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Implementation of Marker Based Tracking Method in the Interactive Media of Traditional Clothes Knowledge-Based on Augmented Reality 360

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ABSTRACT

Knowledge of traditional clothes, especially Indonesia, is currently carried out using digital media such as radio, television and the museum's official website. The limitation of presenting museum information in Indonesia makes the delivery of visual information not yet optimal Studies prove by combining several senses at once in presenting a content can increase people's memory and interest in the content. One of the technologies related to multimedia is Augmented Reality. In this study the authors built an Augmented Reality 360 Interactive Application on Custom Clothing Using a Marker Based Tracking Method that aims to introduce traditional clothes to the Museum used as objects to provide information to the public about traditional clothes with Augmented reality technology and Conveying information for the introduction of traditional clothes. Augmented reality applications on traditional clothes are built using 3D unity software and using Vuforia in applying the marked based tracking method in retrieving a database of images on a marker. The results of this research are applications that can display traditional clothes using augmented reality-based technology so that they are easy to use by the wider community such as the general public and students.

Keywords: Traditional clothes, augmented reality, Knowledge-Based, mobile application.

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1. INTRODUCTION

The museum has various types of historical collections, these collections are useful as a proof of natural history, human culture and environment and can describe the identity of a nation (Cambell & Baars, 2019; Star & Griesemer, 1989; Adlina, 2020). The current awareness of the community towards their own culture has greatly decreased due to technological developments that have increasingly developed rapidly and increasingly influenced the community, this has led to reduced practice as well as learning material about the introduction of the museum (Haryani & Triyono, 2017).

The introduction of traditional clothes is currently done using digital media (Mahmudah, 2019). The audiovisual digital media such as radio and television and the official website of the museum in Indonesia are still limited in presenting information on the museum, making the delivery of visual information not optimal [6]. Studies prove that combining several senses at the same time in presenting a content can improve people's memory and interest in the content (Putra, Wahyudi, & Tumilaar, 2018; Nurdyansyah & Fahyuni, 2016; Mahon & Caramazza, 2008). One of the technologies associated with multimedia is Augmented Reality, where Augmented Reality is a technology that presents a visual display in such a way that is similar to the real world situation (Sahulata et al., 2016).

The method used to develop augmented reality custom clothes is Marker Based Tracking which is a square black and white illustration marker with a thick black border and a white background so the computer will recognize the position and orientation of the marker and create a 3D virtual world that is a point (0,0,0) and three axes namely X, Y, and Z (Grubert & Grasset, 2013). Abdulghani & Sati (2020) conduct research for the design of instructional media to find out traditional houses in Indonesia but their implementation uses computer media.

Marker Based Tracking has long been developed since the 1980s and in the early 1990s began to be developed for the use of Augmented Reality (Listyorini, 2014; Cheng & Tsai, 2013). Meanwhile,

with the development of technology, learning in students does not have to be applied in just one medium as Al-Khowarizmi et al (2020) conducted an analysis of the effects of Indonesian and Chinese learning media and the results were very suitable for 5th grade students of elementary schools.

With the application of this technology, it can make developments into data science based on big data (Lubis, 2019; Lubis, Lubis & Al-Khowarizmi, 2020). So that the existence of big data is able to make the development of artificial intelligence that is specialized in neural networks and machine learning such as classification, classification and forecasting (Al-Khowarizmi et al., 2020; Al-Khowarizmi et al., 2020; Prayudani et al., 2019). So that with the implementation of Augmented Reality traditional clothes knowledge can make students become interactive towards the learning media (Prabowo, Listyorini, & Susanto, 2015; Liong, 2019).

2. LITERATURE REVIEW

A. Augmented Reality (AR)

Augmented Reality is one part of the Virtual Environment (VE) or commonly known as Virtual Reality (VR). AR gives users an idea of the merging of the real world with the virtual world viewed from the same place. AR has three characteristics, namely interactive nature such as enhancing user interaction and perception with the real world, according to real time and in the form of 3 dimensions Mustaqim , 2017). Additionally Augmented Reality (AR) is adding virtual objects to real objects at the same time and Augmented Reality was first used in 1957-1962 by a cinematographer named Norton Heilig, who was named Sensora. Sensora is a simulator that can simulate visuals, vibrations (Kamelia, 2005).

The purpose of AR is to take the real world as a basis by combining several virtual technologies and adding contextual data so that human understanding as its users becomes clearer. This contextual data can be in the form of audio comments, location data, historical contexts, or in other forms. At this time, AR has been widely used in various fields such as medicine, military, manufacturing, entertainment, museums, educational games, etc. (Haryani & Triyono, 2017).

In its development AR has been used in several fields of life fields that have used AR, among others:

1. Medical
   Imaging technology is very much needed in the world of medicine, such as for example, for operations simulations, simulations for the manufacture of virus vaccines, etc. For this reason, the field of medicine applies Augmented Reality to the visualization of their research.
2. Entertainment
   The entertainment world needs Augmented Reality to support the effects that will be produced by the entertainment. For example, when a weather reporter predicts a weather forecast, he stands in front of a green or blue screen, then with Augmented Reality technology, the green or blue screen turns into an animated picture of the weather and as if the reporter entered the animation.
3. Military Training
   The military has applied Augmented Reality to their combat training. For example, the military uses Augmented Reality to make a war game, where warriors will enter the world of the Game, and as if doing real war.
4. Engineering Design
   An Engineering Design requires Augmented Reality to display the results of their design in real time to the client. With Augmented Reality clients will know, about the specifications in more detail about their designs.
5. Consumer Design
   Virtual Reality has been used in product promotion. For example, a developer uses a Virtual brochure to provide complete information in 3D, so customers can clearly know the product being offered.

