FINAL YEAR PROJECT II (TBB 4014)

PROGRESS REPORT

MATCHING DISPLAYED ADS WITH USER QUERIES AND BROWSING BEHAVIOUR TO MEASURE USER SATISFACTION

by

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Bachelor of Technology (Hons)

Business Information System

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CERTIFICATION OF APPROVAL

MATCHING DISPLAYED ADS WITH USER QUERIES AND BROWSING BEHAVIOUR TO MEASURE USER SATISFACTION

By

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TRONOH, PERAK

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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 have been specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

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PUTERI INTAN AISHAH BINTI AHMAD ZAYADI

ABSTRACT

Online Advertising is said to be the current trend in advertising industry and will be able to survive and focuses on being valuable. For this project, the scope of Online Advertising is going to be discussed. To be more specific, this study will focus mainly from the user perspective. Online Advertising is the act of spreading the message of the products and services over the Internet to targeted potential customers (in this study, the user). The problem from the user perspective is that, the ads retrieved or delivered do not satisfy the user, thus affecting the user browsing behaviour. The objectives are to develop an extension of a normal website to get feedback from the user on the ads retrieved, to evaluate the ads relevancy retrieved based on the user query and browsing behaviour, to prepare a set of questionnaire and to come out with a good policy to measure user satisfaction in browsing for ads. This study will describe how the system is being developed with the support of few literature reviews and findings that had been establish previously. The research methodology approach which is the Rapid Application Prototyping also is being discussed. The four phases involved, together with the project activities are being list down in order to monitor the development of the system. The result and discussion chapter will cover the analysis of the survey that had been conducted. Plus, the study will describe the system architecture and the prototype design of the system.

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ABBREVIATIONS AND NOMENCLATURES

IAB   Interactive Advertising Bureau

SKMM   Malaysian Commission and Multimedia Commission

TAM   Technology Acceptance Model

TRA   Theory of Reasoned Action

CHAPTER 1

INTRODUCTION

The first chapter will describe the topics below:

- Background of study
- Problems Statement
- Objectives of Study
- Scope of Study
- Relevancy of the Project
- Feasibility of Project within Scope and Time Frame

1.1 Background of Study

Online Advertising is the act of promoting the products and services of a business over the Internet. According to Wikipedia (n.d), it is also call as Internet Advertising that uses Internet to deliver promotional marketing messages to the customers (in this study, the user). Such methods of Online Advertising include:

- Email marketing
- Search engine marketing
- Social media marketing

It is similar to any other methods of advertising but the only difference is that it is done over the Internet. The main purpose of advertising is to spread the message and information about the products and services of the business. Since Online Advertising is a large business that is growing rapidly, it is as much important as any other business activities because an investment made in advertising reflects whether the company shall gain revenue and increase it sales in the future. Moreover, the main purpose of an advertising itself is to create a message that represent the business and to be able to notify the customers of the products and services that are available in the market.

Advertising on the Internet has allowed businesses to be able to interact more effectively as compared to any other advertising methods, (Zeff and Aronson, 1999). Online Advertising allows users to interact by clicking the advertisement to dig for more information. Having to get more information on certain products and services will enable them to potentially purchase the items online, hence, encouraging the buyer-seller interaction in e-business point of view. Unlike other method of advertising such as television advertising, radio advertising, advertisement in a magazine or billboard advertising which promote less interaction and sometimes not accurate in reaching out to targeted customers.

Online Advertising is very relevant to be used by businesses nowadays, knowing that the usage of Internet is the current trend. Internet is said to be a platform for an effective advertising medium. It is also the global interconnected network that use the specific set of rules and connects networks all over the world to serve billion of users. The existence of the World Wide Web has allowed users to be easily accessible to each other. Advertisers and publisher have devised of delivering specific ads for the Internet users who are most likely to be interested in the products and services offered by the business. The most important thing about the Web itself is that it has a user friendly standard interface. This interface has allowed users, even though they are not computer experts to use the Web in order for them to have access to a variety of Internet resources.

1.2 Problem Statement

In search based advertising, the ads delivered in the search results do not satisfy the users hence, affecting their browsing experience. This is because the ads retrieved are not purely based on relevance but due to the factor involves in deciding which ads are given ads slots. (Yuan et al. 2012). Those factors are based on the match between the search topics, advertisers' keyword, bid prices and click-through rates for keywords. In other words, the ads retrieved are not purely based on user query.

The study will address the problem statement as below:

1. How to measure user satisfaction on the ads delivered or retrieved based on the user search query and browsing behavior?

2. How to get feedback from the user on the ads displayed?

3. What are the important features to measure user satisfaction?

1.3 Objectives

1. To develop an extension of a normal website to get feedback from user on online advertising.
2. To evaluate the ads relevancy retrieved based on the user query and browsing behavior.
3. To prepare a set of questionnaire for the user that is relevant and suitable to the study.
4. To come out with a good policy in order to measure user satisfaction in browsing for ads.

The listed objectives above are to address the problem statement mentioned previously. As a whole, this project is mainly about measuring user satisfaction or user acceptance on online advertisement. Basically, this project would require the author to develop a system, in this case a website that will need a group of users to evaluate and give feedback on the online advertisement provided. There will be a set of questionnaires that the user will need to answer in order to be obtaining the feedback from.

1.4 Scope of study

For this particular project, the scope of study is to discover and explore in depth the concept and theory of online advertising mainly from user's perspective. It is also to identify to what extent that the displayed ads satisfy the users, which will eventually addresses the problem statement. It is also important to understand the four main players in online advertising which is the ad exchange, advertiser, publisher and user.

Furthermore, it is important to critically discover and understand the tools needed in addressing the problems. The author needs to identify which tools and methods that are suitable in developing the web-based system. In order to address this issue is by narrowing down the features which are relevant in measuring user satisfaction on the relevancy of ads displayed. This can be done by analysing users browsing history and search queries.

1.5 Relevancy of the Project

This project is relevant as it will benefits the Online Advertising industry and ecosystem. It is relevant because knowing the nature of Online Advertising ecosystem, it is far more important to be able to know and understand the customer (in this study, the user) needs and expectation as well as to know to what extent ads will satisfy the customers. Therefore, it is important that being able to identify what features needed for an ad to satisfy a customer. This is because, the goal of advertising is that for advertiser to be able to get the customers attention and make sure that the message of an ad is delivered. Advertiser can predict what the customer would want, but they cannot really know. Therefore, it is important for the advertiser to be able to know and understand which kind of advertisement that will attract the user the most. The development and implementation of this project will address this issue.

1.6 Feasibility of Study within Scope and Time Frame

Research done on Online Advertising mainly on the User perspective is the scope of study for this project. The purpose of the study is to understand in depth the concept of Online advertising in order to develop a web based system to measure user satisfaction in browsing for ads whether the ads displayed does match the user search query and browsing behaviour.

