

Augmented Reality Implementation in Watch Catalog as e-Marketing Based on Mobile Application

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Abstract. Augmented Reality is one of important methods to provide user with a better interactive user interface. In this research, Augmented Reality in Mobile Application will be applied to provide user with useful information related with Watch Catalogue. This research will be focused on design and implementation an application using Augmented Reality. The process model used in this research is Extreme Programming. Extreme Programming have a several steps which are planning, design, coding, and testing. The result of this research is Augmented Reality application based on Android. This research will be conclude that implementation of Augmented Reality based on Android in Watch Catalogue will help customer to collect the useful information related to the specific object of watch.

1. Introduction

1.1. Augmented Reality

Augmented Reality is a technique to provide more information than already exist in the real environment by overlaying virtual objects generated by computer. The virtual object created by computer may be comes in two or three dimensional object. Augmented reality works by analyze the real objects which capture by camera as an input and then create additional virtual objects combined with the real objects and shown as an output.

Augmented reality is able to track down the real objects by camera movement and able to manipulate the output by adding additional virtual objects combined. To be able to track down the object, augmented reality will depends on object recognition by edge detection [1].

Augmented reality manipulate user perspective of the physical world by adding additional 3D information that produced by computer. This technique is used in Boeing (Airplane System) to generate the wiring system design by showing wiring path on engineer helmet [2].

1.2. Extreme Programming

Extreme Programming is developing technique that focusing on object-oriented projects where the programmers are located in the same location without any effect of how many programmers hired [3].

Extreme Programming is an agile development technique which the practices based on Pair Programming technique, collective code ownership, and frequent meetings are inherently collaborated. This technique required the programmer needs to be in the same location with the people who fully understand about the business process of the system. In order to have a better improvement using this technique, teamwork becomes one of the important keys [4].



The basic activities of Extreme Programming technique are planning and managing, designing, coding and testing.

1.3. E-Marketing

E-Marketing is an implementation of the application doing the commercial activity which facilitates information of products or services offered to customer [6].

E-Marketing is more efficient than traditional marketing which provides the opportunity as advertisement which can be access anywhere and anytime, increases overall potential of advertisement, increases the income of the companies, and decreasing pollution and energy consumption [7].

2. Literature Review

2.1. Vuforia

Vuforia is Software Development Kit (SDK) which provided augmented reality in mobile application. Vuforia used computer vision method to detect object in the real world (input). To detect the objects, Vuforia implements edge detection algorithm. Vuforia able to detect object not only in 2D but also in 3D objects. Vuforia also able to detect markerless object. Markerless object is an object without matrices marker.

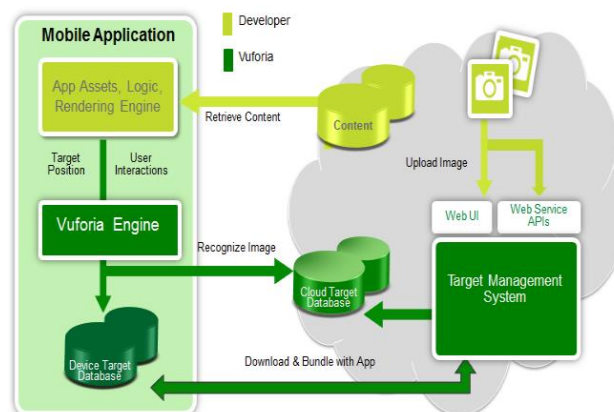


Figure 1. Process of Augmented Reality in Mobile Application using Vuforia

In figure 1 shown the process how Vuforia works in mobile application from detecting object until shown the augmented scene (output which already manipulated by computer which adding virtual objects and combined with the real objects) on mobile side.

Target in Vuforia is an object in real world which capture by camera as an input. Vuforia divided the target into several types:

- i. Image targets, such as: Photo, Board Game, Paper Magazine, Cover Book, Product Packaging, Poster, and Greeting Cards. This type of target shows a simple image of Augmented Object.
- ii. Frame markers, is 2D image with specific pattern which is able to be used as the pieces of game in board game.
- iii. Multi-target, such product packaging in square shape. This type of target shows a simple image of 3D Augmented Object.
- iv. Virtual-buttons, is an object which shown as a button.

