AUGMENTED REALITY AS EDUCATION BY USING ANIMAL ANNOUNCER BASED ON ANDROID APPLICATION

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ABSTRACT

The method used in making applications Introduction This animal is the study of literature, experiment, sampling and interviews. Making animal begins with collecting data that will be created as a model using Blender software Augmented Reality application design using Unity software by designing a marker made using Photoshop, sound edited using Adobe Audition and animal models that have been made. The features available in this app are several types of animals that are displayed in 3D with sound and animation using Augmented Reality technology. Results of testing applications Introduction Pets can run on a variety of Android mobile devices. The normal distance that can be detected by the camera is 6cm up to 4m with marker size 20 x 22cm. Based on that test the accuracy of reading the average marker is 00:12 seconds every marker. Accuracy of reading marker is also given light. The lighter the marker the clearer and faster the marker. There are still many shortcomings that can be developed, such as animals reproduce 3D objects and create animations that better, so that the application more attractive, interactive, and easy to understand.

Keyword : *Augmented Reality, Android, Technologi.*

I. INTRODUCTION

Introduction of animals can stimulate the child's brain to imagine and train creativity. During this time the introduction of animals to children are still many who use animal posters and encyclopedia books. Multimedia technology is very helpful to introduce some types of animals. With a variety of features that support the use of sound and three-dimensional shapes, children will know more fun, easy to accept and understand. As time goes by, AR is growing so rapidly that it enables the development of this application in various fields including education and entertainment. Based on the above description, then the discussion will be raised in this study is Augmented Reality As an introduction education of Animals android based applications, ranging from data collection, analysis and design, implementation, and testing and software integration. which is expected to be an alternative for kindergarten teachers or parents to provide a knowledge of animals to children.

II. BASIC THEORY
1.1 LEARNING MEDIA

Learning media is defined by Gagne and Reiser as physical tools in which instructional messages are communicated. So an instructor, a print book, a movie show or a tape recorder and other physical equipment that communicates instructional messages is considered a medium (Mulyani Sumantri, 2001: 150).

2.2 UNDERSTANDING EDUCATION

In a large dictionary of English education means education, whereas according to Sugihartono (2007: 3) education comes from the word educate, or educate which means nurturing and forming exercises.

2.3 AUGMENTED REALITY

Augmented Reality (AR) is a term for an environment that combines the real world and virtual worlds created by computers so the boundary between the two becomes very slim. This system is closer to the real (real) environment. Therefore, reality takes precedence over this system (Brian, 2009). [6]Ronald Azuma in 1997 defines Augmented Reality as a system that has the following characteristics (Azuma, 1997). Combines real and virtual environments Runs interactively in real time Integration in three dimensional (3D) Furthermore, Azuma writes that AR can simply be defined as a real environment with added virtual objects. [1]The incorporation of real and virtual objects is possible with appropriate display technology, interactivity is possible through certain input devices.AR is a variation of Virtual Environments (VE), or better known as the term Virtual Reality (VR).

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2.4 UNITY 3D

Unity 3d is an application used to develop multi platform games that are designed for easy use. The Unity editor is built with a simple user interface. [3]This editor was created after thousands of hours which has been spent to make it number one in the top ranking for game editors. The graphics on unity are made with high level graphics for OpenGL and DirectX. Unity supports all file formats, especially common formats like all formats of art applications. Unity matches the 64-bit version and can operate on Mac OS x and windows and can generate games for Mac, Windows, Wii, iPhone, iPad and Android.

2.5 VUFORIA

Vuforia is an Augmented Reality Software Development Kit (SDK) for mobile devices that enable the creation of Augmented Reality applications. [2]Vuforia SDK is also available to be merged with unity named Vuforia AR Extension for Unity. Vuforia is an SDK provided by Qualcomm to help developers create Augmented Reality (AR) applications in mobile phones (iOS, Android) interacting with mobile camera cameras. Vuforia is the SDK for computer vision based AR.

