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Research paper

Digital pamphlet of Domestic Tourism based on Augmented Reality: The Promotion of Sidoarjo Urban Tourism Site

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Abstract

Sidoarjo has the potential of historic sights of the world and the center of art heritage in East Java Indonesia. Augmented reality (AR) is being developed as an intelligent tourism promotion to provide information about real destinations and attractions from tourist attractions. Its use will maximize the satisfaction of tourists based on the active use of tourists. Several historic buildings in some areas of eastern Java have been almost recreated. We have taken advantage of the typical ethnic building of the town square to represent the board game. This study presents a new digital pamphlet of domestic tourism based on added facts. Through AR, this historic building generates new life, giving visitors a more engaging and interactive experience that further educates them about the temple itself and about the different historical periods in which the reliefs are carved. Augmented reality, combined with audio commentary in multiple languages, will help visitors to find different reliefs more easily and appreciate the true wonders of this site and the motives behind the historic building carvings.

Keywords: *Augmented Reality, Historic, Pamphlet, Reliefs, Sidoarjo.*

1. Introduction

Tourism is all forms of tourism activities with the support of various facilities provided by local communities and local government, the central government, this is based on the regulation number 10 of 2009 on tourism (1). Heritage tourism or heritage tourism is usually referred to as tourism cultural heritage or cultural heritage tourism or more specifically called cultural heritage and nature tourism (2). One part of Indonesia's heritage tourism is a man-made, mobile or immovable object in the form of a unity of group, or its parts or remains, which is at least 50 years old, or represents a period of style distinctive and represents a lifestyle of at least 50 years, as well as considered to have an important value for history, science and culture (3). One of the Indonesian region that has a wealth of art, history and tourism is East Java. The existing heritage building in East Java consist of sharing types and form such as temples, monumentsm statues and historic caves. Over the last few years there has been an increasing interest in tourism in the iconic places in East Java. Sidoarjo is one of distric of East Java region that has very prospective potential on tourism. The tourism prospect can be seen from the realization of the increase of tourist arrivals in 2014, which reached 29.57% increasing compared to year 2011 which only amounted to 517,583 (4). The cultural tourism area is located at: The cultural tourism area of the temple site, at District of Candi, Krembung Sub-district, Tarik Sub-district, Krian Sub-district, District of Prambon, District Sukodono, District Sedati. The effort of management of cultural tourism area is done by: 1. The arrangement and control of the tourist area and its surroundings are specifically regulated in the planning of the spatial tourist area; 2. The development of tourist areas should pay attention to the construction of facilities supporting, infrastructure and facilities such as roads;3. Integrated tourism development using an integrated system and synergistic (5). This has an impact on regional income, in the future it is necessary to promote the inheritance of artistic buildings that increase the number of tourists higher.

The media used by the government of Sidoarjo Regency through the tourism office to introduce Sidoarjo tourism through the development of media tourism technology in the development of tourism promotion there are web, Android tourism (Sidoarjo tourism), television, magazines and brochures, which use by using internet (6). In recent years, the use of Information and Digital Technology has been growing and increasing especially in term of tourism and promotion technology that allows to bring real conditions virtually such as augmented reality. Augmented Reality(AR) is a technology that enables an environment that includes virtual reality and real world elements. This technology allows users to view the real world, with virtual objects superimposed on or combined with the real world. The rapid of AR evolution has change areas such as education, health, promotion and business. The implementation of AR in education has been development by previous researchers. Dijaya has developed AR mobile for early childhood education and ortopedagogic education field by combining games, education and AR technology (7). Augmented reality is one of the newest technologies, which offers new ways how to educate effectively and attractively (8). Development of AR in the education world, AR has facilitated the provision of learning simulation media, training with low prices but still bring real conditions such as on practicum media in vocational schools (9). Economic and industrial developments should be supported by simulated media and promotional media at low cost but with real-world quality, AR technology can be quite effective options in improving the quality of ecotourism promotion services. In recent years

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the development of AR-based simulation applications is continuously improved to create virtual conditions with real atmosphere. Previous research presented CorfuAR, a fully-functional prototype of a mobile augmented reality tour guide, which supports tourists on the move. CorfuAR displays information about the points of interest (POI) a user selects on the screen of his smart phone; and gives navigation directions to specific, requested POIs (10). Tourist promotion media also develop construction of a computerized model of the Roman Theater of Byblos, one of oldest continuously inhabited cities in the world (11). These facts give inspire the development of Digital pamphlet of Domestic Tourism based on Augmented Reality. The objective of this research is develop model application media to inform user information about historical site real condition virtually based on augmented reality.