The time frame of this project development will includes the two semesters of study. During the first semester, for FYP 1: May 2013 – September 2013, the study focussed on conducting research, planning and analysis. As for the second semester, for FYP 2: September 2013 – January 2013, the study will focus more on the designing and develop the prototype. Based on the given time frame, it is feasible with the scope of study, as what had been mentioned in the previous section.

CHAPTER 2

LITERATURE REVIEW

This chapter will focus on defining and identifying the general topic, issues and area of concern. It will describe the concept, trends and findings on Online Advertising and some arguments that address the problem statement. The purpose of this chapter is to be able to analyse critically some literature review through summary and comparison from several of studies and theoretical articles.

2.1 Recent Trends in Online Advertising

Online advertising, also known as Internet Advertising, is the act of promoting products and services of the business through websites over the Internet. Internet is the largest network that carries vast range of information. Besides, there are findings mentioned that approximately 90% of online consumers regularly browse the Internet to for communication purposes, (Zeff and Aronson, 1999). Advertising indeed, carry a similar approach in the context of communication, where advertising is to spread message and information to the users. Advertisement is used by businesses and company to influence and manipulate the customers into taking the next possible action which is to purchase the product.

Online advertising is said to be the recent trend in advertising industry. According to the report produce by the Interactive Advertising Bureau (IAB), it is proven that online advertising do benefits in the economics point of view. Figure 1 reported that the advertising revenue had increase up to $9.6 billion from $8.3 billion in the first quarter of 2013. The results was obtained and compiled directly from the information received by the companies that sell advertising on the Internet. This shows that advertising on the Internet shows positive trends and does looks promising in the business industry. It is also become relevant that online advertising is a necessity for current businesses where more customers can be reached.
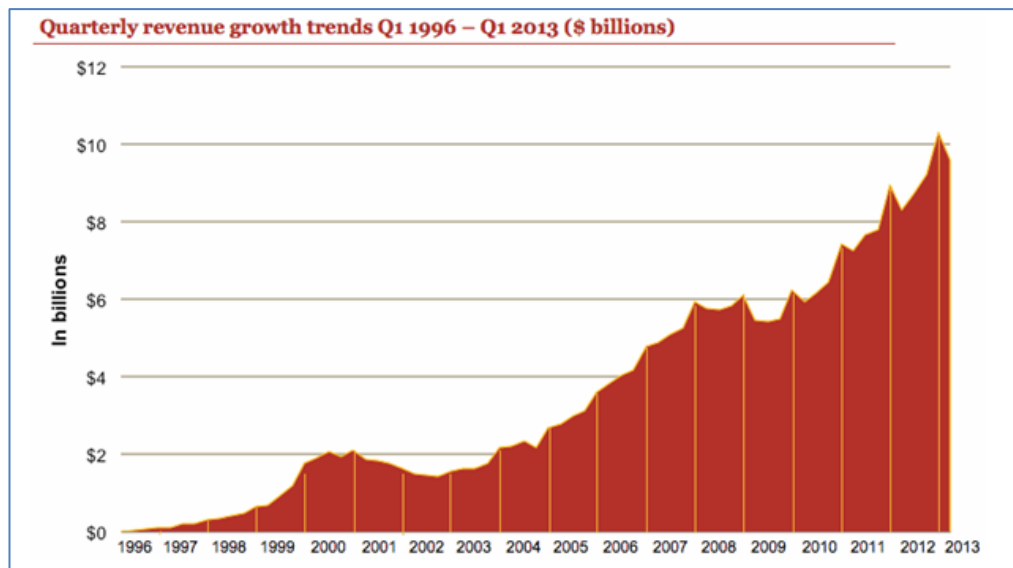
Figure 1: Quarterly advertising revenue growth trends 1996 – 2013.

Based on Figure 1, the graph does support the fast growing of online advertising. This is because it provides the web search engines and publisher some revenue. As for the advertisers, online advertising offers opportunity to creatively utilize the technology to do marketing as a great alternative to traditional advertising. Therefore, this method of advertising does offer wide chances for businesses and advertiser to widely spread message and information in order to reach the users which are also the customers.

Traditionally, advertising is done through television, radio, newspaper, magazines and billboard. This method of advertising is considered to be quite good in delivering message and information about the product and services that the business produce to the customers. But still, as compared to online advertising, traditional way of advertising is not that effective in reaching out the potential customers, considering that the current trends of communication is via Internet. Therefore, it is concluded that the online advertising is complementary to the traditional method of advertising in getting sales and revenues. This is because online advertising allows users to view the advertisement, get more information by clicking the advertisement and may directly purchase the product over the Internet.

2.2 Online Advertising in Malaysia

To have more understanding on the subject matter which is on Online Advertising, the study will also take into account the area of concern which is the advertising industry in Malaysia. According to the Malaysian Communications and Multimedia Commission (SKMM), 2009, the advertising industry in Malaysia had gradually expanded from the traditional form of advertising towards the digital world of advertising as it will reach the audience more effectively. This is proven when RM 14.9 million worth of advertisement was spent for Online Advertising in 2008. The advancement of Internet and extensive Wireless Fidelity (Wi-Fi) connections in today's world is the main elements for the development of Online Advertising.

The development of the Internet has not only changed the user habits, but also had created opportunities for Online Advertising in Malaysia. Most traditional form of advertising such as television, magazines, newspaper and radio had gradually shifted towards having to put its content in the online spaces. As for an example, the local paper Utusan, which is one of the most popular Malay newspapers, had put it contents in the online channel. By doing so, a total average of 40 million monthly pages had been viewed, which is considered to be incredible for advertisers. (Malaysian Communications and Multimedia Commission (SKMM), 2009)

Furthermore, it is also important to study the online behaviour of the people in Malaysia. According to Malaysian Communications and Multimedia Commission (SKMM), 2009, it is said that 61% of Malaysian Internet user have experience using the Internet of more than five years. On top of that, Malaysian Internet users spend almost 20 hours every week online, as compared to watching television which is only 10.6 hours every week. Therefore, it is concluded that people spend more time on the Internet, will have a greater chance to be expose to a large amount of Online Advertising. Thus, it will benefit the advertiser.

2.3 Characteristics of Online Advertising

Online advertising has its own advantages which will be discussed in four distinct aspects (Zeff and Aronson, 1999). They are targetability, tracking, deliverability and flexibility, and interactivity.

- Targetability in comparison
    - As to compare to traditional advertising, online advertising may help businesses and advertisers to reach targeted customers easily. It will also give the ads a much wider coverage to reach more customers and thus increase the number of click-through. Online advertisers may use the information they have throughout the Internet in order to come out with specific advertisement that deliver specific needs of the customers.

- Tracking
    - Advertisers are able to track how users interact over the Internet. There are a lot of analytic tools that can be used to measure online advertising method. It is done by measuring user's response on the advertisement through the number on times an advertisement is clicked or the number of purchase done. In traditional advertising, none of these measuring methods can be done which can definitely help the advertisers in producing products and services as well as to come out with suitable advertisement that addresses specific preference of the customers.

