MOBILE CHINESE DICTIONARY APPLICATION ENHANCED WITH AUGMENTED REALITY (AR) - WORDAR

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ENHANCED WITH AUGMENTED REALITY (AR) - WORDAR

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

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA
2013

DECLARATION

I hereby declare that this project report entitled

MOBILE CHINESE DICTIONARY APPLICATION ENHANCED WITH AUGMENTED REALITY (AR) - WORDAR

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

STUDENT : _____ Date: _____

(STUDENT'S NAME)

SUPERVISOR : _____ Date: _____

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DEDICATION

This thesis is dedicated to my parent and the loved ones for their continuous support and not forgetting my supervisor, Pn Shahrul Badariah, for her guidance throughout the whole development of the project.

This thesis is dedicated to all my friends that have been through all the ups and downs together with me during my university moment.

Last but not least, I also appreciate all the knowledge and helps that comes from everyone who has contribute even a little thing in the development of this project.

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ABSTRACT

The purpose of this project is to implement a mobile Chinese dictionary that is enhanced with Augmented Reality (AR). The primary objective of this project is to identify the problem of inputting method for non-alphabetical characters while searching for the definition of the words. Then a mobile Chinese dictionary application with AR will be developed and after that will compare the effectiveness towards learning process between the conventional mobile dictionary and the new developed mobile AR dictionary.

This thesis consists of seven chapters. Chapter 1 is the introduction which will discuss why this project is being initialized and developed. Chapter 2 will discuss the literature review that is related to this project such as the AR technology, mobile learning and a comparison between similar applications. Chapter 3 will discuss the methodology used in executing this project which is Agile methodology and Extreme Programming and will also discuss the project requirement. Chapter 4 will review the analysis on user and system requirement. Chapter 5 will discuss the design and implementation of a product. Chapter 6 is testing the prototype and evaluates the acceptance criteria that are obtained from the user acceptance test. Chapter 7 is the conclusion that will conclude the whole project and propose the future improvement and enhancement that can be done to the product.

ABSTRAK

Projek ini adalah bertujuan untuk melaksanakan satu kamus Cina telefon bimbit yang diperkukuhkan dengan Augmented Reality (AR). Objektif utama projek ini adalah untuk mengenalpasti masalah yang pengguna dihadapi tentang cara memasukkan perkataan bukan huruf abjad semasa menggunakan kamus telefon bimbit. Selepas itu, satu kamus Cina telefon bimbit akan dibangunkan dan keberkesanan kamus Cina AR dengan kamus conventional terhadap proses pembelajaran akan dibandingkan.

Tesis ini mengandungi tujuh bab. Bab 1 adalah pengenalan dimana sebab-sebab projek ini dimulakan dan dibangunkan akan dibincang. Bab 2 akan membincang kajian kesusasteraan dan ulasan karya yang berkaitan dengan projek ini seperti Teknologi AR, pembelajaran bimbit dan aplikasi yang seumpamanya akan dibandingkan. Manakala bab 3 akan membincangkan metodologi yang digunakan semasa melaksanaan projek ini iaitu metodologi *Agile* dan *Extreme Programming (XP)* dan syarat-syarat tentang projek ini juga akan dibincangkan. Bab 4 akan mengkaji analisis tentang pengguna dan keperluan system. Bab 5 akan membincangkan rekabentuk dan perlaksanaan produk. Bab 6 adalah pengujian prototaip dan penilaian tentang kriteria penerimaan pengguna terhadap produk akan dijalani dan diperolehi. Dalam bab yang terakhir iaitu bab 7, kesimpulan akan dibuat terhadap keseluruhan projek dan penambahbaikan akan dicadang untuk pembangunan masa depan.

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CHAPTER 1

INTRODUCTION

The overall capabilities of mobile devices have rapidly increased in recent year in terms of processing power, connectivity and available sensor. With the help of these useful advancements, together with the increasing prevalence of smartphone, this has made the smartphone feasible and almost every tasks and programs are possible to run on the mobile platform. There was then the Augmented Reality (AR) has been introduced. AR offers a new approach to exploration and learning by blending real world condition with digital data. Running AR on mobile platform has opened a new market to most of the developers. For some people, this new technique is preferable comparing to the conventional method, for example, in the use of traditional dictionary. Connecting the spatial world with the digital information can also help when mastering a new language. The purpose of this paper is to discover the difficulties faced by users when using the conventional mobile dictionary and then propose a solution in order to overcome the difficulties. This chapter will explain the information required for the development purpose.

1.1 Project Background

Dictionary has no doubt to be the place where people consult to when they came across some words that they do not understand. In this immersive technology era, everything seems to be digitalized. Not only the conventional huge computers have emerged into a smaller and portable size, but the same concept also applied to the conventional dictionary. Dictionary has always be the place where people consult to when they encounter the words that they do not understand; regardless of conventional dictionary or digital dictionary.

Over the past few decades, Chinese language has become popularized and also being ranked as one of the most commonly spoken language. When it comes to Chinese characters, there are hundreds of thousands of characters that are currently recognized. Studies indicate that functional literacy requires only 3000 to 4000 characters. However, the number is too large to be learned in a short time.

1.2 Problem Statement

Digital dictionary is the most common application that people will install in their portable device, for example, smartphone. In order to use a digital dictionary, the application will ask the users to input the alphabetical characters to search for the definition. With the technology nowadays, users are able to input the words that they want to search by either text-inputting or even just simple voice over. For most users, there is no problem if they were asked to input the alphabetical characters to search for the definition. On the other hand, they may face some difficulties if they were asked to input non-alphabetical characters such as Chinese characters, Japanese characters, Korean characters and others. It is difficult for them to input the words by either using text-inputting or voice over as they do not write and speak the language. Hence, users need something that could help them in solving the problem.

