Providing Direction using Sight-Seeing Paradigm

By

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Dissertation submitted in partial fulfillment of
the requirements for the
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CERTIFICATION OF APPROVAL

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Approved by,

_____

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UNIVERSITI TEKNOLOGI PETRONAS
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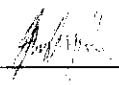
January 2008

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.



NUR HAZIRAH BT ABDUL HASIB

ABSTRACT

The objective of this multimedia project is to design and implement a working web interface that helps travelers to better remember the route to be taken when asking for directions to a specific location. The system uses multimedia elements, mainly JPG images over an appropriate presentation protocol, and supported by vocal narration and text, to describe the landmarks a traveler is expected to see along the route. The interface is viewable on both regular browser and micro-browser on hand-held gadgets. The logic layers and database layer will be designed and implemented as well to ensure an end-to-end solution. The effectiveness of the design is tested by carrying out the experiments on new visitors to "Universiti Teknologi PETRONAS" (UTP). The time required to reach with or without the system is used as the metrics of effectiveness.

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ABBREVIATIONS AND NOMENCLATURES

HTML – Hypertext markup language

2D – Two-dimensional

UTP – Universiti Teknologi PETRONAS

WWW – World Wide Web

PHP – Hypertext Preprocessor

HTTP – Hyper Text Transfer Protocol

SQL – Structured Query language

JPG – File interchange format

GUI – Graphical User Interface

CHAPTER 1
INTRODUCTION

1.1 BACKGROUND

When I first started studying at "Universiti Teknologi PETRONAS" (UTP), I find it is hard to find my ways to the class. There are many buildings in the campus and a lot of constructions are being done at that time. It is hard to find suitable routes to the places around the campus. Besides that, there are no signboards or direction board around the campus.

Direction is commonly used to ask to a certain place that one people who is not familiar to the places. Usually people will ask for the ways from other people or using a conventional maps or using the internet which they will receive a 2D map to conduct their ways to certain locations.

Travelers usually need effective directions to guide their ways in the local or foreign countries that they are not familiar with. Other than that, fire drill routes in buildings are needed to provide directions for its customers and workers to lead them to a more safety places.

1.2 PROBLEM STATEMENT

Directions are needed to help people to find their preferred way to a specific location. Travelers usually ask directions from the local people, where those direction are in a verbal forms. Verbal directions can be misunderstood by other people or this kind of instructions can be forgetful occur to the amount of the information.

Besides verbal directions, people too can use the conventional maps to guide their ways. Internet too could help to find directions that require but using the internet, the users will receive a 2D map of that area. A person needs to understand the maps before proceeding in finding their ways. Many people having difficulties in reading the conventional maps because many notations and legends those are hard to be understood.

Besides that, there are language barrier with the information giving if the users are not used to the language. Example if the country the user is visiting is Malaysia, most probably the direction of the city that are been used are in Malay language. Other than that, if a person is not used to English language, the information also could not be a used or transfer to them.

For a person who has not been to one place, it is hard for them to visualize the surrounding areas. This will make them confuse in order to go there. Without having the pictures of the landmarks or even having a clue on the roads that are required them to follow, it is difficult for them to go to that places rather then a person who is familiar with that area.

With these problems, travelers do not afford to lose time or cost to certain places. They need to know the route before hand because it is really time consuming and required a lot of money if they are facing with these kinds of troubles.

1.3 OBJECTIVE AND SCOPE OF WORK

The objectives in developing this research projects are:

i. Develop a system that can ease people in finding the directions using sight-seeing paradigm
ii. Minimize the time to achieve to the require locations
iii. Minimize the cost in finding the directions

The scope of the project is:

This system will be a web-based system which is more intractable and easier to navigate by the users. The key feature of this system is the landmarks that required along the way to the destination. This will help the users to find the place without hesitated in asking around where to find the places if they get lost along the way.

CHAPTER 2
LITERATURE REVIEW

2.1 PICTORIAL MEANING

Antonio Damasio (1994) in his book *Descartes' Error* [1]; images are not stored as facsimile pictures of things, or events, or words, or sentences. We are all aware that in recalling a face, or an event, we generate not an exact reproduction but rather some sort of re-interpretation, a new version of the original which will in addition evolve over time. On the other hand however we all equally have the sensation that we can indeed conjure up, in our mind's eye, approximations of images we previously experienced. Images form the main content of our thoughts. Of course "hidden behind those images, never or rarely knowable by us", there are numerous processes that guide the generation and deployment of images. "Those processes ... are *essential* for our thinking but are not a *content* of our thoughts."

Regarding to Damasio, a person have a pictographic memory that helps them to remember events or images that they once encounter in their life. They might not remember everything in order or precisely but they have a clue what are they searching for. The minds of a human being are stored with information that helps a person to trigger a memory that is related to the events. Besides that, the human mind can visualize the pictures by looking back on some relevant landmarks or places.

H. H. Prince, Professor of Logic in University of Oxford in his research on *Thinking and Experience* (1953) [2] said that "The 'meaning' of images is the simplest kind of meaning, because images resemble what they mean, whereas words, as a rule, do not." He also said that have superiority over words, in that "they come *nearer* than words do to being instances of the concepts brought to mind by means of them".

Pictures can describe better than words. If someone failed to imagine the situation or the events by figuring out the words, the person fails to educate them. Pictures give a lot of meanings to every person and with words people can confuse with it meanings and the technical words. With pictures, it helps a person to see what the abstract of a matter and help them to figure it out on that subject. Pictures do help a lot in direction because with these pictures, people could visualize the way and see if they are heading to the right path. With the landmarks pictures provided, there will make everything easier because they know what buildings or areas to be expect.