2. Sidoarjo Domestic Tourism

2.1. Sidoarjo Heritage Tourism

Sidoarjo is a district is East Java Province, Indonesia with bordered by Surabaya City and Gresik Regency in the north, Madura Strait in the east, Pasuruan regency in the south and Mojokerto regency in the west. One area in Sidoarjo precisely in village of attraction is the embryo of the establishment of a large kingdom (Majapahit) on the island of Java centered in East Java, Indonesia, and stood around the year 1293 to 1500 AD and control most of the archipelago. This kingdom is a great kingdom and can unite the archipelago becomes one. Evidenced by the many relics left behind the kingdom of Majapahit about the art of majapahit, among others : terakotta, jewelry, temple, statue (12). The temple building is a building containing cultural elements India, but in practice Indonesian artists only use the basics the theoretical basis listed in the Silpasastra as the basis for the concept implementation. Art that is very distinctive especially in terms of this architecture, can not it is said to be a genuine creation of Hindu artists, because until now the ancient ahi have not managed to combine with a certain style of temple building art in Indonesia with one of the temples in India. The temple is an archaeological building made of stone or brick and very closely related to religion. The temple comes from one of the names for Durga as the Death Goddess Candika (13). The place for the worship of the Goddess of Death is at call Candika Graha which means house for Goddess Durga, then comes the term temple or Candi in Indonesia (14). Ancient relics that need to be preserved and preserved are Candi Pari and Candi Sumur as shown in figure 1, both are ancient relics of the time Majapahit. Candi Pari is located in the village of Pari temple, Porong district, district Sidoarjo, Candi Sumur located in District Porong, Sidoarjo regency, East Java, about 100-200 m to the southwest of Candi Pari, estabilised at the same time with Candi Pari. According to J. Knebel's report in "Repporten Van De Comissie In Nederlandsch Indie voor Oudheidkundig Onderzoek Op Java en Madoera" 1905-1906 (15). The Temple of Sumur, also Pari Temple, was built to commemorate the disappearance of a foster sibling of one of Prabu's sons Brawijaya and his wife who refused to stay in the palace of Majapahit at that time.



(a) **(b)**

Figure 1. (a). Candi Pari, (b). Candi Sumur, *source form https://id.wikipedia.org*

2.2 Sidoarjo Urban Tourism

Urban tourism is now increasingly being seen as being means to develop a competitive urban destination in providing entertainment services to the community, at context enhances attraction and function place and region as a sustainable visiting area processes, not only economically and ecologically, but socially, culturally, and politically as well (16). The potential of a region well known to local people can be developed as one of the major tourism destinations in the region. Convenience which is facilitated by regional autonomy allows local governments to draft the best strategy to promote the tourism sector in the region. Difference type a heterogeneous tour between one area and another allows one the region has excellent potential not owned by other regions. This is what taken local government as a strategy to advance the region. The advantages are owned will not be rivaled by other regions (17). Growth level needs high society, who want to let go of daily routines by doing recreation both alone and with the family makes an impulse to visit the existing attractions in Sidoarjo regency that do not have far-away must get out of town. So that the need for the development of existing attractions so that later can compete and be excellent for tourists to come visit. Urban tourism developed by the local government of sidoarjo for recreational and recreational needs of the community are dwarakerta park and abhirama park which is a family tourism place as shown in figure 2.



