Design and Analysis of Online Shop Display Based on Augmented Reality Technology

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Abstract—**With the rapid development of e-commerce, more and more products sold over the internet. But online shopping site is still using the traditional 2D animation, images and text information for displaying their products that cannot meet the needs of today's consumers to understand the product. Based on an analysis of display technology e-commerce systems that exist, this paper studied the virtual product display technology based on augmented reality and is valid for online display prototype system for watches. This technology can be used in e-commerce as well. This can reinforce the traditional view, improve the consumer shopping experience and increase consumer desire to buy something, and eventually bring good benefits to the customer.**

Keywords— Augmented Reality, e-commerce, Online Shop

I. INTRODUCTION

E-commerce is a commercial activity that will not be affected by space and time but must rely on the internet and on the basis of a fair operation of Internet users[4]. Limited on technology products online display and other reasons, consumers can only see the image and the text information 2D animation lack of further information and interaction. The technology cannot provide information about the characteristics, functions and structure of the actual item, causing the difference between the products displayed online and the actual.

In recent years, along with the development of computer graphics, human-computer interaction and computer networks, new display technologies such as virtual reality, augmented reality technologies are evolving rapidly and widely used. Virtual reality technology has improved as compared to the traditional one. In e-commerce, virtual reality can provide virtual product 3D model can only zoom-in and zoom-out but can provide Augmented Reality. Shopping experience closer to the consumer. It can combine virtual objects with real-world scenarios, this can not only solve the shortage of the traditional ways to fully display the common view an item online and characteristics but also fills the gap between consumers and sellers by using augmented reality which makes consumers feel buried. The advantage of this technology is even greater when consumers want to try the product, can allow consumers to touch and a sense of trust and security. Although, this time augmented reality has been applied in many areas, but its application in e-commerce is relatively limited. Based on the analysis of the existing system of electronic trading screen technology, this research framework filed online product

display system based on augmented reality, studying the key technology of augmented reality in display products online and apply online for a prototype system featuring watches.

II PURPOSE OF PAPER

The main objective of this study was able to get the result of a merger between the real world with the virtual world on e-commerce in real time with the AR Toolkit as an environmental advocate AR by using a multi-marker and Blender as a generator of virtual objects that can be intended to provide benefits for promotion or more.

III LITERATUR REVIEW

a. Reality

Augmented Reality (AR) is a technology that combines the virtual object and the two-dimensional or three-dimensional into a real three-dimensional environment and then projecting the virtual objects in real time [1]. Unlike virtual reality completely replace reality, but only adds Augmented Reality or complementary reality.

Virtual objects display information that cannot be accepted by the user with their own senses. Augmented Reality This makes it suitable as a tool to help its perception of and interaction with the real world. Information displayed by virtual objects helps users implement activities - activities in the real world.

In addition to adding virtual objects in the real environment, Augmented Reality also potentially eliminate objects that already exist. Adding a layer of virtual images is possible to eliminate or hide the real environmental view of the user. For example, to hide a table in a real environment, needs to be described layer representation blank walls and floors are laid on the table image is real, thus masking the real table view of the user.

Augmented Reality can be applied to all the senses, including hearing, touch, and smell. Besides being used in fields such as medical, military, industrial manufacturing, Augmented Reality has also been applied in devices that people use a lot, such as on mobile phones[5].

Augmented reality as merging real and virtual objects in the real environment, run interactively in real time, and there is integration in three dimensions, namely integrated virtual objects in the real world. Merging real and virtual objects is possible with the appropriate display technology, interactivity

is made possible through the device-specific input devices, and a good integration requires an effective tracking.

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b.   ArToolkit

ARToolKit is a software library, to build augmented reality (AR). This application is an application that involves overlaying virtual imaging to the real world. To do this, use tracking ARToolKit video, to calculate the real camera position and orient the pattern on the paper marker in real-time. After, the original camera position is known, then the virtual camera can be positioned at the same point, and 3D objects are described above marker. So ARToolKit resolve issues in AR ie, the viewpoint of the object tracking and interaction of virtual objects. This device can be downloaded on the page: http: //artoolkit.sourceforge.net/.

