

Augmented Reality Technology (AR) as Alternative Media for Promotional Product

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Abstract The high demand of apartment for people living in the cities makes the property agencies to compete each other in selling their units with various amenities. However, media promotion is needed by the agencies to spread the detailed information regarding the apartments. 3D Technology is one of the options that can be used. The establishment of promotion application with 3D can be considered to be effective and efficient, because it can support much more detailed information toward people with its presentation. So potential buyers are interested in the products offered. With the current technological development, the merging of the visualization of 2D image objects can produce a 3D virtual object form one of them by using Augmented Reality technology. With the help of the open-source mobile devices that is Android. That way can facilitate the user to know the form of the apartment and the facilities that have been provided.

Keywords Apartment Units, 3D, Augmented Reality, Android

apartments, with the use of information technology in the form of Augmented Reality applications, Augmented Reality is a technology that combines two-dimensional or three-dimensional virtual objects into a real three-dimensional environment and then projects virtual objects in real time.

The Royal Apartments is one of the companies engaged in property, the company's business process simply uses promotional media such as brochures with pictures of apartments in two dimensions, This method is less effective in attracting customers to promote products, as well as limited floor plans in brochures that make customers unable to see the apartment plan in detail, In addition, customers are asked to come to the location of the apartment to see more clearly the development plan apartments. Based on the description above, we recommend The Royal Apartments can utilize one of the information technologies such as the Augmented Reality Application to help promote their products

I. Introduction

1.1. Background

Property currently as one of the promising investment facilities, in recent years the increase in apartment construction has increased. Not only in Java, but some developments also occur outside Java and various other cities.

Increased property business in Indonesia is due to rapidly increasing housing demand. This is one of the causes of many businesses in Indonesia that trigger property in the increasingly tight property business competition. The development of this sector cannot be separated from the intense promotion carried out by the apartment marketing department.

One solution that can be relied upon to promote

1.2. The Royal Apartments

The Royal Apartments are one of the luxury residences in Bandung. Has a simple natural concept designed according to the needs and desires of customers? The ideal place to enjoy free time is valuable. All forms of comfort have been provided for customer satisfaction. Service, security and comfort with "privacy" become harmonious harmony for modern housing.

The Royal Apartments has 36 rooms which are divided into two types of classification, they are Luxury 28 rooms and 8 rooms Penthouse type. Each room is equipped with cable TV, AC, Hot or Cold Water, Telephone, Radio, Living Room, Kitchen, Dining Room, Laundry room, Room Service, 24 hour security with CCTV. The Luxury type has a size of 123 M2 while the Type Penthouse has a larger size of 196 m2 and has two floors.

A. Research Questions

To analyze the needs of information technology and information systems, the writers ask questions as follows:

1. How to make an application on Android that can visualize three-dimensional modeling with Augmented Reality technology in The Royal Apartments catalog package?
2. How to provide information about the types of each Royal Apartments unit on the Android Application?
3. How to display visualization of the three-dimensional modeling space The Royal apartment catalog is interactive and attractive to users with the application of Augmented Reality technology?
4. How to reconstruct elements in the real world and virtual world into new entities?

B. Research Objectives

The objectives to design the information systems architecture are:

1. Create an Android application that can visualize three-dimensional modeling with Augmented Reality technology in The Royal Apartments catalog.
2. Create an Android application that can provide detailed information on each unit of The Royal Apartments.

C. Scope and Limit to the Research

Scope of research's problem in the development of information systems architecture for university that will be developed, such as:

1. Visualization catalogs are made available only at The Royal Apartments
2. This application is made on Android-based smartphones
3. In Augmented Reality, marker readings made only one marker for three apartment units
4. Information presented only on behalf Apartment, Type Units and facilities therein, as well as the Form of the room in the form of three-dimensional images.

D. Research Methodology

System development, prototyping methods will be used as a model system development with the following process:

1. Listening to customers: developers and clients meet and determine general goals, identification of needs and an overview of the parts that will be needed.
2. Design: the design is done quickly and the design represents all aspects of the software that are known, and this design is the basis for making prototypes.
3. Evaluation of prototypes: clients evaluate prototypes that have been created and used to clarify software requirements.

