

PROTOTYPE OF BOOK PREVIEW USING AUGMENTED REALITY ON ANDROID SMARTPHONES

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ABSTRACT

Book is a source of knowledge, which is needed by everyone. Along with the development of technology, there is so many development of book, until the advent of digital books. Nevertheless, the book in physical form can not be abandoned because it has the advantage can be read with a more flexible and their greater satisfaction when read. The books were recently released and published sold and marketed through bookstores, either online or physical bookstores.

New books available in bookstores are usually wrapped in a transparent plastic cover so it can not be opened by the customer. It aims to maintain the cleanness, tidiness and order are not damaged before purchase. Customers will certainly find out whether the book is good or not, according to customer requirements or not, because sometimes just by reading the synopsis on the back of the book has not been sufficient to meet the customer's curiosity.

Augmented reality (AR) is a technology that combines visual objects or virtual world into the real world view in real time. AR technology has been developed in various fields, this is caused by the excellence of AR technology which allows user to interact using natural gestures. Augmented reality has also been developed in web and mobile applications.

By using the technology of augmented realty, customers can find a preview of some of the pages of a new book that wants to be displayed by the author. Customers can also find some of the advantages that exist in the book. So it can increase the customer interest to buy the book.

Keywords: *book, bookstores, augmented reality, marketing*

1. INTRODUCTION

Book is a source of knowledge, which is needed by everyone. Along with the development of technology, there is so many development of book, until the advent of digital books. Nevertheless, the book in physical form can not be abandoned because it has the advantage can be read with a more flexible and their greater satisfaction when read. The books were recently released and published sold and marketed through bookstores, either online or physical bookstores.

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2. THEORETICAL BACKGROUND

2.1 Book Selling

Book is a source of information which is the main reference source for each subject matter. Various information from every aspect of the problem published in a book. Many places can be visited to see and read the book, including libraries, parks read or even a bookstore.

The development of increasingly powerful technologies also affect the development of the current book. Starting from the emergence of digital books, commonly known as e-book, and also developments in terms of book sales through online media.



Figure 1. Bookstores

(Source: <http://wisata.kompasiana.com/jalan-jalan/2012/11/18/bandung-super-mall-bsm-dan-paris-van-java-tempat-belanja-di-kota-bandung-509902.html>)

The advent of digital books, not reducing ask readers to keep reading and have books in physical form or in hard copy form. Visitors bookstore is still a lot, just to read or buy books of interest.

The books are sold in bookstores, sometimes wrapped with transparent plastic cover with a view to maintaining the cleanness, neatness and also not damaged before purchase.

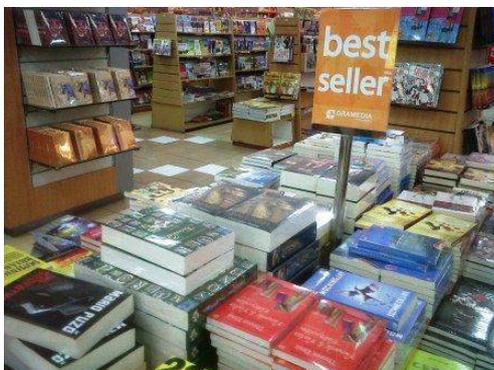


Figure 2. Books are wrapped in plastic

(Source: <http://bandung.panduanwisata.id/mall-paris-van-java-wahana-wisata-belanja-kebanggaan-masyarakat-kota-kembang/>)

The problem that often arises is, when the book you want to buy still wrapped, customers could only see the contents of the book synopsis in the back so it can not freely view the contents of the book.

2.2 Augmented Reality

ICT Consultant firm Gartner create a cycle (Hype cycles) to see the development of technology, to judge from the perspective

of the industry and trends emerging teknologi. This cycle shows to how and when a technology reaches its culmination in the sense of a very acceptable in the industrialized world. In this cycle, augmented reality has just passed the peak, but is still at stage *Peak of inflated expectations*. This can be seen in October 2011, Google reported finding nearly 90,000 searches for augmented reality blog (Sanni, 2012).



