

## As Media Augmented Reality Promotion of College with Marker Logo in Brochure

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### Abstract:

Innovation Augmented Reality (AR) is widely used in various fields of media presentation of information such as the interactive learning media , marketing, supply and sale of an organization, service, or product. Colleges still use the brochure as a media campaign, but with the AR, the promotion of existing facilities can be presented in an interactive form. Information can be presented in the form of 3D animation, which can be accessed on Android smartphones and tablets, the goal is to attract students to the college offered. The facilities are presented in the form of virtual 3D is a map and the building, a library, classrooms, and laboratories. A Marker used to identify the camera is a college logo on brochures which combined with red and blue lines.

**Keywords:** Augmented Reality, Promotion of College, Marker Logo.

### 1. Introduction

Developments in digital visual media are usually used in promoting business activities and education. Visual Digital is a new technology in supporting the dissemination of information in modern societies are already familiar with computers and mobile as part of the communication and retrieval of the information . Promotion of a college still use media brochure distribution manually. People are more interested in the information that is presented visually digital. By using AR techniques in presenting interesting information, so as to provide support the community to goal towards something that is offered.

Augmented Reality (AR) is widely used in several aspects such as interactive media for learning, games, Geographic Information System, offers and promotions marketing organization, service, or product. AR is a variation of the Virtual Reality is a situation where the user sinks into the virtual environment. At the time of the user experience at such situations, users can not see the real world around him. AR itself is a technology that makes users can still see the real world, while cyberspace is opted into the real environment. Accordingly, AR only be an additional reality and however not replace it.

The use of AR through interaction between a camera with a marker . Each AR app definitely has assets in which there are a database marker. The Marker is a

marker that can be a 2D image or a real object. When the application is used, then the marker will be captured through the camera sensor to appear a reaction motion of virtual objects on the device used.

In this study by using AR technology to promote the College of Informatics and Computer Management (STMIK) Palangka Raya, as one of the private universities in Central Kalimantan. The process of introduction of facilities logo STMIK Palangka Raya done through brochures as a marker, using the Android smartphone's camera to the marker identification. So users can see the shape of the campus environment STMIK Palangka Raya and some details of the room such as classrooms, library and laboratory space in the form of 3D animation.

The few studies that apply AR technology to promote products. tourist attractions, learning, education, arts and culture, as is done by:

Research by Fequeiredo, et.al regarding the teaching and learning use Augmented Reality tools. Technology of Augmented Reality, this makes it possible for a teacher to develop educational activities that can take advantage of the augmented reality technologies for improving learning activities. The use of information technology made many changes in the way of teaching and learning. In this paper, present several educational activities created using free augmented reality tools that do not require programming knowledge to be used by

any teacher. The marker to show how that can create learning activities to visualize augmented information like animations and 3D objects that help students understand the educational content [1]. Research by Young-geum Kim and Won-jung Kim, regarding Implementation of Augmented Reality System for Smartphone Advertisements. This work used the markerless augmented reality system on smartphones to design and implement the smartphone application service aimed at efficiently conveying information on advertisements to users. The conventional advertising applications simply introduce and explain goods by inducing consumers to have an interest [2].

Research by Gutierrez, et.al., their article explains how augmented reality (AR) can be used to better educate tourists and visitors about the sites they choose to visit. Using the Temple of Debod in Madrid and its structures as an example, focus on applying AR to the engravings on the walls of the temple. Through AR, these engravings take to describe a new life in shape a virtual reality. This gives visitors a more interesting and interactive experience that better educates them about the temple itself and about the different historical periods in which the 'graffiti' were engraved. Augmented reality, combined with audio commentary in different languages, will help visitors to locate the different graffiti more easily and appreciate the true wonder of the site and the motives behind the engravings [3].

Research by Zarzuela, et. al. about application Serious Game based Augmented Reality for children and handicapped people. A platform based on a zoo on shape augmented reality. With this application, the users can increase their knowledge about a specific topic, in this case, animals. We have designed several 3D elements according to the theme, including a main scene that leads to the different scenes contained in the game. The user can interact with those elements and scenes through the mobile phone [4].

This research study adopts a few things from the literature review of previous research. The difference that differentiates it from previous research is on the display of the AR content that uses a combination of images, text, audio, and 3D object, to improve the usability of the application. In the process of designing a systematic AR, in using the principles and concepts of the software engineering in tracking, will be using the smartphone's camera to display a 3D animated object. In presenting AR using a AR marker and interaction using virtual button.