2. Methodology

A. The Literature Augmented Reality

Augmented Reality (AR) technology in a general definition is a combination of virtual objects with real objects. For example, currently a television station, broadcasting soccer matches, there are virtual objects, about the score of the ongoing match. Here are some definitions of AR:

1. AR as being the opposite of virtual reality. Virtual reality immerses the user in a computer-generated world whereas AR combines the real world with computer graphics. In effect, AR brings the computer world to us. Unlike virtual reality, which requires specialist equipment to be experienced, AR requires only a way to capture the world around you and the means to experience the computer world (typically by overlaying computer graphics in the camera window). Because the requirements are minimal, many of today's smartphones are ideal AR devices [2].
2. AR (augmented reality), is a technology that combines two-dimensional and / or three-dimensional virtual objects into a real three-dimensional environment and then projects these virtual objects in real time [1].

Augmented reality technology opens new opportunities for industry players and the world of education to develop these technologies in their implementation in daily life.

B. Principle of Augmented Reality Activity:

1. Augmented Reality system works based on the detection of images and images that are markers [1].
2. The calibrated camera will detect the markers that are given, then recognize and mark the marker pattern, the camera will calculate whether the marker matches the database it has[1].

If not, the marker information will not be processed, but if appropriate the marker information will be used to render and display the three-dimensional objects that have been created before.

C. Marker

Markers are usually a black and white square illustration with a thick black border and white background, the computer will recognize the position and orientation of the marker and create a 3D virtual world that is point (0, 0, 0) and 3 axes namely X, Y, and Z [2]. In making a good marker, the image or image pattern has the following properties:

1. Rich in detail, for example, street views, groups of people, collages and more.

2. Have a good contrast, that is, have a bright and dark area, or dim.
3. There are no repetitive patterns, for example many boxes of the same size in one image or marker pattern

The image must be 8 or 24-bit with PNG format and JPG with a size less than 2MB. JPGs format must be RGB or GrayScale (not CMYK).



Figure 1. Marker Example

D. Natural Feature Tracking and Detection

Mobile phones are low performance platforms with very limited resources compared to computers. As a result, the limitations of cellphones in every aspect must be taken into account when developing an AR technology. In this method the information needed for tracking purposes can be obtained by optical-flow based matching templates or feature correspondence. One element of the applied natural feature tracking approach is based on a modified version of the SIFT and FERN descriptor features. SIFT is very good at extracting but processor intensive works because of computing, while FERN uses feature classification, which is fast but requires a large memory capacity [2].

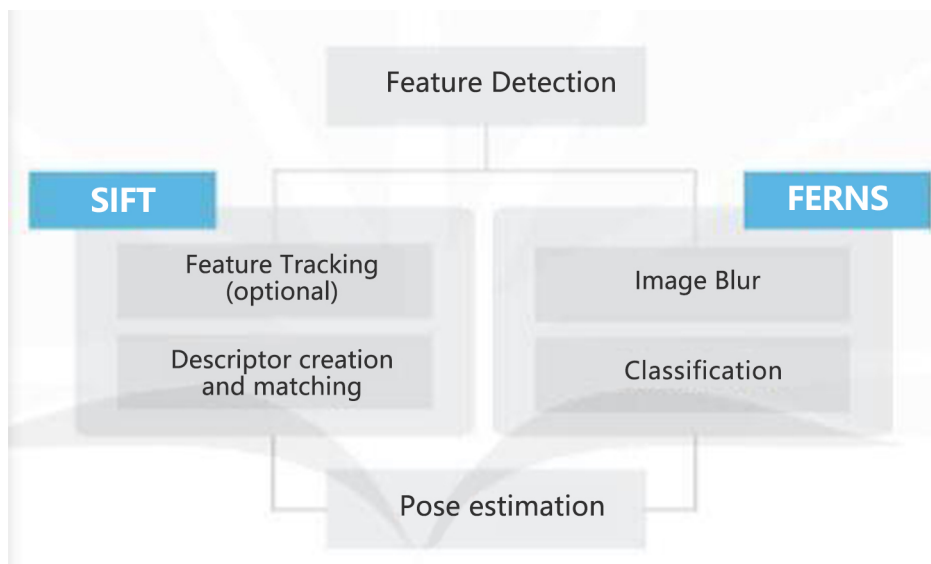


Figure 2. Flow of SIFT and FERN

E. Development Kit

So that in this final project research can be carried out and run smoothly, then the software is needed as follows:

1. Unity 3D

Unity 3D is a cross-platform based game engine. Unity can be used to create a game that can be used on computer devices, smart phones android, iPhone, PS3, and even X-BOX [3].

