

AR NAVIGATION SYSTEM



BORANG PENGESAHAN STATUS TESIS*

JUDUL: AK Navigation System

SESI PENGAJIAN: 2015/2016

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AR NAVIGATION SYSTEM

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

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2016

DECLARATION

I hereby declare that this project report entitled

AR NAVIGATION SYSTEM

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

STUDENT :



DATE: 19/8/2016

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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

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SUPERVISOR :



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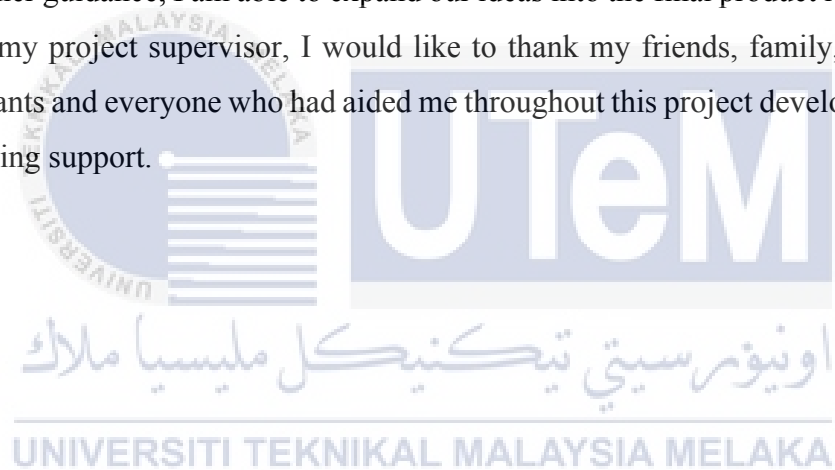
DEDICATION

To my beloved parents.



ACKNOWLEDGEMENT

First of all, I thank God for easing my process to complete this project. Next, I would like to convey my heartfelt thanks to my supervisor, Pn. Zarita for guiding me throughout the Final Year Project execution and for suggesting and giving advises. With her guidance, I am able to expand our ideas into the final product it is now. Apart from my project supervisor, I would like to thank my friends, family, lecturers, lab assistants and everyone who had aided me throughout this project development as well as giving support.



ABSTRACT

This report contains the detailed information on project entitled AR Navigation. The purpose of developing this application is to help a person to identify nearby building location easily. The methodology used to develop this application is Feature-driven Development Methodology (FDD). The methodology focus on identifying all of the features that should be included into the system. The methodology also focus on plan and implement by features. The target users for this application are anyone unfamiliar with all the places in an area and wanted to search for a building location. 3D type of augmentation is used to develop the navigation feature. User will be directed using a 3D arrow that direct users to their destination. Wikitude Javascript API is used to integrate and apply the Augmented Reality technology into the system. GPS system is required by the system to indicate each location accurately.

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ABSTRAK

Laporan ini mengandungi isi kandungan yang berkaitan dengan projek yang bertajuk AR Navigation. Tujuan aplikasi ini dibangunkan adalah untuk membantu sesiapa yang ingin mencari dan menentukan lokasi bangunan yang berdekatan. Methodologi yang digunakan untuk membangunkan aplikasi adalah Feature-driven Development Methodology (FDD). Methodologi ini fokus dalam mengenalpasti fungsi-fungsi penting yang patut ada dalam system. Fungsi – fungsi tersebut haruslah dirancang dan dilaksana dengan teliti. Pengguna-pengguna yang disasar adalah sesiapa sahaja yang tidak mengenali tempat-tempat di kawasan baru dan ingin mengenalpasti kedudukan bangunan yang ingin ditujui. Augmentasi 3D diguna untuk membangunkan sistem. Pengguna akan diarah dan dikemudi dengan tanda arah 3D untuk sampai ke destinasi. API Wikitude Javascript digunakan untuk mengintegrasikan teknologi Augmentasi Realiti dengan sistem. Sistem GPS amat diperlukan untuk memberi bacaan lokasi yang tepat.

