Augmented Reality on Interactive Digital Media Promotion

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Abstract—Augmented Reality (AR) is currently taking place as a technology for data visualization, simulation and education as well. AR is currently widely used as a promotion media of goods/services. This is the underlying research, which is to create an AR-based promotion media for the information delivery of University of Al Azhar Indonesia, particularly the Department of Informatics Engineering (IF). This study begins by specifying the virtual information to be presented to the society, inform academic and nonacademic activities and also outstanding achievement of IF UAI. The virtual information displayed in a multimedia through text, images, 3D objects and video. As the trigger and coordinate to display virtual information in the real world, the need for a marker which is designed such that it becomes a book of IF profiles. Implementation is done by integrating IF profile books with virtual information via an AR-based mobile application “IARBook Apps” that display virtual information right on top of every page in the IF profile books. User testing conducted to the general public through educational exhibits. The results of questionnaires completed by respondents indicates a positive responses and curiosity of respondent to IARBook apps especially when viewing 3D objects that appear in the IF profile books. The uses of AR as a data visualization technology improve the quantity and quality of the delivery of information of IF UAI because it provides a new experience for the society to view and obtain information.

Keywords—Mobile Application, Augmented Reality, 3D objects, Promotion Media.

I. INTRODUCTION

Promotion is the effort to promote product of the company. Promotion media to be one determinant of product information can be delivered to the market. Selection of the appropriate promotion media can enhance the delivery of information and how much information is received and understood by the target promotion. As a private university in the capital city of Indonesia, UAI requires a media to attract and invite readers to choose UAI as a place to continue their education, particularly in the IF UAI.

Currently, UAI is still not widely recognized by society, especially by people outside the city. This is due to many things, one of them was the information conveyed via the promotion media, has not been accepted and understood by the target promotion. UAI as a private college that is fairly young also did promotions by followed education fairs or visited to many schools in Jakarta. In this activity, the information delivered through printed media in the form of flyers, brochures and others.

Selection of the appropriate promotion media can give a positive impression to the audience and attract the recipient of information to use or buy products/services offered through the media. IF UAI as one of department that keep up with technology, sought to applied sciences and technology in a promotion media.

AR is currently widely used as a promotion media of goods/services. AR is an emerging technology that makes it possible to combine printed and digital media into an interactive media to convey information to the society. With this technology, is expected to provide a new experience to visitors or the general public in information acceptance. These apps made in mobile platform or commonly called mobile augmented reality. Mobile augmented reality is AR that you can take with you wherever you go[1]. Today, almost everyone walks around with highly qualified computers that able to render a graphic content to a large degree of realism and the use of Augmented Reality will become an unprecedented immersive experience[2]. This statement in line with the prediction of Qualcomm that in 2012, 25% of mobile apps will feature augmented reality[3].

On previous studies, the book preview based on AR technology seen that respondents are very interested in AR because the user can see a preview of the book to be purchased and interact directly through smartphones[4].

Therefore, an AR-based promotion media made that can display virtual information to the society. Information presented includes the IF UAI profile in the form of multimedia, i.e. text, images, 3D objects and video. This application combines printed media and digital media, thus giving a new experience to users in receiving information and increase user interest in knowing further study program of IF UAI and recommend IF UAI as a place to continue their education. This study has been completed with the university introduction in AR apps. This apps help user to find the class room and laboratories in Sciences and Technology Faculty[5].

II. THEORITICAL BACKGROUND

A. Marketing and Promotion

Marketing is an integrated communications preparation process which aims to provide information about the goods or services in connection with satisfying human needs and
desires. Environmental factors of marketing consist of macro and micro environmental[6]. One part of the macro environmental is technology. The development of technology influences the marketing strategy and marketing achievement, particularly in terms of promotion. Promotion is one part of the marketing commonly known as the 4Ps, namely, Product, Price, Place (Distribution) and Promotion. Figure 1 show the environmental factors.

