BORANG PENGESAHAN STATUS TESIS

JUDUL : KUALA LUMPUR RAIL NETWORK INTEGRATION: INTERACTIVE WEB-BASED SYSTEM USING TREEMAP INFORMATION VISUALIZATION REPRESENTATION (KLRAIL MOBILE SYSTEM)

SESI PENGAJIAN : 2 - 2007/2008

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KUALA LUMPUR RAIL NETWORK INTEGRATION: INTERACTIVE WEB BASED SYSTEM USING TREEMAP INFORMATION VISUALIZATION REPRESENTATION (KLRAIL MOBILE SYSTEM)

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

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
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2008

DECLARATION

I hereby declare that this project report entitled

KUALA LUMPUR RAIL NETWORK INTEGRATION: INTERACTIVE WEB BASED SYSTEM USING TREEMAP INFORMATION VISUALIZATION REPRESENTATION (KLRAIL MOBILE SYSTEM)

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

STUDENT : _____ Date: 27 JUN 08

(HAZIMIN BIN HAMDAN)

SUPERVISOR : _____ Date: 27 JUN 08

(MUHAMMAD HAZIQ LIM ABDULLAH)

DEDICATION

I dedicate this project especially for my family who never quit on me and give me strength to finish this project. Special thanks also to all that also encourage me to complete the project.

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Bismillahirahmannirahim.

Alhamdullillah and Thank You Allah S.W.T for giving me the strength and courage that finally I had been finished my Projek Sarjana Muda.

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Thank you.

ABSTRACT

KLRail Mobile is a website that provides routes to rail user around Kuala Lumpur. Existing rail website did not show the route from one place to another. Current websites also did not calculate fares. This project is the answer of all of this problems. The project scope is to develop a suitable web based system that suited in PDA browser. This will be useful for rail's user who has PDA to access this website. Another scope of this project is to apply information visualization techniques which is use to display the results of information that user's needs. Using treemap, one of Information Visualization method, this website will help users to solve their problem, not only show a route but also all alternatives route to their destination. In this project, Rational Unified Process (RUP) has been use as the project methodology. The Rational Unified Process consists of cycles that may repeat over the long-term life of a system. A cycle consists of four phases: Inception, Elaboration, Construction and Transition. Each cycle is concluded with a release, there are also releases within a cycle. Following each RUP cycles, the development of this project has become successful.

ABSTRAK

KLRail Mobile adalah sebuah projek laman web yang memudahkan perjalanan pengguna LRT dan monorail sekitar Kuala Lumpur. Laman-laman web yang sedia ada tidak membekalkan peta perjalanan sekiranya seseorang pengguna ingin menggunakan perkhidmatan mereka. Jumlah bayaran tambang juga tidak diberitahu kepada pengguna. Projek ini adalah jawapan kepada masalah ini. Projek ini bertujuan untuk membangunkan sebuah laman web yang sesuai secara khususnya adalah kepada pengguna PDA. PDA adalah alat komunikasi yang popular di kalangan pelancong. Ini akan memudahkan mereka dalam merancang perjalanan mereka di Kuala Lumpur. Selain itu, skop projek ini juga adalah menggunakan salah satu daripada teknik dalam *Information Visualization* iaitu *treemap*. Dengan menggunakan teknik ini, laman web ini akan membantu dengan lebih mudah dan berkesan bukan sahaja memberikan peta perjalanan kepada pengguna malah membekalkan jalan-jalan alternative kepada pengguna. Dalam projek ini, *Rational Unified Process* telah digunakan sebagai metodologi projek. *RUP* akan menjalankan proses sepanjang pembangunan laman web ini. Setiap pusingan proses mengandungi empat fasa iaitu *Inception, Elaboration, Construction* dan *Transition*. Dengan metodologi yang digunakan, laman web ini dapat dibangunkan mengikut masa yang ditetapkan.

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INTRODUCTION

1.1 Project Background

With a booming economy comes increased car ownership and traffic congestion, The Government has taken steps to alleviate this escalating problem with the implementation of public transport such as Light Rail Transit or LRT, monorail and others. Kuala Lumpur public transport is the most modern in this region. All this modern transport is build along the main attraction place in Kuala Lumpur.

The KL Monorail is a monorail system in Kuala Lumpur, Malaysia connects the Kuala Lumpur Sentral transport hub with the "Golden Triangle". Light Rail Transit or LRT operates two rail-based networks, Kelana Jaya Line and Ampang Line, both of which are rapid transit systems.

With the numbers of people that use this facility increased, many of them still having problem when they want to get information from the website. Information about costs, time and others are important to make the customers clear about what they are dealing with. There are few web sites that offers the information but there is still none of them are compatible with mobile technology especially when travels.