## 2. Theoretical Foundations

Research raised of the AR technology in Android-based with 3D modeling to promote facilities owned in STMIK Palangka Raya. A Marker created use a logo on brochures, sensor toward logo through the camera lens smartphone. Display a virtual reality with options menu such as classrooms, libraries and laboratories, all of which will be presented in the form of 3D animation.

### 2.1 Platform

AR STMIK PLK made for Android-based system, which can operate at various types of smartphones and tablets. Smartphones are mobile devices that are ideal for applications AR. Such devices have been equipped with built-in camera is very possible to arrest objects, GPS, accelerometer and processor that can perform high computing. Smartphones and tablets into a device that can be used to develop AR applications. AR STMIK PLK designed using Vuforia SDK [5] in the development of AR system. Vuforia is an software library open source that is widely used to design the AR application, this software also supports Markerless techniques.

### 2.2 Augmented Reality (AR)

AR is a technology that is the view of the physical world collaborated between reality with 3D virtual image, so the real world merges with the virtual environment. Researchers from the US and Japan have started research in the field of AR since 1990 [6].

An AR system allows for combining or "supplementing" real world objects with virtual objects or superimposed information. As a result virtual objects seem to coexist in the same space with the real world. However, AR is not restricted only to the sense of sight; it can be applied to all senses such as hearing, and touch [7]. AR allows for combining virtual content with the real world seamlessly [8]. This differs from the notion of a Virtual Environment (VE) where the user is completely immersed inside a synthetic environment. In this sense, "AR supplements reality, rather than completely replacing it" [9].

The Reality-Virtuality clearly shows the relation between a real environment, AR and a virtual environment. With the help of Augmented Reality real environment around us will be able to interact in digital form (virtual). Information about objects and the environment around us can be added to the AR system which then displays the information in the layer real world in real-time as if the information is real [10].

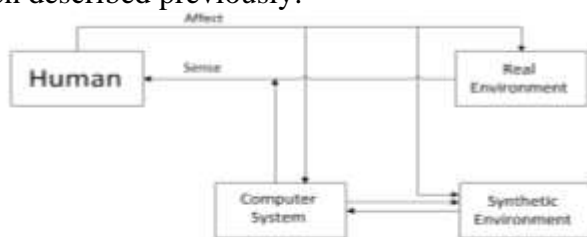
### A. Computer Vision and Augmented Reality

Computer Vision Techniques used to look for a card (marker) and using pattern recognition techniques to recognize patterns that exist, and identify the meaning of each marker.

In the manufacture of Augmented Reality systems, some things needed are as follows:

- 1) The 3D modeling of the object to be combined with the real world.
- 2) The correspondence between the real world with 3D models through calibration.
- 3) Tracking is used determines the user's perspective to the real world.
- 4) Real-Time Display combined with the original image and also computer graphics created be based on the model.
- 5) Time and accuracy in response to movement between images and graphics greatly influence the effectiveness of the system.

Figure 1 describes briefly about 5 points that have been described previously:



**Figure 1.** Operation Environment Working On AR [11]

### B. Virtual Reality (VR) and Augmented Reality(AR)

VR and AR is a branch of computer science that almost sama.VR is technology on a broad spectrum. There are several definitions of the VR of the first computer generated a 3D output with high graphics. The second definition VR is a interactive 3D , allowing users to interact with computers in real time. The third definition of VR is a virtual world, consumer such as can enter the virtual world. VR and AR only have difference at the way the system immersiveness. VR has a virtual environment that is deeper than AR, because the VR controls subconscious human senses. Instead AR can combine the real world with the virtual object [10].

VR with another statement does not use the camera, the resulting display is the animation or the results of the recordings. While AR result shown is a combination of real world and also the results of the animation or computer.

### 2.3 Markerless Augmented Reality

Markerless is AR which is used to track objects that exist in the real world. To perform object tracking, AR Markerless system, relying on natural-tracking feature. AR Markerless tracking with existing objects earlier, then used as a target image or images be detected to displayed as the virtual object [12].

Virtual Button is a rectangular area that has been defined by the developer prior to the target image when touched or obstructed in the view of the camera, can be happen an event. Application Virtual button on the learning media is very as possible. To create a virtual button on Vuforia, developers need to initialize the key to determine the coordinates of two points (X1, Y1) and (X2, Y2), which will form a rectangle area button.