- Deliverability and Flexibility
    - Internet is the network which is accessible all the time. Through the Internet, advertisement is delivered and accessible in real time for 24 hours a day. Besides, the advertisement can be launched, updated, or cancelled whenever necessary. Advertisers may monitor the progression of the advertisement at little or no cost at all. Unlike television advertising, there is high cost needed in creating or even changing the content of the advertisement.

- Interactivity
  - Online advertising encourages an effective interaction from the customers. Users may just click the advertisement for more detailed information about the product; users may view the choices and then purchase it online immediately. It promotes a better branding where businesses and advertisers may provide any relevant information about particular product and also response to any queries from the users through e-mails, for instance.

Among the available ads for online advertisement are:

- Sponsored search ads
  - This is the ads that are being displayed by search engine which act as the publisher alongside the organic results or also known as search results.
- Contextual ads
  - The ads that are being displayed based on the geography, language, device and other characteristics of the visitors. A contextual ad does fully utilize the opportunity in advertising.

2.4 Online Advertising Players and Perspective

There are four main players in online advertising and they are ad exchange, advertiser, publisher and user. Each player play important role in the Online Advertising ecosystem that will eventually benefit each other.

1. **Ad Exchange**
   o It is the advertising service that provides the mediums for advertisers to place their advertisement. This enables the advertisers to spread information regarding their products and services to targeted users. Ad exchange sells keywords to advertisers and works as the auctioneer. Some advertising services are there in the industry are, Google AdWords and Yahoo! Sponsored Search. Other than that, ad exchange also handles the contract negotiation between publishers that want to sell ads spaces to the advertisers.

   o Ad exchange is considered to be a platform for publishers to sell ads inventories meanwhile, the advertisers to buy impressions and clicks in real-time. It is understood that the selling and buying ads slots is the major event of an ad exchange. The main role of an ad exchange is conduct an auction model, balancing the relevance and revenue and effectively dealing with textual information. (Yuan et al. 2012).

2. **Advertiser**
   o Advertisers are those that need ads spaces to place their ads for marketing purposes. Advertiser need spaces on the sponsored search result and webpage reserved spaces. Advertiser make investment in making the advertisement so that the users will get the information about the product and service, which will later reflect the return on investment from users through purchases and subscribing on ads.

o   According to Yuan et al, (2012), advertiser is utilizing the existence of an ad exchange and its services in order to publish ads on publisher's webpages. The most critical task for an advertiser is the keyword selection and bid optimization part. Advertiser will need to bid on keywords that will best represent and describe the products and services that they are selling. Advertiser need to have its own bidding strategy since the ad exchange will select ads based on few different factors which include the bidding price.

3. **Publisher**

o   Publisher host the website that has reserved spaces to display advertisement. Publisher will obtain revenue by selling the ads spaces to advertisers. Some common publishers are CNN and BBC. The challenge for a publisher is to be able to come out with the optimal price to sell the ads spaces. It is important for publisher to have content that has profitable keywords.

o   Role of a publisher is to deliver and sell a number of inventories in contract form or in real-time. Since the revenue in online advertising is shared between publisher and ad exchange, the publisher needs to have a good strategy of balancing the revenue and the quality of the content. This is because, a relevant ads being display will more likely to have users to click the ads and thus, more revenue can be obtain. (Yuan et al. 2012).

4. **User**

o   It is the people who browse the web. They perform search using search engines that are available on the Internet. According to Yuan et al. (2012), the ads search are not retrieved purely based on relevance. Ads retrieved are based on the match between search topics and the advertisers' keyword, bid prices and the click-through rates for the keyword. The ads are given slots and being displayed based on the advertisers keyword, and

bid prices. Thus, this does not fully support user satisfaction on web browsing.

o Users are the most important players in the Online Advertising ecosystem. This is because, they are exposed to the ads and also are those who will involve in financing the website. Knowing that the Internet is the source of any kind of information, the search engine is use to provide the user with relevant ads.

2.5 Measuring User Satisfaction

The study will focus on these two ads (sponsored search ads and contextual ads). Computational advertising also play important roles in online advertising. It is the scientific and computed way of displaying ads to users based on some algorithms. The challenge is to find the best match of ads being displayed based on user queries which will then promote user satisfaction. Websites had used the Personally Identifiable Information (PII) which uses cookies and browser to profile user and deliver relevant and targeted ads to them by Yan et al.(2009). User satisfaction of the websites can be done through usability testing where it can be done by using both objectivity and subjectivity variables (Helm et al, 2005). Such objectivity measure may include task success rate and task completion time. Subjectivity measures the satisfaction of users with the system. Therefore, in this study it is important to be able to learn, predicting and matching displayed ads to users based on the users browsing history and search queries.

In the user perspective, the ultimate goal of advertising is to find out whether the ads published do really satisfy the user, relevance and delivering the right message. There are few ways that had been established by researchers in measuring user satisfaction. According to Fox et. al. (2005), explicit techniques and implicit measurement can be use. An explicit technique is by asking users or experts to identify and evaluate the relevance and quality of the ads. Meanwhile, the implicit measurement is by monitoring the time spent on page and the exit type when the users performed web searches which also considered to be correlated with the explicit user satisfaction measurement.

Other than that, in web based system, End-User Computing Satisfaction (EUCS) tools has been developed by Doll and Torkzadeh in 1988, was used to measure user satisfaction. This particular tool had applied five different components which are content, accuracy, format, ease of use and timeliness. This instrument is to find out users satisfaction and dissatisfaction in information system mainly in Internet portals. Study conducted by Xiao and Dasgupta (2002), had test this instrument and found that this EUCS instrument is still valid in measuring user satisfaction. Every study and research has its own limitations, and this instrument has no exception. Therefore, instead of just using the five components that had been mentioned previously, some other components might be relevant such as privacy and security.

From a much different perspective, an article wrote by Tomlin (2010), had mentioned that usability testing is the right tools that can be used to improve web sites or web-based applications. Also mentioned that, usability testing is being done in order to understand the message of an online advertising, and improve the task. Usability testing is a method that highlights the property of being usable, or in a simple word, it is the product that is being tested rather than the user. According to Wikipedia (n.d), usability testing measures the usability, ease of use of a specific

object and its goal is to discover errors and areas of improvements. In general, it involves measuring the test subject, in this case the web-based system in four areas which are efficiency, accuracy, recall and emotional responses. The system is considered usable for the end user if the result of usability testing meets the usability goals.