ARToolKit uses computer vision techniques to calculate the real camera viewpoint to the real marker. There are five steps in the process of working ArTookit, camera First, look for the marker, then the marker is detected is converted into binary, then black frame or black frame will be detected by the camera. The second step is, the camera will find position in 3D marker and calculated with a real camera. The third step, the camera will identify the marker, whether the pattern marker in accordance with the templates memory. Step into four, to transform the position marker. The fifth step, rendering 3D objects in the above marker. Figure 1, shows in detail the process of how ARToolkit.
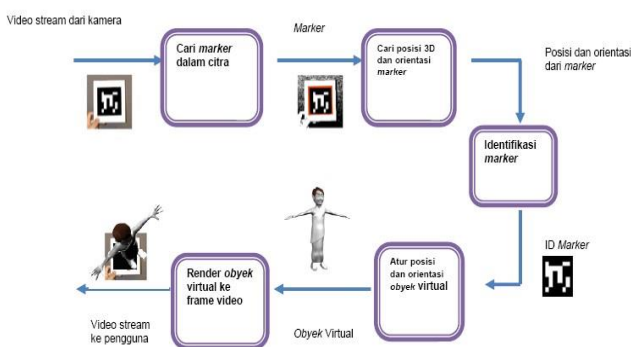

Figure 1. The working principle of AR Toolkit

C.   Marker

Marker is meant here is a pattern made in the form of Figure 2 that will be recognized by the camera [2]. Marker patterns can be created with Photoshop. For a standard marker, the recognized pattern is the pattern of the marker with a square shape with a black box inside. But now many

developers marker makes without a black frame. In ARToolkit, provided the folder containing the marker - a standard marker that can be used by beginners AR maker, from the pictures we can see a picture of two pattern, which has two different patterns, but it has two black frames and patterned the same square. We may ask, why should a framed black and patterned square? It because ARToolkit use the computer vision techniques to calculate the angle of the camera real.

Figure 2. Example Patern / Marker

Figure 3. Introduction phase pattern / marker in ARToolkit

From Figure 3, we can see there are three stages when the camera is reading the marker, the first stage of the camera panned marker directly, the second phase marker is converted into a binary black and white. After that ARToolkit find pictures of black boxed and match with the template memory in ARToolkit, whether the marker is suitable or not ?. When the marker is declared fit then ARToolkit will use the introduction of the boxes and orient marker to calculate the position of a real camera with a real marker, after which it will be filled when the 3x4 matrix.

Real camera coordinates to the marker, this matrix will be used to adjust the position of the virtual camera. The third stage, when the coordinates of the virtual camera and a real camera has the same, then we will draw computer graphics and overlaying 3D objects [3]. (To note ARToolkit using Open GL and API to set the coordinates of the virtual camera and draw 3D objects,) as shown in Phase 3.

IV.   RESULT AND DISCUSSION

This study was held in 5 stages. The first stage is the analysis of the system, namely the study of literature that aims to study the basic theory of literature about Augmented Reality, ARToolkit, blender and Adobe Photoshop. The second stage makes the system requirements specification, which do the details of what is required in systems development. The third stage making system design, from creating the design and manufacture of multi-marker and design of object creation .. The fourth stage is to do testing of the system that has been made and the fifth stage of implementing a system that has been created.

a This study used two kinds of input in the form of a virtual object in the form of 3-D image (3D) made from the Blender

and Video environment are taken in real-time using video cameras in this study used a webcam and immediately processed by the device ARToolkit.

b. Selection of Hardware and Software As input from the surrounding environment is a real, live video taken by using a webcam and immediately processed by the device ARToolkit.
In the implementation and application of the mode of construction of the design into a finished application, in this study used ARToolkit and Blender software and hardware used is a laptop computer with Intel processor specifications 2:00 GHz Core2 duo, 1.75GB RAM and 250 MB shared VGA.