TABLE OF CONTENTS

CHAPTER	SUBJECT	PAGE
	DECLARATION	ii
	DEDICATION	iii
	ACKNOWLEDGEMENT	iv
	ABSTRACT	v
	ABSTRAK	vi
	TABLE OF CONTENTS	vii
	LIST OF TABLES	xii
	LIST OF FIGURES	xv
CHAPTER I	INTRODUCTION	1
	1.1 Overview	1
	1.2 Problem Statements	2
	1.3 Objectives	2
	1.4 Scopes	2
	1.5 Project Significances	3
	1.6 Expected Output	4
	1.7 Conclusion	4

CHAPTER II	LITERATURE REVIEW	5
2.1	Introduction	5
2.2	Facts And Findings	6
2.2.1	Domain	6
2.2.1.1	Augmented Reality	6
2.2.1.2	Augmented Reality Technologies	7
2.2.1.3	User Acceptance for Augmented Reality	8
2.2.2	Existing System	9
2.2.2.1	Layar	9
2.2.2.2	IKEA Catalogue	10
2.2.2.3	Battlefield Augmented Reality System	11
2.2.2.4	Google Maps	12
2.2.2.5	Yelp Monocle	13
2.2.2.6	NavVis IndoorViewer	14
2.2.2.7	Research on Current System	15
2.2.3	Technique	16
2.3	Project Methodology	16
2.4	Project Requirements	18
2.4.1	Software Requirement	18
2.4.2	Hardware Requirement	19
2.4.3	Other Requirement	19
2.5	Project Schedule and Milestones	20
2.6	Conclusion	22
CHAPTER III	ANALYSIS	23
3.1	Introduction	23

3.2	Problem Analysis	23
3.3	Requirement Analysis	25
3.3.1	Data Requirements	25
3.3.2	Functional Requirements (FR)	26
3.3.3	Non-Functional Requirements (NFR)	29
3.4	Other Requirement	30
3.5	Conclusion	30
CHAPTER IV	DESIGN	33
4.1	Introduction	33
4.2	High-Level Design	33
4.2.1	System Architecture	34
4.2.1.1	Sequential Diagrams	34
4.2.1.2	Architecture Diagram	42
4.2.1.3	Deployment Diagram	43
4.2.2	User Interface Design	43
4.2.2.1	Navigation Design	43
4.2.2.2	Input Design	46
4.2.3	Database Design	52
4.2.3.1	Conceptual And Logical Database Design	52
4.3	Detailed Design	53
4.3.1	Software Design	53
4.3.1.1	Logic And Concept	53
4.3.1.2	Class Poi	55
4.3.1.3	Class Checkpoint	58
4.3.1.4	Class Direction	59

4.3.1.5	Class Arrow	61
4.3.1.6	Class World	62
4.3.1.7	Class Presentingdetails (Global)	66
4.3.2	Physical Database Design	71
4.3.2.1	Table Checkpoint Ddl & Dml	71
4.3.2.2	Table Poi Ddl & Dml	72
4.4	Conclusion	73
CHAPTER V	IMPLEMENTATION	74
5.1	Introduction	74
5.2	Software Development Environment Setup	75
5.3	Software Configuration Management	79
5.3.1	Configuration Environment Setup	79
5.3.2	Version Control Procedure	80
5.4	Implementation Status	83
5.4.1	Feature View Points Of Interest (POI)	83
5.4.2	Feature Filter Points Of Interest (POI)	84
5.5	Feature Direct To Points Of Interest (POI)	85
5.6	Feature Cancel Directing Process	87
5.7	Feature View Current Location On Map	88
5.8	Conclusion	89
CHAPTER VI	TESTING	90
6.1	Introduction	90
6.2	Test Plan	91
6.2.1	Test Organization	91
6.2.2	Test Environment	92

6.2.3	Test Schedule	93
6.3	Test Strategy	97
6.3.1	Classes Of Tests.	98
6.3.1.1	Unit Testing	98
6.3.1.2	Integration Testing	98
6.3.1.3	System Testing	99
6.3.1.4	Acceptance Testing	99
6.4	Test Design	100
6.4.1	Test Description	100
6.5	Test Data	122
6.6	Test Results And Analysis	122
6.7	Conclusion	151
CHAPTER VII	CONCLUSION	152
7.1	Observation On Weaknesses And Strengths	152
7.2	Propositions For Improvement	152
7.3	Project Contribution	153
7.4	Conclusion	153
	REFERENCES	154
	APPENDICES	156

