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PRELIMINARY STUDY ON CHARACTERISTIC OF AUGMENTED REALITY FOR ECO-TOURISM SECTOR IN PERAK

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Abstract

This paper presents a study of augmented reality characteristics in the eco-tourism sector. Two main focuses of this study are augmented reality application and its characteristics. This study employs quantitative methods which involve collecting data from augmented reality application respondents with selected eco-tourism places. The documentation of existing augmented reality, virtual reality and mixed reality become the basis of this study. Existing eco-tourism locations especially in Perak will be a significant part of this study in order to achieve its aims.

Keywords: *eco-tourism; augmented reality; tourism*

1.0 INTRODUCTION

The exponential growth of technology has offered a lot of useful applications to its users. One of the applications created is Augmented Reality. Augmented Reality (AR) promotes memorable interactive experiences to their users. It is an immersive perception of a real-world setting in which objects existing in the actual life are augmented by computer-generated perceptual knowledge, often through multiple sensory modalities, including visual, auditory, haptic, somatosensory and olfactory (Azuma, 1997). Previous studies have shown similarities in the definition of AR where they stated that AR can be described as an evolving type of practice that enhances the real world through computer-generated content that is linked to specific locations or events (Alkhamisi & Monowar, 2013).

AR was accepted as an evolving technology in 2007, and we are beginning to adopt this very fresh and thrilling kind of human-computer interaction with today's mobile phones and AR browsers (Van Krevelen & Poelman, 2010). AR is one of the components of mixed reality whereby the surrounding environment is replaced with a synthetic one by both virtual realities (or virtual reality) and augmented virtuality in which actual objects are linked to virtual ones. The first AR system was created in 1968 by Ivan Sutherland. It used an optical view-through head-mounted monitor that was monitored by one of two separate 6DOF trackers: a mechanical tracker and a tracker (Arth, Gruber, Grasset & Langlotz, 2015).

2.0 LITERATURE REVIEW

2.1 Augmented Reality (AR)

The demands of AR technology grows in time. Following Sutherland's work, Louis Rosenberg developed the first truly interactive AR device in the U.S. Air Force Research Laboratory to substitute for the shortage of high-speed 3D graphics processing power in the early 1990s. It enabled the overlay of sensory input on a workspace to increase human efficiency (Rosenberg, 1992; Li, Tsai, Chen, Cheng & Heh, 2015). This shows that AR seeks to enhance the life of the user by adding visual knowledge not only to the immediate vicinity, but also to every indirect perception of the real-world environment.

Looking at the idea of AR, it clearly promotes interactive design. Allanwood and Beare (2015) highlighted that interactive design is one of the components in digital media. They also added in their study, there are no clear terms that may describe the definition of interactive design. This is because the increasing advancement of technologies and the digital revolution have altered the understanding and importance of interactive design. However, as put forward by Goodman, Stolterman and Wakkary (2011), interactive design is the specification of digital behaviors in response to human or machine stimuli. Hence, interactive design can be understood as a system of interaction between users and products (machines).

2.2 The Usage of AR in Industry

For several decades, AR technology is used in many industries, including education, military, medical, manufacturing, tourism and advertising (Sirakaya & Alsancak Sirakaya, 2018; Wu, Lee, Chang, & Liang, 2013; Yen, Tsai, & Wu, 2013). Previous study by Hamza-lup, Rolland, and Hughes (2014) elaborated the idea of incorporating AR in the medical sector. They created a dispersed version of medical instruction intended to train the hand-eye coordination of medical practitioners while conducting endotracheal intubations. The device would allow paramedics, pre-hospital staff and students to exercise their skills without touching a real patient and provide them with the tactile input they may not otherwise receive.

Meanwhile, AR is also applied in the study by Hsieh and Koong Lin (2011) to enhance students English proficiency. They created a set of Ubiquitous Augmented Reality Digital Learning System (UARDLS) and designed Augmented Reality 3D Digital Media teaching materials based on the content of textbooks. The participants of the study were the elementary school students. They invented an eye-tracking technology to monitor and evaluate their students' eye motions. This is to inspire students' learning motivation. It shows that a future in which AR is integrated plays a far larger part in supporting people.

2.2 Augmented Reality in Eco-Tourism

Eco-tourism is characterised as a type of tourism that involves visiting delicate, untouched and natural areas that also encourage the preservation of its originality Coria and Calfucura (2012). The key goal is to promote a protected environment for the good of future generations in order to understand and experience its originality. Hence, we believed AR will give tourists new experiences every time they visit a tourist spot. With the enhancement of AR, the explanation of each tourists' spot for instance a museum or a historic site will be described through AR. However, this technology has not been completely utilised whereby with the current technology, users can only experience one-way interaction.