From Wikipedia[3], the meaning of **image** (from Latin *imago*) or **picture** is an artifact, usually two-dimensional, that has a similar appearance to some subject—usually a physical object or a person.

Images may be two-dimensional, such as a photograph, screen display, and as well as a three-dimensional, such as a statue. They may be *captured* by optical devices—such as cameras, mirrors, lenses, telescopes, microscopes, etc. and natural objects and phenomena, such as the human eye or water surfaces.

The word *image* is also used in the broader sense of any two-dimensional figure such as a map, a graph, a pie chart, or an abstract painting. In this wider sense, images can also be *rendered* manually, such as by drawing, painting, carving, rendered automatically by

printing or computer graphics technology, or developed by a combination of methods, especially in a pseudo-photograph.

A mental image exists in an individual's mind: something one remembers or imagines. The subject of an image need not be real; it may be an abstract concept, such as a graph, function, or "imaginary" entity. For example, Sigmund Freud claimed to have dreamt purely in aural-images of dialogues. The development of synthetic acoustic technologies and the creation of sound art have led to a consideration of the possibilities of a sound-image made up of irreducible phonic substance beyond linguistic or musicological analysis.

From the definition that has been made by the "Wikipedia", pictures can be easily memorized by human after the person has seen the image before. This because the mind is generating the image without the knowledge of the person itself and this always occurs that humans remember images better than words. Pictures are highly recommended in direction is because the direction will be easier if the person can visualize the landmark images rather than giving the route verbally. For human, words are difficult to remember because words are confusing to human minds.

2.2 VIRTUAL TOUR

Based on the research that has been conduct by PIP Director Lee Rainie (202-419-4500) [4], most popular virtual tour destinations include museums, tourist and vacation locales, colleges and prep schools, real estate, historical exhibits, parks and nature preserves, and public places.

This is because these places are interesting places that a person would like to visit but they need to be familiar with the places before they go there. For the places that are far from home such as the Taj Mahal and other tourist attraction places, it is hard for someone to actually go there without having a clue about the places and they need to see for themselves if that places are worth going and what was the famous place at those places

In the research of [4], there are statistics regarding the usage of virtual tours from selected groups. Virtual tours are not the province of young internet users. Indeed, 51% of younger Baby Boomers (those age 40-49) have taken virtual tours, compared to just 37% of those in Generation Y (ages 18-27). Those who take virtual tours are also highly educated: 58% of the internet users with college or graduate degrees have taken virtual tours. In addition, tour takers are slightly more likely to be urban than 1 rural (51% of urban internet users have taken virtual tours vs. 42% of online rural residents).

The research showed that the people around the ages of 18-27 years old are not interested in virtual tours compared the people around the ages of 40-49 years old. This happened because the youngster love to have challenges in life and are more independent in discovering new places. For the young Baby Boomers, there are indeed love to planned their activities at the first hand because to them, there are limited times to visit those places and need to visit all the places during among of the time. Besides that, the Baby Boomers do not have the strengths of the youngsters which may be the reason why they need to know the places and planned their route well.

Figure 2.1 below is the statistic that how many people are taken virtual tour in year 2004.

Virtual tour takers

54 million online Americans have taken virtual tours. The percentage of that 54 million who fall into each group...

	% of virtual tour takers who are...
Men	47%
Women	53%
Race/ethnicity	
Whites	82%
Blacks	7%
Hispanics	3%
Other/Refused to answer	1%
Age	
Generation Y ages	26%
Generation X ages	27%
Younger Baby Boomers ages	28%
Older Baby Boomers ages	21%
Mature ages	5%
After work ages	3%
Household income	
Live in households earning less than $30,000	15%
$30,000-$49,999	22%
$50,000-$74,999	21%
$75,000 or more	42%
Educational attainment	
Not high school graduate	4%
High School graduate	23%
Some college	27%
College and graduate school degree	46%
Community type	
Rural	23%
Suburban	38%
Urban	32%
Internet access at home	
Dial-up	36%
Broadband	64%
Parental status	
Parent with child under 18 living at home	44%
Non-parent	56%

Source: Pew Internet & American Life Project November 2004 survey. N=537 internet users. Margin of error is ±5%.

Figure 2.1: Statistics on Virtual Tour Takers

With the statistic above, the value should be increase due to this statistic has been made on 2004. Many people are depending on Internet to find their solution in different matters including directions. Even though the research project system is not a virtual tour instead a picture directions, using this information, I could say that the system has the advantage in helping people for the best solution in finding their require path easily by using images.

2.3 BENEFITS

The tagline that has been used by Optimum Yield Inc. [5], which is *"If a picture is worth a thousand words, 360 Degree Virtual Tours are worth millions!"* has a lot of meaningful thoughts to it. It is true that virtual tours give millions of words because each person has different interpretation on certain pictures. Every landmark will be meaningful to other people and with those memories; people will hardly forget the places.

Besides that, the virtual tours are available 24 hours per day, 7 days per week, and are becoming increasingly popular. This is true that the web-based system will provide 24 hours service for its users and will provide an extra feature which will show the landmarks picture during night based on the user's clock on their monitor.

