

# Learning development model biological material "flowers wijaya kusuma (*Epiphyllum anguliger*)" by using augmented reality media to facilitate independent learning students

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**Abstract.** With the development of technology today, android mobile have many benefits for humans in various fields, namely in the field of information, education, business and communication. This study aims to create a media application as a model of biology learning to introduce flowers Wijaya Kusuma to biology students are classified as a rare flower and has a uniqueness in the blossoming of flowers that sometimes humans rarely to be able to find where and when the right time for the flowering process Wijaya Kusuma. Based on that, the researchers analyzed and looked for solutions how to introduce the interest of Wijaya Kusuma to the students in the biology learning process by utilizing Augmented Reality (AR) technology. AR as the incorporation of real and virtual objects in real environments, runs interactively in real time and there is integration between the three dimensions (3D). Merging of real and virtual objects is possible with the appropriate display technology. In this research-based augmented reality application created with the marker method which uses a marker for the detection of objects in combining the digital world and the real world. There are 5 markers a marker to display animations and 3D objects as well as information of interest Wijaya Kusuma, the information delivered include voice and text that can make the application interactive. This application is very useful for biology students who study the course of Plant Physiology.

## 1. Introduction

The development of today's technology, especially android mobile have many benefits for humans in various fields including the field of information, education, business and communication. Therefore, many mobile android used to assist in completing the work of man, a job that could only be done manually, but with the rapid development of technology then the work can be done with the help of mobile android which is certainly very easy in completion and can save time. And one of the emerging mobile android technologies today is Augmented Reality (AR) [1].

The use of mobile android in the field of education and learning is very rapid, one of them biology learning, especially about the introduction of flowers Wijaya Kusuma on biology students who have its own tendency in a very short time and very influenced by several external factors such as climate. Currently learning the introduction of flowers Wijaya Kusuma can only be learned from books, videos, internet or come directly to the habitat where Wijaya Kusuma flowers grow and develop. However, due to its existence which is very rare and only some areas in Indonesia still have it then needed a development of learning media so that student still can know, know and see how the flowering process Wijaya Kusuma through Augmented Reality (AR).



Augmented Reality is one of the technologies in the field of multimedia that can combine digital objects into the real world in other words is a blend of digital and real world [2]. Augmented Reality method is marker, the implementation of Augmented Reality technology which will be used as a learning media for Wijaya Kusuma flower material using marker method where by using a marker in object detection to combine digital object to real world, using Android mobile device.

Based on this background then in this research will make a learning media application that implements Augmented Reality in the introduction of interest Wijaya Kusuma by using a method of an android based marker. This application is expected to be a new alternative to learning media in introducing interest Wijaya Kusuma on biology student of Universitas Wijaya Kusuma Surabaya.

## 2. Literature review

Wijaya kusuma has become one of the rare and mysterious flowers. The flowers will be fragrant when it blooms. But it is difficult to predict when this flower will bloom. It is said that ancient kings in Indonesia who will rise to the throne should be picking flowers Wijaya Kusuma in bloom.

Wijaya Kusuma flowers will only bloom for a moment and time at night only. Usually Wijaya Kusuma flowers grow a lot dikarang. Nusakambangan Island is one of the places where Wijaya Kusuma flowers grow, but in addition there are also Nusakambangan also on the island of Thousand Islands, Karimunjawa, Madura and Bali.

If you look at the origin of this flower is from the mainland of South America, which then spread to China and into Indonesia in Majapahit era. Many people in Java believe that anyone who can see the flowering of Wijaya Kusuma then he will get fortune. "The flowers of Wijaya Kusuma or its Latin name are *Epiphyllum Anguliger* type cactus, entering anthophita division, opuntiales and dicotiledoneae class. There are about 1,500 species (family) of cactus plants can flourish in moderate to tropical region Wijaya Kusuma".

Interesting interest Wijaya Kusuma will only bloom in the middle of the night and only for a few moments, but the next morning the flowers have wilted again. Not all Wijaya Kusuma plants are easy to flower, it all depends on climate, soil fertility and maintenance.