### 2.4 Promotion with teknologi Augmented Reality

A tool to convey the message carried by the companies, institutions, organizations and intermediaries that aims to provide information is often referred sale. Information may include a description of the product, price and place, that is inform, entice, recalls to consumers, intermediaries, or a combination of both. A promotional mix supports some elements supporting the course of a promotion [13].

The application of AR technology, a sale will be more attractive and provide something different compared to other promotional media. Implementation for promotion with collaboration a technology can be a special attraction for enthusiasts graduate a high school student in the region of Central Kalimantan Palangka Raya about information on STMIK Palangka Raya.

## 3. Supporting Component

### 3.1 The Software Supporting for Augmented Reality

Some support tools that assist in presenting AR:

- 1)The Software graphic design  
Graphic design software is a vector-based drawing software used to design the logo STMIK Palangka Raya with 3D design patterns.
- 2)The 3D modeling software  
The software used to create an image or design with a 3D pattern, in that it helps in making the marker. A marker will be printed with a printer that will be identified by the camera.

## 3)The software maker to Video

The software used to create a video game that can generate animated images moving in real time, or for a game editor.

## 4)The Software support to Android Augmented Reality

Software support for development Android Augmented Reality-based program that can be operated on the Android platform. This software provides support in the form of data processing 2D and 3D images, video, and sensor-processor computer vision with the real world. Android apps can use Vuforia Augmented Reality SDK and Unity. Vuforia is Augmented Reality software developed by Qualcomm, which uses a consistent source of the computer vision which is focused on image recognition. Vuforia has many features and capabilities support for iOS, Android, and Unity 3D (Unity Game Engine), a platform which can be used in almost all types of smartphones and tablets. Vuforia has the ability to support for computer vision, the introduction of multiple images, tracking and detection, and image database management solution that is flexible [11].

Android is an operating system for mobile phones based on Linux. Android provides an open platform for developers to create their own applications for use by a variety of mobile devices.

### 3.2 The Device Supporting for Augmented Reality

## 1)Webcam

Webcam (short for web camera) is the designation for the real-time camera whose pictures can be accessed or viewed via the world wide web (www), instant program messaging, or video call application. This webcam is used to censor a marker, so that the marker can be identified to run the application program.

## 2)Marker

Marker is an image that is designed, which will be used as the image to be recognized by a webcam, so that helps in displaying subsequent application on mobile android to display information from applications that are built.

## 3)Virtual Android

Computers equipped with a virtual support Android software to run Android applications when creating the application.

## 4)Android-Based Mobile

Android-based mobile devices that are used to run applications through a browser in it, include software to operate video.

## 4. Methodology

The media promotion is a tool that serves to convey a message or information activities, products, or services may be an offer, solicitation, or notice to the public. To add to the appeal of the community about the promotion by adding the AR technology as part of the development of marketing technology, using a marker on the brochure STMIK Palangka Raya.

Presentation of the work in the form of a 3D AR technology will feature amenities and services on sale AR application STMIK Palangka Raya. The map and building STMIK, laboratories, classrooms, and libraries in 3D and animation.

### 4.1 Processing System AR STMIK Palangka Raya

Flow of processing The application of STMIK Palangka Raya AR can be shown in Figure 2.

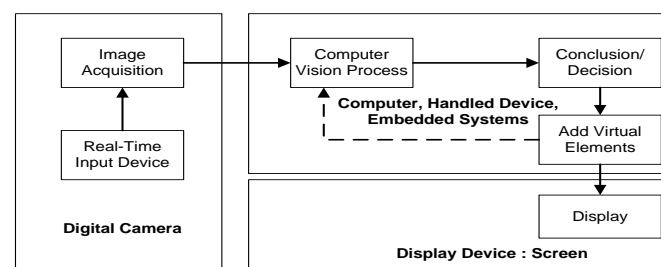


Figure 2. Flow Application of AR STMIK PLK

Explanation of the diagram Figure 2 is as follows:

- 1) Real-time Input Device, insert or retrieve images on the brochure STMIK Palangka Raya, the section logo. By using the digital camera section in the Android mobile or on the computer.
- 2) Image Acquisition, is a step to the acquisition of the original image in the form of digital images, making it easier for the recognition process.
- 3) Computer Vision Process, is a step to make the process of managing the image from the Image, The next analysis will be done on a computer.
- 4) Add Virtual Elements, a few additional elements designed and built in the form of visual applications are processed to provide

information on the mobile, the menu selection facilities of the location map and building , laboratory , classrooms, and libraries in 3D in STMIK Palangka Raya.