On top of that, there are many other theoretical views that are use nowadays, to understand how end user will act and decide on to use technology applications. There is one approach in which it is use to determine user acceptance on any information technology. This approach is called, Technology Acceptance Model (TAM). This approach is based on the Theory of Reasoned Action (TRA) as proposed by Ajzen and Fishbein (1980). TRA is concerning with the intended behaviour of the individuals. TRA proposed that individuals' attitude, beliefs, motivation and subjective norms in relation to the behaviours do affect an individuals' performance. In other words, individuals' behaviour do determined his or her actual behaviour. (Ajzen and Fishbein, 1980).
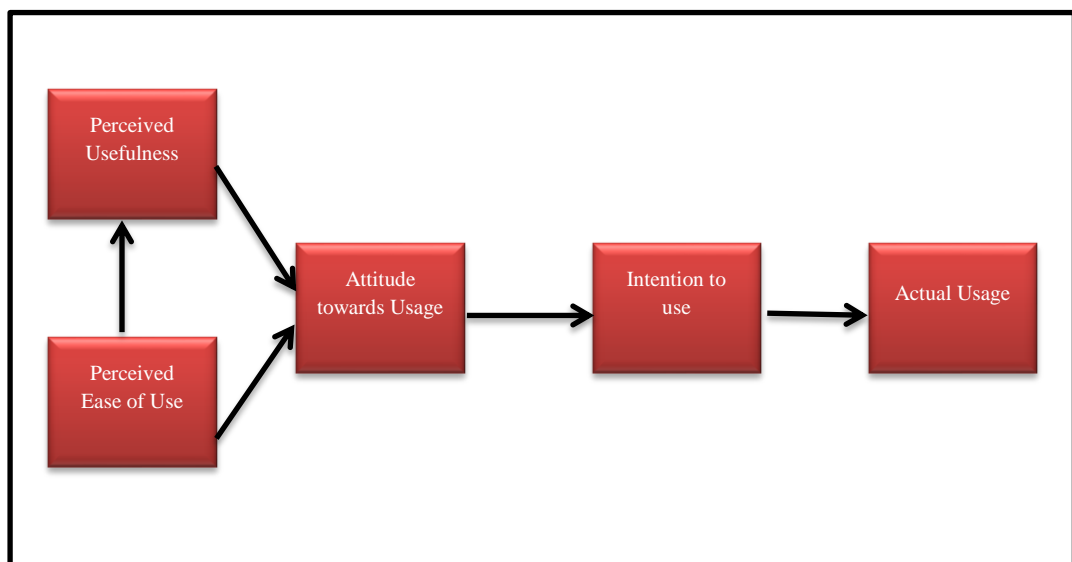
Figure 2: The Technology Acceptance Model (TAM)

Figure 2, describe the Technology Acceptance Model (TAM) that can be used to evaluate and analyse user acceptance on the information technology applications. (Davis, 1993). User acceptance is usually associated with the factor of determining the success or failure of an information system. TAM proposed that user acceptance and intention to use the information technology is influence by the characteristics of the system. According to Dalbouh (2013), his recent study in evaluating user acceptance for a mobile tracking on patient progress applications had use TAM approach. This particular study had use the attributes of perceived of usefulness, perceived ease of use, user satisfaction and attribute usability which are all related to the acceptance of computer technology system.

CHAPTER 3

METHODOLOGY

3.1 Research Methodology

The most suitable methodology for this project is the Rapid Application Development (RAD) method. It is a software development methodology requires minimal planning of rapid prototyping. It promotes a much faster development as well as higher-quality results than any other method. Besides, this methodology encourage high quality product to be developed faster, while reducing development cost and saving valuable resources. This methodology is relevant in conducting this project considering that there are time constraint issues in order to complete the project. This methodology gives opportunity and flexibility to make any necessary changes during the development phase.

Four phases in Rapid Application Development:
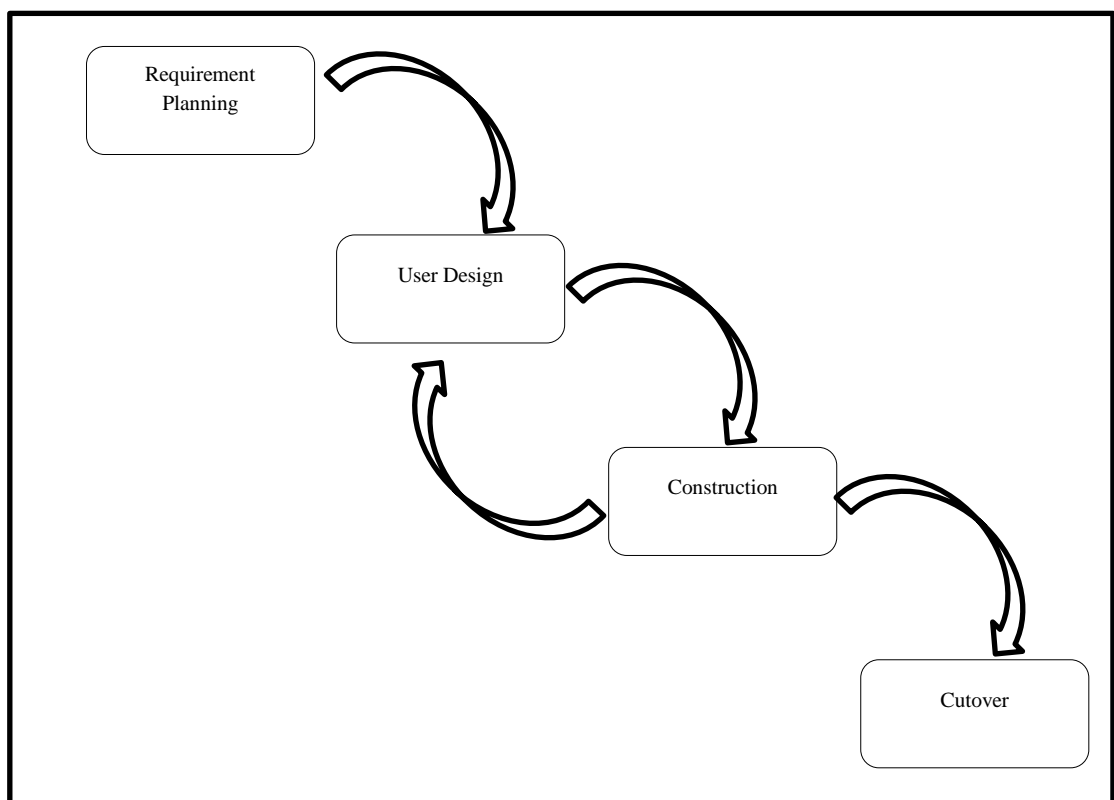
Figure 3: Four Phases in Rapid Application Development (RAD)

- **Requirement Planning Phase**. It is the combination of the system planning and system analysis phases of the System Development Life Cycle. This particular phase discuss the business needs, project scope, constraints and the business requirement. It also includes the hardware and software required to build the project.

- **User Design Phase.** Users interact with the system analyst, developing the model structure and the prototype that represent the entire system including the inputs, processes and outputs. This is where the tools are used to develop and produce the product that meet the system requirement. Moreover, this phase allow users to understand, modify and approve the working model.

- **Construction Phase.** This focus on the development of the program and application task which is similar to the System Development Life Cycle. However, should there is any changes or any area of improvement that need to be done, users can still participate. Such tasks are programming and application development, coding, unit-integration and system testing.