Personal digital assistants (PDA) have become more famous nowadays especially for travelers. PDA is a small handheld computer, also known as palmtops, handheld PCs, or handhelds. Newer PDA also has audio and video technology built inside them, and enables this gadget to be use as media player or browsing the internet rather than use it as a mobile phone. The new feature that is dynamic route map will be added as for enhancement from current system.

This project is about developing a website using one of the method that use to visualize information on a web-page. The project will focus on how the data and information can be viewed differently and interpret easily.

1.2 Problem Statements.

Increasing price of oil make public transport becomes more popular. People around Malaysia take initiative to shift from convenience private transport to hectic public transportation atmosphere. People in Kuala Lumpur were never missing this situation, either from going to work or having a day. More than that, this largest city of Malaysia need more sufficient public transportation to suits the capacity of Kuala Lumpur peoples likes LRT System and KL Monorail. These two transportation system has become popular as main transport for Kuala Lumpur people and tourists. Peoples do not need to worry about parking or traffic jammed problems.

However this new high technology of transportation was only relying on its name. It is because, lack of information and delivering methods on how to travel in Kuala Lumpur. This website also implements a simple technique to retrieve and visualize the information for viewers. This website also put all the information into one place without separates them into parts that should be more easy and interactive to viewers to get what they needs.

1.3 Objective

The project objectives are:

i. To develop a web-based LRT system for Personal Digital Assistant (PDA) user

- Develop a web-based system for PDA user easy to access from anywhere at any time.
- This will also bring this web-based system technology more closely to the LRT's passengers.

ii. To produce dynamic map for users

- Current LRT information system website didn't produce any dynamic map for users. They only show the route line only.

iii. Applying Information Visualization Representation

- Current LRT information website did not apply the suitable method to visualize the information. It only uses the simple graphic to visualize the current information. In this project, I have chosen treemap visualization as the concept.

1.4 Scope

The project scope is to develop a suitable web based system that suited in PDA browser which can be surf by PDA users to get information. This will be useful for user who has PDA to surf this website and get information from it.

Another scope of this project is to apply information visualization techniques which is use to display the results of information that user's needs. Current websites are

only focusing on the information of the trains not about the route that should be taken by users.

1.5 Project Significance

The importance of this project is to develop an attractive and simple user-interface for users to fetch any information. From this project, PDA users can easily manage their plans to travel according to the information provided. This project is really important since there is no system for any rail system in Malaysia. The result representation shows how the information visualization approach is used to display information and data will easily adjust the information provided. While developing this website, we can also help to commercial our web.

The website is about the information of Light-Rail-Transit (LRT) system which provides customers with a 'one-stop-centre' of information such as services, fares and ticketing for PDA's. By using the correct visualization, this website will help all the customers to find their way easily. The expected of these projects is also to develop a good website, interactivity and provide an efficientl of information.

1.6 Conclusion

As a conclusion, this project is about to develop a mobile website that suits for PDA users. The project aim is to show how to use one of the methods of information visualization, which is treemap visualization and apply it in on a mobile website. Choosing the suitable and correct information visualization is important in developing this website. This will affect the users and the website content, whether it was effective or not, and make sure that the objectives was successfully achieved.

CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

A literature review is a body of text that aims to review the critical points of current knowledge on a particular topic. Most often associated with science-oriented literature, such as a thesis, the literature review usually precedes a research proposal, methodology and results section. Its ultimate goal is to bring the reader up to date with current literature on a topic and forms the basis for another goal, such as the justification for future research in the area.

In this chapter, all the steps that take to get the best web-based system will be explained. This includes domain that related to this web-based system, the current system that exists and the result after some research and comparison, project methodology which will describe the approach that has been selected to use in this project, and project requirement including software and hardware that needed to develop this web-based system.

2.2 Domain

2.2.1 Kuala Lumpur Rail Network System

Kuala Lumpur is the most modern city in Malaysia. As capital city of Malaysia, Kuala Lumpur must have a systematic transportation system. Kuala Lumpur also provides many public transports to be use. One of them is rail system, including monorail, LRT, commuter and trains. This website provides information on how to go to places in Kuala Lumpur using rail system.

2.2.2 Interactive Website

A website is a related collection of World Wide Web (WWW) files that includes a beginning file called a home page. A company or an individual tells you how to get to their web site by giving you the address of their home page. From the home page, you can get to all the other pages on their site. A web page is a document, typically written in HTML that is almost always accessible via HTTP, a protocol that transfers information from the web server to display in the user web browser. Interactive means accepting input from a human. Interactive websites means are websites that allow users to enter data or commands. Interactive websites can attract users and this will help the website services and these sites interact with the user usually through either a text-based or graphical user interface.