3. Methodology

As the development method, in this research, Extreme Programming detail process will be described by figure 2 below.

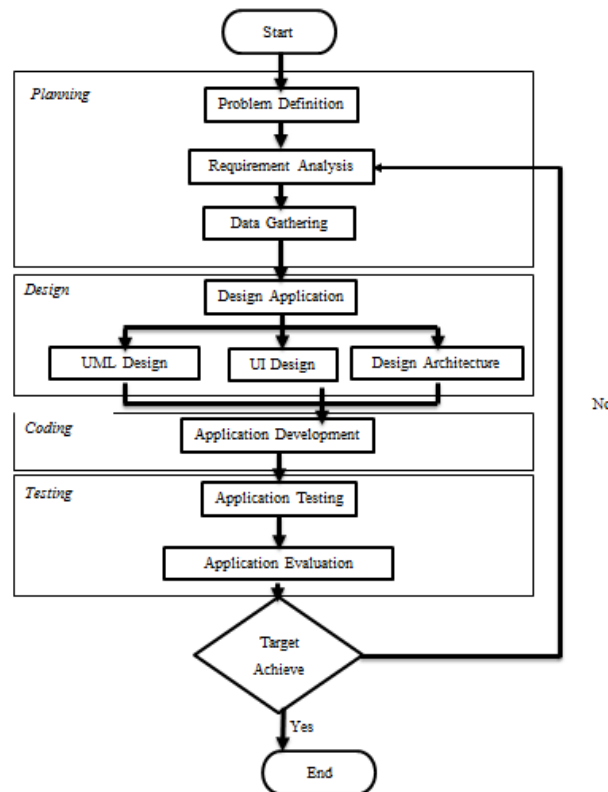


Figure 2. Development Stage

The development process divided into four main steps which are Planning, Design, Coding, and Testing. In planning phase, the problem needs to be defined in detail. In design phase, the structure of the system needs to be design first which describe in “UML Design” followed by UI Design to create the design of the application and Design Architecture as the framework used in code. In coding phase, the system will be developed. In testing phase, the application will be tested using Measurable Human Factors and Eight Golden Rules to evaluate the application whether the application is already align with the purpose of this research.

4. Result

Below are the specifications of the mobile devices suggested:

- i. Processor : Dual-Core 1.2 GHz
- ii. RAM : 1 GB
- iii. Available Memory : 100 MB
- iv. Camera : Available (No Specific Resolution Required)

Below are the displays of the User Interface of the main feature of the application which shown the augmented reality implementation.

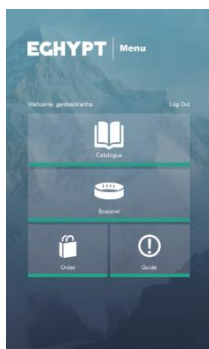


Figure 3. Main Menu Screen



Figure 4. Catalogue's Menu Screen



Figure 5. Bracelet's Menu Screen

Figure 3 shown a screen which will be shown after login process is done. In this screen, there are 4 others menu which are Catalogue, Bracelet, Order, and Guide. Figure 4 shown a screen which will be shown if the Catalogue's Menu on Main Menu Screen is clicked. On this screen, product information along with the product's image will be shown. Figure 5 shown a screen which will be shown if the Bracelet's Menu on Main Menu Screen is clicked. On this screen, the augmented reality process is happen. When the camera is targeting the hand of the user then the application will run the augmented reality to detect the real object, in this case the object is human hand, and then manipulate the display by adding virtual objects which is the watch that already chosen in Catalogue's Screen combined with the hand of the user.

So, the augmented image which shown to the user seems like the user hands wearing the watch chosen on Catalogue's Screen.

Below are the evaluation result based on Eight Golden Rules:

i. Consistency

Figure 5 shows the consistency of EGHYPT.