- **Cutover Phase.** This is the final stage which is similar to the implementation phase in System Development Life Cycle. It includes data conversion, testing, change to new system and user training. This is a much compressed version, where the system is built, delivered and placed for operation in a much sooner as compared to any other methodology.

3.2 Project Activities

This methodology consists of four phases and the tasks involved for each phase are shown in the table below:

PHASE	PROJECT ACTIVITIES
1) Requirement Planning	• Review literatures and do research on the subject matter. • Collect data and gathering for system requirements. • Prepare survey questions. • Prepare gantt chart.
2) User Design	• Design user interface and website. • Prepare and design the usability testing. • Develop matching ads. • Develop the matching system flowchart and database design.
3) Construction	• Develop the prototype. • Apply any enhancement and changes needed. • Evaluate system functionality. • Check whether the system develops meets the system requirement.
4) Cutover	• Prototype ready to be used. • Recommendations.

Table 2: Project Activities

3.3 Gantt Chart and Key Milestone

No	Task	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Final Year Project 1														
1	Title selection / proposal	█	█												
2	Submit proposal			█											
3	Literature Review and research on subject matter			█	█	█	█	█							
4	Requirement Planning				█	█	█	█	█	█					
5	Prepare survey questions								█	█					
6	Design user interface and system architecture										█	█	█	█	█
7	Develop gantt chart					█	█								

Table 2: Gantt chart for Final Year Project 1

As for Final Year Project 2, this project will be focusing on the prototype development and the implementation part. Also will consider and analyse for any further lacking of functions and improvements so that the system will meet the objective of this study. Some future works which will be done during the FYP 2 are as shown in the table below:

Final Year Project 2															
No	Task	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Develop the user satisfaction system (write codes)	■	■	■	■	■	■								
2	Testing the system, ensure the functions are working –meet project requirement					■	■	■	■						
3	Publish the website and run test on user							■	■						
4	Input any needed functionality of the system (if needed)								■	■	■	■	■		
5	Prototype ready to be use											■	■	■	
6	Demonstrate during presentation													■	■

Table 3: Gantt chart for Final Year Project 2

3.4 Tools

The tools needed for the development of this project are:

1) Adobe Photoshop CS6

- Adobe Photoshop CS6 is the latest version of a graphic-editing program created by Adobe System. In relation to this project, Adobe Photoshop is used for the purpose to develop and design the required advertisement.

2) Php and phpMyAdmin

- Php is a free software that is released under the PHP License. It is a server-side scripting language which is use to develop a dynamic website. For this project, PHP is used to develop a webs-based system that is able to capture data and feedback from the user.

- PhpMyAdmin is a software tool that is written in PHP. It is used for the purpose of administration of MySQL over the webpage. It can perform the task of creating, modifying or deleting the databases, as well as executing SQL statements. This database is used to store the data and feedbacks obtain from the user.

3) Wamp Server

- It is a web server development platform. This particular tool is used to create web applications with Apache2, PHP, phpMyAdmin and a MySQL database. When user request to view the web page, the server will receive the file request, and then look for that particular file. Once found the file is then send to the users.

Besides this two tools, there are few more tools needed which have not finalised. An extensive research, data collections and gathering are needed in order to identify more specific tools that can help in building the project thus meet the system requirement.

3.5 System Architecture

This section of the project will describe the system architecture of the project which is the structure and the representation of the system. It will also describe the requirement of the system. In Online Advertising, from the user perspective, user will enter search query indicate the ads that the user is looking for. The search engine will do the work and ads are retrieved. Users will then click on the ads and view it. Then the role of the system that this project will develop which is to measure user satisfaction comes in. The author will prepare few online advertisements to be placed on the website. The system of the website will require the user to evaluate and give feedback on the ads that they view based on a set of questionnaires provided. Then the feedback will be sent and store in the database model. The feedback will then be use by the search engine for further process which is not included in the implementation of this project.

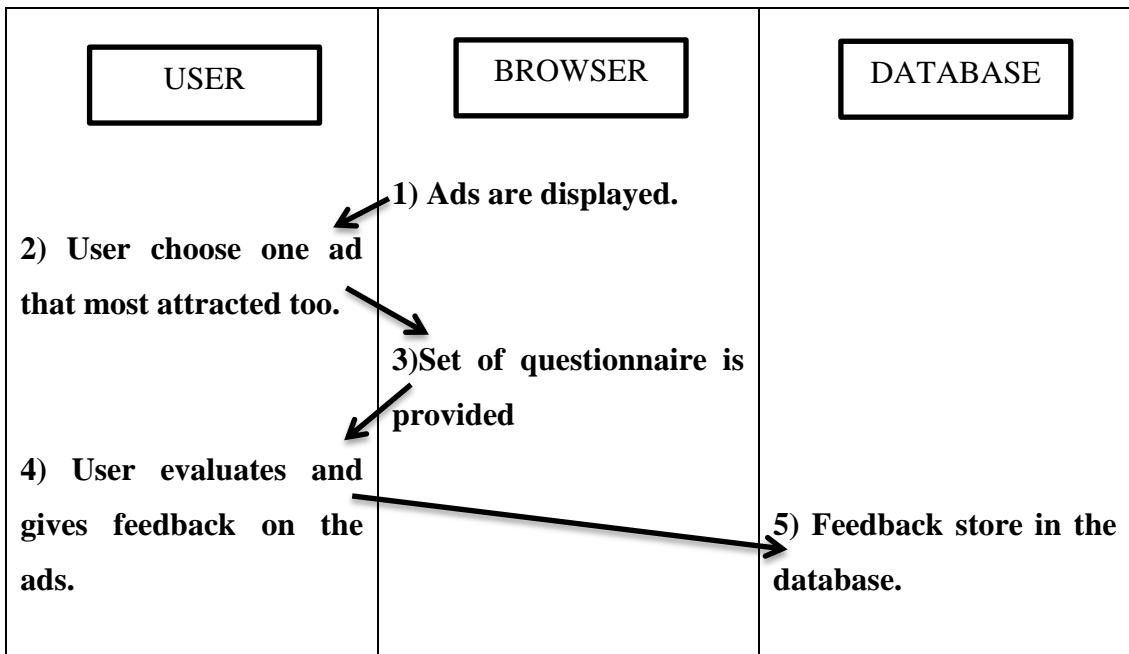The proposed system architecture of this project is as shown below:

USER	BROWSER	DATABASE
	1) Ads are displayed.	
2) User choose one ad that most attracted too.		
	3)Set of questionnaire is provided	
4) User evaluates and gives feedback on the ads.		5) Feedback store in the database.