B. Marker Tracking Method

Marker based tracking is an AR that uses markers or two-dimensional object markers that have a pattern that the computer will read through a webcam or camera connected to the computer, usually a black and white illustration with a thick black border and a white background. this method users no longer need to print a marker to display digital elements. In this case, the recognized marker takes the form of the device's position, direction, and location (Setyawan & Dzikri, 2016).

3. RESULTS AND DISCUSSION

At the design stage of this system, the processes of making Augmented Reality systems on traditional clothes will be explained so that the flow process is clearer using the system flowchart model.

A. Flowchart System

Flowchart with certain symbols that describe the sequence of processes in detail and the relationship between a process (instruction) with other processes in a program. In this study the author tries to describe the process of use and manufacture of Augmented Reality applications.

a) *Flowchart Usage*
Following this is the Flowchart usage for the Augmented Reality application for traditional clothes:

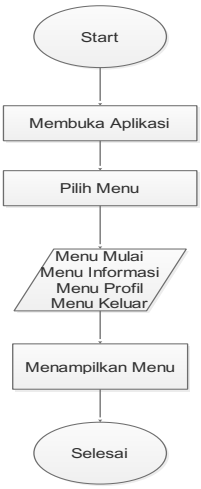


Fig. 1 Flowchart Usage

b) *Making Flowchart*
Following this is the Flowchart making for the Augmented Reality application for custom clothes:

Fig. 2 Making Flowchart

Figure 2 The making flowchart explains how the Unity 3D application starts from a Unity 3D Software then manages the Marked Based Tracking method in Vuforia so that it can insert a marker for Augmented Reality needs and insert custom clothes on Unity 3D so that the custom clothing image can be seen when the Marker is directed to the camera.

In the user system display that functions as a system used by the user to see the augmented reality system on the traditional clothes, this system serves as a medium that can be used by various elements of society to conduct learning media on the introduction of traditional clothes.

The following is the display found on the user's system:

1. Display the main system menu

On the main menu system there are menus to support the existing system, all the menus can display information needed by the user as a learning medium for traditional clothes contained in the augmented reality system on traditional clothes, such as start menu, information, developer profile and quit, can be seen in figure 3:

Fig. 3 Display the main menu

2. Start Menu Display

The start menu display will display the entire start menu such as a list of traditional clothes in Indonesia, which will use augmented reality technology according to the system requirements of the learning media implemented in the mobile application, as in Figure 4 below:

Fig. 4 Display menu list of traditional clothes

Figure 4 explains the traditional clothes menu in Indonesia and can display augmented reality technology which uses markers as a database of images on traditional clothes.

3. Information display

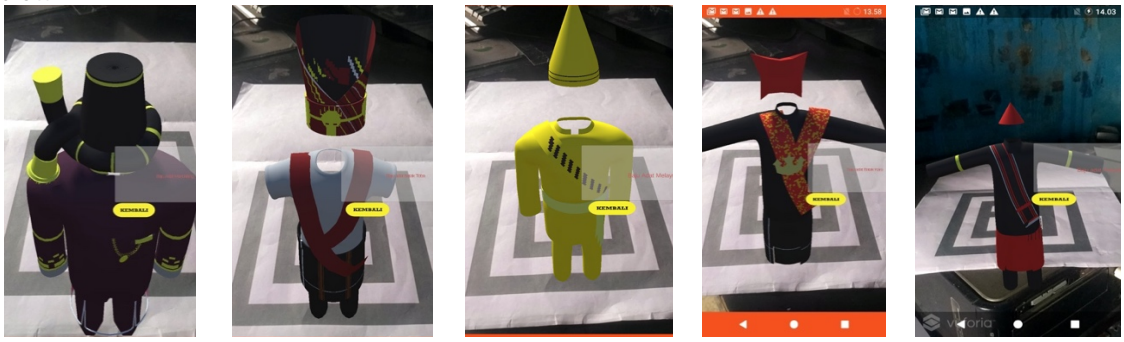
Information display will display information in the form of text so that the user can find out about information from the application on the augmented reality system on the traditional clothes as in Figure 5 below:

Fig. 5 Information display

Figure 5 explains the contents of the developer profile that will be displayed by the system, so it makes it easier for users when they want to know the developer profile.

4. Display Augmented Reality custom clothes

Display Augmented Reality clothes are the result of a system that will display traditional clothes in the form of Augmented Reality, so a User can see traditional clothes more interestingly, as in Figure 6 below:



(a) (b) (c) (d) (f)

Fig. 6 Display Augmented Reality Clothes There

In planning software development in building an application using augmented reality technology that the author designed it can be concluded that the implementation of traditional clothes using augmented reality technology is very beneficial for people who want to know the local traditional clothes in Indonesia. In this paper, samples of traditional clothes are taken so that it is necessary to do a remake using 3Dmax software and then insert it into the 3D unity software so that the augmented reality

technology can be run. The results of this research are in the form of an application for the introduction of traditional clothes using 3D unity which can be used as a learning medium.

4. CONCLUSION

In the description of the series starting from the process of making the Augmented Reality 360 Application in Interactive media on Indigenous Clothes on students using the Marker Based Tracking Method, a number of important conclusions can be drawn namely Producing the introduction of traditional clothes at the museum that provides information to the public about traditional clothes with Augmented reality technology . By using Vuforia you can create a marker that can store images of objects from custom 3D clothes. The marked bases tracking method is applied with the help of Vuforia. And it is hoped that in the future this application will be able to know all the traditional clothes in the world.

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