LIST OF TABLES

TABLE	TITLE	PAGE
2.1	Comparison between Google Map, NavVis and Layar AR	16
2.2	Comparison between Google Map, NavVis and Layar AR	18
3.1	Functional Requirements	26
3.2	Non Functional Requirements	29
3.3	Data Dictionaries	31
4.1	Class POI attributes table	55
4.2	Class CheckPoint attributes table	58
4.3	Class Direction attributes table	59
4.4	Class ARROW attributes table	61
4.5	Class World attributes table	62
4.6	Class presentingdetails attributes table	66
6.1	Test Organization	91
6.2	Test Environment Setup	92
6.3	Test Schedule	94
6.4	Test Description for View Points of Interest	101
6.5	Test Description for Filter Points of Interest	102
6.6	Test Description for Direct to Points of Interest	103
6.7	Test Description for Cancel directing process	105
6.8	Test Description for View current location on map	106
6.9	Test Description for View Points of Interest and direct to selected Points of Interest	107
6.10	Test Description for View Points of Interest and filter	

	Points of Interest	108
6.11	Test Description for Direct to Points of Interest and changing option for directing arrow	109
6.12	Test Description for Direct to Points of Interest and cancel directing process	110
6.13	Test Description for Direct to Points of Interest with direct details on map	111
6.14	Test Description for Performance and usability of viewing Points of Interest	112
6.15	Test Description for Performance and usability of filtering on Points of Interest	114
6.16	Test Description for Performance and usability for directing to Points of Interest	116
6.17	Test Description for Performance and usability of cancelation directing process	118
6.18	Test Description for Performance and usability on viewing current location on map	119
6.19	Test Description for Acceptance Testing	121
6.20	Test Data	122
6.21	Test Result for View Points of Interest	123
6.22	Test Result for Filter Points of Interest	125
6.23	Test Result for Direct to Points of Interest	126
6.24	Test Result for Cancel directing process	129
6.25	Test Result for Cancel directing process	130
6.26	Test Result for View Points of Interest and direct to selected Points of Interest	132
6.27	Test Result for View Points of Interest and filter Points of Interest	134
6.28	Test Result for Direct to Points of Interest and changing option for directing arrow	135
6.29	Test Result for Direct to Points of Interest and cancel directing process	136
6.30	Test Result for Direct to Points of Interest with direct details on map	137

6.31	Test Result for performance and usability of viewing Points of Interest	139
6.32	Test Result for performance and usability of filtering on Points of Interest	141
6.33	Test Result for performance and usability for directing to Points of Interest	143
6.34	Test Result for performance and usability of cancelation directing process	146
6.35	Test Result for performance and usability of cancelation directing process	147
6.36	Acceptance Testing	149



LIST OF FIGURES

DIAGRAM	TITLE	PAGE
2.1	Augmented Distance Value on Building	7
2.2	Augmented Image on Magazine	8
2.3	Augmented 3D furniture object in room	10
2.4	Use of Augmented Technology in Training	11
2.5	Google Indoor Maps	12
2.6	Yelp Monocle interface	13
2.7	2D Augmented Arrow of NavVis IndoorViewer	14
2.8	Software Development Lifecycle for FDD	17
3.1	Activity Diagram of Building Search	24
3.2	Use Case Diagram	26
4.1	View Points of Sequence Diagram Sequence Diagram 1	34
4.2	View Points of Interest Sequence Diagram 2	35
4.3	Direct to Points of Interest Sequence Diagram - 1	36
4.4	Direct to Points of Interest Sequence Diagram - 2	37
4.5	Cancel directing process Sequence Diagram	38
4.6	Filter Points of Interest Sequence Diagram	40
4.7	View current location on Map Sequence Diagram	41
4.8	AR Navigation system Architecture Diagram	42
4.9	AR Navigation system Deployment Diagram	43
4.10	User Interface for User Input	47
4.11	World View	48
4.12	Panel of POI Details	49

DIAGRAM	TITLE	PAGE
4.13	Current Location on Map UI	50
4.14	Cancel of Navigation	51
4.15	Entity Relationship Diagram	52
5.1	AR Navigation System Deployment Diagram	77
5.2	AR Navigation System Architecture Diagram	78
5.3	POI Filter of AR Navigation	84
5.4	POI details panel	86
5.5	Directing arrow	86
5.6	Cancel Directing	87
5.7	Marker on Google Map	88
6.1	Testing Phases	99



CHAPTER I

INTRODUCTION

1.1 Overview

Augmented reality is augmentation generated from computer input like sound, video, graphic, or GPS data on physical or real world environment element which is viewed lively, direct or indirect. It is a concept of a mediated reality, which the view of actual reality element is modified by a computer. Augmentation happens in real-time with physical environment elements. The real world element is not fully replaced. If it is, it is called Virtual Reality instead of Augmented Reality. With AR technology, system become more interactive and immersive. Artificial information either in 2D or 3D(mostly) is overlaid on real world to represent information and data which user can interact with the system. So, AR Navigation is proposed to interactively help find and locate specific building location. The design of the augmentation of the mapping system will be in 3D for user to have better interaction with system. User may request more data by interacting with augmentation in the system. There will be three main functions in the system, which cover checkpoint managing, building directing, building identifying. The directing functionality will cover calculation of nearest direction and alternative way other than the suggested direction. Beside from having directing functionality, super user will be able to modify building information through building managing functionality if there is a requirement. User will have to find/search

specific building through name. Interactive media such as audio and graphic will be used to direct user to specific location.