![Fig. 1 The role of promotion in the marketing][6]

**B. Augmented Reality**

Augmented Reality discovery initiated by Ronald Azuma in 1997. The three main characteristics of Augmented Reality by Ronald Azuma are, combining the real world and the virtual world, the interactive features in real time and can display 3D objects[7]. Along with technology development, AR also has developed so rapidly. The number of application developers interested in creating applications based of AR as interactive media in various fields of life.

![Fig. 2 System Flows of Augmented Reality][8]

Augmented Reality works by taking a marker coordinates (target) in the real world with a camera. After getting the marker position, 3D objects will be placed in the same position with the marker that has been detected. 3D object is displayed above the marker, which can be seen through the screen, so it seems in the real world [8]. Figure 2 shows the flows of Augmented Reality.

The position of the objects that would be displayed depends on the location and orientation. Location of the object can be shown in translation coordinates are (x, y, z) and orientation angle of rotation in the form of (α, β, γ) in the 3-dimensional coordinates. Thus the position of the object has a 6 point commonly known as six degrees of freedom (6 DOF), it can be seen in Figure 3

![Fig. 3 Position the camera to the real world][8]

**C. Game Engine**

Game engine is software designed to make a game. Game engines are the nuts and bolts that sit behind the scenes of every video game[10]. Unity is one of the game engines developed by David Helgason, Nicholas Francis and Joachim Ante. By using unity developers can make the game applications fast, because of the many features that are provided. Applications created can be published in various platforms such as Windows, Mac, Android, iOS, PS3 and Wii[11]. Unity can be used for developing an Augmented Reality application by including the Vuforia SDK.

Vuforia is Augmented Reality SDK developed by Qualcomm. Detection and pattern recognition (the image target) are done by using computer vision. Image targets that can be used include, single targets, multi targets, cylinder, and 3D object target.

Vuforia works with several components, namely cameras, image converter, tracker and background video renderer. These component work ranging from frame capture, the process of tracking the target and converts the camera and detects the pattern of the image target to the computer vision.

**III. METHOD**

Development of the system will go through stages as follows:

1. **Literature**
   The study of literature is used to obtain initial information about the data required in the promotional activities of Informatics. The information referred to in the form of the data of academic as well as the activities of academic and non-academic Information of IF UAI.

2. **3D Object design and Marker**
   Do the design and manufacture of 3D objects to be displayed in the application Informatics on Augmented Reality’s Book (IARBook), as well as the marker design/ pattern as a medium for displaying 3D objects, so that the user (visitor) to feel real 3D environment.

3. **Design and application development IARBook**
   Build the application, and implementation with markers and 3D objects.

4. **Survey Responses Promotion Section UAI and visitor promotion activities of IF UAI**
   Some members of the IF promotion division and UAI Promotion division will be chosen to be asked questions regarding IARBook made based on the value of efficiency and experience in using IARBook.
The data used was taken from the IF promotion section and UAI promotion section. Testing is done by testing the application on IF UAI promotional activities and by asking for responses from the internal UAI through questionnaires distributed to the respondents.

A. IARBook Design

IARBook is designed consists of 10 pages plus a cover page book. Each page on the left, was given the title of the pages are the Islamic Education Foundation (YPI) Al Azhar, Welcome to UAI, Welcome to IF UAI, Lecturer of IF UAI, Specialization, Lab IF UAI, HMIF UAI, Testimonials Alumni IF UAI and Contact us. On the yard side, display images into a target image that will become the target image to be recognized by an application on a smartphone (android). IARBook Use Case diagram is shown in Figure 4.

![Fig. 4 Use case diagrams of IARBook](image)

User of IARBook gets information about the IF UAI through several media, namely text, images and 3D objects. Users can see the text that contains the vision and mission of IF UAI, drawings and photographs of academic and nonacademic activities IF UAI and, 3D buildings UAI and the Great Mosque of Al Azhar.

