

THE APPLICATION OF AUGMENTED REALITY FOR HOUSE PROMOTION

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THE APPLICATION OF AUGMENTED REALITY FOR HOUSE PROMOTION

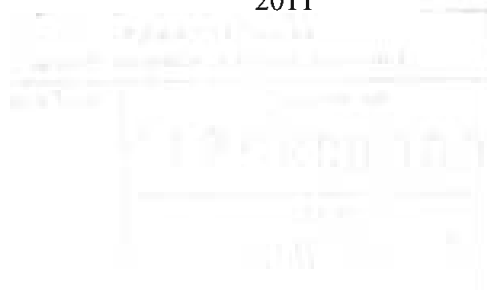
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DECLARATION

I hereby declare that this project report entitled
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is written by me and is my own effort and that no part has been plagiarized
without citations.

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DEDICATION

I sincerely dedicated this project to my beloved parents, friends and my supervisor, Encik Mohamad Lutfi Bin Dolhalit. Without their supports and patience, the completion of my project would not have been possible. Million thanks for the understanding and guidance given throughout the completion of my project.

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ABSTRACT

Augmented Reality (AR) is a current technology which can create a virtual object in the real world environment by using the web camera or recording device. The basic components used in AR are tracking marker, computer and web camera. It involves the processes of capturing, computing and rendering. The purpose of this project is to develop an AR application which can give overview and introduce a house to the customers. In order to create the application, the house and the plan floor of the house are modeled into 3D graphic models. The AR application is developed by using open source library. The project methodology used in this project is System Development Life Cycle (SDLC). Therefore, the product developed will be undergoes planning, design, development and implementation processes. This AR application can be utilized with the marker, web camera as the display device and a personal computer for application processing. In conclusion, this paper is intended to provide a general idea of open source AR development process and apply it in developing an AR application which is named as The Application of Augmented Reality for House Promotion.

ABSTRAK

Augmented Reality (AR) merupakan teknologi terkini yang digunakan untuk menghasilkan objek maya dalam persekitaran nyata dengan menggunakan web kamera atau alat perakam. Komponen yang diperlukan dalam menghasilkan teknologi tersebut adalah penanda, komputer dan web kamera. Proses yang terlibat termasuk proses pengambilan, pengkomputeran dan penghasilan. Projek ini bertujuan untuk membangunkan suatu aplikasi *AR* yang dapat memberikan gambaran awal dan memperkenalkan sesebuah rumah kepada pelanggan. Untuk menghasilkan aplikasi tersebut, rumah dan pelan lantai rumah tersebut perlu ditransformasikan kepada model tiga dimensi. Aplikasi *AR* tersebut akan dibangunkan dengan menggunakan *open source library*. Projek metodologi yang digunakan dalam projek ini adalah *System Development Life Cycle (SDLC)*. Oleh itu, produk yang dibangunkan akan melalui proses yang terdapat dalam *SDLC*. Aplikasi yang dibangunkan dapat berfungsi dengan hanya menggunakan penanda, web kamera dan juga komputer. Kesimpulannya, tujuan penyelidikan projek ini adalah untuk menghasilkan suatu aplikasi *AR* bernama *The Application of Augmented Reality for House Promotion* dengan mengemukakan konsep dan proses yang perlu difahami dalam menghasilkan aplikasi tersebut.

TABLE OF CONTENTS

CHAPTER	SUBJECT	PAGE
	DECLARATION	ii
	DEDICATION	iii
	ACKNOWLEDGEMENTS	iv
	ABSTRACT	v
	ABSTRAK	vi
	TABLE OF CONTENTS	vii
	LIST OF TABLES	xii
	LIST OF FIGURES	xiv
	LIST OF ABBREVIATIONS	xvi
 CHAPTER I	 INTRODUCTION	
	1.1 Project Background	1
	1.2 Problem Statement	2
	1.3 Objective	2
	1.4 Scope	3
	1.5 Project Significance	3
	1.6 Conclusion	3

