AR NAVIGATION SYSTEM

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BORANG PENGESAHAN STATUS TESIS*

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AR NAVIGATION SYSTEM

LIEW WEI JIE

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

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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

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 to integrate and apply the Augmented Reality technology into the system. GPS system is required by the system to indicate each location accurately.

ABSTRAK

Laporan ini mengandungi isi kandugan yang berkait 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 banguanan 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.

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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 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).