Referring from Museum Virtual Tour Design Guide, WORCESTER POLYTECHNIC INSTITUTE [6] the benefits of photo-based tour are:

i. Access
    a. Providing audio description
    b. Providing descriptive text and clear images
ii. Education

a. Allowing the user to explore the university rather than just reading a description

iii. Maintenance

a. Providing an option that is easy to update and inclusive for user needs

2.4 EXAMPLE ON VIRTUAL TOUR

Figure 2.2 is an example on virtual tour campus from Paul Smith's College[9].

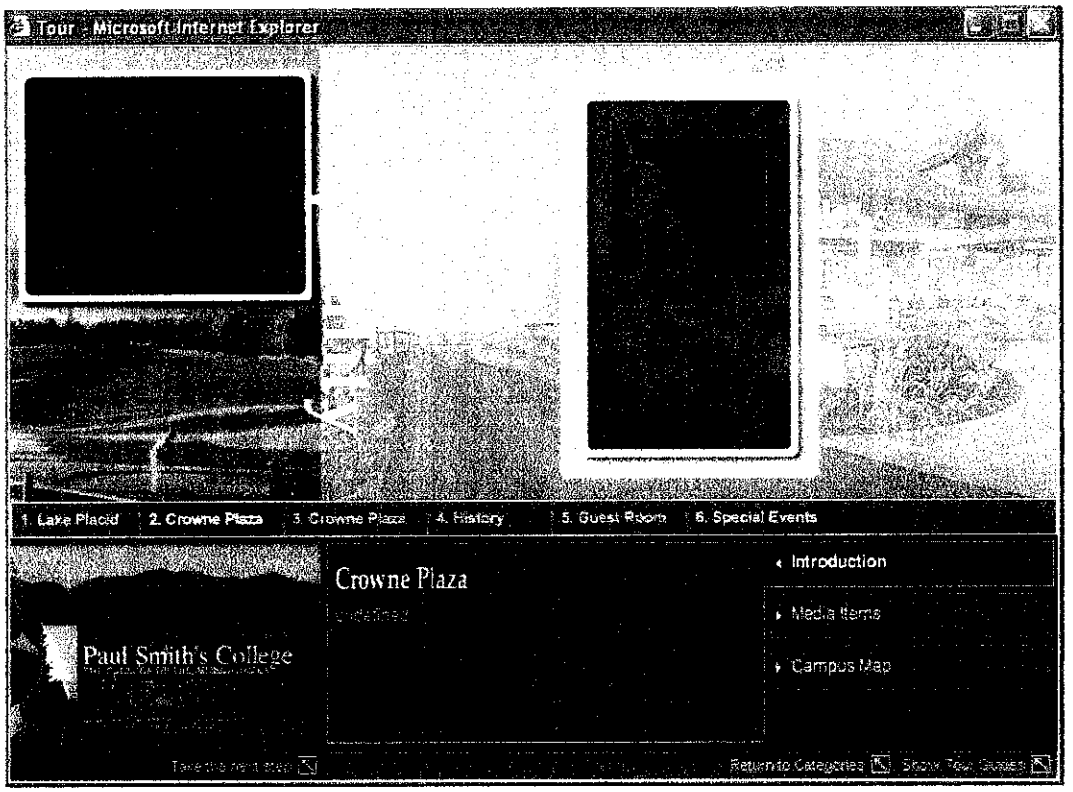


Figure 2.2: Virtual Tour Campus

This is a webpage from Paul Smith's College which it is only a basic webpage that provide the pictures of the campus areas. This webpage creates the excitements which will influent the users to know more on this college.

The ideas used in virtual tour can be reused in providing directions. Virtual tour prove that this webpage that using images or video being able to visualize gives users confident and generate interest; but probably not providing that helpful directions.

2.5 DIFFERENCES BETWEEN MEN AND WOMEN IN FINDING DIRECTIONS

From the research made by Jennifer Leason, Alastair MacFadden, Scott Bell, and Lorin J. Elias, University of Saskatchewan [13], "As predicted, men made significantly fewer errors than women in our real-world navigation task. This difference can be attributed to the large number of errors made by women following Euclidean instructions, as men and women did not differ in the number of errors made during the landmark condition. Although there was a significant sex difference in performance on the Mental Rotations Test, these differences did not appear between the groups who followed Euclidean or landmark instructions while navigating. Thus, the high rate of errors among women using Euclidean instructions did not simply result from reduced spatial ability in these women. Rather, our data suggest that, overall, women were less able to use the Euclidean instructions accurately (based on errors) and efficiently (based on time)."

Euclidean instruction is verbal instruction which the direction is giving by map and few other "written direction". Basically from the case study, you could see that men are good in finding their way using the Euclidean direction rather than women because women made too many mistake in reading and interpreting the maps. But the study also showed the number of errors using landmark condition between men and women are not that differ. This shows that using landmarks pictures can help both genders in finding their ways easily rather using maps and verbal direction which this may only help the men in succeed in finding the places. This study showed the effectiveness in landmarks picture in giving direction rather than using maps and verbal direction.

From Alastair MacFadden, Lorin Elias and Deborah Saucier [14] case study, they said that "females tend to give directions that feature landmarks and left/right turns, whereas males include more cardinal and distance information. It is plausible this difference results from disparate attention to these features during exploration of a map. In the present study, 22 males and 22 females learned routes on a map while their eye movements were monitored, and then gave written directions between different locations. Consistent with earlier research, males made more references to NSEW when giving directions, whereas females referred mainly to left/right turns and landmarks along each route."