Figure 3. Gartner Hype Cycle for Emerging Technologies 2011 (Sanni, 2012)

In 1997, Ronald Azuma published a comprehensive survey of augmented reality, then along with the rapid development of AR, a new survey published in 2001. Three characteristics of AR by Ronald Azuma (Azuma, 1997), namely:

1. The incorporation of real and virtual worlds
2. The existence of interactive features and real time
3. Can be displayed in 3D

Basically, the working principles of AR are as followings (<http://www.sys.im.hiroshima-cu.ac.jp/people/kato/>):

1. The Camera captures video of the real world and sends it to the computer.
2. Software on the computer searches through each video frame for any square shapes.
3. If a square is found, the software uses some mathematics to calculate the position of the camera relative to the black square.
4. Once the position of the camera is known a computer graphics model is drawn from that same position.

5. This model is drawn on top of the video of the real world and so appears stuck on the square marker.
6. The final output is shown back in the handheld display, so when the user looks through the display they see graphics overlaid on the real world

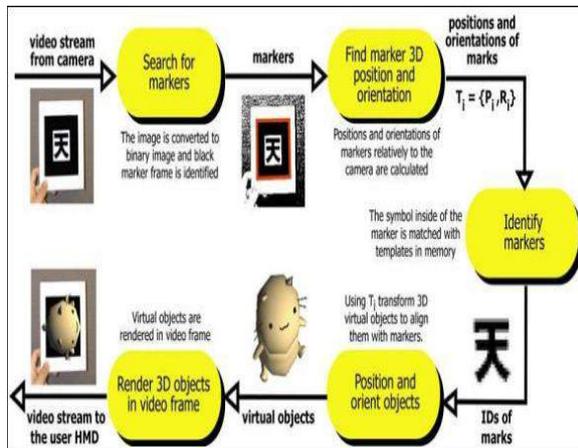


Figure 4. Working Principle AR^[2]

The position of the object to be displayed depending on the location and orientation. Location of the object can be shown in translational coordinates are (x, y, z) and orientation in the form of the rotation angles (α , β , γ) in the 3-dimensional coordinates. Thus the position of the object has a 6 point which is called the six degrees of freedom (6 DOF).

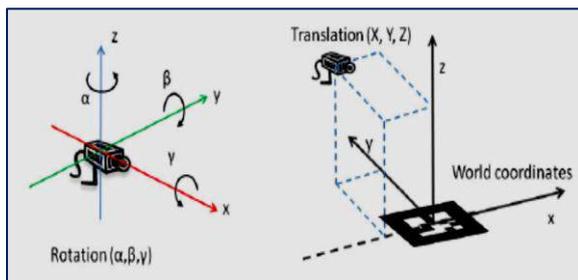


Figure 5. Position the camera to the orientation and rotation of the real world^[5]

AR technology has been widely used in various applications, such as instructional media, media promotions, games and other applications. Among them, the number of digital textbooks using AR technology, games and promotional media such as brochures sale of goods and services.

2.3 Vuforia

Vuforia is a software platform created by Qualcomm that promote computer vision features. There are some objects that can be track by vuforia, there are^[3]:

1. Images
2. User-Defined Images
3. Cylinders
4. Text
5. Boxes
6. Frame Markers

This is one of example the tracking process of target image by Qualcomm vuforia:

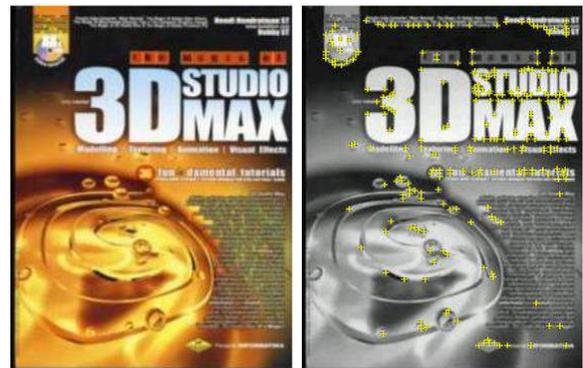


Figure 6. Tracking process of target image in vuforia

2.4 Unity

Game engine is a software designed to make a game. A game engine is usually constructed by encapsulating several standard functions that are commonly used in the manufacture of a game^[4]. Most game engines usually a library or set of functions that use combined with programming languages.

In some cases, the game engine is sometimes also called middleware. This is because the game engine is used as an intermediary between programming languages with the format of the data from a variety of software-producing assets.

A game engine is also usually equipped with a graphical functions or basic computing that is rarely known by the developer. Game engine wrap it all to make the manufacturing process becomes faster and easier. Some game engines of this type, including Brender, PlayCanvas and Panda3D^[4].

