



Implementation of Augmented Reality Technology on Business Cards Using Blender and OpenSpace 3D

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Abstract

Business cards are the identity of a business person and also a link between clients and your business. Currently Augmented Reality (AR) is developing rapidly in various fields. One application of AR is in the field of creative industry. This Augmented Reality application for business cards is one of the innovations that can make conventional business cards into a more interactive business card. This business card is made using Blender and OpenSpace 3D. Based on the test results, this AR application is successfully run and can display several features, such as location links, blog addresses, and company websites. Based on the questionnaire testing, 85% stated that business people strongly support and agree that this application is appropriate to be implemented as an interactive business card.

Keywords : Augmented Reality, Blender, Business Card, OpenSpace 3D

Introduction

Business cards are still widely used for business people. Business cards usually only contain information in the form of text, must be read first to find out the profile of yourself and the company. Because it is with this business card that represents business people introducing themselves and the company to prospective clients. One innovation that can be done using Augmented Reality (AR) technology. With the use of Augmented Reality, it is possible for business cards to become very attractive digital business cards that are more interactive, innovative and creative in displaying information (Affan, Suryanto and Arfriandi, 2018).

Augmented Reality or in Indonesian called augmented reality is a technology that combines real objects in the form of two dimensions and or three dimensions into a real three-dimensional environment and then projects these virtual objects in real time There are three principles of Augmented Reality. The first is Augmented Reality is a merger of the real and virtual worlds, the second runs interactively in real-time, and the third there is integration between objects in three dimensions, namely virtual objects integrated in the real world (Azuma, 1997, p.2).

The development of AR technology to optimize a product in the economic field has had many good impacts, therefore, the author is interested in making an interactive business card as an implementation of Augmented Reality in the creative industry using Blender and OpenSpace3D software. With Augmented Reality technology, business people can have interactive business cards and recognize this technology. The business card can display several features, such as location links, blog addresses, and company websites.

Methodology

Agile Method

The method used in this research uses the Agile method. The agile method is a conceptual framework with an iterative and incremental development approach [4]. This method divides the SDLC into several timebox iterations. Therefore, the contribution of each team member is very important [7]. Agile is also said to be a system development approach that emphasizes speed of delivery and allows changes at any time [10]. The speed can be understood because of the partial development and work groups in completing modules arranged on a priority scale. The stages of system development with agile methods can be illustrated in Figure 1 as follows:



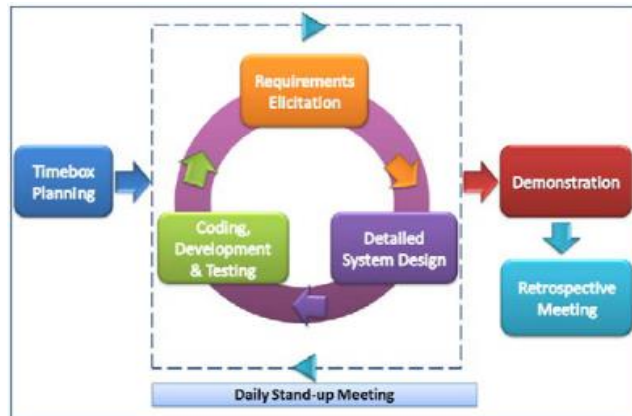


Fig 1. Extreme Programming

Extreme Programming (XP) is a lightweight software development method and one of the agile methods pioneered by Ken Beck, Ron Jeffries and Ward Cunningham. Extreme Programming (XP) is the most widely used and well-known approach. The goal of XP is to create small to medium-sized teams, rather than large teams. It is intended to deal with unclear requirements or changes in requirements that are very fast [16].

Extreme Programming (XP) as a dynamic method is shown in the four values it has and all four are the most necessary basics in XP. Kent Beck states that individual short-term goals often clash with long-term social goals. Therefore, values are created that become laws and rewards. The four values are: 1. Communication. 2. Simplicity. 3. Feedback. 4. Courage. As a methodology for developing software XP certainly has a life cycle. The XP life cycle has five phases, namely: 1. Exploration Phase. 2. Planning Phase. 3. Iteration to Realize Phase. 4. Productionizing Phase. 5. Maintenance Phase. 6. Death Phase.