2.2.3 Personal Digital Assistant (PDA)

This system is only for PDA users. This mobile web will apply one of the treemaps method to retrieve informations that been requested by user. Treemaps is one of the information visualization (InfoVis) method that used to retrieve data and

information. By using one of these methods, all information can be viewed attractively. This information includes the path, the route and the time of the train arrival and departures.

2.2.4 Information Visualization – Treemap

In some websites, the amount of information is so huge and the content may be lost whenever it is displayed on a single computer screen. If the entire structure has to visible all at once, the details may be too small to read. Adding visualization methods to a website automatically will improve user performance in this situation.

In this project, one of the methods in information visualization will be used is treemap. Treemap has many types including 3D-Hyperbolic Tree, Space-Tree, Cone-tree and several others. This project will used space-tree to display the information that need by user. Figures below show some example of tree in treemap.

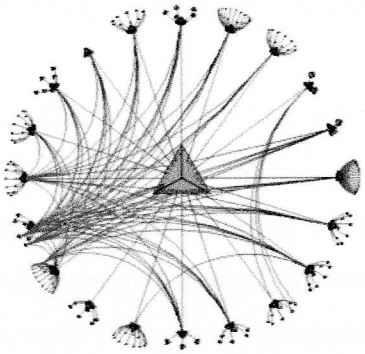

Figure 2.1 Hyperbolic-Tree Visualization

Hyperbolic graph layout uses a context + focus technique to represent and manipulate large tree hierarchies on limited screen size. Hyperbolic trees are very valuable to visualize hierarchical structures such as file directories, web sites, classification hierarchies, organization hierarchies, newsgroup structures and others.

Other than traditional methods such as paging (divide data into several pages and display one page at a time), zooming, or panning show only part of the information at a certain granularity, hyperbolic trees show detail and context at once.

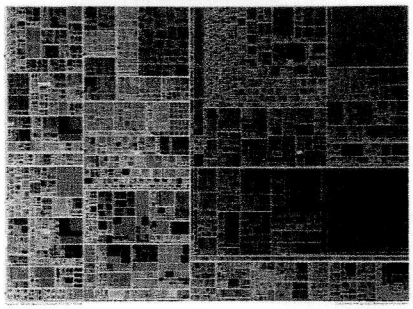

Figure 2.2 Treemap Visualization

Tracing its ancestry to Venn diagrams, the Treemap algorithm was developed in the HCI Lab at the University of Maryland. It uses a space filling technique to map a tree structure (e.g. file directory) into nested rectangles with each rectangle representing a node. A rectangular area is first allocated to hold the representation of the tree, and this area is then subdivided into a set of rectangles that represent the top level of the tree. This process continues recursively on the resulting rectangles to represent each lower level of the tree, each level alternating between vertical and horizontal subdivision.

The cone tree is a three-dimensional representation of hierarchical information. The hierarchy is presented in 3D to maximise effective use of available screen space and enable visualization of the whole structure. The node of the tree is located at the apex of the cone and all its children are arranged around the circular base of the cone in 3D. Moreover, any node can be brought to the front by clicking on it and rotating the tree. Figure 2.3 shows a snapshot of a cone tree. The root of the hierarchy is placed at the top with its children placed evenly spaced along its base. This placement is repeated for each node of the tree, the parent being placed at the apex of the cone. Each cone is shaded transparently so that it can be perceived yet not block the view of cones behind it.

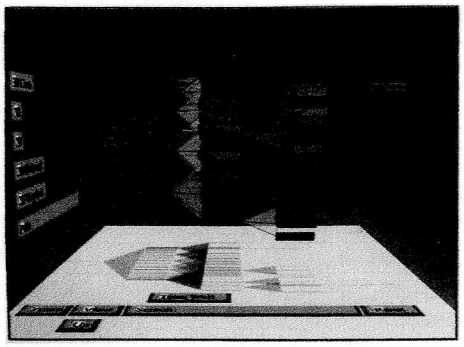

Figure 2.3 3D-Cone Tree Visualization

2.3 Existing System

From the research that been done, there is several websites that gives services such as information about the trains, the route and others. But these websites not really suitable to the customer needs.

i. RapidKL Online

RapidKL was the company that manage the public transportation around Kuala Lumpur, includes the Light Rail Transit (LRT). Nowadays, these transportation services has become the main public transport for people every day. Before they separate these rails to Ampang Line and Kelana Jaya Line, they were used to called PutraLRT and StarLRT.

Figure 2.1 shows the main page of Ampang Line and figure 2.2 shows us the main page of Kelana Jaya Line. This page seems to simple and lack of informations and they need to go to other page to see the fares and stations. User also has to find their own ways to make their journey in short time.