Unity Technology built in 2004 by David Helgason, Nicholas Francis and Joachim

Ante in Denmark. Integration main objective is to create a software that can be used by all people, especially to make a game.

Unity3D is a game engine that allows us as individuals or teams to create a 3D game easily and quickly. By default, unity has been set for making the game is a first-person point-of-view, but unity can also be used for games is the Third Person of point-of-view like the genre Role Playing Game (RPG) and Real Time Strategy (RTS). Unity also is a multiplatform game engine that allows the game is made to be published in a variety of platforms such as Windows, Mac, Android, iOS, PS3 and Wii^[4].

3. RESEARCH METHOD

This research was carried out during the period between September 2014 and January 2015 at the laboratory of informatics Engineering, University of Al Azhar Indonesia. The initial step of this study was to conduct a survey and interviews on some customers bookstore. Furthermore, the design process and the design of the application and subsequently implemented on smartphones for some books.

Book preview was made to see some of the pages contained in a new book that is still wrapped. Users use this application using android smartphone. Customers activate the application. To be able to see a preview of the book pages, customers should direct the smartphone camera on the cover of the book, through a smartphone screen will be displayed one page of the book. To view the next page, the customer can choose the buttons 1, 2 and 3 on the screen of smartphone.

To see the interest, as well as the effectiveness and evaluation of applications which have been made we perform testing for some respondents.

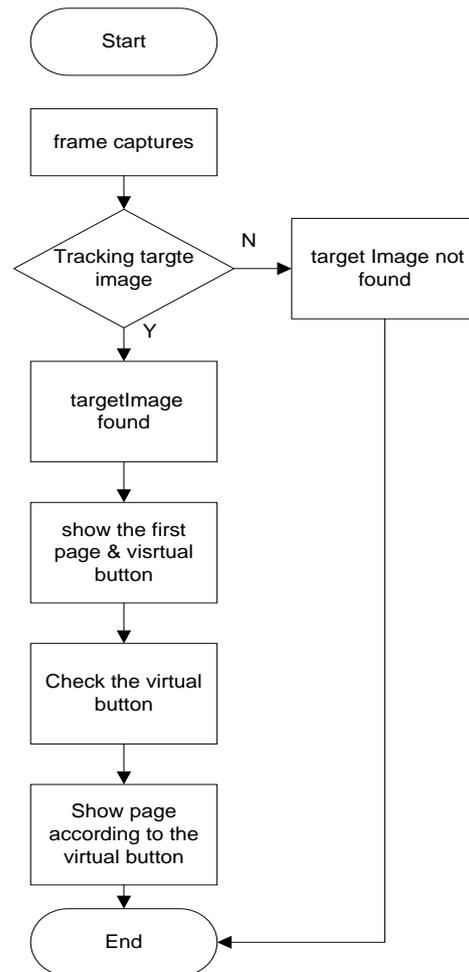


Figure 7. Flowchart of the application

4. RESULT AND DISCUSSION

At the beginning of the application, will display a splash screen with the display as follows:

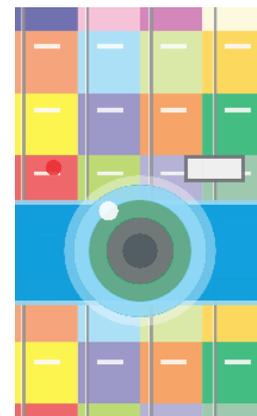


Figure 8. Application splash screen

Then the customer asked to direct the smartphone camera on the cover of the book that you want to see a preview. After pointing the camera at the cover of the book,

then on the smartphone screen will display the home page of the book. To see the pages that follow, the customer can choose the buttons 1,2 and 3 which have been provided on the screen smartphone.