At the planning stage begins with activities (a) identifying existing problems, in this study the problem that arises is that conventional business cards are limited in displaying the desired information (b) user stories, to describe the features, functions and length of work required in making software. (c) determine the purpose of the application, which is to be able to develop business card applications as AR-based information media. (d) identify hardware and software requirements for making applications, which consist of, Windows 10 Operating System, Blender, OpenSpace 3D, Laptop, Mouse and Webcam.

Then in this study make (a) create a program structure as a basis for making AR, (b) storyboard as an overview of the application. Then at the design stage what is done is designing the GUI (Graphics User Interface) design. Then at the coding stage the results of the design will be implemented into Blender for making buttons and avatars, and OpenSpace 3D for making Augmented Reality. At the testing stage, testing is carried out (a) blackbox testing, (b) respondent testing to determine user interest in this application.

Program Structure

The following is a research flow that is used as the basis for making Augmented Reality on Business Cards.

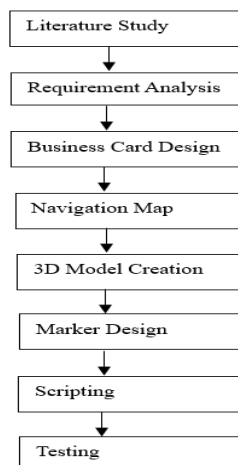


Fig 2. Program Structure

Description:

Literature study is to study the theoretical basis of the literature on Augmented Reality, OpenSpace 3D, and Blender.

Needs analysis is to examine the needs that will be used in making Augmented Reality on Business Cards.

Designing a Business Card is a prototype for making a Business Card.

Navigation map is the structure of features on Augmented Reality on Business Cards.

Modeling is the creation of 3D objects and exporting to OpenSpace3D with the Blender application.

Marker design is the selection of markers in the OpenSpace 3D application.

Scripting is the stage of unification between 3D models and markers. At this stage the interaction is given to the 3D object.

Testing is testing the Augmented Reality book that has been made.

Story Board

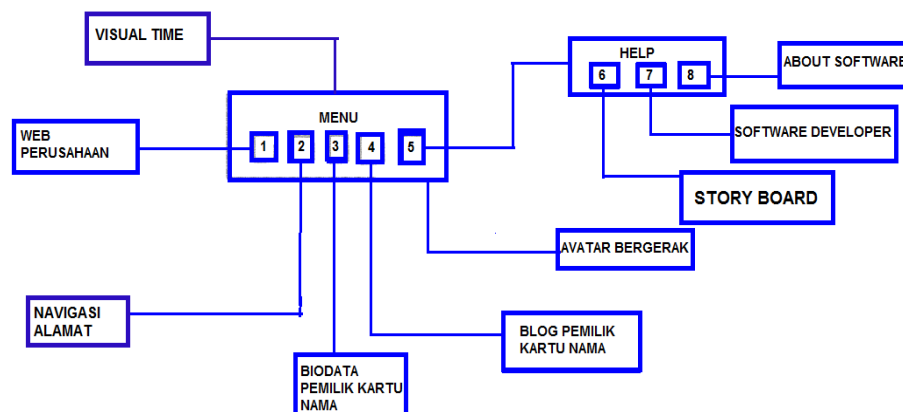


Fig 3. Story Board

Story Board Description:

Main Menu Page:

First. Company Web button to go to the company web where the business card owner works that will appear on the computer's web browser.

Second. Company Address button to go to the address navigation that will appear on the web browser of this application.

Third. Biodata button to go to the biodata of the business card owner which will appear in the web browser of this application.

Fourth. Blog button to go to the business card owner's blog that will appear on the computer's web browser.

Fifth. Help button to go to the help information for application users when displaying this business card which will appear in the web browser of this application.

Help page:

First. Story Board button to find out the Story Board for application users when displaying business cards that will appear on the web browser of this application.

Second. Software Developer button to go to the web or blog of the creator of this application which will appear on the computer's web browser.

Third. About Software button to go to the name and version information of this application.

Additional Features

Visual Time is a feature that will appear when this application is run, when morning, afternoon or evening. In this application, the sun will appear during the day, while at night the moon and stars will appear. Left click on the mouse and then slide it to look up, this feature will be useful when glasses for AR are widely used by

users because when looking at this business card we can see the surroundings with a night or morning atmosphere according to real time.

