GUI-based editing tool through which administrators with no programming skills can easily create AR-apps. CARDA stores components such as 3D models, targets, texts, images, audio, video and graphics effects in the database through ACI as shown in Fig. 2.

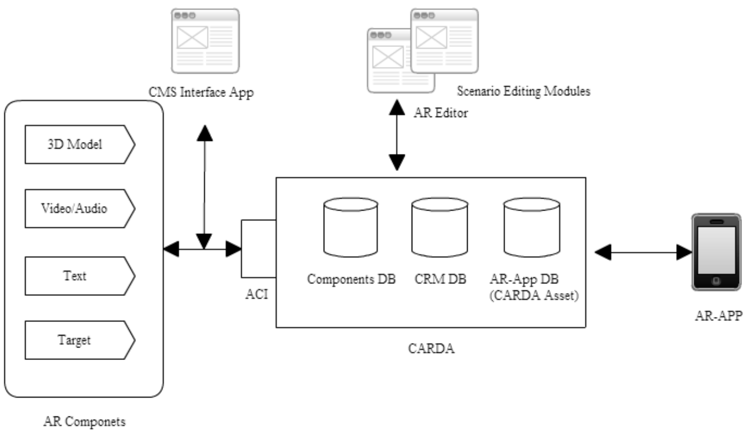


Fig 2. Architecture of CARDA

2.2 Auxiliary CMS Interfaces

CARDA can manage multiple apps and targets through a CMS interface as shown in Figure 3. Multiple markers can be registered, and specialized services can also be added.

Figure 4 shows the screen enabling to registration of a marker by connecting with the Vuforia[8] module within the CMS. To enhance the user’s working efficiency, a web interface was embedded within the CMS.

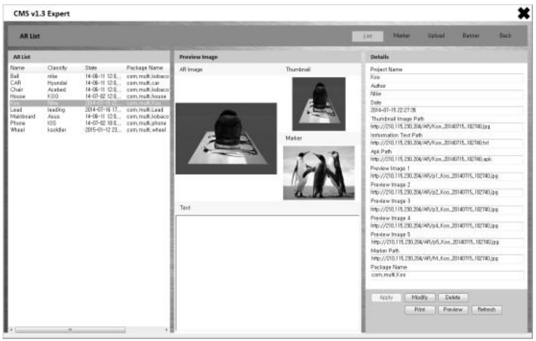


Fig 3. Example of CMS Interface App Screen

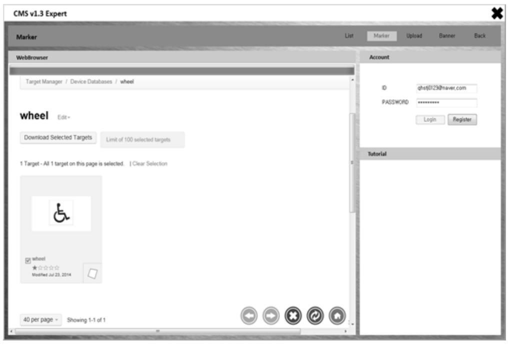


Fig 4. Example of screen using tab for target management

3 A Scenario Editing Module

This section describes a new scenario editing module to support the creation of AR apps running in an active mode.

Although AR is a great technology, it has a disadvantage that AR can easily be a passive service that is not operated without ongoing interaction. In this regard, CARDA has an editing function to add scenarios to an AR service, as if the video was edited using a timeline at the time of execution. Fig. 5 shows an example of adding a function to AR content with the CMS. The additional services required for the service are listed on the left, and users can design using the drag and drop function, so that the service can be offered at the desired location on the screen and at the desired time

Fig 5. Example of Adding Additional Services to AR Content using AR Editor

CARDA dynamically links components created in the most suitable language in the text or audio component by receiving basic character encoding set up in an individual mobile device. Figure 6 shows an example where English and Korean explanations are dynamically linked and serviced, according to the letter code set up on the user

Fig 6. Example of offering service in linkage with CRM. English explanation service is on the left, and Korean explanation service is on the right

4 Data Transfer Method for Active mode AR Apps

The basic model of CARDA Asset links necessary components according to a scenario, as an AR-app runs. XML and JSON (JavaScript Object Notation) are the popular choices for the data format to transmit data between the app and CARDA. Because JSON is lighter than XML, communication can be made with just 60 to 70% of the data of XML[9]. Therefore, this paper used JSON as the data format for communication between apps and CARDA.

JSON is very effective for describing the behavior of AR components in advertising scenarios described in section 3. The following shows an example of simple communication result between CARDA and an AR-app.

{
"carda_host":"210.115.230.111",

"login_id":"hallym0123",
"login_pass":"1234",
"vuforia":{
"vuforia_id":"FASE0120",
"vuforia_pass":"1234",
"vuforia_mark_name":["model01","model02","model03"],
}
"bgm":{
"bgm_id":"\bgm\bgm_test.mp3",
"bgm_time":{"st":1234,"end:"3345"},
}
"model01":{
"ar_id":"\model\model01.obj",
"ar_time":
{"st":2657,"end:"3845","pos":"x023y033z043","rot":"z023","zoom":"23"},
{"st":8697,"end:"12845","pos":"x023y033z043","rot":"left","zoom":"65"},
}
"cms":{
"language":"english01",
"encode":"utf-8",
"position":"123:323:22"
}
}

5 Conclusion

This paper extended a previous study that implemented CARDA for the purpose of creating and managing effective mobile AR advertising apps. In order to achieve this goal, this paper considered a new running mode of AR-apps, an active mode, and modified the structure of CARDA.

Even though AR technology offers excellent potential for interactive advertising, it has the disadvantage that AR can easily be a passive service that requires ongoing user interaction throughout the process. Considering that the goal of advertising is to introduce products to customers it would be beneficial if this limitation could be removed. This paper proposed an AR advertising app able to run in an active mode requiring no ongoing user interaction. A scenario editing module was designed and implemented so that AR components can be arranged in a timeline according to a pre-designed scenario.

Acknowledgments.

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