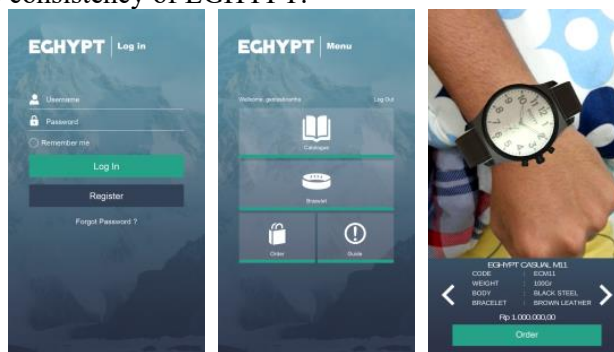


Figure 5. Consistency in EGHYPT

ii. Cater for Universal Usability

Figure 6 shows a "Guide Page" to help user to understand about EGHYPT.

iii. Offer Informative Feedback

EGHYPT already provided with an informative feedback. Figure 7 shows a sample of informative feedback in EGHYPT.

iv. Design Dialogs to Yield Closure

Figure 8 shows a sample of Closure in EGHYPT's Registration Page when user already done the registration process there will be a "Closure Message".



Figure 6. Cater for Universal Usability in EGHYPT

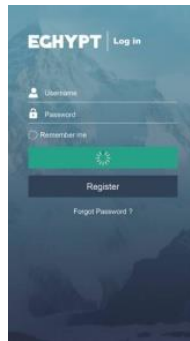


Figure 7. Informative Feedback in EGHYPT

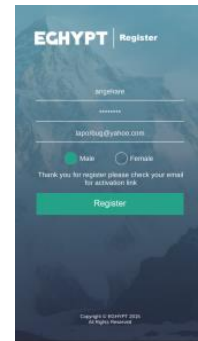


Figure 8. Closure Message in EGHYPT.

- v. Offer Error Prevention and Simple Error Handling
Figure 9 shows a sample of Error Prevention in EGHYPT's login page when users try to log in using invalid data.
- vi. Permit Easy Reversal of Actions
Figure 10 shows a sample of Easy Reversal in EGHYPT's home page when users click back button, application will shows a confirmation dialog.
- vii. Support Internal Locus of Control
Figure 11 show that EGHYPT already provided users with full control of navigation in home page.



Figure 9. Error Prevention in EGHYPT

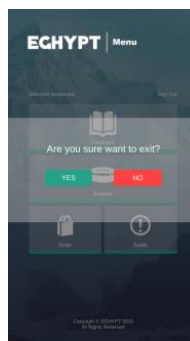


Figure 10. Easy Reversal Action in EGHYPT



Figure 11. Internal Locus of Control in EGHYPT

- viii. Reduce Short Term Memory Load
Figure 12 show that EGHYPT already provided users with interactive design which able to reduce short term memory load of users. Such as the use of specific image for a button.

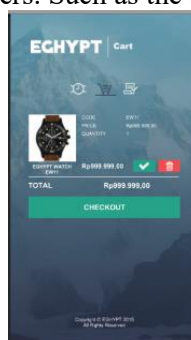


Figure 12. Interactive Design in EGHYPT

Below are the Measurable Human Factors:

- i. Speed to Learn
According to the users' survey found that 53.33% of respondents agree that EGHYPT is easy to use and 43.33% of respondents agree that EGHYPT is very easy to use.
- ii. Recall at Later Time
According to the users' survey found that 66.67% of respondents agree that EGHYPT is provided with specific icon that easy to remember.
- iii. Performance Speed
According to the users' survey found that 53.33% of respondents agree that EGHYPT is responsive and 30% of respondents agree that EGHYPT is very responsive.
- iv. Accuracy (Minimize Error)
According to the users' survey found that 56.67% of respondents agree that EGHYPT is provided users with clear error information and support and 30% of respondents agree that EGHYPT is provided users with very clear error information and support.
- v. Enjoyment
According to the users' survey found that 30% of respondents agree that EGHYPT is interest of using EGHYPT and 66.67% of respondents agree that EGHYPT is very interest of using EGHYPT.

5. Conclusion

In this research, Vuforia SDK is used to develop the augmented reality application. The result of this research is an e-marketing application uses augmented reality in mobile application to provide information of product to customer by targeting the object product using this application.

References

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