UNIVERSITI PUTRA MALAYSIA

AR UNIVERSITY LOGO: MARKERLESS MOBILE AUGMENTED REALITY WITH WAZE APPLICATION INTEGRATION

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FSKTM 2015 42

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This thesis Submitted to the School of Graduate Studies, University Putra Malaysia, in Fulfillment of the Requirement for the Degree of Master of Science

(Multimedia System)

JUNE 2015

Abstract of thesis presented to the Senate of University Putra Malaysia in fulfillment of the requirement for the degree of Master of Computer Science

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JUNE 2015

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The university logo represents the entity symbol for the university. Each university has its unique logo in term of design. Since there are variants of design for each logo, it is difficult for people to remember the name or other information of the University related to university logo. Apart from that, the logo itself cannot convey much information to the people. Therefore, current progress in AR technology has come to solve these problems. This project is using Markerless AR technology to track and identified university logo for people. The identification process can deliver information to the user including university name, homepage website and geographical location of university. There are three main elements to be concerned in the development of this project application. The elements are android mobile application concept, interaction with the user and tracking of university logo to identify the university with information deliver to the user by just capturing the photo image. Based on the experiments, 83% strongly agree that adding AR to University Logo helps give University information/direction to University. As a conclusion, AR can solve the problem by convey more information on University Logo.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan ijazah Master Sains Komputer

AR LOGO UNIVERSITI: REALITI TANPA MARKER DENGAN GABUNGAN APLIKASI WAZE UNTUK TELEFON MUDAH ALIH

Oleh

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Logo universiti mewakili simbol entiti untuk universiti. Setiap universiti mempunyai logo yang unik dari segi reka bentuk. Oleh kerana terdapat varian reka bentuk untuk setiap logo, ia adalah sukar bagi orang untuk mengingati nama atau maklumat lain universiti yang berkaitan dengan logo universiti. Selain itu , logo itu sendiri tidak boleh menyampaikan banyak maklumat kepada rakyat. Oleh itu, perkembangan semasa dalam teknologi AR telah datang untuk menyelesaikan masalah ini. Projek ini menggunakan teknologi AR tanpa penanda untuk mengesan dan mengenal pasti logo universiti. Proses pengenalan boleh menyampaikan maklumat kepada pengguna termasuk nama universiti, laman utama laman web dan lokasi geografi universiti. Terdapat tiga elemen utama yang akan terbabit dalam pembangunan aplikasi projek ini. Elemen-elemen tersebut adalah konsep android aplikasi mudah alih , interaksi dengan pengguna dan pengesanan logo universiti untuk mengenal pasti universiti dengan maklumat disampaikan kepada pengguna dengan hanya menangkap imej gambar. Berdasarkan eksperimen, 83% setuju bahawa penggunaan AR pada Logo Universiti dapat menyampaikan maklumat dan lokasi universiti. Secara kesimpulannya , AR boleh menyelesaikan masalah dengan menyampai lebih banyak maklumat university.

DEDICATION

This work is dedicated to my dearly parents, my wife, my sweet son, my brother, my sisters, Kurdistan Region Government, my friends.

Special thanks to God and my great supervisor, Dr.Puteri Suhaiza Sulaiman for her guidance, direction and constructive comments.

And Faculty of Computer Science and Information Technology, University Putra Malaysia for the facilities.

Especially, I would like to give my special thanks to my family whose patient

love enabled me to complete this work.

DECLARATION

I hereby declare that the thesis is my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently, submitted for any other degree at University Putra Malaysia or at any other institutions.

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SAMIR DILER ABDULLAH

Date: 30 JUNE 2015

LIST OF TABLES

LIST OF FIGURES

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1 Overview

Augmented reality (AR) is the interaction between digital information such as computer graphic with real time video or user's environment (WhatIs.com, 2015). The digital information can be various digital components such as animation, picture and video. According to Naglaa Ali Megahed (2014), AR consists of virtual objects overlaid or mixed within the real world in automated technology. Therefore, AR can be deemed as a digital technology that interacts with the user in real time environment by blending or overlaying the digital information with virtual objects.

