TOWARDS THE DEVELOPMENT OF MOBILE AUGMENTED REALITY MODEL

Fatin Norsyafawati Mohd Sabri *
Nik Zulkarnaen Khidzir**
Ahmad Rasdan Ismail***

Augmented reality (AR) is a variation of virtual reality (VR). Many manufacturing companies and computer science have been studying the AR technology as a new human machine interface with the development of VR technologies. However, most of software and methods for digital manufacturing require the perfect 3D models of the whole product or the whole system in virtual reality to represent the target system and surrounding environment. Certain manufacturing companies which realize the weaknesses of VR based digital manufacturing technologies have been studying AR technology as new interface between man and machine. Therefore, this study would become the basic idea for the researchers to explore and increase the experience of the user, who can retrieve this information by a user-friendly interface.

* Pelajar Phd di Fakulti Teknologi Kreatif & Warisan, Universiti Malaysia Kelantan
**Timbalan Dekan (Penyelidikan & Inovasi) di Fakulti Teknologi Kreatif dan Warisan, Universiti Malaysia Kelantan.

***Ketua Unit Pengurusan Persekitaran, Keselamatan dan Kesihatan Pekerjaan, Universiti Malaysia Kelantan.

1.0 Introduction

In ancient times, (AR) is only a stuff of science film and fiction. However, nowadays because of the advances in mobile tech- nology, anyone who uses mobile devices such as smartphone, iPad and webcam can experience it. By using AR, an application is designed inside your tablet which is similar to the live view of the physical world (Bryne, 2012). AR is defined as technology that is used to create next generation, reality-based interface" and is moving from laboratories around the world into various consumer markets and industries (Jebara, 1997). It has been recognized as an emerging technology of 2007 (Julier & Bishop, 2002).

Augmented reality also brings the possibility of enhancing missing senses for some users such as be used as a sense substitution device. Sightless users could receive audio cues notifying them of unknown visual events while hearing-impaired users could receive visual cues informing them of missed audio signals. Researcher believed that AR is not well used in new mobile devices like Android based devices, iPad nd iPhone. However because most of the current applications include entertainment, gaming and education used this technology, most already believe that these are "amazing apps" (Carmigniani et al., 2011).

Mobile and wearable computing systems offer users access to computational resources even when they are away from the static infrastructure of their workplaces or homes. One of the most essential aspects of these devices is their potential to support location- alert or location-based computing, offering services and information that are applicable to the user's current place (Beadle et al.,
1997). For example location-based computing and location-based services open up novel possibilities in the way we interact with computers, collect information, find our way in unknown environments, and do business (Hollerer, 2004).

2.0 Augmented Reality

AR is still in infancy stage. Therefore, future possible applications are infinite. AR technology is used to help us hear, see and feel our surroundings in novel way and also enhanced our perception. AR supports us in variety areas such maintenance, design, review and education (Krevelen and Poelman, 2010). For example, the combination between ancient and current views of historical site can be shown by combining the real and virtual worlds using AR. AR has the advantage of providing the user with an intuitive and visual experience by digitally recreating ruins compared to common commands such as sand tables, videos and static image. Thus, by using this technology, the mobile augmented reality application AR Teleport was developed with the aim to facilitate anyone to perceive and past appearances anywhere and anytime (Kang, 2013).

Another example of advanced study in AR includes use construction of controlled environments containing any number of sensors and actuators and also head-mounted displays and virtual retinal displays for visualization purposes. This research is about interacting people with information directly without requiring the use of any intermediate device (Grinberg & Sarusi, 2013). In developing technologies, AR has been used and applied by researchers in many ways.

ARCHEOGUIDE which is among earliest AR application is actually a new system bringing state of the art visualization technology and mobile computing in cultural heritage. The system bridges the gap between science, recreation, history and renders culture more accessible to a wider public. In contrast, traditional audio commentary systems widely adopted in cultural sites all over the world, ARCHEOGUIDE offers a more lively and ealistic experience. The 3D reconstructions of artifacts and monuments are presented to the user through a special augmented reality interface while he has constant visual contact with the natural environment and listens to audio commentary. This feature renders the system more user-friendly and avoids the weaknesses of other alike systems where the user is isolated or immersed in a purely synthetic world (Yim et al., 2014).