2.6 BLENDER

Blender is a professional free and open-source 3D computer graphics software product used to create animated movies, visual effects, art, 3D printed models, interactive 3D applications and video games.

2.7 BASIC CONCEPTS 3 DIMENSIONS (3D)

Basic 3 dimensional concept (3d) there are some that is:

1. **Coordinate system**
   Displaying a 3D image object can make it easier to visualize and deliver the meaning of an image compared to a two dimensional (2D) visualization.
2. **Transformation**
   Transformation is a process to make changes to an object.
3. **Translation**
   Translation is the process of moving the object from one position to another.
4. **Scale**
   Scale is the process of changing the size and position of an object.
5. **Rotation**
   2-dimensional rotation is used against the object by rotating along a circular path in the xy plane.

2.8 DESIGN OF UML MODEL (UNIFIED MODELING LANGUAGE)

The flow of implementation is seen in the flowchart below:

Figure 3.1 flowchart

From the flowchart above it can be seen that the application is run by scanning Marker then the application will display three-dimensional objects (3D) when Marker is scanned or scanned detected by application. The following merupakan activity diagrams Explaining the work activities of actors running augmented reality applications to track tracking markers highlighted by augmented reality cameras. Activity diagram tracking marker can be seen on the picture In Figure 3.2
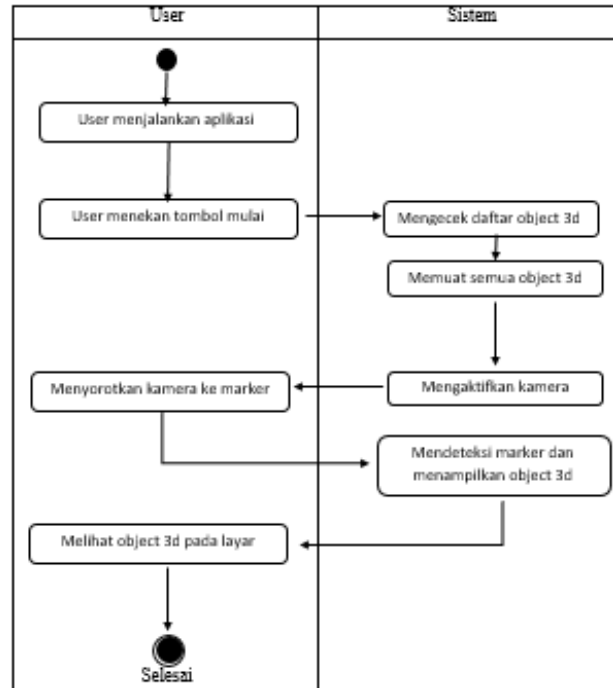

Figure 3.2 Activity diagram tracking marker

III. IMPLEMENTATION AND TRIAL TEST
3.1 IMPLEMENTATION

Figure 3.3 Splash Screen

Figure 3.3 Splash Screen is a graphical control element consisting of a window containing the current image, logo, and software version. A splash screen usually appears when a game or program is launched

Figure 3.4 Marker

Figure 3.4 tag card marker containing the image pattern, so the application can detect the pattern and display 3d objects that have been previously set in unity.

Figure 3.5 Menu

Here is a sub menu view, in the sub menu there is a button option start yuk to start the application Ar option how to play for tutorial use of the application, options about for application info and option out to exit the application as in Figure 3.5.

Figure 3.6 Way Menu

Figure 3.6 the way menu is the implementation of the page how to play When the user pressing the play mode then the system will go to the page how to play that shows the user's usage instructions and button back to return to the main menu

Figure 3.7 about menu

Figure 3.6 Way Menu When the user presses the button about the system will go to the page about which shows information about the purpose of this application is created and shown to whom this application is made.

