

BORANG PENGESAHAN STATUS TESIS*

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DICTIONARY APPLICATION ON ANDROID PLATFORM

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VISUAL REPRESENTATION OF AUGMENTED REALITY MOBILE
DICTIONARY APPLICATION ON ANDROID PLATFORM

TIANG LEH MEI

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

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MELAKA
2013

DECLARATION

I hereby declare that this project report entitled
**VISUAL REPRESENTATION OF AUGMENTED REALITY MOBILE
DICTIONARY APPLICATION ON ANDROID PLATFORM**

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

STUDENT : _____ Date: 30 July 2013
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(SYARIFFANOR HISHAM)

DEDICATION

This project is dedicated to
my beloved Heavenly Father and family

ACKNOWLEDGEMENTS

First and foremost, I would like to express my highest gratitude and praise to my Almighty God who blessed me with His unfailing grace and mercy that I could get my project done successfully. It is His unfailing love and promises gave me encouragement and strength to move forward. It is His righteousness that He never leaves me indulged in my weaknesses but disciplined me as His loved child so that I grow and become a better person. I could not have thanked Him enough for all He has done. To God be the glory.

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Last but not least, I would like to express my greatest thanks to some of my dear friends who have been a great source of support and help during my time in need. Thanks for the knowledge and loving care you all have shared with me.

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ABSTRACT

The advanced development of smart device allows the installation of digital dictionary in one's smart device. However, the users seldom use their installed dictionary unless necessary. The main reasons are due to its input method and output presentation, which is lack of efficiency in terms of word searching and explaining. Thus, this project aims to develop a visualized mobile dictionary application for Android smart device by using Augmented Reality (AR) technique. With this, the application enhances the efficiency of word search and explanation by using image capture as the input method and integrating multimedia elements of image, 3D model and video as the output presentation. In addition, adoption of AR technique in this development enables both input and output methods happen in real time. Metaio SDK (Software Development Kit), a ready built AR development platform is used for both AR engine and database development of this application under the Prototyping methodology. This project offers visual representation of meaning description as an alternative ways of representing information. Based on the results gained from the testing activities conducted, this application is highly accepted by the public except the system speed is required to be improved. The future work on this project will be focus on the enhancement on the system speed and detection accuracy. As a conclusion, the development of this product is significant in terms of language and innovation.

ABSTRAK

Kemajuan dalam pembangunan peranti pintar membolehkan pemasangan kamus digital dalam peranti pintar seseorang itu. Walau bagaimanapun, pengguna jarang menggunakan kamus dimuat turun kecuali ketika keadaan itu amat memerlukan. Ini disebabkan oleh kaedah input dan paparan output kamus digital semasa yang kurang efisien daripada segi carian perkataan dan deskripsi yang diberikan. Oleh demikian, projek ini bertujuan membangunkan satu aplikasi kamus mudah alih bergambar untuk peranti pintar Android dengan menggunakan teknik *Augmented Reality* (AR). Dengan ini, aplikasi yang dibangunkan lebih efisien dalam carian perkataan dan paparan deskripsi perkataan. Imej digunakan sebagai input dan paparan output pula adalah dalam bentuk teks, imej, model 3D dan video. Di samping itu, penggunaan teknik AR dalam pembangunan ini membolehkan kedua-dua kaedah input dan output berlaku dalam keadaan *real time*. Metaio SDK (*Software Development Kit*), platform pembangunan AR yang sedia ada digunakan untuk pembangunan enjin AR dan pangkalan data di bawah metodologi *Prototyping*. Projek ini menawarkan perwakilan visual sebagai kaedah alternatif untuk persembahan maklumat. Penggunaan teknik AR dalam pembangunan aplikasi ini turut menyumbang dalam pembangunan inovasi baru.

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LIST OF ABBREVIATIONS

2D	-	2 Dimensional
3D	-	3 Dimensional
APK	-	Android Package file
AR	-	Augmented Reality
CPU	-	Central Processing Unit
fps	-	frames per second
GB	-	Gigabyte
GPS	-	Global Positioning System
HTML	-	HyperText Markup Language
kbps	-	kilo bytes per second
OCR	-	Optical Character Recognition
OS	-	Operating System
POI	-	Point of Interest
pt	-	point
RAM	-	Random Access Memory
SDK	-	Software Development Kit
XML	-	Extensible Markup Language

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CHAPTER 1

INTRODUCTION

1.0 Introduction

Chapter One provides the basic ideas in the development of AR mobile dictionary application with visual representation on Android platform. This chapter comprises the descriptions of project background, problem statement, objective, research question, project scope, project's framework and project significance. As the ideas are well stated and structured, this chapter offers a clear and big picture to the developer about the system of the application to be developed. As Confucius said "success depends upon previous preparation, and without such preparation there is sure to be failure", the elements included in Chapter One serves as the very beginning of the preparation for this AR mobile dictionary application development. This chapter is significant in guiding and directing the developer towards the desired goals with clearly specified statements of the elements included in this chapter.