In this case study, it showed that women are more concern in their surrounding rather than men because for them it is easy to remember landmark rather than distance information. Both genders have their own way in finding the directions but using landmarks, it gave the advantage to the female in discovering the location. For the male, it is either using landmarks or distance information, they will not have the problem in finding the location because men is availability in finding those directions with making to many errors than the female did.

CHAPTER 3
METHODOLOGY

In developing a system, one needed a specific methodology in guiding the overall process flow. In developing this system, the prototyping development methodology is most suitable. This method is most suitable because of the phases is move from sequence another sequence and it performs the analysis, testing and implementing phases concurrently and all the 3 phases are performed repeatedly in a cycle until the system is completed. With these methodologies, the basics of analysis and design are performed and work immediately begins on a system prototype, a "quick-and-dirty" program that provides a minimal amount of features. The 1st prototype is the first part of the system that user will use. The prototype then evolves into the final system. The stages of the model are illustrated in Figure below:

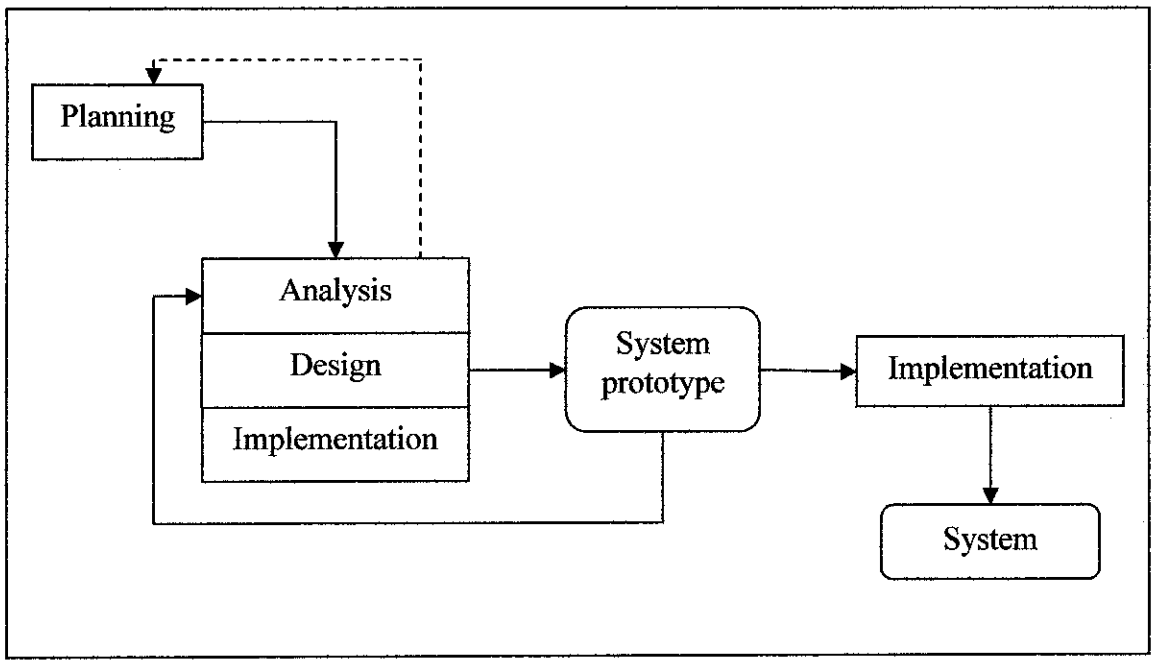


Figure 3.1: Prototype-based Methodology

3.1 PLANNING PHASE

In this initially phase, I talked to my supervisor about the ideas of the project. After, I conduct literature review to establish the objective, scope and schedule of design, implement and test. Beside that, I make a research on the used of the pictures in website and how important pictures in direction navigation.

3.2 ANALYSIS PHASE

In this phase, the entire requirement needs to be collected from the resources. I am using PHP to design my web-based project which I need to determine the functions, and the input and output of the system.

To make this web-based system a successful, it is important to make sure that the web site is presentable and accessible. If the system cannot be understandable by the users,

this will create a large barrier in conducting the system. The system is helping the users in getting to the specific locations easier not the other way around.

3.2.1Requirements

The following features are helpful considerations for the creation of an inclusive and accessible virtual tour:

i. User friendly navigation
    a. Contrast between the screen background and objects
    b. Colour-coded and consistent shapes for navigation, avoiding complementary colours
    c. Clear and persistent in putting the buttons in every pages

ii. Photos
    a. Clear and good contrast between background and foreground objects
    b. Define the edge by using borders

iii. Text
    a. Be concise
    b. Use appropriate fonts
    c. Use appropriate font styles
    d. Sufficient weight of font in text and titles
    e. Simple but descriptive sentences
    f. Avoidance of scrolling text

iv. Information presentation
    a. Short sentences and easy to understand

b. Avoiding to much information
c. Short paragraph to capture the audiences attention

v. Color
   a. Balance with the background
   b. Consistent colors that do not distract the audiences
   c. Avoidance of complementary colors together: red and green, blue and orange and purple and yellow

vi. Addition features
   a. Audio descriptions partially sighted people
   b. The pictures is shown in night mode which determine by the monitor clock

Non Functional Requirements are:

i. Operational
   a. This system which is "Providing Direction Using Sight-Seeing Paradigm" must be compatible with the Internet Explorer (IE) 6.0 or the latest version, Netscape® Browser 8.0 or the latest version or Mozilla Firefox 1.5 or the latest version
   b. The system must be able to runs in multiple platforms

ii. Performance
   a. The user interaction should be effortless and easy to handle
   b. The language that will be used in the system will be English because it is an international accepted language
   c. The page must be able to work globally

d. The system should be available 24 hours a day, 7 days a week, throughout the year

iii. Security

a. The system does not required a high level of security because no valuable information and no transaction involves

b. The upper superior will have the access into the database which containing the path information and the pictures

iv. Cultural and Politics

a. The system must meet the international laws and regulations, as well as the Malaysian's laws and regulations

b. The system must meet the international quality control

Figure 3.2 shows the system architecture diagram of this system.