3.2 TEST RESULTS

Augmented reality-based animal recognition education has four pages of interfaces. The interface page is the main menu interface page, the play options menu, the options menu and the camera screen. Main menu page that serves as the main view of the application, in making this application the main menu page is formed from a scene on the project unity and two-dimensional texture. In this test, a marker will be detected first by the camera. Trial is done 2 times, Test the application speed at marker from A-Z on minimal and enough light and installation test and match on smartphone device with different android type. An example of a marker test result that reads the application as follows:
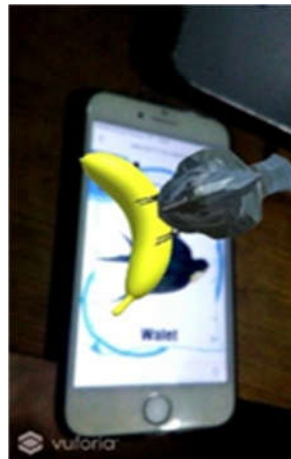

Figure 3.8 marker W

Brand and smartphone specs	Test status	Brand and smartphone specs	Test status
Xiaomi Redmi 2 Android Kitkat 4.4.4 Ram 2Gb Int 16Gb	Success	Smartfren Andromax B Android 6.0 Marshmallow Internal 8 gb, 1 gb ram	Success
Acer Liquid Android Lolipop 5.1.1 Ram 1Gb Int 8Gb	Success	Iris50 Android 6.0 Marshmallow Internal 8 gb, 1 gb ram	Success

Redmi 4x Android Nougat 7.1.2 Ram3Gb Int 32Gb	Success	BrandCode B11 Android 6.0 Marshmallow Ram 1gb, Internal 8gb	Success
Asus Zenfone Android Lolipop 5.1.1 Ram1Gb Int 8 Gb	Success	Oppo F1s Android Lolipop 5.1 Ram 4Gb Int 64Gb	Success

Marker detection is done by directing the marker directly in front of the camera so that the entire surface of the marker can be seen by the camera. Based on table 3.9, that all tested data successfully display 3D-shaped objects in accordance with the test marker image with an average response time of 00: 39sec every marker, in room minimal light in room measuring 2 x 2 meter with lighting one bower 5 watt and get get response time average 00:12 second every marker in room enough light in room 4 x 120 meter with lighting of rm t5 2x28W citrus as much three test markers, the result is that the closer the distance to the camera the faster the marker will be detected. However, when the distance of the camera with the marker gets farther the slower the marker is detected, so the marker pattern becomes obscure and causes the marker not to be detected, otherwise the application speed reads the marker to be scanned by the intensity of the light, the brighter the marker becomes clearer and fast marker detected and vice versa. Marker Testing On Smartphone is done to know the functional application on each android version. Based on Table 6.2, apps can run on smartphones with minimum android version 5.4.4 with 1Gb of ram and 8Gb internal to smartphone with android nougat 7.0 ram 4Gb and 64Gb internal system.

4. Conclusion

Based on the results of research that has been done then it can be concluded that:

1) This research has successfully developed an apk-shaped augmented reality app to help and simplify child kindergarten teachers in introducing animals to kindergarten children with fun using AR technology.
2) Augmented reality apps can display 26 animals with food in 3 dimensions and sound from scanned markers. Marker will can be read and will be able to display 3 dimensional images.
3) Based on the results of marker tests conducted on applications highlighted to the marker to test the 3d object and also the sounds raised the average response time of 00:12 seconds in the room enough light every marker and the average response time of 00: 39sec on the dim light . the speed of the application to read the marker to be scanned is influenced by the intensity of the light, the brighter the light the marker becomes clearer and the marker quickly detected and vice versa.
4) Based on the test results of several smartphone applications with different specifications state that the application can run on smartphones with minimum android version of lollipop 5.0 with 1Gb and 8Gb of internal ram up to smartphone with android version nougat 7.0 with 4Gb ram and 64Gb internal.

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