- i. Display, is displaying the results of the information in the form image of moving animations 3D on a smartphone.

#### 4.2 Stages Design Application AR STMIK PLK

Stages of design AR STMIK Palangka Raya are as follows:

##### A. Design Marker

Marker used as targets in AR Camera to bring the model. In vuforia, you must create a marker developer.vuforia.com online through the site. Files to be used as a marker uploaded on situsdeveloper.vuforia.com, the files used by the author is a .png image file extension. The image quality to be used as a marker, are required to have a minimum 4 star rating of the maximum value of 5. It will be automatically determined by the Vuforia when we do upload image to be used as a marker on the site.

Once a file has been uploaded successfully, then the marker is part of the Unity Marker used is the design of the logo image STMIK Palangka Raya supplemented with red line and the blue circle that surrounds the main logo. These designs can be imprinted on the brochure STMIK Palangka Raya. Design created marker shown in Figure 3.



Figure 3. A Marker Design.

##### B. Design of Material Collection

This stage of design to collecting material is the stage of collecting the main ingredient of supporting data in programs such as building design STMIK Palangka Raya, classrooms, laboratorium, and libraries. background audio, video, and documentation from Palangka Raya STMIK profile.

##### C. Interface Design and Assembly

Interface design is a stage in making the AR System Interface at STMIK Palangka Raya, by adding some components of applications such as:

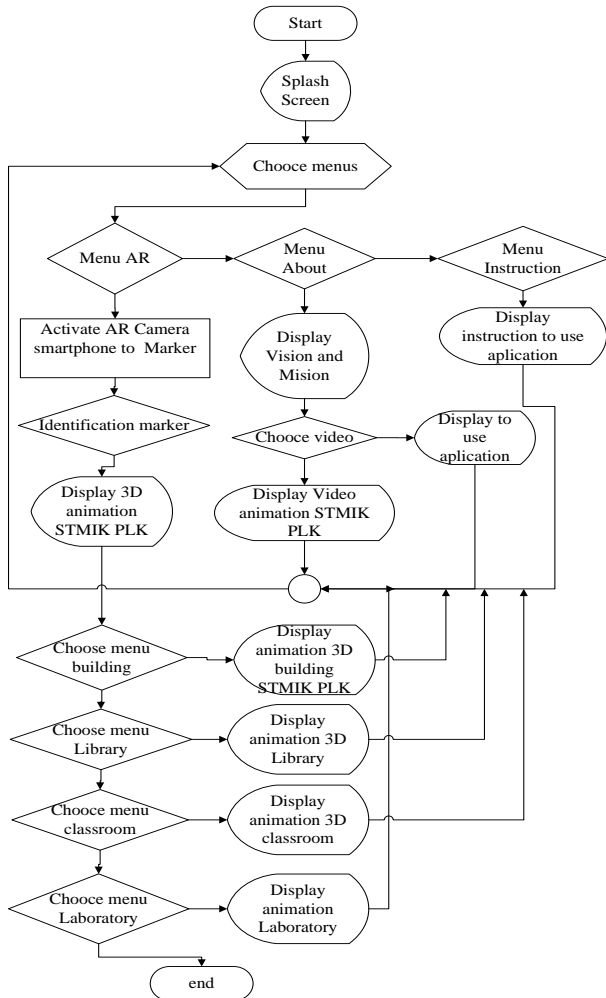
1. Virtual button, which serves as a navigation tool when performing image tracking.
2. Figure 3D animation, which serves as a display of Palangka Raya STMIK buildings, classrooms, libraries and laboratories.
3. Text, writing about the introduction STMIK relating Palangka Raya, as for the type of font to be adjusted at the stage of assembly.
4. Video, animation video about STMIK shown in the form of youtube.
5. Assembly stages are stages for programming using the programming language, so the interaction is built tailored to the needs of the activities required in the interface design, so that it displays the desired results.

##### D. Implementation of the program to the smartphone with Android operating system

Application AR STMIK PLK will be implemented on smarthphone with the Android operating system, by first the file installed in smarphone.