Generally cactus type plant is difficult to determine its morphology, but Wijaya Kusuma plant can be seen clearly the leaves and stems, after this plant is old age. Actually the stem of Wijaya Kusuma plant is formed from leaf strands that shrink and harden. While this plant is young, the leaves are soft yellow leaves. The leaves are hard green leafy strands and shrink at the edges with bumpy edges and smooth, spiny leaf surfaces.

Wijaya Kusuma flower buds will appear on leaf waves, in the form of longer buds longer the stalk of flowers until the flower is hanging down. Stems and flower buds are usually pink but the flowers themselves are white. These flowers can grow either in a place protected from sunstroke or in a climate that is not too hot. When it will be planted in pots it is better to be given a mixing media medium Sphagnum moss, broken stem nail pole, and clean sand a bit like when planting orchids.

## 3. Methods

Augmented Reality is the incorporation of real and virtual objects in real environments, running interactively in real time, and there is integration between objects in three dimensions, ie virtual objects integrated into the real world [3].

The method developed in Augmented Reality is currently divided into two methods, namely Marker Based Tracking and Markerless Augmented Reality:

### 3.1. *Augmented reality-based marker*

The marker-based AR, also called marker-based tracking, is an AR type that recognizes markers and identifies the pattern of the marker to add a virtual object to the real environment. The marker is an illustrated black and white square with a thick black side, a black pattern in the middle of a square and a white background.

### 3.2. *Markerless augmented reality*

One of the methods of Augmented Reality that is currently developing is the Markerless method, with this method users no longer need to use a marker to display digital elements [4].

There are three principles of Augmented Reality, the first of which is the integration of the real world and the virtuality, the second runs interactively in real time, and the third is the integration of objects in three dimensions, i.e. virtual objects integrated into the real world [5].

Android is a Linux-based operating system that includes operating systems, middleware and applications. Android provides an open platform for developers to create their apps. Initially, Google Inc. bought Android Inc. which is a newcomer who makes software or software for smartphones [6].

Unified Modeling Language is a modeling standard in the creation of object-oriented applications submitted by the Object Management Group (OMG) in 1996.

text.

**3.2.1. Use case diagram.** Use case diagram describes an interaction between one or more actors with information systems to be created. In other words, the use case diagram is used to find out what functions are in the system and who is entitled to access the function [7].

**3.2.2. Class diagram.** Class diagrams describe the structure of the system in terms of defining the classes that will be created to build the system. Class diagrams have what are called attributes and methods or operations. Attributes are the variables that belong to a class. The method or operation is a function of a class [7].

**3.2.3. Sequence diagram.** Sequence diagrams describe the behavior of objects on a use case by describing the lifetime of objects and messages sent and received between objects [7].

**3.2.4. Activity diagram.** An activity diagram is a workflow diagram explaining various user or system activities, people doing each activity and sequential flow of those activities [8]. We hope you find the information in this template useful in the preparation of your submission.

## 4. Results and discussion

Applications built an Augmented Reality applications. This application aims to produce an Augmented Reality application that can be implemented as a medium of learning in the delivery of material about the introduction of flowers Wijaya Kusuma Surabaya in the course of Plant Physiology.

Augmented reality media has the characteristics of being able to direct the object of abstract material into a more concrete, either in shape (according to its original form), colour (more clearly according to its original colour), transparency (visible parts), object dimensions (see from all sides), and size (enlarged / enlarged). Based on these characteristics, augmented reality media attract students' attention, so it can arouse students' interest and motivation when studying plant physiology. When students' interest and motivation arise, the students' curiosity about the concept of the introduction of Wijaya Kusuma flowers will grow. Curiosity is one area of attitude.

Because the students' curiosity increases students will find the concept of how and when the process of blossoming flowers Wijaya Kusuma through observation activities. In observational activities, students are required to use the skill of using tools. Skill using this tool is one of the skill domains. This leads to the use of augmented reality media to improve the skills of using tools that will allow students to view concrete, clear, detailed, and intact observation objects when the observation is done directly and independently, so that learning becomes meaningful and meaningful than the concept of how and when flowers Wijaya Kusuma bloom will be more easily understood by the students so that the realm of knowledge can increase.

## 5. Conclusions

The results showed that there is the influence of application of augmented reality media to student self-study result. If any, should be placed before the references section without numbering.

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