AR technology can be created and used in various electronic devices such as computer, smart TV, game device such as PlayStation and other more as long as the device is able to interact with the user in real time with its digital information and its ability to work with virtual objects. As the mobile technology is booming, many AR developers had tried to create mobile application with AR technology especially mobile devices such as smart phones and tablets are handheld and can be carried anyway with the user in anytime at anywhere. Metaio company is an augmented reality company that offers the AR platform and AR libraries for software developers to create AR application in mobile devices for various platforms such as android and IOS (Metaio.com, 2015). According to Klein (2006), tiny devices like mobile phones have attracted various research in the usage of video cameras the same as a mean for tracking purposes as a result of the lower costs and the advanced video capturing capabilities of the new video cameras.

As AR technology is growing fast in IT industry, a lot of AR products and applications

had been developed to cater the interest needs of users. One of the famous AR project is Google's Project Glass that enable user to interact with the surrounding with the virtual objects via AR technology in real time as user could wear the Google Glass at anywhere in anytime. There is also a mobile AR application that able to display virtual objects to the user on top of traditional business card by using a mobile phone camera (Obeidy et al., 2013). In this project research, an android mobile application is designed and developed to track or identify university logos by displaying the information relates to the logos with virtual objects in metaio AR technology. This application would be known as "Logo Trackers".

"Logo Tracker" is not just work with AR technology to display the university information with virtual object but it also integrates with Waze application to provide GPS location of the university. Waze application is the largest navigation and community-based traffic application (Waze Mobile, 2015). Basically, "Logo Tracker" application is able to recognize the logo with the camera view in the mobile devices and display the university information to the user in virtual object as well as provides buttons which are able to direct user to the geographical location of the university and provide URL link to the university website.

1.2 Problem Statement

University logo had been widely used as a form of representation to people. Mostly it is unique among other university logos to represents itself to other people. The logo itself does not convey any information regarding its university information or its location. Therefore, people could not know about the university and location of the university by just looking at the logo. People would not spend extra effort by goggling the university or asking people about it.

University logo has limitation in providing information to the user as it could not able to hold information regarding its university information and location. In order to overcome this type of limitation, augmented reality technology can be used. As an example, many researchers are using mobile augmented reality in business card system that could display virtual objects to the user on top of traditional business card (Obeidy, W. K., H. Arshad, and B. Parhizkar, 2013). Therefore the problem statements in can be summarized as below:

i. **University logo could not hold information about the university**

University logo mostly is a formed of art icon that uniquely identify the university entity. It could not deliver much more information such as university background, history and news to the people.

ii. **University logo could not provide location navigation**

University logo can be seen anywhere weather on road advertisement board, magazine or television screen. People could not able to locate the university location by just seeing the university logo.

1.3 Goal and Objective

The goal for this project is to use markerless AR technology powered by Metaio Company to design and develop an university logo tracker application which is able to track university logo in real time and provide the GPS location of the university. In order to achieve the goal, the following objectives had been considered:

i. To use augmented reality to link university information on the university logo
ii. To use augmented reality to provide university location via tracking of university logo
iii. To develop user friendly and responsive AR navigation apps for universities in Malaysia

1.4 Scope

This application is an android mobile application with AR technology. Therefore, the scope of this application must be able to support or cater the needs to design and develop the application.

i. Hardware

This AR application would be implemented on top of mobile device with android platform. The mobile devices must have a built in camera.

ii. Software

This AR application use the platform and programming language powered by Metaio company. It also will use the GPS system powered by Waze plugin.

iii. Functionality

There are two main functionalities in this AR application. One is to display university information with virtual object. The information to be display can be modified in future enhancement. As for now, it will just display the full name of the university. Apart from that it also provides the link to the homepage of the university. The second function is to provide the navigation to the university location with Waze plugin.

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