2. Microsoft Visual Studio

Is complete software (suite) that can be used to develop applications, be it business applications, personal applications, or application components, in the form of console applications, Windows applications, or Web applications [3].

3. Google SketchUp 3D

Google SketchUp is software made by Google that works for graphic design, which can produce 3D images [3].

3. Results

A. System Analysis

The problem found in the marketing division is the ineffective marketing media to promote every apartment offered to clients. Among others information about the catalog of the apartment in the form of two-dimensional incomprehensible by clients such as the shape of the room and the amenities provided.

B. Use Case Diagram

Use case diagram is a functional requirement that is described from the point of view of a user of a system. Use Case answers the question of how actors interact with the system and describes the actions that will be carried out by the system.

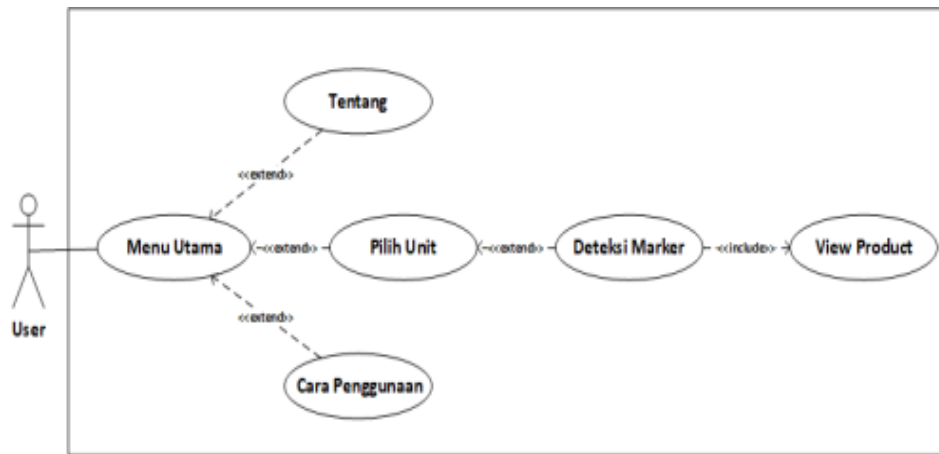


Figure 3. Use case application diagram three-dimensional space plan

C. Class Diagram Tahap Analisis

The class diagram helps in visualizing the structure of the classes of a system and is the most widely used type of diagram. Class diagram shows the relationship between a class and a detailed explanation of each class in the model of a system.