Figure 4: System Architecture

The system that will be developed will be focusing and addressing the expectation from the user perspective. The system is expected to be able to measure user satisfaction on the ads retrieved by evaluating and give feedback based on the ads. The feedback will be used to achieve the objective of the project which is to develop a policy to measure user satisfaction in browsing for ads. Therefore, an extension of a normal website is needed where the ads retrieved can be viewed by the users and evaluate by them. The user will be needed to evaluate the ads relevancy to see how the user would come to accept the advertisement as the information technology application. There will be some questions based on the Technology Acceptance Model (TAM) that will be provided to the user to evaluate the ads.
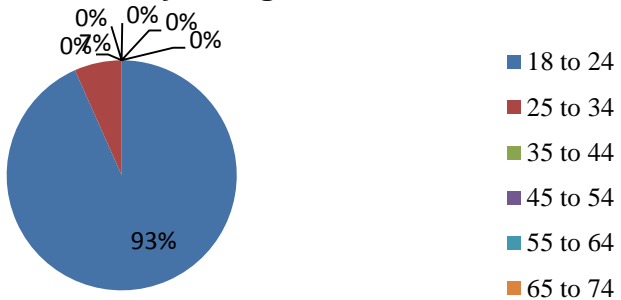
CHAPTER 4

RESULT AND DISCUSSION

4.1 Survey Analysis

A survey had been conducted to identify the Internet users' opinion on Online Advertising. The survey is conducted online, and had being able to get feedback from 30 respondents. The survey question is divided into two parts:

- Part A: Demographic

  This part of the survey question, asking the users on the demographic data of the respondents. For advertiser to make good ads, the advertiser needs specific information in order to deliver ads to targeted customers. Once receive the data, it will then be used to analyse current patterns related to Online Advertising that address the scope of study for this project. The questions are as below:

No.	Result and Analysis
1.	**What is your gender?**
	Question 1, is asking on the gender of the respondent. 57% of the respondents are female and 43% are the male respondents. Thus, the majority of the respondents are the female.

| No.	Result and Analysis
2.	**What is your age?** 0% 0% 0% 0%%% 0% 0% 93% ■ 18 to 24 ■ 25 to 34 ■ 35 to 44 ■ 45 to 54 ■ 55 to 64 ■ 65 to 74
	Question 2, asking on the group of age that the respondents belong to. Majority of the respondents, which is 93% are belong to the group of age 18 to 24 years old. Meanwhile, another 7% are those in the group of age between 25 to 34 years old.

- Part B: User attitude towards Online Advertising.

  This part will investigate information on user attitude towards Online Advertising. This is for the purpose of to identify the user awareness since Online Advertising is considered to be the recent trend for businesses to market its products and services.

No.	Result and Analysis
3.	**How often do you use Internet?** 0% 0% 17% 23% 60% ■ Very Frequently ■ Frequently ■ Moderate Amount ■ A Little ■ Very Infrequently
	Question 6 is asking on the how often the respondents uses the Internet. The highest percentage is 60%, said that they use the Internet very frequently. 23% of the respondents said they frequently use the Internet and the lowest percentage is 17% said that they very infrequently use the Internet.
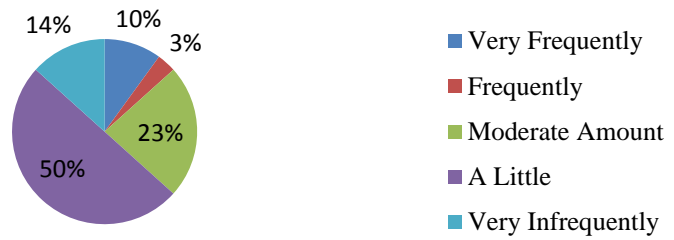
4.	**How often do you search for online ads?** 14% 10% 3% 23% 50% ■ Very Frequently ■ Frequently ■ Moderate Amount ■ A Little ■ Very Infrequently
	Question 4 is asking the respondents on how often they search for online ads. Half of the respondents, 50% agree that they search for online ads only a little. Second highest amount is 23%, said they search for online ads only in moderate amount. Only 14% said that they very infrequently search for online ads and 10% said they very frequently search for online ads. The lowest percentage is where only 3% of the respondent frequently searches for online ads.
5.	**To what extent that you depend on the search engine to search for online ads?** 3% 20% 20% 20% 37% ■ Very Dependent ■ Dependent ■ Some ■ A little ■ Not At All
	Question 5 is asking on to what extent that the respondent is depend on the search engine to search for online ads. 37% said that they very dependent. Only 20% for each said that they just dependent, some and a little dependent on the search engine. The lowest amount which is 3% said that they do not dependent at all on the search engine.

|	
6.	**It is very easy to search for online ads.** 0% 10% 13% 30% 47% ■ Strongly Agree ■ Agree ■ Neither Agree or Disagree ■ Disagree
	Statement 6 needs feedback from the respondents if it is very easy to search for online ads. The highest amount is 47% just agree that it is easy to search for online ads. 30% of the respondent are neither agree nor disagree with the statement. 13% strongly agree and only 10% strongly disagree on whether it is easy to search for online ads.
7.	**Most online ads provides users with essential information.** 7% 0% 13% 30% 50% ■ Strongly Agree ■ Agree ■ Neither Agree or Disagree
	This statement needs feedback from the respondent whether most online ads do provide users with essential information. 50%, which is half of the respondents are neither agreed or disagree. 30% agree, 13% disagree and only 7% strongly agree that most online ads provide users with essential information.
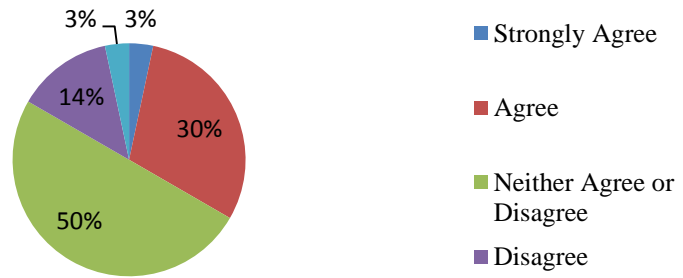
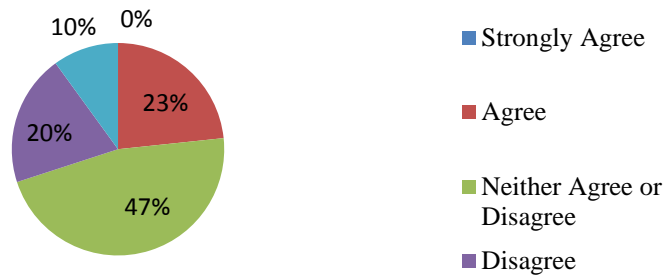|	
8.	**The online ads delivered match my search query and browsing behavior.** 3% — 3% 14% 30% 50% ■ Strongly Agree ■ Agree ■ Neither Agree or Disagree ■ Disagree
	This statement requires feedback on whether the online ads delivered match the respondent search query and browsing behaviour. 50% neither agree nor disagree, 30% just agree and 14% of them disagree with the statement. Only 3% each strongly agree and strongly disagree.
9.	**I managed to find what am I searching for, when clicking on any of the delivered ads.** 6% 0% 17% 27% 50% ■ Strongly Agree ■ Agree ■ Neither Agree or Disagree
	Statement 9 needs feedback on whether the respondent managed to find what is they looking for when clicking on the delivered ads. 50% neither agree nor disagree. 27% agree that they found what they looking for, and 17% said disagree on that. Only 6 said that they strongly disagree, since they could not find what they are searching for from any of the delivered ads.