1.1 Project Background

Recent years, the development of mobile apps like emerge in an endless stream, which makes a single mobile device multi-tasking and multi-functioning. People nowadays do not have to buy an electronic dictionary for their convenience, but install a mobile dictionary application will do. Generally, the function of a mobile dictionary is to explain the meaning of a word with a phrase of words of similar language. Furthermore, some mobile dictionaries provide explanation in different languages from the word searched. For example, the dictionary explains an English vocabulary in Chinese phrases. For further enhancement, voice explanation function is added into the application.

However, both text and voice ways of explanation have some limitations. One of the limitations is, that it cannot give an exact picture of the thing or situation described to the user. The user might imagine the thing described nearly the same or far from the actual picture of the word. For instance, the definition of “foxglove” is described as “any of a genus of erect herbs of the snapdragon family; especially: a common European biennial or perennial cultivated for its showy racemes of dotted white or purple tubular flowers and as a source of digitalis” (m-w.com, n.d.). The reader is able to know about the “foxglove” into detail through the above description. However, the user will still wondering what is that actually and how is it look likes. Thus, the situation will be better if the description comes along with a visual element such as a 2D image, 3D model, and video or come altogether to complement each other.

In addition, a full text sentence of description is sometimes an obstacle to the user from reading and understanding the meaning. When the users think of reading a long sentence of the meaning, the users would rather guess the meaning of the word or choose to not bother about it, and thus, this has hindered the users from using their dictionary application and learning the new vocabulary. Hence, a full text description ices the enthusiasm of

learning of the users in certain point. Besides that, another factor that hinders the users from using their mobile dictionary is the conventional word search input method of key-in. Users are annoyed to type and spell the vocabulary for search, especially when the vocabulary is a long word.

Therefore, an AR based visualized mobile dictionary application is developed with an intention of eliminating the limitations mentioned above. Markerless AR technique is employed in this development to enable image capture input method. This application also offers a visual representation of mobile dictionary to the users by integrating graphical multimedia elements as the options for dictionary output presentation.

1.2 Problem Statements

The AR based translator (Google play, n.d.) found in the application store has been an inspiration for the developer to develop an AR based dictionary as there is still no AR based mobile dictionary application found in the market yet. Besides that, there are three main problems will be solved along with the development of this AR based visualized mobile dictionary application.

The first problem is the limitations with the current word search input methods, which are the key in and voice search methods. Users are annoyed with the key typing of word input, especially for the long words and feel impatient with the spelling mistake of key typing and voice search.

Secondly, there is a problem also with the full text description of meaning. Users do not like to read a long sentence which is full of text and even worse when they found another vocabulary in the description sentence. The conventional full text explanation also lack of visual elements in presenting the meaning to the users.

Last but not least, the current application store lack of AR technology development. There is no AR based mobile dictionary app being developed yet.

1.3 Objective

The following shows the four main objectives of this project:

1. To implement visual elements into mobile dictionary as another way of representing information.
2. To investigate the degree of acceptance of the target users toward the developed application.
3. To explore the technique of developing AR based dictionary for Android mobile devices.
4. To develop an AR based visualized mobile dictionary application for Android mobile devices.

1.4 Research Questions

Some specific researches are conducted along with this project development. In this project, developer wants to study the techniques to implement visual elements into a mobile dictionary to offer another way of representing information. In addition, the developer also wants to investigate whether the application developed will increase the engagement of the users toward the mobile dictionary. Lastly, the developer wants to study the techniques of developing AR based dictionary for Android smart device. The developer needs to research on the most suitable platform and programming language that could make the development of the application possible.

1.5 Project Scope

The target user of this application is the Android smart devices' users of age range from 12 to 30 years old. The Android devices need to have minimum features of Android 2.2. This application is available for the word search only using English digital written or printed words. The volume of thesaurus is limited within a hundred words due to certain constraints.