In order to help visitors and scientists better appreciate and enjoy the past glory of these sites, it provides personalized augmented reality tours and reconstructions of ruined cultural heritage sites. It features portable units carried by users during their communication networks, central database and site tours. Multimedia database is the central depository for the multimedia material making up the tour presentations. It is also used to promote cultural education and support scientific research and in European countries and beyond (Vlahakis et al., 2001).

MARIE application is designed to enhance engineering education but also applicable to other areas. The study has developed and implemented a user-friendly interface to experimentally explore the potential of augmented reality by superimposing Virtual Multimedia Content (VMC) information in an Augmented Reality (AR) tabletop environment, for example a student desk workspace. By this application, user can interact with the VMC, which is composed of three-dimensional images, objects, animations, sound and text (Azuma,1997).

The previous study has proved that the presented augmented reality system produce the low cost and real-time augmented presentation. Therefore, it can be applied to a variety of other teaching and learning augmented reality environments, such as archaeology, cultural heritage, surgery operations, architecture, military services and others (Liarokapis et al., 2002). Another example of advanced study in AR includes use construction of controlled environments containing any number of sensors and actuators and also head-mounted displays and virtual retinal displays for visualization purposes. This research is about interacting people with information directly without requiring the use of any intermediate device(Grinberg & Sarusi, 2013).

3.0 Infographics

Infographics are becoming increasingly popular, not in the least bit because of the Internet and in certain social media like Twitter. They are so ubiquitous, on the web, in newspapers and also magazines. Infographics are at the bond of journalism, communication, analysis and design. Thus, it requires terrific skill to make a good infographic where someone has to be able critically look at the data, make the right conclusion, see the relevance and working with designing software.

Today, animated information graphics are serving to communicate complex correlations succinctly even more so than static versions. The production of such animations on the basis of up-to-the-minute data is already common practice in select TV shows. Now, these moving formats are finding broader application in television and on the internet, as well as in public places and on an increasing number of mobile devices. They can be seen in editorial contexts and in the areas of corporate communication and advertising(Finker & Manger, 2012).

4.0 Virtual Heritage

Heritage is as much about the living and evolving place, environment, people, static monuments and landscapes (Addison, 2000). Virtual environments which are culturally embedded are often classified as virtual heritage. Digital tools and emerging
media and offer us the possibility to experience 3D virtually reconstructed historic sites as travelers, visitors or even as resident.
Many critics have identified different matters that often inhibit widespread distribution and use of virtual heritage. Virtualizing heritage is defined as actualizing the heritage content digitally and to simulate it using computer graphics technology. Generally, cultural heritage and virtual heritage have independent meanings. Cultural heritage refers to properties and sites with archaeological, historical value and aesthetic. Meanwhile virtual heritage is defined as the instances of these properties and sites within a
technological domain. (Tan&Hafizur,2009).

Virtual heritage plays an important role in facilitating the synthesis, reproduction, conservation, representation, digital reprocessing, and display of cultural evidence with the use of advances in VR imaging technology. Some researchers described the virtual heritage as a vehicle for preservation, access and economic development at the service of archaeological remains valued for their artistic qualities. Based on the observation with over a year of virtual heritage programs with the public, people really like
to know about their ancestors and are generally fascinated by the simplethings and stories that pertain to life in antiquity. Nevertheless, it is still very expensive, difficult and aesthetically questionnable to create characters and organic forms using the existing modelling tools (Roussou,2002).

5.0 Human Perception Concept

Combination of sensory input from stimuli and interpretations by the mind is called s human perception. The mind's subjective mechanisms take rays of light striking the retina of the eye and transforms them to objects and the visual space in which those objects reside (Galantner & Galantner, 1970). The general term for the field of study in which this study fits is psychophysics, the scientific study of human perception. "Psychophysics is usually defined as the quantitative branch of the study of perception, examining the relations among observed stimuli and responses and the causes for those relations. Since its inception, psychophysics has been based on the assumption that the human perceptual system is a measuring instrument yielding results such as experiences, judgments aresponses that may be systematically analyzed" (Baird & Noma, 1978).

6.0 Conclusion

Generally, augmented reality is still a new field. Nevertheless, it is an interesting field to explore. Therefore, many applications can be made using this technique. The issues and knowledge gap found through the review lead to preliminary study on the integration of the animated infographic and Augmented Reality (AR) conserving the intagible heritage and cultural assets virtually. Thus, the review analysis and findings could provide future direction for future research and contribute to the body of knowledge for this area specifically to improve the usability of the software and multimedia product.

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