

## BORANG PENGESAHAN STATUS TESIS

JUDUL: VISUALIZATION OF DENTAL IMAGING BY DEVELOPMENT OF INTERACTIVE WEB

SESI PENGAJIAN: SESI 2014/2015

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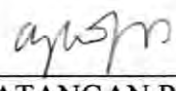
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VISUALIZATION OF DENTAL IMAGING BY DEVELOPMENT OF  
INTERACTIVE WEB

LIM MUN YEE

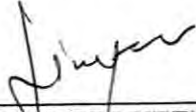
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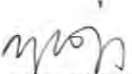
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I hereby declare that this project entitled  
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## **DEDICATION**

To my beloved parents, friends and supervisor

## ACKNOWLEDGEMENTS

First and foremost, I would like to take this opportunity to express my highest gratitude and deepest appreciation to my dearest supervisor, Pn Norazlin Binti Mohammed, you had truly inspired me with countless of valuable guidance and advices throughout the whole process of this final year project. Your willingness and commitment had motivated me to contribute and work further for this project. Furthermore, your patience and understanding had helped me through all problems and obstacles that I faced during my difficult times. Puan, you did not just help me to solve but also gave me time and chances to modify, repair and improve my weaknesses shown in this project. For this, I would like to say, thank you so much puan.

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## ABSTRACT

Formerly, government dental clinic uses a pink patient treatment card to record patient's general information, dental record, medical history, mouth cleanliness examination, dental charting and treatment plan. After the dentist assistant insert the data of the patient's dental problem, they will need to calculate the total tooth decay, missing tooth, filled tooth and extracted tooth of the patient. When the dentist wants to review the patient's dental chart, he will need to refer the dental code to find the meaning of the code. The development of this web-based application is to help the dentist to insert data easily and visualize the dental chart efficiently. Moreover, this application also has auto-calculate system to help the dentist assistant to calculate the total number of tooth decay, filled tooth, missing tooth and extracted tooth of the patient. In addition, this application also has a function of visualization of the mouth cleanliness, it can let the patient to understand their dental condition. This application use 2D teeth structure to visualize the position of their teeth, and 2D symbol to represent the dental problem and treatment. Furthermore, this web-based application just needs browser to access to convenient to the end users.

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## LIST OF ABBREVIATIONS

<b>HTTP</b>	–	<b>Hypertext Transfer Protocol</b>
<b>CSS</b>	–	<b>Cascading Style Sheet</b>
<b>PHP</b>	–	<b>Pre Processor Hypertext</b>
<b>MySQL</b>	–	<b>My Structured Query Language</b>
<b>EDRs</b>	–	<b>Electronic Dental Record System</b>
<b>DT</b>	–	<b>Dental Technician</b>
<b>FDI</b>	–	<b>Federation Dentaire Internationale</b>
<b>UM</b>	–	<b>Universiti Malaya</b>
<b>3D</b>	–	<b>Three Dimension</b>
<b>ERD</b>	–	<b>Entity-relationship diagram</b>
<b>DFD</b>	–	<b>Data flow model</b>
<b>GB</b>	–	<b>Giga Byte</b>
<b>RAM</b>	–	<b>Random Access Memory</b>
<b>CPU</b>	–	<b>Computer Processing Unit</b>
<b>MB</b>	–	<b>Mega Byte</b>
<b>MGD</b>	–	<b>Mouth, Gingivitis, Denture</b>
<b>IC</b>	–	<b>Identity Card</b>
<b>ID</b>	–	<b>Identity</b>
<b>2D</b>	–	<b>Two Identity</b>
<b>SMK</b>	–	<b>Sekolah Menengah Kebangsaan</b>



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## **CHAPTER I**

### **INTRODUCTION**

#### **1.1 Project Background**

In the government dental clinic, the procedures involved when a patient visits a dentist are tracking of dental history, clinical examination, charting, special investigations, diagnosis and finally the treatment plan. In the tracking of dental history, patient will present their complaint to the dentist and the dentist will record the information into the patient dental card. Then, dentist will proceed to the clinical examination to check the patient's oral condition, face, lips and SM lymph nodes. All of the clue will also save in the dental card.

The dentist and the dentist assistant will do the charting together. Dentist will check the patient's teeth and tell the condition to the dentist assistant, and then the dentist assistant will mark on the dental chart. The dental chart represents every part of teeth and there are spaces around the teeth for the dentist assistant to mark on it. After that, it is the part of special investigations if the patient has any special problem, all the details will be written in it. Diagnosis will be carrying on next to certify the situation of the patient. Lastly, dentist will write all the treatment plans at behind of the cards. When the dentist needs to access to the dental data, he will need to refer back to the card to look at the teeth chart and the Treatment Plan.

DEISY is the Student Dental System created by UM. It is used in the dental clinic for record patient's details, dental conditions, and treatment plans. A lot of steps need to be done in this system to complete the entire task. In the dental chart of DEISY, it is divided into two parts, treatment plan and finding. On the right hand side, there is a place of options include teeth problem and treatment. Dental student will click on the number of teeth on finding or treatment plan, and then click the option at the right hand side if the teeth need to be record as treated or got problem. This chart is also use to be displayed. The chart can only be edit only if the patient is check in, otherwise, the chart is cannot be edit.

## **1.2 Problem statements**

The chart on the dental card is difficult for dentist as they will need to remember meaning of all the teeth codes in order to identify dental problems shown on the chart. Furthermore, the list of code and meaning is in another page of the card and this will make dentist decrease their efficiency in tracking the history of the patient. Besides that, the Treatment Plan is at the last page of the dental card, so this will make dentist inconvenient and waste time in tracking the previous treatment record of the patient.