1.6 Project Framework

This project is frame-worked by Prototyping Methodology. Figure 1.1 shows the project framework:

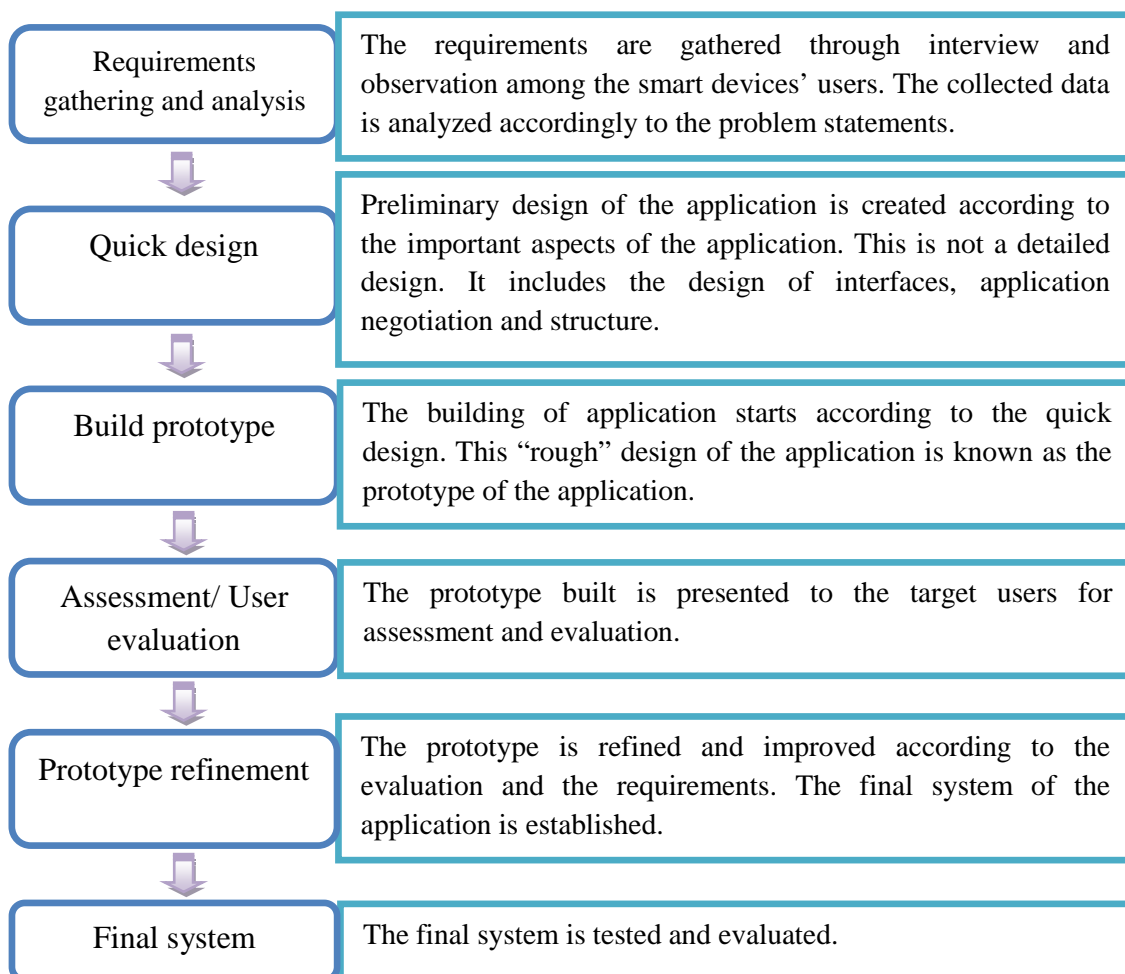


Figure 1.1: Project framework with Prototyping Methodology

1.7 Project Significance

This project is significant in term of education and technology. The product provides an innovative approach of finding words' meaning that integrates the advanced technology of augmented reality and multimedia elements. The integration of AR technology and multimedia elements in mobile dictionary application is believed to be able to improve the learning trend of people and make learning interesting and fun. This product is thus believed to be able to boost better understanding of English vocabulary. This product is an innovation of technology in the educational field.

Summary

In a nutshell, this project is about to develop an AR based visualized mobile dictionary for Android smart devices with the background that there are limitations in current mobile dictionaries. The development of this project is expected to fulfil four main objectives as stated before. Although the usability of this application is limited by its project scope, the significance of this application development is undeniable. This project is believed to be able to contribute to the field of education and technology innovation.

CHAPTER 2

LITERATURE REVIEW

2.0 Literature Review

Chapter Two discusses about the area of study involved in this project development. All the information related to this project will be reviewed. As defined by University of Wisconsin Writing Center (2012), literature review is a “critical analysis of a segment of a published body of knowledge through summary, classification, and comparison of prior research studies, reviews of literature, and theoretical articles”. Thus, many researches papers that are related to this project were studied. The review on the researches done by other parties is able to make the ideas of this project justified and provide the readers with up-to-date literature on a related topic. Besides that, developer conducted the study on the current systems, and made the comparison between the existing systems. Features of existing systems are compared with the AR visualized mobile dictionary also.