CHAPTER	SUBJECT	PAGE
CHAPTER II	LITERATURE REVIEW & PROJECT METODOLOGY	
	2.1 Introduction	4
	2.2 Domain	4
	2.3 Existing System	7
	2.3.1 Comparison of Existing System	9
	2.3.2 Comparison of Existing Tool	10
	2.4 Project Methodology	12
	2.5 Project Requirement	15
	2.5.1 Software Requirement	15
	2.5.2 Hardware Requirement	16
	2.6 Conclusion	16
CHAPTER III	ANALYSIS	
	3.1 Current Scenario Analysis	17
	3.2 Requirement Analysis	19
	3.2.1 Project Requirement	19
	3.2.1.1 Project Source	19
	3.2.1.2 Project Specific Technique	20
	3.2.2 Software Requirement	21
	3.2.3 Hardware Requirement	22
	3.2.4 Other Requirements	23
	3.3 Project Schedule and Milestones	24
	3.4 Conclusion	26

CHAPTER	SUBJECT	PAGE
CHAPTER IV	DESIGN	
	4.1 Introduction	27
	4.2 Project Scenario Flowchart	27
	4.3 System Architecture	29
	4.4 Preliminary Design	30
	4.4.1 Interactive Storyboard	30
	4.4.1.1 The House Interface	
	Design	30
	4.4.1.2 The Floor Plan Interface	
	Design	31
	4.5 User Interface Design	31
	4.5.1 Navigation design	31
	4.5.2 Input and Output Design	32
	4.6 Conclusion	33
CHAPTER V	IMPLEMENTATION	
	5.1 Introduction	34
	5.2 Media Creation	34
	5.2.1 Production of Texts	35
	5.2.2 Production of Audio	35
	5.2.3 Production of Graphic	36
	5.3 Media Integration	39
	5.4 Product Configuration Management	39
	5.4.1 Configuration Environment Setup	40
	5.4.2 Version Control Procedure	42

CHAPTER	SUBJECT	PAGE
	5.5 Implementation Status	43
	5.5.1 3D Graphic & Texts Creation	43
	5.5.2 Audio Composition	43
	5.5.3 Code Development	44
	5.6 Conclusion	44
CHAPTER VI	TESTING AND EVALUATION	
	6.1 Introduction	45
	6.2 Test Plan	45
	6.2.1 Test User	46
	6.2.2 Test Environment	47
	6.2.3 Test Schedule	48
	6.2.4 Test Strategy	48
	6.3 Test Implementation	49
	6.3.1 Test Description	49
	6.3.2 Test Data	50
	6.3.3 Test Result and Analysis	50
	6.3.4 Analysis Testing	51
	6.3.4.1 Ease of Use Analysis Testing	51
	6.3.4.2 Information Gained Analysis Testing	53
	6.3.4.3 Navigation Analysis Testing	54
	6.3.4.4 Satisfaction Analysis Testing	56
	6.3.4.5 User Preferable Web Camera Analysis Testing	57
	6.3.4.6 Time to Complete Task Analysis Testing	59

CHAPTER	SUBJECT	PAGE
	6.4 Conclusion	60
CHAPTER VII	PROJECT CONCLUSION	
	7.1 Observation on Weakness and Strengths	61
	7.2 Propositions for Improvement	62
	7.3 Contribution	62
	7.4 Conclusion	63
	REFERENCES	64
	BIBLIOGRAPHY	65
	APPENDICES	

LIST OF TABLES

TABLE	TITLE	PAGE
2.1	Comparison of Existing System	9
2.2	Comparison of ARToolKit and FLARToolKit	12
2.3	SDLC process and the Activity involved	13
2.4	List of Software Requirement and Functionality	15
2.5	List of Hardware Requirement and Functionality	16
3.1	Summary of Software Requirements	21
3.2	Summary of Hardware Requirements	22
3.3	Summary of Other Requirements	23
3.4	Description of Project Schedule and Milestones	24
4.1	Input Design and Functionality	32
4.2	Output Design and Functionality	33
5.1	Application Text Type	35
5.2	Project Version and Description	42
5.3	3D Graphic Creation	43
5.4	Audio Composition	43
5.5	Code Development	44
6.1	Test User Group and Description	46
6.2	Hardware Requirement in Test Environment	47
6.3	Software Requirement in Test Environment	47
6.4	Testing Section and Time Estimated	48