Othman (2019) stated that Perak offers amazing ecotourism experience. There are several areas that have been gazetted as eco-tourism sites in the state of Perak. Some of the places are Royal Belum State Park, Off-Grid Jungle Farm Life in Lenggong, Taiping Lake Garden, Gunung Lang Recreation Park and Gua Tempurung. The most popular eco-tourism site in Perak is Royal Belum State Park. Royal Belum is Malaysia's largest forest and believed to be in existence for over 130 million years (Bathmanathan, Ahmad & Ali 2014). In this paper, we would like to identify the characteristics of AR for the eco-tourism sector in Perak especially in Royal Belum. Royal Belum with 117,500 hectares of land will provide an incredible experience to visitors. The visitors who would like to visit this historic place will need to ride a

water vehicle such as a boat house to experience the real atmosphere in a forest that is rich in biodiversity. Other studies written by previous researcher are stated below:

Table 1: Existing augmented reality writing

Author(s)	Paper title
Yung & Khoo-Lattimore (2019)	New realities: a systematic literature review on virtual reality and augmented reality in tourism research
tom Dieck& Jung (2018)	A theoretical model of mobile augmented reality acceptance in urban heritage tourism
Loureiro, S, Guerreiro & Ali (2020)	20 years of research on virtual reality and augmented reality in tourism context: A text-mining approach

3.0 PROBLEM OF STATEMENT

Until recently, AR technology was one of the most outstanding technologies. The core premise was the complete inclusion of the user in a computer-generated virtual environment. Thus, AR Technologies are therefore becoming increasingly common, not just among the science community, but also the general public. However, this technology has not be fully utilized by the tourism sector, especially in Malaysia. Based on the existing writing, the technology's presence in the tourism sector may help it to grow bigger (Buhalis, 2019). He added, the tourism sector should now opt for AR to enhance its services.

On the other hand, prospective travelers have access to large knowledge bases, which are generated directly from the AR system. It can help reduce the cost for the travel agency as well as to the travelers themselves. As rightly put by Hall and Williams (2019) innovation in tourism may reduce the travelling cost. The presence of advanced technology in tourism may reduce any unseasonable cost for travel agencies and tourists.

Perak has certain areas that have gained world recognition such as the World Heritage Site (UNESCO) in the Lenggong Valley and Royal Belum State Park (Ahmad,2018). However, these areas with high historical and biodiversity values are less well received by locals due to the lack of promotion in the media, especially through digital content. In this regard, the cooperation from tourism promotion bodies such as MATTA is expected to help to boost these areas with great potential to the community (Appendy,2018).

4.0 METHODOLOGY

This research paper employs quantitative research methods to fulfil the research objectives. The research relies on four phases to build arguments,

Table 2: Research stages

Stage	Process
Stage 1	Collect primary data about existing augmented reality application
Stage 2	Identify characteristics of augmented reality
Stage 3	Creating sample of augmented reality application
Stage 4	Testing and data analysis

5.0 RESEARCH PHASES

5.1 Phase 1

5.1.1 Data collection

Existing articles and studies are the primary data for this research paper. Hence, the examples of existing augmented reality in the market are collected. All kinds of augmented reality in various sectors are also collected at this phase. This is to ensure more data can be

collected and studied. Besides, books, existing published journals and articles related to augmented reality characteristics and other relevant issues are also recorded. This phase will become the base of this research paper.

5.2 Phase 2

5.2.1 Characteristic of augmented reality

In this phase, characteristics of augmented reality application are identified. Researchers extract the characteristic of augmented reality from existing writing and application. A variety of augmented reality provider applications are extracted at this phase. Moreover, researchers identify suitable characteristics of augmented reality that can be applied for eco-tourism based application.

5.3 Phase 3

5.3.1 Develop application

New augmented reality applications are developed at this phase. The suitable characteristics of augmented reality especially for eco-tourism are applied in this developed application. Perak-eco-tourism location becomes a sample/model for this augmented reality application. Suitable application software is used to create this new application. The respondent's device to run this application is considered when developing this application.

5.4 Phase 4

5.4.1 Testing and data analysis

One eco-tourism sector travel agency is chosen. Respondents are among travel agency officers and their existing tourists. Likert scale based questionnaires are provided to test the augmented reality for eco-tourism application. The questions are based on the characteristics of application and eco-tourism locations that provide more information and develop their interest to visit the eco-tourism location. The data collection from respondents are analyzed using suitable software.

6.0 AUGMENTED REALITY CHARACTERISTICS

Researchers had identified augmented reality characteristics based on existing articles and published journals. These characteristics are also based on other related interactive design technology. Below are characteristics of augmented reality that were extracted.

Table 3: Characteristics of augmented reality

Authors(s)	Title	Characters
Han & Jung (2018)	Identifying tourist requirements for mobile AR tourism applications in urban heritage tourism	meaningfully design
Allanwood & Beare (2015)	User experience design: Creating designs users really love	fun, usability, simplicity, challenge, gestalt theory, semiotics, narrative, constraints
Steane (2014)	The principles and processes of interactive design	color, images, typography, layout, grids, format

7.0 CONCLUSION

AR provides different added value to multimedia content. Thus, the user can experience a variety of information. This technology (augmented reality) in eco-tourism may help this sector become more visible among tourists. By tapping on the screen, you may see a pop-up menu that allows you to select from various fields of interest, showing the right augmented reality. The use of this technology will also benefit media content activists to produce more digital elements related to eco-tourism in the state of Perak and in return, these digitized materials will promote the state of Perak far and wide, through any global platform.

Augmented Reality is supposed to modify what we see around. It is intended to enrich our enjoyment when travelling the world, and maximise our joy. Therefore, AR is the ideal tourism instrument which brings new value and opens new avenues for the tourism and retail sectors alike. More activities from the attractions of an area in the state of Perak can be brought forward such as kayaking, hiking, and fishing. The use of this AR technology will also be the main platform in the variety of packages offered in order to provide improvements to the user experience itself.

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Kelulusan daripada pihak tuan dalam perkara ini amat dihargai.

Sekian, terima kasih.

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Saya yang menjalankan amanah,

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Setuju.

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