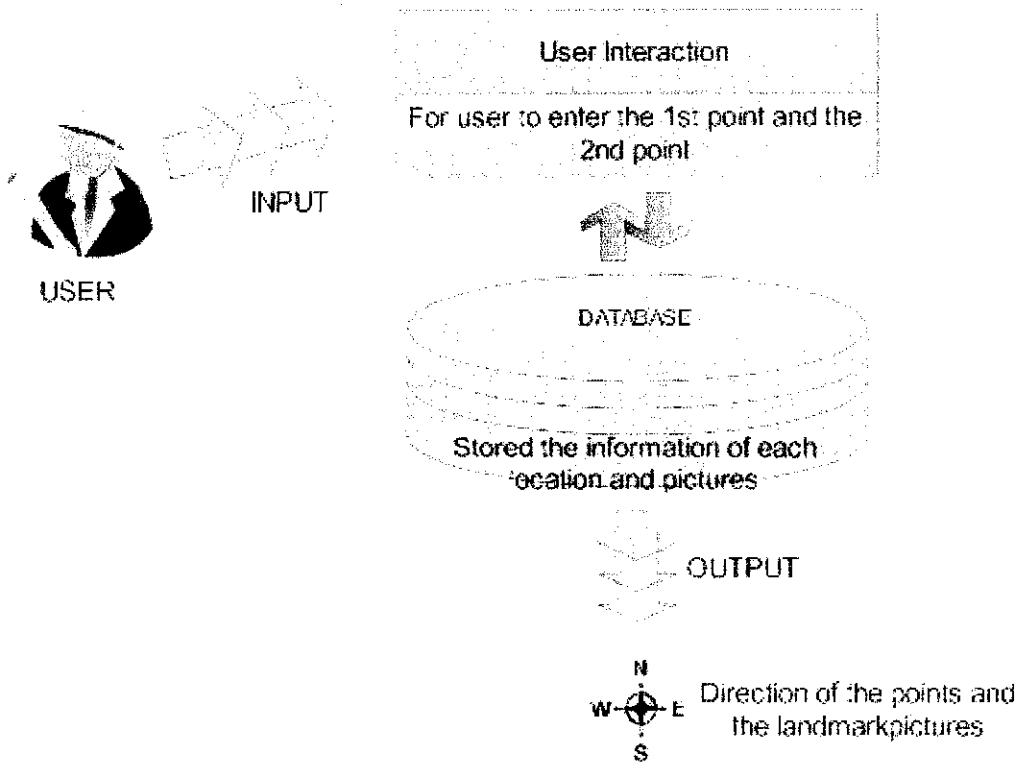


Figure 3.2: System Architecture Diagram

In the system architecture diagram, showed that the user will enter two inputs and the database will calculate the distance between both points. In the database, there will be stored the value of each point and the pictures of each landmark to help the system to generate the results. The interface of the system will be a web-based interface and the result will be generating from multimedia elements which consists Macromedia Flash and JPG format.

Figure 3.3 below is the use case diagram of the system.

