INTERACTIVE WAY TO SHOP ONLINE USING AUGMENTED REALITY TECHNOLOGY

MOHD TIRMIZI BIN MOHD KHANAPI

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(MOHD TIRMIZI BIN MOHD KHANAPI)	(PN. NORAZLIN MOHAMMED)
Alamat tetap: Lot 1922, Batu 19,	Pn. Norazlin Mohammed
Jalan Segamat, Kg Payamas Dalam,	
84900 Tangkak, Johor	
Tarikh: 22 August 2016	Tarikh: 22 August 2016

CATATAN: * Tesis dimaksudkan sebagai Laporan Akhir Projeck Sarjana Muda (PSM)

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MOHD TIRMIZI BIN MOHD KHANAPI

This report is submitted in partial fulfillment of the requirements for the Bachelor of Computer Science (Media Interactive)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2016

DECLARATION

I hereby declare that this project report entitled

INTERACTIVE WAY TO SHOP ONLINE USING AUGMENTED REALITY TECHNOLOGY

is written by me and is my own effort and that no part has been plagiarized without citations.

STUDENT : _____ Date : 25/8/2016
(MOHD TIRMIZI BIN MOHD KHANAPI)

I hereby declare that I have read this project report and found this project report is sufficient in term of the scope and quality for the award of Bachelor of Computer Science (Interactive Media) With Honours.

SUPERVISOR : _____ Date : 25/8/2016
(PN. NORAZLIN MOHAMMED)

DEDICATION

To my beloved parents and family, thank you for your unconditional support with my studies. I am honoured to have you as my parents and family. Thank you for giving me a chance to prove and improved myself through all my steps of life.

To my supervisor, Mrs. Norazlin Mohammed, thank you for guidance and encouragement during my project implementation.

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First and foremost, I would like to express my deepest obligation to my supervisor, Mrs. Norazlin Mohammed, who has supported and guidance me throughout the progress of Final Year Project with her knowledge and patient. Without her help, this report and product would not have been completed on time.

Thus, I would like to thanks my parents who have always supported and encouraged me when I encountered obstacle during the progress of Final Year Project. Without their support, I would not have the motivation to continue my project.

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ABSTRACT

An online shopping has revolutionized the business world. An interactive e-commerce system is presented in this project that customers could visually interact with the product into the physical environment. The developments of this online shopping web portal are provided. A new modelling method, which recovers 3D model, is also presented in this web application. Experiment results and data show the validity of these new technologies. This application consist three features. First is the normal portal for online shopping (e-commerce) where it display the product and you can make payment, register and etc. from there. The second features are the printed catalogue of the product where it can be display anywhere for example in a parking lot or bus stop. The third features are The AR technology. What it does is, it can visualize the product in term of suitability, size and etc. from the printed catalogue. Then if the user agrees to buy the product, it will be directly inserted into the cart from the online shop portal and ready to make payments. Payment can be made via online banking.

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LIST OF ABBREVIATIONS

3D	**-**	**Three-Dimensional**
AR	**-**	**Augmented Reality**
SDK	**-**	**Software Development Kit**
VR	**-**	**Virtual Reality**
QR	**-**	**Quick Response**

CHAPTER 1

INTRODUCTION

1.1 Project Background

Online shopping has revolutionized the business world by making everything anyone could want available by the simple click of a mouse button. This matter also includes in Malaysia. It has recorded remarkable growth over time. On this day buy-physical goods via the Internet has become a normal lifestyle by Internet users in Malaysia.

However there are few problems with online shopping in Malaysia. Customer difficult to see the items they wish to purchase. The product in online shopping cannot be visualized in terms of size and suitability. It makes the customer think twice about buying it sometime. So we decided to help online shopping become more interactive so the customer can interact with the products they want to buy

We are developing an Interactive Online Shopping using Augmented Reality technology (AR). It is a shopping portal that has interactive features that allow users to visualize the product before buy it. It also can be brought wherever they are. This system has two features. First is the normal portal for online shopping where it displays the product and you can make order from there. The second features are The AR technology. What it does is, it can visualize the product in term of suitability, the colour, and size from the web portal. Then if the user agrees to buy the product, it will be directly inserted into the cart from the online shop portal and ready to make payments. Payment can be made via online banking.

