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Implementation of Augmented Reality of Android Based Animal Recognition using Marker Based Tracking Methods

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Abstract. Augmented Reality (AR) is a technology that combines 2 dimensions with 3 dimensions in realtime. Augmented reality can be applied in various things, one of them is in the field of education. In the world of augmented reality technology education can be used as a means of introduction of aquatic animals. Augmented reality serves to display 3-dimensional objects and their information by scanning markers. Markers made as scanning objects are carried out by the smartphone camera and will display objects in 3 dimensions. Based on testing the distance measurement of the camera against the marker, the optimal distance obtained from the camera can read the marker at a distance of 8 - 77 cm. This augmented reality application has been running well on smartphones and has featured 3-dimensional objects along with its information. Applications that have been made to facilitate the introduction of aquatic animals.

Keywords: Marine animals, Augmented Reality, Android

1. Introduction

1.1 Background

In the world of education, interactive learning media are needed to support children's learning interest. The making of this interactive media application uses augmented reality, in the application convey the types of aquatic animals and their information which will be displayed in 3-dimensional form. Android-based water animal application by using the technology augmented reality where the input from this application is an image (marker) of aquatic animals and the output is in the form of 3-dimensional objects from aquatic animals that will be displayed on the smartphone screen. To start this application by selecting the menu button you want to display then selecting the scan button to view 3-dimensional images in realtime. This application combines a 2-dimensional world with a 3-dimensional world that aims to avoid the monotony of books that only display 2-dimensional image objects.

1.2 Previous

The research conducted by Risyan Arief Setyawan and Afdhol Dzikri entitled "Analysis of Tracking Marker Methods in Augmented Reality in Central Java Traditional Musical Instruments". The study made comparisons between single marker and markerless methods. The application of traditional musical instruments of Central Java has been tested to see the effect of the distance between the camera smartphone with a marker and a color the marker used.



2. Research Methodology

Methodology is a scientific process or method to obtain data that will be used for research purposes such as data collection that is analyzing the problems that occur, and the design procedure is the steps that will be carried out in making the application are as follows:

2.1 Direct Observations (*Observation*)

Making observations directly to the object of the discussion that you want to get is the most important parts of data collection that are needed relating to the process of introducing cultures in North Sumatra.

2.2 Interview (*Interview*)

This technique is directly face to face with several students in the home environment to get an explanation of the problems that were previously unclear. To obtain accurate data the author gives several questions to children.

2.3 Library (*Library*)

In this method the author cites thesis material from various sources such as journals, the internet, and books relating to the implementation of the thesis, in the form of theories or opinions from various researchers. In this method aims to provide a strong theoretical foundation throughbooks of Augmented Reality available in the library, which are related to the writing of this thesis.

The method used in the development of the system in this study werethe marker-based trackingmethod in which these methods do the scanningoftwo-dimensionalmarker or object which then will be displayed on thesmartphonescreen in three-dimensional form that is more similar to the original.

3. Story Board

Table 1. Story Board

Name	Description
Marker	Figure 2 dimensions is the object
Camera	To dothescanning of the marker
Smartphone	To display a 3-dimensional image
Laptop	Application Development
5.6.3f1 Unity	Software makes application
Vuforia	Database

4. Testing Application

Testing the application is made to ensure that the applications that have been built can run well in accordance with the functions previously determined at the stage of application analysis and design. Test results from the application can be seen in the following picture:

4.1 Splash Screen



Figure 1. Splash Screen

4.2 Initial Menu

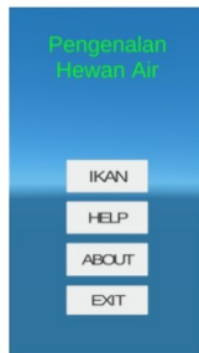


Figure 2. Initial Menu

4.3 Water Animal Page



Figure 3. Water Animal

4.4 Information Page

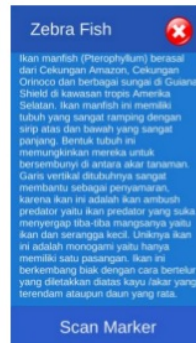


Figure 4. Information page

4.5 Scan Marker

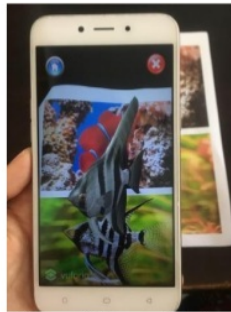


Figure 5. Scan Marker

5. Distance Test

Table 2. Camera Distance Test

No	Distance Camera	Description
1.	1 cm - 7 cm	Animal water not detected
2.	8 cm - 20 cm	Animals detected clearly
3.	50 cm - 60 cm	Small detectable animals
4.	70 cm - 77 cm	Animals not detected

6. Conclusions

The conclusions obtained in this study are as follows:

1. applications Augmented Reality that have been made can be run on smartphones properly and correctly.
2. application Augmented Reality of aquatic animal recognition that has been made showing 3-dimensional objects detected and displaying information from the animal.
3. All features that exist in the application of aquatic animal recognition have functioned and run well as expected.

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