10.	**I enjoy most online ads.** 10% 0% 23% 20% 47% ■ Strongly Agree ■ Agree ■ Neither Agree or Disagree ■ Disagree
	This last statement needs feedback if the respondents do enjoy most online ads. The highest percentage is 47% neither agree nor disagree on the statement. 23% agree and 20% disagree. Only 10% strongly disagree, which means that they do not enjoy most online ads.

4.2 Prototype and System Design

The project is focus on the user perspective in Online Advertising, where the challenge is that the ads delivered do not satisfy the user, thus affecting their browsing experience and satisfaction. Therefore, it is proposed to develop a system that can measure user satisfaction and user acceptance on online ads. The author is needed to develop a web based system which is an extension of a normal website to get feedback from the user. The feedbacks receive from the user will then used to develop the policy. It is for the purpose to identify to what extent the user will accept and satisfy with the delivered ads. Being able to identify what the user would expect from an ad will help to identify whether online advertising is truly valuable.

This section will describe the design interface of the system. Firstly, the system will provide the user with a few of online advertisements. The user is needed to choose which advertisement does the user is most attracted too. Once the user click in the chosen ads, it will then directed the user to a page where a set of questionnaire is provided and need to be answer based on the relevancy of the ads based on the user query and browsing behaviour as well as how far does the user satisfy with that particular ads. Once the user had answered all of the questions, the data is being capture and store in the database. The author had also prepared another webpage that shows the database which prompt out the summary of answers that had been given by the user for each of the ads. This particular webpage can only be viewed by the author for the purpose of recording and analysing of the data.

The author had developed four different kinds of advertisement based on the Technology Acceptance Model (TAM) which had been discussing previously in Chapter 2. The main reason, the author refer to this model in developing the advertisement is because this model do provide an information representation of the information technology application, in this case is the advertisement, by which the system design and characteristics influence user acceptance. Each of the advertisement has its own characteristics. The characteristics are perceived of usefulness, perceived ease of use, user satisfaction and attribute usability. Below are the following ads:

- Advertisement 1: Perceived usefulness

- Advertisement 2: Perceived ease of use

- Advertisement 3: User satisfaction

- Advertisement 4: Attribute usability

Below is the screenshot of the webpage:

    i.   First webpage, where it displays the ads develop by the author.

Figure 5: First Webpage Screenshot

ii.   Second Webpage, once the user click on the chosen ads, the question is retrieved.

Figure 6: Second Webpage Screenshot

iii.   Third webpage, the database that shows the summary of answers given by the user for each ad that they chose.

Answer

ads	q1	q2	q3	q4	q5
1	Agree	Strongly agree	Strongly agree		
2	Agree	Neutral	Neutral		
3	Strongly agree	Neutral	Agree		
4	Strongly agree	Strongly agree	Strongly agree	Strongly agree	Strongly agree
1	Strongly agree	Neutral	Agree		
1	Strongly agree	Disagree	Strongly agree		
4	Agree	Agree	Disagree	Agree	Neutral
3	Agree	Agree	Agree		
4	Strongly agree	Agree	Neutral	Neutral	Agree
3	Strongly agree	Neutral	Strongly agree		
4	Agree	Agree	Neutral	Neutral	Disagree
1	Agree	Agree	Agree		
2	Agree	Agree	Disagree		
2	Agree	Neutral	Agree		
2	Agree	Neutral	Agree		
3	Agree	Neutral	Agree		

Total feedback: 16

Figure 7: Third Webpage Screenshot

44

Below are the set of questionnaires that the author had prepared for each of the advertisement based on the elements of Technology Acceptance Model (TAM).

1) Advertisement 1: Perceived usefulness
   a. I am able to get information from the online advertisement.
      o Strongly Agree
      o Agree
      o Neither Agree or Disagree
      o Disagree
      o Strongly Disagree

   b. The online advertisement allow user to get further information (via company contact no).
      o Strongly Agree
      o Agree
      o Neither Agree or Disagree
      o Disagree
      o Strongly Disagree

   c. Searching or viewing online advertisement can save time.
      o Strongly Agree
      o Agree
      o Neither Agree or Disagree
      o Disagree
      o Strongly Disagree

Figure 8: Questionnaire for Perceived Usefulness

2) Advertisement 2: Perceived ease of use

    a. Learn to understand the advertisement is easy.

- o Strongly Agree
- o Agree
- o Neither Agree or Disagree
- o Disagree
- o Strongly Disagree

    b. It is easy to use online advertisement to get what I search for.

- o Strongly Agree
- o Agree
- o Neither Agree or Disagree
- o Disagree
- o Strongly Disagree

    c. It is easy to share information of/on the online advertisement with others.

- o Strongly Agree
- o Agree
- o Neither Agree or Disagree
- o Disagree
- o Strongly Disagree

Figure 9: Questionnaire for Perceived Ease of Use

3) Advertisement 3: User satisfaction

    a. I am completely satisfied with the advertisement.

- o Strongly Agree
- o Agree
- o Neither Agree or Disagree
- o Disagree
- o Strongly Disagree

    b. I can easily get what I am searching for through online advertisement.

- o Strongly Agree
- o Agree
- o Neither Agree or Disagree
- o Disagree
- o Strongly Disagree

    c. I believe that online advertisement may help advertiser to reach out to the customers.

- o Strongly Agree
- o Agree
- o Neither Agree or Disagree
- o Disagree
- o Strongly Disagree

Figure 10: Questionnaire for User Satisfaction

4) Advertisement 4: Attribute of usability

    a. It is easy to use computer and internet to get and view online advertisement.
- o Strongly Agree
- o Agree
- o Neither Agree or Disagree
- o Disagree
- o Strongly Disagree

    b. I found that the advertisement is useful for me to get information.
- o Strongly Agree
- o Agree
- o Neither Agree or Disagree
- o Disagree
- o Strongly Disagree

    c. It is easy to decide about the product (to buy or not) when viewing the online advertisement.
- o Strongly Agree
- o Agree
- o Neither Agree or Disagree
- o Disagree
- o Strongly Disagree

    d. I would prefer to search for online advertisement in the future.
- o Strongly Agree
- o Agree
- o Neither Agree or Disagree
- o Disagree
- o Strongly Disagree

e. The online advertisement allows me to purchase it right away (via 'shop now' button).

- o Strongly Agree
- o Agree
- o Neither Agree or Disagree
- o Disagree
- o Strongly Disagree

Figure 11: Questionnaire for Attribute Usability

CHAPTER 5

CONCLUSION AND RECOMMENDATION

This section describe final view of the entire project on whether the project had successfully been done and also suggesting any future work that is suitable for a further development of the project.