1.2 Problem Statements

- i. A person finds it hard to identify a building location when he/she is at UTeM.

1.3 Objectives

- i. To make recommendations of nearby building directing system that is in walking distance which is based on augmented reality on real world physical environment design.

1.4 Scopes

Modules

- i. View Points of Interest.
- ii. Filter Points of Interest.
- iii. Direct to Points of Interest.
- iv. Cancel directing process.
- v. View location on Map.

Users

- User that is searching for building in UTeM.

Operating System/Platform

- iOS

Devices

- Smart phone with camera and motion sensor (accelerometer and a magnetometer). iOS/Android
- Laptop with Windows NT/OSX/Linux operating system that is suitable for Cordova Development
- Minimum Specification:

Mac OS X

- Mac® OS X® 10.8.5 or higher, up to 10.9 (Mavericks)
- 2 GB RAM minimum, 4 GB RAM recommended
- 400 MB hard disk space
- At least 1 GB for Android SDK, emulator system images, and caches
- 1280 x 800 minimum screen resolution
- Java Runtime Environment (JRE) 6 (For Android)
- Java Development Kit (JDK) 7 (For Android)

On Mac OS, run Android Studio with Java Runtime Environment (JRE) 6 for optimized font rendering. You can then configure your project to use

Java Development Kit (JDK) 6 or JDK 7.

1.5 Project Significances

- i. The one who searching for any nearby building in UTeM would use the application to locate building's actual location.
- ii. The application can be widely use in a wide area navigation. eg. Historical building navigation, for tourist usage.

1.6 Expected output

A person that do not know where is the actual location of building in UTeM will use this application to search and guide them to destination. This application will help a person to easily identify and locate a building location at unfamiliar places.

1.7 Conclusion

This chapter describe and explain the reason why the project should be run to solve the problem stated. For this project, the targeted user will be user that is searching for a specific building in an area. Next chapter will discuss literature review on the topic related to the project such as Augmented Reality(AR) Technology and the uses of AR in navigation.



CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

This chapter discusses on literature review of topics related to Augmented Reality(AR). The literature review gives a broad view of the stage of AR Technology maturity in built environment, which can be used to guide new augmented reality system design as well as to help evaluate existing system on AR Technology. Topics covered for literature review are AR Technology, and its application on different field. Advantages of AR Technology are reviewed to assess its contribution on helping and supporting human needs in daily life to show the importance of applying AR Technology in this project.

2.2 Facts and findings

2.2.1 Domain

2.2.1.1 Augmented Reality

The domain of Augmented reality is augmentation generated from computer input like sound, video, graphic, or GPS data on physical or real world environment element which is viewed lively, direct or indirect. It is a concept of a mediated reality, which the view of actual reality element is modified by a computer. Augmentation happens in real-time with physical environment elements. The real world element is not fully replaced. If it is, it is called Virtual Reality instead of Augmented Reality. Compare to virtual reality, augmented reality is closer to the real world (Bonsor, 2001). With AR technology, system become more interactive and immersive. Artificial information either in 2D or 3D (mostly) is overlaid on real world to represent information and data which user can interact with the system. As mentioned in article written by Bonsor, (2001). he stated that “Augmented Reality is changing the way we view the world”. Technology is changing human life by making work done easier. Augmented reality that give sensory enhancements over a real-world environment in real time, change how human interact with technologies.

Whilst augmented reality concept has been popular for a long period, the term ‘augmented reality’ was created and used by Professor Tom Caudell, a researcher at Boeing, in 1990. He was referring to a head-mounted digital display that guided workers through assembling electrical wires in aircrafts. In 1961, Morton Heilig, a cinematography patented his Sensorama machine, which is a giant arcade game device with multi sensory that emitted aromas, and embedded with environmental elements such as wind and it also vibrated and played stereo sounds. Probably it leans more towards the virtual reality world, but some have referred to this as one of the earliest sample of device with augmented reality technology. (Sawers, 2011).