1.2 Problem Statements

Online shopping in Malaysia has recorded remarkable growth over time. It has become a normal lifestyle by Internet users in Malaysia. However there are a few problems that occur when buying goods online.

Firstly the product in online shopping cannot be visualized in terms of size and suitability. It makes the customer think twice about buying it sometime. Customer does not have prior exposure to the items they are buying.

Next problem is current online shopping system does not interactive with the customer. They can't visualize how there are look when wearing goods that they are wearing. Is it suitable for them or not. Lastly a visit to the shopping mall requires travel and must take place during business hours. It is hard for the working people where they don't have time to shop.

1.3 Objectives

i. To study the use of Augmented Reality technology on online shopping
ii. To develop an online shopping portal as a platform to interact with AR technology
iii. To know the effectiveness of using an interactive online with new AR technology

1.4 Project Scopes

This project is primarily designed for youth generation that age ranged from 17 to 25 years old. This is because the chances for them to shopping online are higher at this age.

Other than that, this project is focuses on developing the web portal for online shopping using PHP languages, MySQL databases for cart and CSS Bootstrap for mobile responsive purposes.

Next, in this project we going to apply an Augmented Reality technology using webcam for desktop platform and will be implemented in a web browser.

Furthermore, throughout this project, we will be focuses on the spectacle. The reason that the spectacle are chosen is because this project is developed is to make the online shopping become interactive by using The Augmented Reality technology and the spectacle are the most suitable product to test the technology. Hence only four types of spectacle are chosen to test for the interactivity of this project.

1.5 Project Significances

This Interactive Online Shopping is suitable for the user who likes to shop online but encounter some problems when viewing the product that there want to buy. It is designed to optimize the satisfaction of the users to choose the product that they want to buy.

With this Interactive Online Shopping portal, they can save their time and energy because they don't have to go to the shopping mall and queue to pay what they buy from it.

Other than that, by developing this Interactive Online Shopping, the owner of the shop will receive the benefit from this portal. This is because they have already replacing their marketing strategies into more interactive ways with implementing the Augmented Reality technology.

1.6 Expected Output

The expected output of this project is an Online Shopping Portal (E-Commerce) which can be access from any browser and also the Augmented Reality technology that will be embedded on the web portal.

First of all, the web portal is started with the features products available and some menu to browse the available products. Then when users click on the button shop or category button on the top menu, it will direct them to the category page where it will display the entire product available on the web. Next, when users click on one of the product, it will display the details page of the product. In this page, users can view the product in three different ways which are: the normal images of the product, 3D model of the product, and the AR interaction of the products. An addition, this web portal includes the promotion brochure that integrated with the mobile apps that can scan the brochure to view the product in 3D. They can purchase by clicking on the purchases button that will be include while they are scanning the products. This will be directly open the portal of the Online shopping to continue with the payments.

After the Interactive Online Shopping is finished to develop, the testing will be conducted among the youths and this portal can solve the problem faced by the users who like to shop online.

1.7 Conclusion

In a nutshell, this project aims to develop an interactive online shopping portal using PHP languages and MySQL databases that will be embed into the product catalogue to make it interactive using an Augmented Reality technology. This project is also will compare whether an interactive online with new AR technology can facilitate the customer more than traditional online shopping. This Interactive Online Shopping will facilitate the users to solve the problem faced when shopping online.

CHAPTER 2

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

In this chapter, a literature review and project methodology for developing this Interactive Online Shopping portal would be discussed. Literature review plays an important role in developing this project. It is about gathering, analyzing and conducting the reading about the related topics of the project that implemented. Most of the reading sources for the literature review are from the articles, reference books, journal, and also Internet. The literature review will be done by searching articles about previous technology used for shopping online, reference book about E-Commerce in library, and information about the Augmented Reality technology that is going to implement in my system through the internet.

The project methodology that used to develop this system is Waterfall Model. Project methodology needs to be followed to avoid project failure and to manage the project from beginning to end of the project. Every phases will be discuss in detail in order to help developer to structure, plan and control the process of developing the project systematically. Besides that, software and hardware requirements are listed and functionality of each of the software and hardware requirements is explained in detail.