1.3 Objectives

i. **To identify the problems of text-inputting for non-alphabetical characters while searching for the definition of the words.**

While using the mobile dictionary, there are various ways to input the words that we want to search, such as text-inputting and voice over and others. When it comes to the language that users do not understand or non-alphabetical characters, it is difficult for them to either input the words by text-inputting or voice over as they do not know how to write and read the words. So the problems will be gathered and analyzed and eventually a solution will be proposed to overcome this issue.

ii. **To develop a mobile dictionary application enhanced with augmented reality on Android platform.**

There are a lot of mobile dictionary applications that can be found and downloaded to the smartphone, be it on Android or IOS or Windows; but somehow the application did not meet the requirement for certain people. Thus, a mobile dictionary that is enhanced with Augmented Reality (AR) will be developed on Android platform to fulfill the requirements.

iii. **To investigate the effectiveness of implementing augmented reality into mobile dictionary application on Android platform.**

Once the application has been developed, it will be tested with a group of tester to find out the effectiveness of the mobile dictionary application that is enhanced with AR will be helpful in terms of searching and understanding the definition of the words.

1.4 Research Question

i. How mobile AR dictionary change the way the conventional mobile dictionary works in terms of text inputting?

Since the mobile dictionary has been introduced a few years back, the touch screen smartphone has not yet being popularized; there were only the keypad phone. So when users use the dictionary, they have to type in the words in order to search the meaning. With the help of AR technology, instead of inputting the words manually, users will only have to move their smartphone's camera on top of the words that they want to search; the AR technology will do the rest of the work for users.

ii. How mobile AR dictionary can be developed on Android platform?

By using Android Development Tools (ADT). ADT is a plugin for Eclipse IDE that is designed with integrated environment in which to build Android applications. It enables the users to quickly set up Android project, create an application user interface, debug the application using the SDK tools and distribute the application by exporting the .APK file.

iii. How AR dictionary perform better than the conventional mobile dictionary in terms of learning environment?

Dictionary can be somehow boring in the traditional way. Instead of displaying texts and pictures, AR provides an interesting and interactive learning environment by augmenting the 3d model or animation which makes the learning process livelier.

1.5 Project Scope

i. Target audience

The target user for the wordAR project will be young adult aged 20 to 24 whom Chinese language proficiency is low or novice learners for Chinese language. Users will only be able to look for the definition by scanning the Chinese characters with their smartphone.

ii. Application

Since the wordAR application is in the initial phase, the application will be tested with only 5 Chinese characters which represent different "Transportations" which are commonly used in Chinese language. Due to the capacity and time constraint, only typed Chinese characters will be used throughout this project.

1.6 Project Framework

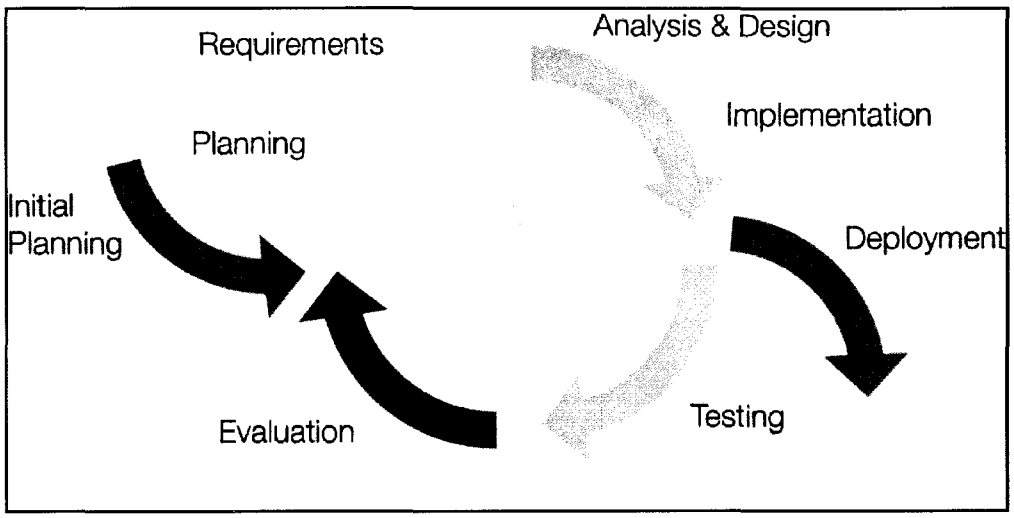

Fig 1.1: Project Framework

In this project, the Agile methodology is approached. It consists of several phases which are project initiation (requirement), technical design (architecture and design), development and test and feedback. One of the benefits from this methodology is that the project will never get out of track because the constant involvement of users.

There are few practices that primarily based on Agile methodologies. The extreme programming is used in this project. The extreme programming consists of 5 phases: exploration, planning, productionising, death and maintenance. The iteration of development and testing will be repeated until a requirement is accomplished. This will be further explained in Chapter 3 later.

1.7 Project Significance

This project is a significant advance to the existed mobile dictionary application. The combination between AR technique and dictionary function will create an interactive environment and a whole new interesting experience that could engage and motivate users towards the usage of dictionary. WordAR is a simple application to use and easy to remember and at the same time, easy to understand as the related virtual 3D object will be augmented upon the Chinese characters.

Summary

In conclusion, the purpose of this research paper is to discover the difficulties faced by users when using the conventional mobile dictionary and then propose a solution in order to overcome the difficulties. This project is significant advance to the existing mobile dictionary application. The wordAR application will change the perspective of users towards the usage of mobile dictionary. It is believed that the mobile AR dictionary will engage and motivate users in using the dictionary.

In the next chapter, research or studies that are related to mobile augmented reality for language learning purposes will be reviewed and discussed.