(a) **(b)**

Figure 2. (a). Abhirama Park, (b). Dwarakerta Park, *source form https://id.wikipedia.org*

3. Design and Implementation of Digital Pamphlet of Domestic Tourism Based on Augmented Reality

User-centered design methodology was adopted for design and implementation of this project. User-centered design (UCD) is a general term for a philosophy and methods which focus on designing for and involving users in the design of computerized systems. The ways in which users participate can vary. At one end of the spectrum involvement may be relatively light; they may be consulted about their needs, observed and participate in usability testing (18)

3.1 Design Heritage 3D Modelling

Development of 3D models for historic buildings using blender tools in order to create conditions as the original. building conditions developed from various angles, sizes, textures, colors and carvings of the physical conditions to create a real atmosphere. Figure 3 shown 3D modelling of urban and domestic heritage building tourism.

3.2 Load 3D Model Application

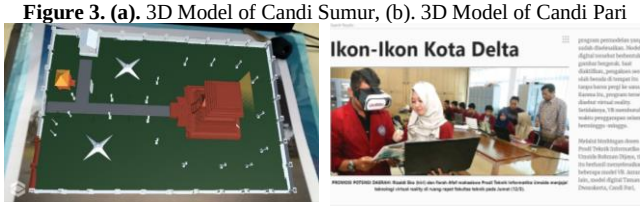
This app is an assistant, who guides potential travelers to know the beginning of the domestic and urban tourism attractions in sidoarjo, figure 4 show the implementation of application digital pamphlet of domestic tourism based on augmented Rreality. This AR application allows the candidates of tourist to become more visible through more interactive pamphlets visually. The future of

tourism promotion media will be better able to be a companion of tourists in order to meet the initial information about the sights before visiting.



(a) **(b)**

Figure 3. (a). 3D Model of Candi Sumur, (b). 3D Model of Candi Pari



(a) **(b)**

Figure 4. (a). Load 3D digital pamphlet of domestic tourism, (b). AR digital pamphlet of domestic tourism testing by user

4. Result and Findings

4.1 System Evaluation

The application usability survey is compiled in Table 1 for the application is done by a group of prospective tourists consisting of 20 respondents who have never been a tourist location or not from Sidoarjo through Demo application. The System Usability Scale (SUS) questionnaire was used for measuring usability, as well as a feedback survey that took place ad-hoc by the authors (Table 1), applied to 20 potential tourist for assessing the degree of stability and satisfaction achieved by every application.

4.2 User Respondence Evaluation

Results from digital pamphlet app shows a high score based of table 1. That multimedia content is considered as high quality (V1), and the application does not show any unexpected difficulties its usage, which is quite easy (V2). Potential travelers consider without a doubt that these three applications are helpful for getting to know the conditions of the tourist environment, and the hints of this systematic app (V3). A temporary personal experience use it quite satisfactorily too, showing the high value above average and The participants' perceptions are a helpful tool understand the abstract concept of electrical engineering (V5). They consider that a good digital pamphlet portable and can be used anywhere (V6).

Table1: Component variable for Testing Application

Component	Variable
V1	Rate quality from 3D models
V2	Application easy to use
V3	The application instructions are systematic
V4	Rate your experience of use about this application
V5	The application can be used anywhere and anytime due to its portability

5. Conclusion

5.1 Conclusion

The number of tourist sites that have not been explored in sidoarjo encourage creative promotional activities that provide interactive information. In some cases, a simple promotional medium does not support the increased understanding of information to potential travelers. Application of digital pamphlet AR allows prospective tourists to be able to find out the initial information location in sidoarjo. stingrays, well temples and some city parks developed in 3Dimensional form through the AR technology implemented in the form of digital pamphlets. The potential tourists can explore the attractions in detail from historic buildings and family parks in sidoarjo. application test results show potential tourists can feel the real condition of historical sights and tourist areas and initial information from tourist sites.

5.1 Future Work

Other suggestions for future work are stated below:

1. To enhance reality of digital pamphlet, smart glasses and leap motion can be used when explore location.
2. To provide proper interaction, multimedia tools for digital pamphlet such as sounds, graphics, animations, videos and more 3D objects should be properly designed according to children's levels
3. In the future, new designed digital pamphlet activities should provide user to comment about something and ask more questions to other.
4. In the future, similar digital pamphlet can be developed for different sample groups and for different promotion fields. Moreover, their psychological experiences and other variables related to learning can be examined.

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