The design of this profile book is made simple to make it easier for users to learn and use it. The use of virtual data such as 3D and video with augmented reality is expected to provide an exciting new experience to the user. both of these become important basis of design because these two things are part of specific guidelines i.e. learnability and user satisfaction[12]. Stages IARBook use ranging from open an application, activate the camera, controlling the target image to display the virtual data can be seen in Figure 5.

![Fig. 5 Activity diagram IARbook](image)

IV. RESULT AND DISCUSSION

IARBook made using unity and vuforia. Unity is used to create augmented reality applications using ARCamera and the target image (QCAR). Image target used in unity vuforia stored in the database. IARBook application was made based on Android using the C# language. Figure 6 some examples IARBook pages.
By using the android device that has been installed with this application, user can view information about IF UAI in the display device by pointing at the IARBook. Figure 7 show the icon of installed IARBook apps.

Information submitted in the form of text, image (2D), and 3D objects (buildings UAI and Al Azhar Mosque). Screen shoot for 3D of Al-Azhar Mosque and UAI building can be seen in Figure 8 below.

For the following pages, screenshots of the application displayed images and video, as seen in Figure 9. Images on the screen show the pictures of activities in Laboratories of Informatics. The video is testimony from the graduates telling about their college experiences in Informatics Department of University of Al Azhar Indonesia. Through pictures and videos displayed, expected visitors get complete information about the activities of lectures in IF UAI.

IARBook has been tested in the Education and Training Expo at JCC on February 5 to 8, 2015. Many users who use this application look very interesting to use and ask about the workings of this IARBook.
In addition, testing was also done in the internal circles, namely the lecturer, UAI promotion agency, PR and IF UAI students as shown in Figure 10. Testing is done by giving questionnaires to the respondents. Respondents consisted of lecturers of Information Technology and Sciences and Technology Faculty, promotion division, Public Relations division and students of informatics engineering, which consists. Figure 11 show the testing of IARbook to Public Relation Division.

Questionnaires were administered divided into four parts valuation, namely interest in AR, IARBook design, IARBook content and assessment of the overall IARBook. The result of the questioners can be seen in Figure 12.

Fig. 10 Testing IARBook on exhibition at JCC

Fig. 11 Testing to UAI Public Relations Division

Fig. 12 Results of the questionnaires

Processing the results of a questionnaire carried out by using a Likert scale to see an average of respondents to the application. Processing is done for each question on the questionnaire. Results of the questionnaire processing can be seen in Table 1. Based on the results of the questionnaire processing seen most of the respondents gave a positive response to the IARBook application. Most of the statement of the average value of the respondents ranged from 80-100%, meaning that respondents gave the highest value and strongly agree with any questions. Based on the result of questionnaire, the IARBooks help to promote the IF UAI to other especially for student who looking for a college and AR give a new experience in getting information about university, this result is in line with the previous study about Introducing College with an AR apps[5].

Table 1. Results of Treatment Questionnaire

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<th>No</th>
<th>Statements</th>
<th>Result</th>
<th>Category</th>
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<tbody>
<tr>
<td>1</td>
<td>Are you familiar with the previous AR</td>
<td>94%</td>
<td>already</td>
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<tr>
<td>2</td>
<td>The impression of seeing a 3D object on the book</td>
<td>89%</td>
<td>very interesting</td>
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<tr>
<td>3</td>
<td>The visual quality of 3D objects displayed</td>
<td>76%</td>
<td>good</td>
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<tr>
<td>IARBook design are interesting</td>
<td>85%</td>
<td>strongly agree</td>
<td></td>
</tr>
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</table>
V. CONCLUSIONS

Augmented Reality is the visualization technology that is appropriate for the moment. Information needs in the form of text, image 2-dimensional and 3-dimensional objects can be visualized in a single application with a very good and interesting. IARBook be one that strongly supports the promotion of media in disseminating information about the study program of Informatics UAI.

IARBook can combine print media such as books and electronic media in the form of the applications installed on the device based on Android. Based on the testing that was done seen many interest visitor promotion activities undertaken IF UAI. This strongly supports the delivery of information about UAI IF Prodi to the general public, especially students.

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REFERENCES