2.2 Domain

Domain for this project includes the augmented Reality (AR), application of AR, Face Recognition, and the definition of E-Commerce.

2.2.1 Augmented Reality (AR)

The concept of AR is similar to Virtual Reality (VR). VR's concept is to create a fully artificial environment which generated in 3D by digital technologies that allow users to experience and interact over their sense of vision. On the other hand, AR is implements an interactive experience but aims to supplement the real world. It is an advanced technology that allows computer generated virtual imagery information which must be registered in 3D and glaze onto a live direct or indirect real-world environment in real time. In other words, AR is bridges the gap between the real and virtual world in a seamless way.

There have much research have widened the definition of AR and according to a survey of AR, 1997, it has defined that an AR system requires all of the three characteristics: combines real and virtual, interactive in real time and registered in 3D.

2.2.1.1 Types of AR

Desktop AR and Mobile AR are the two types of AR. Desktop AR works with a webcam. The screen will display the animated 3D object or data once the webcam has detected the presence of marker or marker-less for the object. In addition, the augmentation will display on screen once a marker is place within the view's area of a webcam and can identify by the webcam.

The common usage of a computer monitor in AR would be in the kiosk. A very popular example of Desktop AR is the Shisedio Makeup Mirror in Japan. The kiosk is placed at specific places in the store to allow customers walk to the kiosk and simply position their faces in front of the kiosk and their face shows up on the screen. Customer then can clicking on any Shiseido product and will have it applied to their digital face. Figure 2.1 shows the customer try using the simulator. The

customer can tried a combination of makeup to fit their needs. Furthermore, this type of system has applied in other areas such as in gaming system, libraries, public building, museums and others.

Figure 2.1 Customer tries the simulator

For mobile AR, users can use their smart phone's camera and screen to identify the markers they pointed or use the tracking technologies such as digital camera, accelerometers, GPS, compass or other optical sensors to track the objects or marker and the relevant AR content or data will display on Smartphone's screen.

The most popular example for mobile AR nowadays is IKEA AR Catalogue. It allowing customers to see what products will look like in their homes. The app works with the 2014 Ikea catalogue. The app currently features 90 products including sofas, chairs, desks, beds and bookcases. The app has been launch in the Apple App Store and Google Play since 2013.

2.2.1.2 Marker vs. Marker-less AR

In AR, there are two primary types of implementations where the AR systems can either be marker-based or marker-less. A marker-based application works by having software to recognize a particular pattern, such as the Quick Response (QR) code, two-dimensional (2D) black and white pattern or 2D picture marker, when a camera points at it, and overlaying a digital image at the point on the screen and it is shown in Figure 2.1 (a).

Although for the marker-less technology as shown in Figure 2.1 (b), it does not require the marker to know the position of the object or person. It has the capability of a particular device to record its position or object in the world and then offer data that's relevant to that location or object. Thus, it needs a tracking system that involves a compass, GPS and an image recognition device. It may also be referred to location-based AR or position-based AR and can be used to track an object in the real world as well. For example, finding way around city, scan the building to get the information and much more. Hence, marker-less application has wider applicability that marker-based application as it is functional at anywhere and anytime without the need for special tag or reference points.