During treatment, patient would spend a lot of their time while waiting for the dentist to trace their treatment history and also to check their teeth. In addition, patients can hardly understand their dental condition with the current card and chart system. When dentist checking the patient's teeth, he needs another assistant to help him to record each teeth's condition in the dental chart, what if his assistant have any emergency not around?

Doctor Assist, a computer system for dental clinic, however the dental chart in this system is still could not clearly visualize the dental problem.

UM Student Dental System (DEISY) is too complex. Dentist student still waste a lot time in inserting patient's tooth conditions despite the advanced technologies. DEISY is a very complete system with full of dental problems details. However, dentist will key in the data slower because a lot of steps need to be done. In the charting image of DEISY, it is divided into two parts, they are Treatment Plan and Findings. On the right hand side, there is a bar of options include dental problems and treatments. In each part of the Treatment Plan and Findings, the dental student will click on the number of problem teeth and then click the icon in the option bar. This is to record the dental problem or the type of treatment. The same charting image is also used to be displayed. To edit the chart, the patient has to be checked in first. Therefore, DEISY is not so user friendly.

In the government dental clinic, the dental assistants believe that computer system is not so user friendly and is less effective compared to the card system when data is inserted. This is because they are used with the old card charting system. For dentist assistant or nurses that have less experience with new technology like computer or tab system, they will need a longer time to learn the way to use it. Besides that, they will also waste time in finding and fixing error when they make mistake in the system.

Therefore, an effective and efficient system must be introduced to improve the dental system and help the dentist, dentist assistant and nurses to increase their work productivity.

### **1.3 Objective**

This project embarks on the following objectives:

- i. To study how to visualize dental clinic data on a 2D image
- ii. To design an web based application where dentist can easily store and visualize patient's data with infographic

- iii. To test the efficiency of this system in helping the dentist to figure out the dental in infographic

#### **1.4 Scope**

This web based application engages one level on the following scope:

- i. It will store patient's basic information like name, IC, contact number, gender, home address and all dates when he/she visits the dental clinic.
- ii. It will store patient's dental record in image form.
- iii. It will have all patients' treatment plan history.
- iv. Automatic Calculate System of total number of tooth decay

#### **1.5 Project Significance**

This project is used to improve the current dental system by visualize the dental imaging. Besides that, this will increase the effectiveness and efficiency when dentist want to acquire the dental data. It will also let the patient understand their dental condition easier by looking at the infographic.

#### **1.6 Expected Output**

This system is built to allow dentist and nurse to record and access their data easier and effectively. It can replace the card system that is difficult to envision dental clinic data. Besides that, it is expected to be able to transfer data from dental chart to infographic by web based application. Moreover, an automatic calculate system about total number of tooth decay will also be added into this system. Furthermore, patient also can view and understand their dental's condition with the infographic.

## 1.7 Conclusion

This project is a project that is very important in develops a new dental charting system that will help the dentist a lot. It includes the study of visualization technique for the dental chart, and how to present the information into infographics. Moreover, an automatic calculate system that contain total number of tooth decay also will be added inside. Besides that, this system will improve the efficiency and effectiveness of the current dental charting system, it will help the dentist to safe time when he figures out the data. Last but not least, patient will also able to read the chart and understand their dental condition. Next phase will discuss about my facts and findings, project methodology, project requirements and project schedule and milestones.

## **CHAPTER II**

### **LITERATURE REVIEW AND PROJECT METHODOLOGY**

#### **2.1 Introduction**

This is an interactive web based application that enables dentists and nurses to key in and visualize patient's dental record. However, this project are required some sort of research and finding to support. Therefore, the creation of the literature review is one of the most important parts to do. Literature review requires the culmination of many skills including library research and logical arrangement of the information. It is also a summary of previous research on a topic.

The purpose of the literature review is to help in explaining on how the question to be investigated fits into larger picture and why it being approached. This allows the reader to be brought up to date regarding the date of research in the field and familiarizes them to any contrasting perspectives and viewpoints in the topic. Accurate information will strengthen the idea of the development.

Project methodology is a management and a discipline, which can bring significant benefits to organization. There are a number of frameworks available for defining projects and for managing their implementation. Basically, there are process-oriented, data-oriented and object-oriented approaches.

## 2.2 Domain

This is an interactive web based application used to store and visualize dental image. Further definition will be explained for web based application, visualization technique and dental record system.

### 2.2.1 Web based application

A web based application means any system that can be entered over a network connection using HTTP, rather than existing within a device's memory. It is any program than able to run on a web browser. It is built with the programming languages such as HTML, Javascript and CSS which supported by browsers to render the application. However, web-based applications can also be client-based, where a division of the program is downloaded into user's computer, but processing is done through the internet on an external server.

To run the http, we need a web server and the Apache HTTP Server is used. It is very good to develop and maintain an open-source HTTP server for operating systems in nowadays like UNIX and Windows NT. The aim of this project is to provide a high security, efficient and extensible server that provides HTTP services in sync with the current HTTP standards. Apache httpd was launched in 1995, has been the most famous web server on the internet since April 1996 (The Apache Software Foundation, 1997-2015).

For this project, a package called Appserv is used to install Apache, PHP and MySQL. A localhost will be used to open phpmyadmin webpage to create database, tables and insert data. PHP is a server side language that used to create dynamic and interactive web pages. It can make functions such as error functions, file system functions and directory functions (PHP 5 Tutorial, 1999-2015). Besides that, MySQL is an very famous open source database, enable the effective delivery of reliable,