c. Model Design
The design idea of this application development is done in two parts: the use of a single marker and the use of multiple markers. The intended use of multi-marker is to show some virtual objects at once on the running time on ARToolkit.
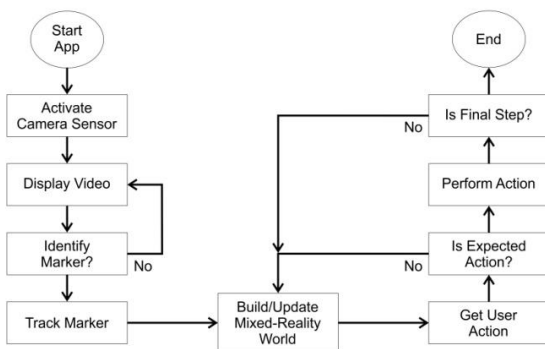

Figure 3. Tahap pengenalan patern

1. Single Maker
Forms logic flow on the use of a single marker can be visualized in Figure 6. In the design process of a single marker can be explained as follows: Virtual Objects (3D) resulting from the rendering device blender
then stored on your computer and the
webcam device arrests marker images which are stored on a computer for processing by using the device ARToolkit. And the final result that emerged is a combined form of Virtual Object Visualization (3D) with the external environment (marker) webcam and will be referred to as a webcam only.
a. Virtual Object Material
In this study, some form of virtual 3D objects. It is intended to conduct experiments do multi markers at the AR Toolkit.
b. multi Marker
In the design of marker single process can be explained as follows: some objects Virtual (3D) resulting from the rendering device blender which is then stored on your computer and the device webcam perform image capture marker is more than one kind of marker that is then stored on a computer for processing by using ARToolkit device. And the final result that emerged is a combined form of some object Virtual Visualization (3D) with the external environment

(marker).
c. Making 3D Objects
This 3D object creation devices utilize a blender. In a blender, 3D objects needed are 3D objects with type .WRL. .wrl making process is to do export into those types. Figure 4 shows the export facility using menu File -> Export to the blender.
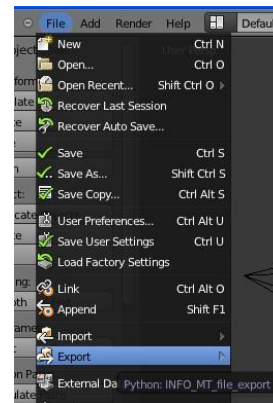

Figure 4. Export Facility in Blender

d. Use of Marker
Marker is meant here is a pattern made in the form of images that will be recognized by the camera. Marker patterns can be created with Photoshop. For a standard marker, the recognized pattern is the pattern of the marker with a square shape with a black box inside. In ARToolkit, provided the folder containing the marker - a standard marker that can be used by beginners AR maker. Figure 5 shows some of the markers used in this research trial.
Marker contained in ARToolkit is in the form of a PDF file. If you are going to use the marker alone can be printed directly without re-measurement.
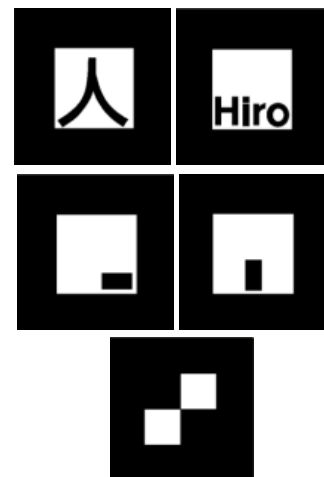

Figure 5. Marker with different patterns

V.   5 CONCLUSIONS AND SUGGESTION

From the implementation of the research conducted can be concluded as follows:

With the ARToolkit visualization of virtual objects 3 dimensions can be done easily, with the device ARToolkit virtual objects that can be visualized not only using marker single, with a model of multi-marker, seen from the hardware used ability ARToolkit to visualize only able to process 3D objects with a capacity of 3 Mega Byte.

Based on the shortcomings and the conclusions found in the current study, the suggestions proposed is to facilitate the introduction of an object maker, is expected to make the marker a representative such as for example the detection maker with detection of hands or other objects that are easier to use, if using webcam separate, expected use auto focus camera. It is recommended that the device ARToolkit capable of capturing images marker well, development of interaction three dimensions can be developed for animation spatially so that the expected file will be lighter during an animation, those institutions or sellers suggested this device can be developed for the animation book brochure interactive with potential consumers.

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