5.1 Relevancy to the Objective

As a conclusion, this project is about developing a system to measure user satisfaction on online ads. This is because the scope of study for this project is on the online advertising mainly in the user perspective. Therefore, the system develop should address the problem statement and also does reflect the objectives mentioned previously. Being able to grab the concept of online advertising will help in developing a much suitable and effective system to measure user satisfaction on online ads. It is said that online advertising is valuable considering it is the recent trend for the businesses to spread and deliver the message of the products and services to targeted user. Hence, being able to identify user interest would be important as it will lead to their satisfaction on browsing for ads.

In relation to that, it is very relevant to apply the Technology Acceptance Model (TAM) that can evaluate and analyse user acceptance on the information technology application, in this study is the advertisements. Using the elements of TAM, will allow the study to identify which system characteristics or features of online advertisement that user will be most attracted to. The website built is able to come out with a system that can display the prepare advertisement and get the user to give feedback based on the chosen ads. The system is also able to capture the data given by user and store it in the database.

5.2 Suggested Future Work

For future work, it is highly recommended that the data and feedback gained from the user is being used and analysed to come out with a suitable policy. Being able to undergo more users testing by having the user to get to answer and give feedback using this web based system is recommended. The data from the user is needed as it will be the supporting evidence for the theory used in this study.

It is also relevant if the study would want to explore more suitable theory in gathering the information on how the user would come to accept the information technology. This is because, user acceptance is very important in identifying whether the information technology a success or vice versa.

REFFERENCES

Interactive Advertising Bureau. (n.d) *First Quarter 2013 Internet Ad Revenues Set High, at $9.6 Billion*. Retrieved June 24, 2013, from http://www.iab.net/about_the_iab/recent_press_releases/press_release_archive/press_release/pr-060313

Yan, J., Liu, N., Wang, G., Zhang, W., Jiang, Y., & Chen, Z. (2009). *How Much Can Behavioural Targeting Help Online Advertising?* Retrieved on June 24, 2013 from http://www2009.eprints.org/27/1/p261.pdf

Zeff, R., & Aronson, B. (1999). *Advertising On The Internet* (2nd ed.). Canada: John Wiley & Sons, Inc.

Helm, S.F.A., Chaparro, B.S., & Farmer, S.M., (2005). *Using the End-User Computing Satisfaction (EUCS) Instrument to Measure Satisfaction with a Web Site.* Retrieved on June 24, 2013, from http://users.tkk.fi/~ptranne/thesis/Abdinnour-Helm-2005/Abdinnour-Helm-2005.pdf

Yuan, S., Abidin, A.Z., Sloan, M., & Wang, J. (2012). *Internet Advertising: An Interplay among Advertisers, Online Publisher, Ad Exchange and Web Users.* Retrieved on May 22, 2013, from http://arxiv.org/pdf/1206.1754.pdf

Wikipedia. *Online Advertising.* Retrieved on 24 June, 2013, from https://en.wikipedia.org/wiki/Online_advertising

Stanford University, California.(2010). *Introduction to Computational Advertising*. Retrieved on 24 June, 2013, from http://www.stanford.edu/class/msande239/

Fox S, Karnawat K, Mydland M, Dumais S, White T. Evaluating implicit measures to improve web search. ACM Transactions on Information Systems 2005;23:147{68.

Doll, W. J., Xia, W. and Torkzadeh, G. "A Confirmatory Factor Analysis of the End-User Computing Satisfaction Instrument, MIS Quarterly, December 1994, pp. 453-461.

Xiao, L., Dasgupta, S.(2002). *Measurement of User Satisfaction with Web-Based Information Systems: An Empirical Study.* Retrieved on 18 August, 2013, from http://melody.syr.edu/hci/amcis02_minitrack/CR/Xiao.pdf.

Tomlin, W,C. (2010). Usability Testing and Online Marketing Campaigns. Retrieved on 18 August, 2013, from http://www.usefulusability.com/usability-testing-makes-killer-online-marketing-campaigns/

Wikipedia. *Usability Testing.* Retrieved on 18 August, 2013, from https://en.wikipedia.org/wiki/Usability_testing.

Malaysian Communications and Multimedia Commision (SKMM). (2009). Advertising Development in Malaysia. Retrieved on 10 October, 2013, from http://www.skmm.gov.my/skmmgovmy/files/attachments/Ad_Dev_Malaysia.pdf.

Ajzen, I. and M. Fishbein. (1980). Understanding Attitudes and Predicting Social Behavior. 1st Edn., Prentice Hall, Englewood Cliffs, ISBN-10: 0139364439, pp: 278.

Dalbouh, H.M. (2013). A Questionnaire Approach Based on the Teachnology Acceptance Model For Mobile Tracking on Patient Progress Applications. Retrieved on 8 November, 2013 from http://www.thescipub.com/pdf/10.3844/jcssp.2013.763.770.

Davis, F.D. (1993). User Acceptance of Information Technology: system characteristics, user perceptions and behavioural impacts. Retrieved on 8 November, 2013 from http://deepblue.lib.umich.edu/bitstream/handle/2027.42/30954/0000626.pdf?sequence=1.

Appendix A : Survey Questionnaires

Introduction

This survey is conducted to identify user's attitude and satisfaction toward online advertising. It is to study the problem of why the ads delivered do not satisfy the users and thus, affecting their browsing experience. The data and feedback receive from this survey will be used to develop an algorithm of predicting, matching and displaying relevant ads to address user satisfaction.

PART A

General Questions:

1. Gender
   - o Male
   - o Female
2. Age
   - o 18 - 24
   - o 25 - 34
   - o 35 – 44
   - o 45 – 54
   - o 55 – 64
   - o 65 – 74

PART B

User attitude towards online advertising

1. How often do you use Internet?
   - o Very frequently
   - o Frequently
   - o Moderate amount
   - o A little
   - o Very Infrequently

2. How often do you search for online ads?

- Very frequently
- Frequently
- Moderate amount
- A little
- Very Infrequently

3. To what extent that you depend on the search engine to search for ads?
    - Very frequently
    - Frequently
    - Moderate amount
    - A little
    - Very Infrequently

4. It is very easy to search for online ads.
    - Strongly Agree
    - Agree
    - Neither Agree or Disagree
    - Disagree
    - Strongly Disagree

5. Most online advertisement provides users with essential information.
    - Very frequently
    - Frequently
    - Moderate amount
    - A little
    - Very Infrequently

6. The online ads delivered match my search query and browsing behaviour.
    - Very frequently
    - Frequently
    - Moderate amount
    - A little
    - Very Infrequently

7. I managed to find what am I searching for, when clicking on any of the delivered ads.
    - Very frequently
    - Frequently

- o Moderate amount
- o A little
- o Very Infrequently

8. I enjoy most ads.
   - o Very frequently
   - o Frequently
   - o Moderate amount
   - o A little
   - o Very Infrequently