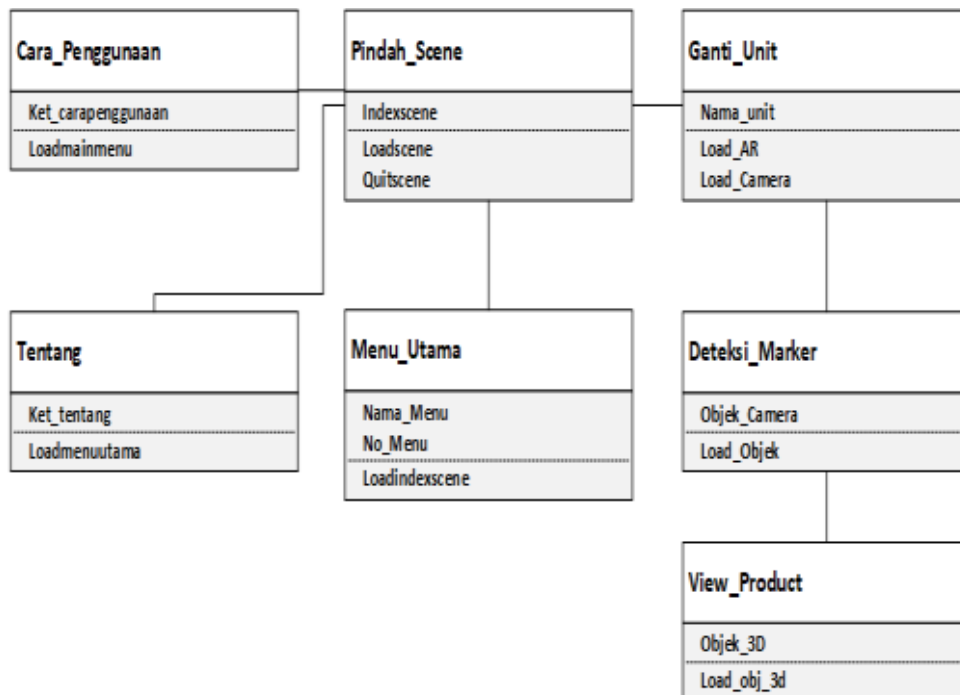


Figure 4. Class Diagrams Analysis

D. Prototype Testing Final stage

Before the system is implemented in this final project, it needs to be tested. This test is intended to minimize the number of errors or system failures during system implementation.

Testing is done using blackbox testing method or also known as behavioral testing. Blackbox testing is a software testing method that tests the functionality or no functionality of the system without knowing the internal structure of the module or program to be tested.

E. User Interface

The user interface is a user interface intended for application promotion kit three-dimensional floor plan room apartment.

The menu provides menus such as "start", "about", "how to use" and "exit".



Figure 5. Main Menu Interface

Menu about this contains information on the apartment. The menu can be accessed by pressing a menu about the main menu page.

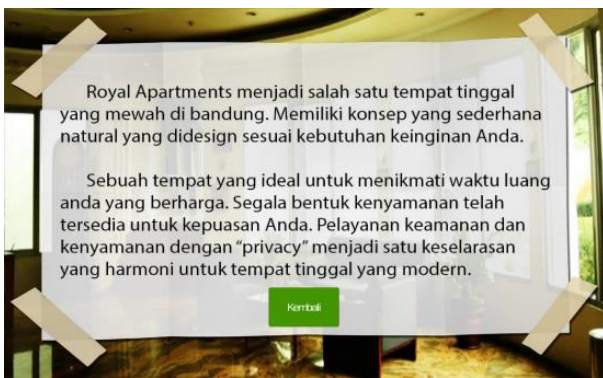


Figure 6. About Menu Interface



Figure 7. How to Use Menu Interface

How to use this menu contains information about how to use the application in detail that contains a marker. menu usage method can be accessed by pressing the usage method menu on the initial menu page.

A menu display category that appears when the start button on the main menu has been pressed. In this view the user is provided a menu such as select the unit and return.



Figure 8. Start Menu Interface

The "Luxury" category menu display unit has three-dimensional sketches.



Figure 9. Luxury Unit Menu Interface

Menu display unit category "Penthouse 1st floor" there are three-dimensional sketches.



Figure 10. Penthouse 1st floor Unit Menu Interface

Menu display unit category "Penthouse 2st floor" there are three-dimensional sketches.



Figure 11. Penthouse 2st floor Unit Menu Interface

4. Conclusions

A. Conclusions

Based on the stage that has been done in the previous chapter, it can be concluded as follows:

1. Augmented Reality application is expected to help to promote the apartments at The Royal Apartments.
2. AR Android app can provide company information that is displayed on a three-dimensional product design that is built with the SDK (Software Development Kit) Unity using Vuforia system development in the form of extensions..
3. This system can provide visual information interactively by displaying the product design three-dimensional attractive and easy to understand and can be used practically by all people (age and general), this app uses Augmented Reality technology along with markers that serve as markers to display the three-dimensional image.
4. This application can choose the type of unit in the form of luxury apartments and penthouses with visualizing the three-dimensional model using Google SketchUp application.

B. Suggestion

As a reference to create the next Augmented Reality (AR), we submitted some suggestions, as follows [4]:

1. In the next development is expected to feature online apartment reservations that can be directly inputted without filling out the order form manually.
2. In addition to three-dimensional visualization of apartments are expected to be added visualialisasi other three-dimensional building plans such as hotels, housing and others.
3. On the development of further applications are expected to be additional features to replace the marker Markerless order to mengvisualisasikan plan buildings more easily without media marker.
4. Augmented Reality application is expected to be developed into Virtual Reality media to make it look more real and detailed

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