Moving Avatar is an avatar created to entertain users who will move when the button on this business card is pressed. At certain events that have been prepared in this application, the avatar can take any form according to the wishes of the business card owner.

Interface Design

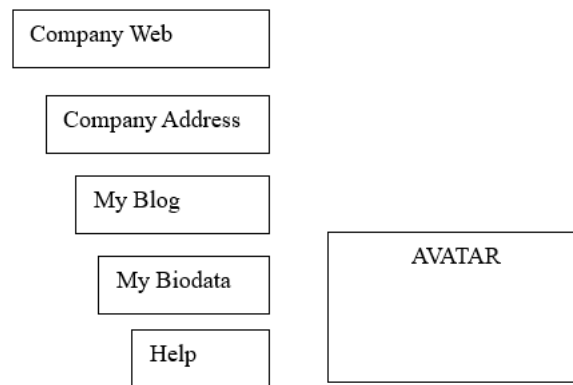


Fig 4. Main Menu Interface Design

In Figure 4 describes the main menu page which has one avatar and five navigation buttons to display the following information features:

First. Company Web button to go to the company web where the business card owner works which will appear on the computer's web browser.

Second. Company Address button to go to the address navigation that will appear on the web browser of this application.

Third. Biodata button to go to the biodata of the business card owner which will appear in the web browser of this application.

Fourth. Blog button to go to the business card owner's blog that will appear on the computer's web browser.

Fifth. Help button to go to the help information for application users when displaying business cards that will appear in the web browser of this application.

Business Card Design

The business card design stage is a very important stage, because this stage will determine whether the business card can convey information well. The following is a book layout design:

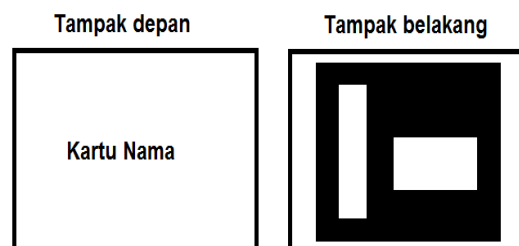


Fig 5. Business Card Design

Result

Avatar and Button Creation

At the stage of making avatars and buttons, the author uses the Blender 2.61 programming language.

For avatar creation, the steps are as follows:

First. The author inserts the cube into the workspace by clicking the add info menu after that select mesh, in the mesh there are many objects select cube. After the author selects the cube then we press tab to make edits to the cube.

Second. To make the avatar head first, in the mesh tools there is a look cut and slide to give an intersection line to the cube object. The author uses regional extrude in mesh tools to create the legs.

Third. To create the avatar's hand, in the mesh tools there is a look cut and slide to give an intersection line to the object. Then we create an initial mold that can be extruded to create a hand.

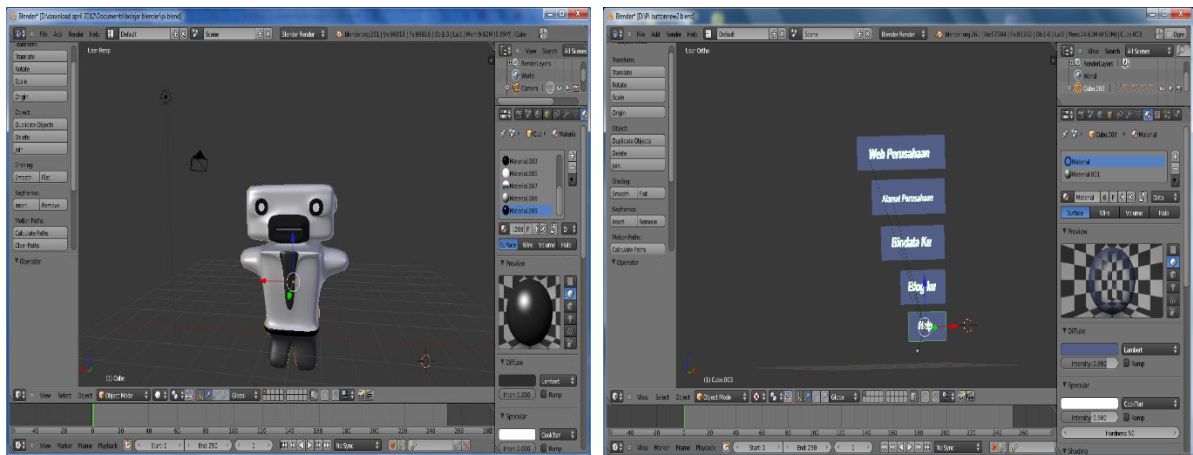
Fourth. After forming the avatar, we make the avatar subdivide. Then give it a color so that the avatar looks interesting.