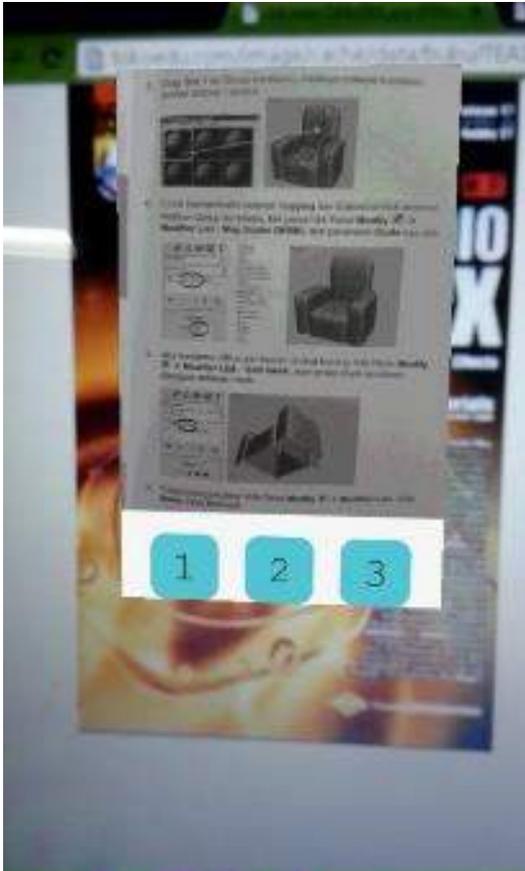


Figure 9. Screen Shoot of book preview

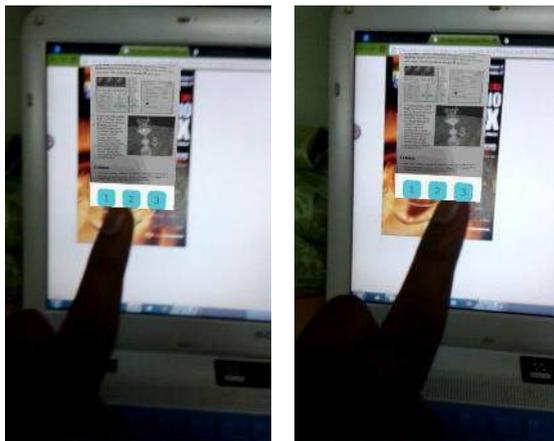


Figure 10. Screen Shoot Virtual buttons.

To see the interest, as well as the effectiveness and evaluation of applications which have been made we perform testing for some respondents.

Tests conducted on 10 respondents UAI a student who is meant to be able to know usability interaction on the device used to image the target of a book cover.

Tests conducted several stages:

1. Respondents rate the impression of Augmented Reality to preview book.
2. Respondents tested the application on your android device.

The results of the tests performed can be shown that the majority of respondents have interest in AR and can directly interact with the objects used as Target Scanning. Some respondents may feel the information they need can be directly known in real time.

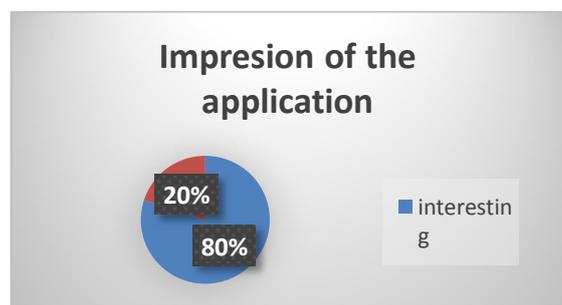
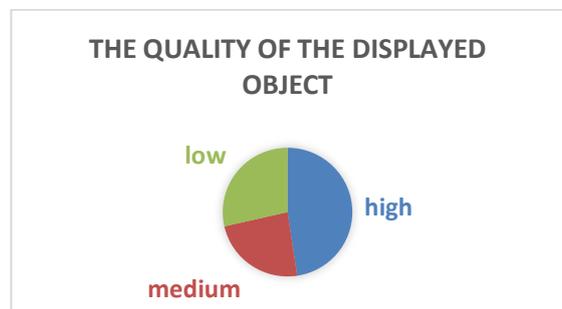
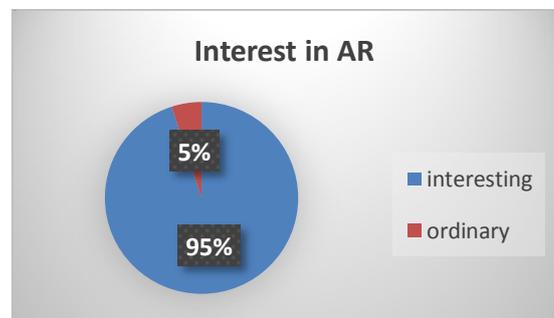


Figure 11. Testing Results

5. CONCLUSION

The results show that most respondents feel interested in using a preview of this book and the application can interact in real

time which will display a preview of the contents of the book.

Based on the research design phase, implementation, and testing has been done, we can conclude the following:

1. The use of Augmented Reality applications on android devices more attractive.
2. The use of Augmented Reality applications will eliminate the culture of customers who will buy the book without opening the seal.

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