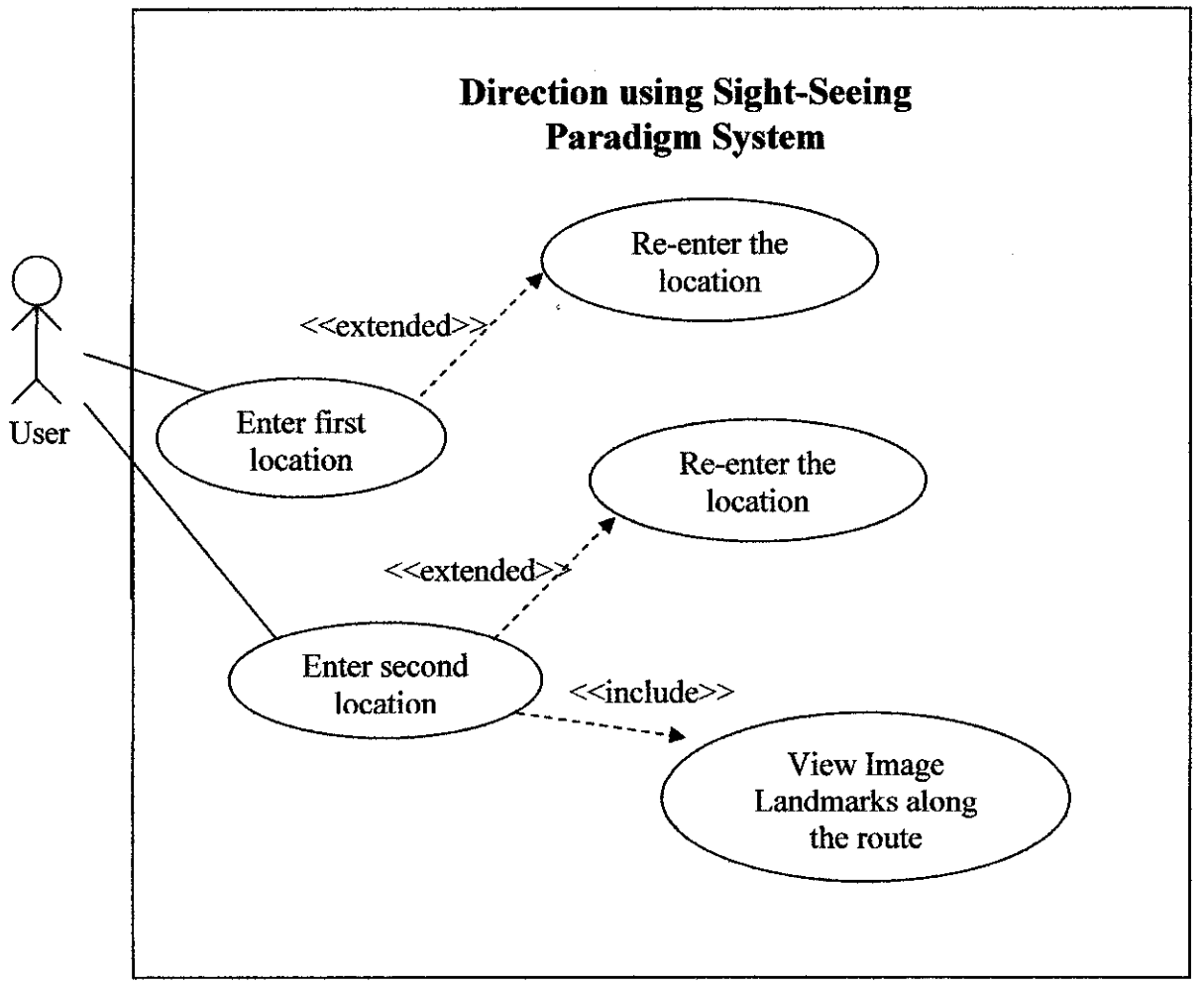


Figure 3.3: Use Case Diagram

3.3 DESIGN PHASE

Figure 3.4 below is the flowchart diagram on the system.