#### 4.3 Flow Processing Application AR STMIK PLK

The Flow Processing Applications STMIK Palangka Raya AR is shown in Figure 4. At the time the application is run will display the interface "splash screen" which is then followed by the emergence of the next scene. Scene below displays the main menu interface with three buttons that show AR STMIK selection PLK, profile STMIK Palangka Raya, application usage instructions. On the menu displayed AR STMIK PLK will bring the user using AR techniques to activate the camera on a smartphone, for detecting marker STMIK PLK logo that has been provided. The result of identification is the interface of choice for displaying floor plans and buildings, libraries, laboratories, and classrooms that have been packaged in the form of 3D animation. In the action menu of the profile is displayed STMIK Palangka Raya, with other activities provided for displaying video on STMIK Palangka Raya.



**Figure 4.** Flow of processing Application AR STMIK PLK

**5. Results and discussions**

Applications can be installed and used properly on Android version 4.1 more and the screen brightness below at 250 ppi. Display application at smartphone with form icon STMIK Palangka Raya, application AR STMIK PLK run on the Android smartphone. So if the icon is activated will display the initial interface of the application AR STMIK PLK, as shown in Figure 5.



(a) Display application (b) Interface first of application

**Figure 5.** Application AR STMIK PLK

The next interface display screen is a interface start menu AR STMIK PLK, as shown in Figure 6. On interface of main menu there are menu options such as start AR, see about STMIK Palangka Raya and about the application, as well as see the instructions for use AR application STMIK PLK and the option to exit of applications



**Figure 6.** Display interface of menu major

If enabled, "MENU AR" will appear interface operate AR, camera Augmented Reality will be active as shown in Figure 7. There are several options on the interface button next if like to see 3D objects buildings, libraries, classrooms, and laboratories.



**Figure 7.** Display of AR Camera Lost Marker

When activated the "GEDUNG" will be displayed in 3D animation a map and the building STMIK Palangka Raya as shown in Figure 8 (a). When activated the button "PERPUS" it will display a 3D animation of the library STMIK Palangka Raya as shown in Figure 8 (b).

When activated the "KELAS" will display a 3D animation of the classroom STMIK Palangka Raya as in Figure 9 (c). When activated the "LABORATORIUM" will be displayed on the 3D animated computer lab STMIK Palangka Raya as in Figure 9(d).



(a) Display the building Object

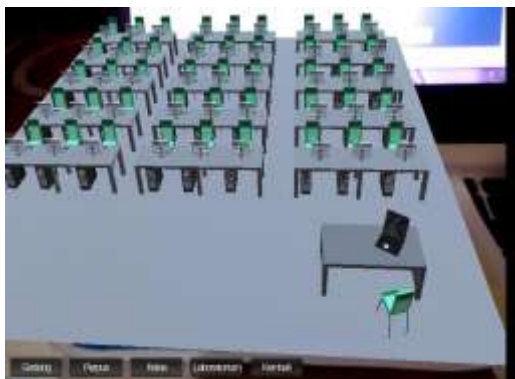


(b) Display the Library object

Figure 8. Display AR of building and library object



(a) Display the Laboratory Object



(b) Display the classroom object

Figure 9. Display AR of laboratory and classroom object

The "TENTANG" in the start menu interface in Figure 6, will display the scene of the Vision and Mission STMIK Palangka Raya, and there is a button to see a 3D animation video STMIK Palangka Raya, as shown in Figure 10.



Figure 10. Display interface about Vision and Mission STMIK

Button "PETUNJUK" on the start menu interface in Figure 6, will be shown how to use the application AR scene STMIK PLK, as in Figure 11.



Figure 11. Display user scene

## 6. Concluding remark

After passing through several stages of the process pengonsepan, design, collection of material, and manufacturing of AR STMIK PLK then the conclusions that can be drawn are as follows:

- 1) Augmented Reality can visualize the promotion of 3D modeling using a marker logo on College which combined with red and blue lines.
- 2) A marker Logo of College can be printed on the brochure, that marker can be used sensor at the camera with Android smartphones to run applications AR STMIK PLK, if the program is already installed on the smartphone.
- 3) Objects that can be displayed on Augmented Reality is STMIK Palangka Raya buildings,

classrooms, laboratories, and libraries are built in the form of 3D animation.

- 4) The application is successfully installed and used properly on android version 4.1 more and sharpness the screen below 250ppi

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