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A Study on the Information Value of Digital Archives for Art Education

－The Project of AR Application for Parent-Child Interactive Game－

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1 Introduction

Augmented Reality (AR) technology extends Virtual Reality (VR) performances by blending real and virtual elements into real scenes, and to enrich the visual object with a non-artificial view of real scenes. AR technology has already made vivid impact on many domains. This paper focus on how AR techniques can offer a great solution of enabling visualization of 3D models of cultural architectures to be applied in art education for children and to be used to enhance children's cognitive skills.

The AR Project ~ Hukou Old Street aims to transform artistic cultural heritage of Hukou Old Street into content of AR application. By playing AR cards, the users will immerse in a virtual scene of Hukou Old Street and learn the beauty of historic architectures in ubiquitous computing environment.

2 The concept

With the innovation of technology and mobile devices, the features and performances of portable digital products have been increasing dramatically, prompting more convenience and mobility of digital game products in use. By multi-touch somatosensory interaction, the player's gesture touch and limb movements involved in the game, bring a more intuitive feeling, instead of something more than the emotional reflections. When the direction of information technology gradually being taken seriously into the future development of education model, along with computer hardware and software and the Internet to flourish, constructing a multimedia and interactive digital learning environment continues to provide more learning opportunities and quality optimization for development and to enhance cognitive and affective skills.

Mobile devices are capable of real-time rendering of high-end video, synchronized transmission of voice, text, images and other media learning activities; they are beyond the traditional teaching model to provide a ubiquitous computing environment (Ubiquitous Computing), and trigger the restructuring of many learning styles in the way of changing imagine (Reimagined) concept. Many studies have found that computer software, computer games or interactive multimedia interface can be used to enhance young children's cognitive and language skills and promoting their motivation and performance.

The AR Project ~ Hukou Old Street focus on developing a proper approach to serve as parent-child interactive game, and offer a learning opportunity to appreciate historic architectures by playing cards.

3. The practice project

Children's digital learning activities focus on the intermediary and auxiliary of the information technology, by multi-faceted understanding and learning experience to help young children learn through the image of the computer, the sound and the manipulation of learning mode, to effectively develop their learning levels. By 'sensory integration' and 'perceptual-motor training' for parent-child interactive game content, the activities assist preschool parents using the function and mobility of the mobile devices to increase the Game/Toy-based e-learning to cultivate young children's sensory-motor performance.

This paper proposes a content system that includes tools and materials used to create representations of digitized cultural architectures of Hukou Old Street.

The development of AR contents consists of three aspects: content creation, target management, and AR presentation as shown in fig. 1.

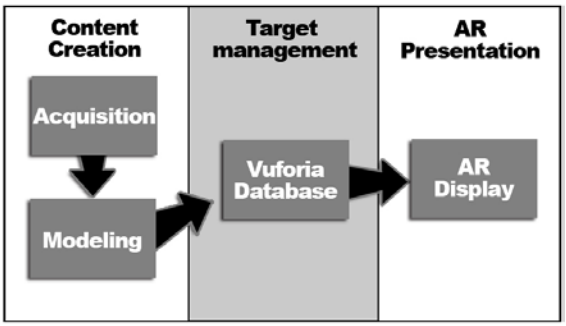

Fig. 1 The structure of developing AR contents

3D models of architectures are stored in the Target Database offered by Vuforia SDK-based AR application. With Vuforia software platform, 3D objects come to life with interactivity through 3D graphics to mobile device and individually show on the corresponding AR card (see fig.2).

Fig. 2 AR architectures

Through webcam or mobile device' s camera, the front side, which is illustrated with graphic appearance of architecture, will function as AR Target to show corresponding 3D model. Meanwhile, the rear side, which is illustrated in form of doorplate, is design to show the description of details of the specific architecture (see fig. 3).

Fig. 3 AR description

4. Conclusion and future works

The present project for building a virtual scene of cultural architectures enables user, or parents especially in this project, to bring magnificent architecture closer to see and use for parent-child interactive learning. The solution of this project makes cultural architecture portable and interactive, and furthermore, to transform viewers into players to interact with AR content in an intuitive and exciting manner.

For presenting AR component in a more attractive and functional way, future works will integrate the AR target into the form and function of toys that are more appealing to children. It means the transformation of AR target markers will also function as essential approach of production development to accomplish both business and educational purposes.

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