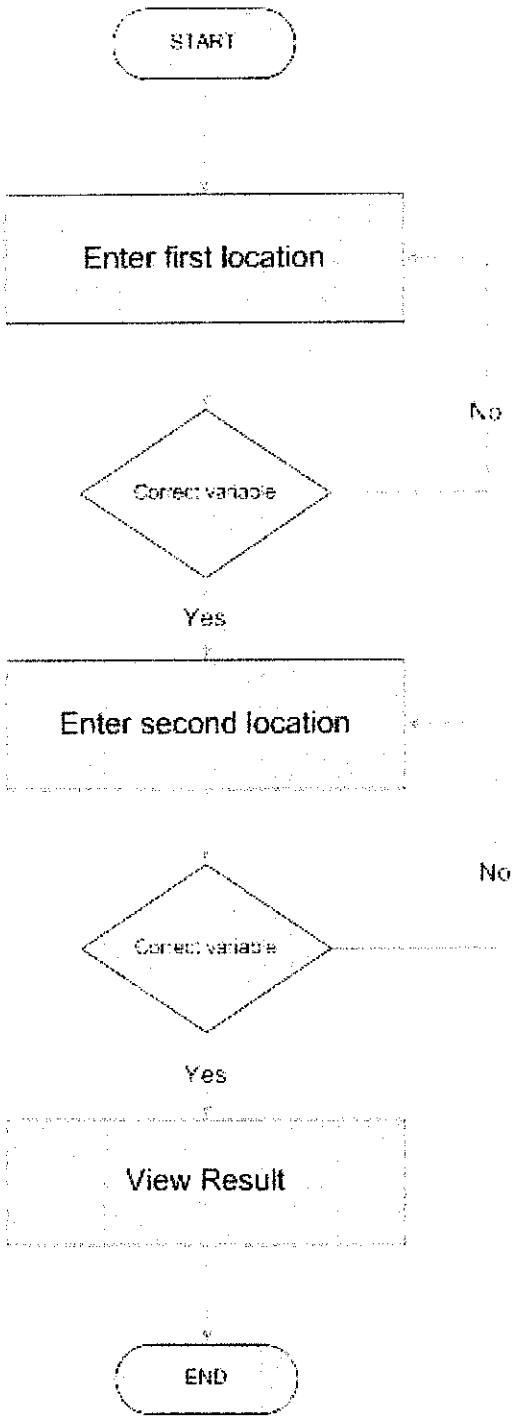


Figure 3.4: Flowchart diagram

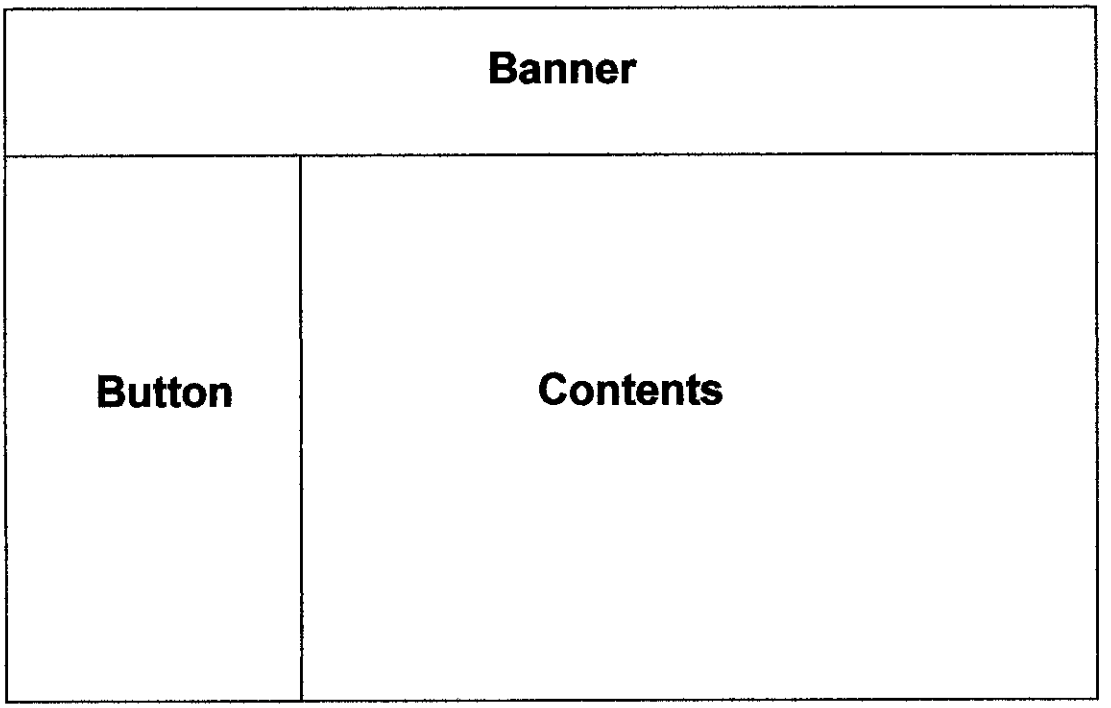
3.3.1 Tools/ equipment required:

- APACHE 1.3 - as Web Server
- PHP 4 - PHP is a widely-used general-purpose scripting language
- My SQL - database management system
- Macromedia Dream Weaver - To build an interactive interface.
- Adobe Photoshop -- design button and interactive banner.

3.4 IMPLEMENTATION PHASE

The implementation is the phase where the system that already finished will be implemented either as pilot implementation or full implementation. Normally the implementation will be done through pilot implementation whereby the installation will be done on one site or selected computer and the users will use the newly installed systems. If everything goes well with the hardware and network setup, then the massive installation to other machine will be done.

3.5 INTERFACE METHOD (LAYOUT OF THE SYSTEM)



i. *Banner* - Using adobe Photoshop to create a banner
ii. *Button* - That includes the button that can link to other page.
iii. *Content* - In content section, all the information detail will appear here.

The GUI for this system will be user friendly which will help user to navigate easily without having to figure out which process is next. The system will be a direct web-based system which will help the user to navigate the page by themselves. The picture will popup will the direction from one point to another point showed.

3.6 TESTING PLAN

In this testing process, I will test this system on people who are not familiar at all with the "Universiti Teknologi PETRONAS" (UTP) surrounding. I will test this system when schools having field-trip to UTP. I will select three groups in conducting this

testing. Each group will consist of five team members and the selection of each group will be equal. This is to prove that this system works in order of its users.

The first group will used this system to guide them the location given. The members of this group will guide their way to the require locations without the assistant from other people. The system will be design based on user-friendly because the system should not be difficult to navigate. There is video sharing to help the users to use the system.

The second group will only receive the conventional map to help them with their directions. There are also not allowed to ask people the way but only use the map to guide them.

The last group will not be provided with the system or the conventional map but the can ask the people the directions. They can communicate along the way until they found the locations.

Every team will be given the same location to go. This is to make the result time accurate. Each group will have facilitators to foresee them in this testing process. Using the time, we could determine which team arrives first at the location. This test will prove that with the help of the system, users have advantage in arrive the locations first without asking the directions from other people.

CHAPTER 4
RESULT AND DISCUSSION

4.1 THE DIFFERENCES BETWEEN THE SYSTEM AND OTHER SYSTEMS

The differences between this system and the other existing system are:

i. This system provide pictures of the landmarks that is required
ii. It is not a virtual tour but it is picture direction which guide people using pictures
iii. The JPG images are the important thing in the systems
iv. The user interface for this system is important because the users are interacting with the system rather then the virtual tour which only show the video

The differences of this system and Google map or Yahoo map are:

i. Google or Yahoo map only provide the users with a 2D which then help the users by narrowing down to the place that the users required which for the research project, the system will help the users in finding from one point to other point that the users require and shows all the related landmarks of its surrounding
ii. It is easily to use which the system is easy to navigate and really understand the need of the users

4.2 BENEFITS OF THE SYSTEM

The system will give the benefits to a lot of people including the students and tourists. In any way the system would provide a way in other for a person to easily to other locations. It is not only save cost but it will also save time using this system. Travelers could not afford higher cost or more time in order to get to one place. Besides that, using this system, the users could share the information with other people, for example their family and friends. With that help of others, the users would find the location easier if they forget the landmarks.

Besides that, this system is an upgrade version of virtual tour. Using pictures for direction are increasing popular. It is easier to find a location when you could imagine the areas and also come across with the landmarks before you encounter the real contexts. This system will help to locate one point to another point and shows all related areas and landmarks which could help the users to remember the route due to people are easier remembered pictures rather then words.