TABLE	TITLE	PAGE
6.5	Test Case and Expected Score Results	49
6.6	Test Rate Indicate and Description	50
6.7	Average Score for Ease of Use Test Case	51
6.8	Average Score for Information Gained Test Case	53
6.9	Average Score for Navigation Test Case	54
6.10	Average Score for Satisfaction Test Case	56
6.11	Percentage of the Preferable Web Camera	57

LIST OF FIGURES

DIAGRAM	TITLE	PAGE
2.1	Toyota IQ Demo (April 2009)	8
2.2	Oxford Brookes Visualise Construction Project (November 2008)	8
2.3	Princeton Electronic Billboard on Football Game	9
2.4	ARToolKit Image Processing	11
2.5	SDLC Processes Diagram	13
3.1	Current system flowchart	18
4.1	Project Scenario Flowchart	28
4.2	System Architecture	29
4.3	House Scene	30
4.4	The Floor Plan Scene	31
4.5	Application Navigation Chart	32
5.1	3D Graphic Creation Steps	36
5.2	Textured the House Model	37
5.3	The House in Wireframe View	37
5.4	Textured the Floor Plan	38
5.5	The Floor Plan in Wireframe View	38
5.6	Process of Media Integration	39
5.7	Code Environment in Microsoft Visual C++ 2008	40

DIAGRAM	TITLE	PAGE
5.8	ARToolKit Marker Generator Environment	41
5.9	View Application Using Web Camera	41
6.1	Bar Graph of Average Score for Ease of Use Test Case	52
6.2	Bar Graph of Average Score for Information Gained Test Case	53
6.3	Bar Graph of Average Score for Navigation Test Case	55
6.4	Bar Graph of Average Score for Satisfaction Test Case	56
6.5	Bar Graph of User Preferable Web Camera	58
6.6	Bar Graph of Average Time to Complete Task	59

LIST OF ABBREVIATIONS

AR	-	Augmented Reality
3D	-	Three Dimensions
CD	-	Compact Disc
SDLC	-	System Development Life Cycle
VRML	-	Virtual Reality Modeling Language
RAM	-	Random Access Memory

CHAPTER I

INTRODUCTION

1.1 Project Background

Nowadays, there are many strategies that can be used to promote some product. The popular product promotion is using internet. However, many of the promotion also still using paper such as brochure, newspaper, magazines and catalogue especially for house promotion. This can cause bored because customer can't get real feel of the product. But, if the product promotion can deliver in a new perspective and concept, it can give more details about the product.

Therefore, an application which will give overview and visualize a house will be designed and developed by integrated augmented reality technology. The purpose is to improve advertising strategy and also to reduce the cost of promotion for home sales agent. Moreover, the interaction between computer and human can be more powerful when the object in the screen can be integrated and displayed in the real-world environment.

Augmented reality (AR) is a field of computer science that involves combining the physical world and an interactive, three-dimensional virtual world. The technology will enable customers to get a real 'feel' for the house. Furthermore, this augmented

application also can allow customers to interact with a 3D photo-real version of the house. This is because augmented reality is attempts to supplements the real environment with virtual information.

1.2 Problem Statement

Today, we usually see house promotion in the newspaper, magazines, brochure and others. Furthermore, housing developer also use miniature model to promote the house. This can cause bored and lack of interaction. Therefore, in this project I use the augmented reality approached for house promotion based on the three dimensional (3D) concept. Nowadays, many people more attract with the new concept especially 3D concept of product promotion from others type of promotion strategy such as use online, brochure and magazines. So, by applying augmented reality used in promotion, it can be the best strategy to get customer attention and can attract people to buy the house.