For button creation, the steps are as follows:

First. The author enters the cube into the workspace by clicking the add info menu after that select Mesh>Cube. Then press tab to edit mode, select face select mode in the 3D menu. Then change the cube object into a rectangle. After that, press tab again so that it returns to object mode and give color in the properties>material menu to beautify the button we created.

Second. The author needs four buttons for the company web, user blog, and company address that will be connected to the address navigation. We click the object for the button we have created, then press shift+d on the keyboard. We give text to the button by clicking the info add menu then select text. So that the object can be exported, the author transforms the text into a mesh by pressing Alt+c on the keyboard.

Then the object is exported. In the process of exporting avatar and button objects, the author uses Blender 2.49b. After exporting, the avatar object and button object can be imported into OpenSpace3D.



(a) Fdvdfvdfv

(b)

Fig 6. Avatar Creation Process (a) and Button Creation Process (b)

Marker Creation

As explained in the previous section, markers are markers that make objects appear on the brochure display on the screen. In OpenSpace3D Software, there are many markers that are ready to use. In addition to using available markers, OpenSpace3D software can also use markerless, which is a marker that is made by yourself using imaging applications such as: Ms.Paint, Adobe Photoshop, CorelDraw and others. The marker image used in making AR business cards is:

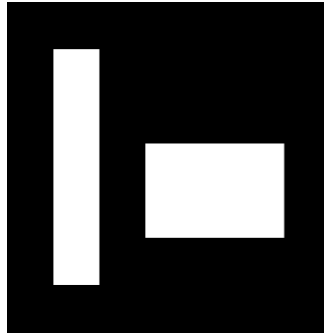


Fig 7. Marker image on business card

Settings in OpenSpace3D

In making Augmented Reality the author uses the OpenSpace3D application. The steps are as follows:

First. In the OpenSpace3D application view, click the scene editor at the bottom. This is a work area for designing interfaces and interactions that will be given to 3D object models.


Second. Insert the button and avatar objects that we have exported from Blender to OpenSpace3D by clicking import .scene to import the button and avatar objects.

Third. Then the object that has been set in size and position must be modeled using a dummy so that the object can be called when making interactions with the object that you want to display. By clicking Add dummy in the Scene, then insert the object into the dummy in the Scene tree.

Fourth. Next, enter Ar Capture and Ar Marker. In the scene editor, right-click the Ar Marker input as shown in Figure 7 and Ar Capture as shown in Figure 3.44 which is used to calibrate the camera and determine the marker. The purpose of camera calibration and marker determination is to calculate the level of distortion of a camera lens used so that the resulting image is close to the ideal image and the center of the object model will appear right in the middle of the marker.

Fifth. The next step is to create an interaction with the object to be displayed. Providing interaction is done by creating an instance or function Ar Marker.



Sixth. To run it, click the play icon  in the menubar. Then highlight the business card to the available Ar Marker webcam.

Application Testing

In order for the Augmented Reality application for Business Cards to run well, of course, testing needs to be done. If testing has been done, then this application can be implemented.

Based on the results of functional testing of the AR application there are no errors during the testing process. The application can display avatar, visual time, and button features that will connect to information from business card owners such as company web, company address, biodata, blog, and help. Based on questionnaire testing, 85% stated that business people strongly support and agree that this application is appropriate to be implemented as an interactive business card.



Fig 8. Main Menu Display

Conclusion

Augmented Reality Application for Business Card has been successfully created using Blender and OpenSpace 3D. This application can display information virtually and can be used as an interactive business card. This is reasonable because it has interesting features due to the combination of ordinary business cards with Augmented Reality technology. From the questionnaire results, it can be concluded that 85% of business people strongly support and agree that it is appropriate to be implemented as an interactive business card and recognize this technology. .

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