Internet is the main thing in this decade, and I would like to think that as an advantage. Many people preferred to surf the internet to gather information on certain areas including directions. The users could collect all the information they needed any time any where because the system is available 24 hours per day, 7 days per week. The users can also access the system anywhere which has internet connection.

4.3 POTENTIAL APPLICATION USAGE OF THE SYSTEM

There are many potential applications that can be implemented with this idea. Pictures do help people in remembering any events regarding with the buildings and its surrounding areas. Many people do have benefits with the picture direction method. The areas which get these benefits are:

i. Campus
    a. Many university or college has a very big area. For new students or their parents, it is hard for them to find their way to the residential colleges for the first time. With this system, it will help to guide them to their preferred locations.

ii. Safety
    a. For safety measures in certain buildings, there are always fire drills route which guide the employers, employees and their customers to the safe grounds. With the help of the system, the employers could save their budget in the fire drills route, if they could provide the directions in their company website. Each visitors or employees need to view the safety routes before entering the buildings.

iii. Tourism
    a. This system will improve the current system which had been use to guide the tourist to other location. The pictures of the landmarks will have the travelers determine their routes to the require destinations without facing with the language barrier. Pictures will not be misunderstood rather then verbal direction given by the local people.

iv. For the public audience

a. The examples of this kind of system are Yahoo Map and Google Map. These two main website can enhance the skills in finding the directions by applying pictures to state the landmarks. With the helps of those pictures, people will feel the confident in finding the places that they are not well-known with.

CHAPTER 5
CONCLUSION

The system is hoped to meet its objectives of assisting travelers seeking a specific destination with minimal effort and time. An experiment proves that the sight-seeing paradigm introduced is indeed capable. Many people are now realizing that pictures do play important roles in creating visualization in person's mind.

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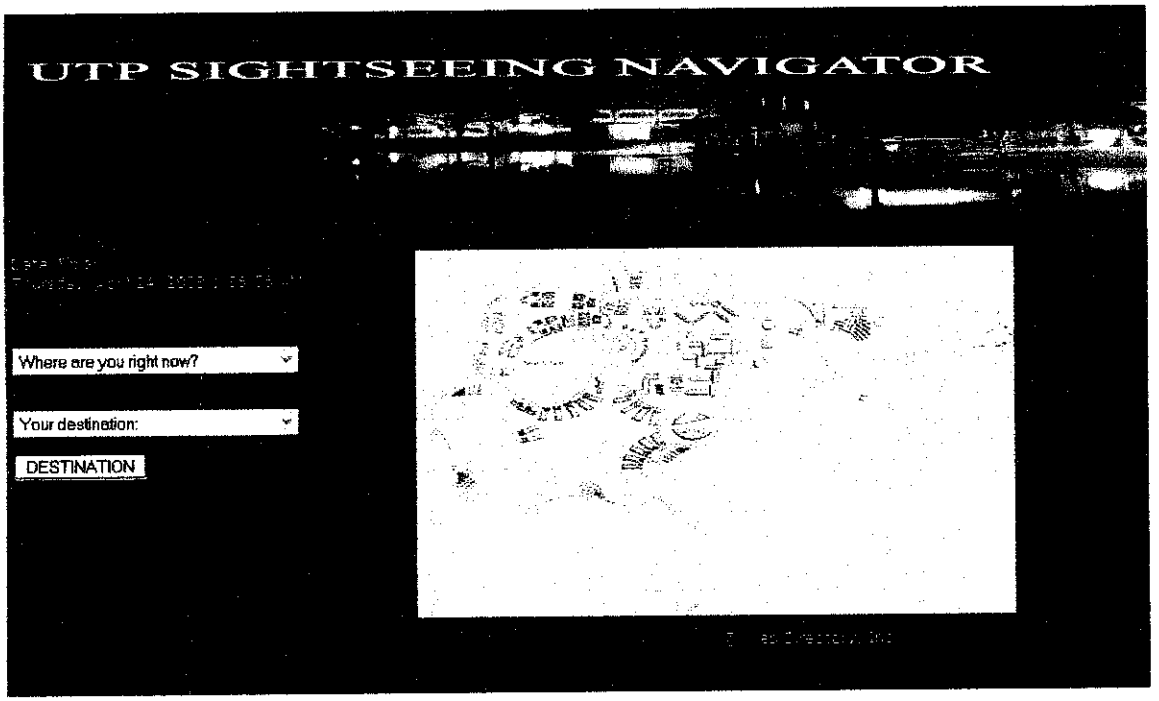
APPENDICES

Appendix A: Screen Shot of the Web-Based System



Appendix B: Questionnaires

Questionnaires – Providing Direction using Sight-Seeing Paradigm

This survey meant to assist in a project of implementing new direction navigator in UTP areas.

1. Are you a student of UTP?
   - ☐ Yes
   - ☐ No

2. How long have you been in UTP?
   - ☐ Less than a year
   - ☐ 2 – 3 years
   - ☐ More than 3 years

3. Your experience as a computer user?
   - ☐ Beginner
   - ☐ Intermediate
   - ☐ Advance

4. What do you think about this system?

   _____

   _____

5. Is the system is easy to navigate?
   - ☐ Yes
   - ☐ No. Why? Please state the reason(s).

     _____

     _____

6. Do you think this system will help you in finding the required destination?

☐ Yes

☐ No. Why? Please state the reason(s).

_____

_____

7. Can you give your opinion in improving the system more?

_____

_____

_____

_____

Thanks for your time and cooperation.