1.3 Objective

- To develop augmented reality application for house promotion. The application is developed using the open source library and required software.
- To improve advertising strategy. Nowadays, there are many poor way to promote product such as using the brochure. Using the augmented application can improve the promotion strategy especially house promotion because user can get more details information about the product.
- To promote house in new concept based on augmented reality environment. Augmented reality use the concept of view the virtual object in the real environment. This concept is more interesting and effective for promotion strategy.
- To make promotion more interactive and better than using brochure or catalogue

1.4 Scope

For this project, the target user is home sales agent to promote house for making house promotion more interactive. Another target user is customers who want to know more about house or ordinary user. In this project, the application to be developed is standalone based application. This project is to build a virtual house in 3D model. A few areas in the house also will be illustrated in augmented reality application.

1.5 Project Significance

In this project, the home sales agent and customer will get the benefits from the application. The users may use the product in the different way based on augmented reality application. This application also can increase user's interest to know more about the house. The promotion strategy also can improve using this interactive application.

1.6 Conclusion

From this project, the expectation is to develop a standalone application which can visualize a house to users for promotion. The application is developed and designed by using augmented reality technology and 3D models. Next topic will discuss about literature review and project methodology.

CHAPTER II

LITERATURE REVIEW & PROJECT METHODOLOGY

2.1 Introduction

This chapter is to discuss about the literature review and project methodology of the domain augmented reality. The literature review in this chapter is to study related augmented reality application. Furthermore, the processes of the development of augmented reality application also will explain in this chapter.

2.2 Domain

Augmented reality involves augmenting the real world scene so that the user keeps one foot in the real world and another in the virtual world. The virtual images are merged with the real view to create the augmented experience. Augmented Reality (AR) enhances user perception by supplementing the real world with virtual content. Augmented Reality is different from virtual reality because the user is completely immersed in an artificial world and becomes divorced from the real environment. Azuma (2001) in his article entitled “Recent Advance in Augmented Reality” to confine AR definition to the following three characteristics:

- It combines real and virtual objects in real environment
- It runs interactively and in real-time
- It registers real and virtual objects with each other

Augmented Reality is very useful in many application include healthcare, advertising, maintenance, entertainment, medical and home design. AR can be used to enhance environment information by overlying some of the real environment with virtual object. Therefore, users can interact with virtual object in real environment and can get meaningful information.

According to Andrei Arusoaie (2010), “Augmented Reality allows the user to see the real world, with virtual objects composited with the real world. Therefore, AR supplements reality, rather than completely replacing it. AR can be thought of as the “middle ground” between Virtual Reality and real world.” Nowadays, the application of augmented reality is significantly increasing in many fields. ARToolKit is a software library freeware originally developed by Dr. Hirokazu Kato at HIT Lab, University of Washington in year 1999. It is registered under the GNU General Public License. Another Java ported version of ARToolKit is FLARToolKit.

A tracking marker with black square graphic is required in order to create an ARToolKit and FLARToolKit application. The tracking marker will save as pattern file in a computer. The image processing started by using a web camera to capture real environment video frame in real time. After that, the computer software will search through each video frame to find the tracking marker which is the black square. Once the black square is found, the position of the camera relative to the black square is calculated and a virtual object is drawn following the marker position. The virtual graphic is drawn on the top of each video frame. Finally, user will have an immersive experience by viewing the virtual objects through the computer screen in the video display.

There are three components consists in augmented reality as described by R. Silva, J. C. Oliveira and G. A. Giraldi (2001). The components are scene generator, tracking system and display. The scene generator is the device or software responsible for rendering the scene. Rendering is not currently one of the major problems in AR, because a few virtual objects need to be drawn, and they often do not necessarily have to be realistically rendered in order to serve the purposes of the application. The tracking system is one of the most important problems on AR systems mostly because of the registration problem. The objects in the real and virtual worlds must be properly aligned with respect to each other, or the illusion that the two worlds coexist will be compromised. For the industry, many applications demand accurate registration, especially on medical systems. Basically, most of the displays devices for AR are HMD (Head Mounted Display), but there is another type of display devices for augmented reality. The devices are Optical See-Through, Virtual Retinal Systems, Video See-Through, Monitor Based AR and Projector Based AR. When combining the real and virtual world two basic choices are available is optical and video technology. Each of them has some tradeoffs depending on factors like resolution, flexibility, field-of-view, registration strategies, among others.