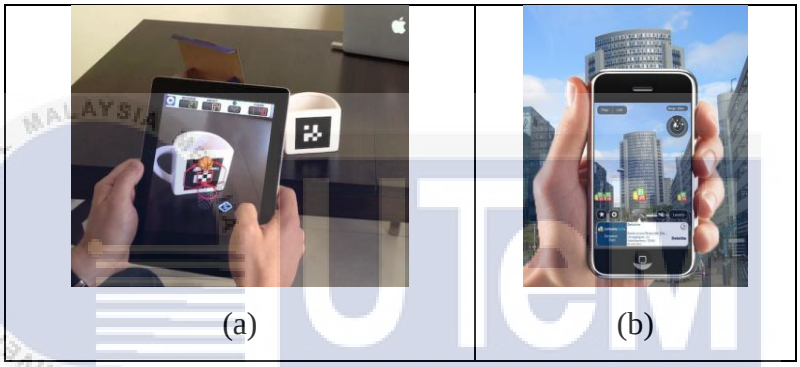

Figure 2.2 Marker-Based application and Markerless application

2.2.1.3 Application of AR

Todays, AR is widely used in every field and there are different kinds of application have been developed in those fields such as education, interior design, medical, health care, tourism, sightseeing, navigation, entertainment and other fields. For example, health care where the product information is appear as shown in Figure 2.3. This application allows the users to get product information in-store before purchase. It acting like a personal shopper, it uses augmented reality technology to provide shoppers with personalised information whilst browsing the shelves.

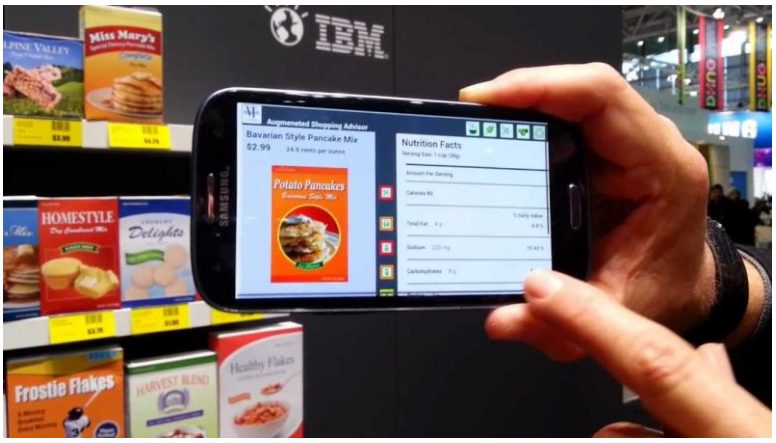

Figure 2.3 Product information appear on screen

AR in education is another example of AR application. Nowadays, many magazines, textbook or any subject reference book has attached marker inside it. Users just need to point their Smartphone's camera on the marker, the hidden content will appear on the screen. After that, users can enjoy to play around with the 3D object. This application aims to help users to more understand the information and to improve their memory for the specific subject. Figure 2.4 is one of the examples that applied AR in education.

Figure 2.4 A bugs is appeared when the marker is detected

2.2.2 Face Recognition

Face recognition has been a fast growing, challenging and interesting area in real time applications. A large number of face recognition algorithms have been developed in last decades.

2.2.3 E-Commerce

E-commerce (electronic commerce or EC) is the buying and selling of goods and services, or the transmitting of funds or data, over an electronic network, primarily the internet. E-commerce was introduced to the market in the last decade as many individuals and organizations purchase through the World Wide Web. These business transactions occur either as business-to-business, business-to-consumer, consumer-to-consumer or consumer-to-business.

2.2.3.1 E-Commerce in Malaysia

Back in 1990, Malaysia introduce the first internet service provider JARING and later TMNET in 1996. Since then, the growth of internet usage in Malaysia has been steadily growing from a simple number of 90 internet users in 1992, and increased drastically to a 50, 176 in 1996 (Kamla-Raj, 2006).

The expected growth in e-commerce is due to an accelerated rise in the number of PCs in Malaysia, as well as growth in the proportion of PCs hooked up to the Internet each year. This brings greater opportunities for Malaysians to conduct both business and shop online (Legard, 1998). Despite the statistics and success stories of many online merchants elsewhere, the disquiet of going online by local firms is real, especially for smaller companies. Local companies appear to be lagging and afraid to venture into online retailing. This is because Internet commerce is still relatively new and there are no hard and fast rules to live by, with no tried and tested business model to imitate (Louis and Leon, 1999).

2.2.3.2 E-commerce Applications

E-commerce is operate using a variety of applications, such as email, online catalogues and shopping carts, EDI, File Transfer Protocol, and web services. This includes business-to-business activities and outpace such as using email for unsolicited ads (usually viewed as spam) to consumers and other business prospects, as well as to send out e-newsletters to subscribers. More companies now try to persuade consumers directly online, using tools such as digital coupons, targeted