

Mobile Advertising Using Bluetooth Pull-based Technology

by

Uzwani Binti Mahmud

Dissertation submitted in partial fulfillment of
the requirements for the
Bachelor of Technology (Hons)
(Information Communication Technology)

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CERTIFICATION OF APPROVAL

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A project dissertation submitted to the
Information Technology Programme
Universiti Teknologi PETRONAS
in partial fulfillment of the requirement for the
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Approved by,



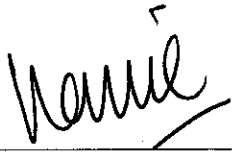
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UNIVERSITI TEKNOLOGI PETRONAS
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Jan 2006

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.



UZWANI BINTI MAHMUD

ABSTRACT

Advertising on mobile devices has large potential due to the very personal and intimate nature of the device and high targeting possibilities. This project is called B.L.U.E system, an advertising system for delivering location-aware mobile advertisement that allow personalization to mobile phones using Bluetooth pull-based technology. This report covers the background study, literature review and theory based on research, and also methodology used in research and design phase. In research, questionnaire is used to gather information pertaining to user preferences. Meanwhile, in design phase, the methodologies used are Incremental Development and Release; and Assembling Reusable Components. The last two part of this report covers result and discussion from the research and testing phase, and also recommendation for future work.

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ABBREVIATIONS

API	Application Program Interface
B.L.U.E	Bluetooth Location Ubiquitous Emphasizer
B-MAD	Bluetooth Mobile Advertisement
MoMa	Mobile Marketing
SMS	Short Messaging Services
URL	Uniform Resource Locator
WAP	Wireless Application Protocol
WTK	Wireless Tool Kit

CHAPTER 1

INTRODUCTION

1.1 Background

In marketing, mobile advertising has two distinct meanings – advertisements moving from place to place, e.g. displayed on the sides of buses; and advertisements delivered to mobile devices, e.g. mobile phones and personal digital assistants (PDAs). This paper will study the latter, where mobile advertising is sent to mobile devices via Bluetooth connection.

One might ask, why use Bluetooth and not just plain old SMS? Using SMS for advertising purposes is not considered suitable, due to the high cost and the problem of not having a database of phone numbers of the target groups. The advantages of using Bluetooth, on the other hand, include the ability to target the message to a specific location and consumer segment.

Bluetooth doesn't stand alone in technology options for wireless connectivity. 802.11 and HomeRF are two wireless standards that also address wireless connectivity. Table 1 shows the various wireless communication technology options and outlines the characteristics of each. 802.11 technology is very focused at wireless LAN extensions. Power ratings are not the main design goal. HomeRF is an initiative to communicate with other intelligent embedded devices in the home with the home PC. Bluetooth provides close to the same data rate with the added benefit of having a typical power consumption of 1mWatt. That means that Bluetooth power budget within a typical cell phone represents approximately 3% power load. This makes Bluetooth a technically

viable communications option for handheld wireless devices desiring to accommodate voice and data services. The summary of these wireless options can be seen below:

Technology Characteristics	
802.11 Wireless LAN	2 Mbps, 802.11b 11 Mbps >100 mWatt
HomeRF	Home networking, many devices, accommodates data & voice 1 or 2 Mbps 100 mWatt
Bluetooth	Variable data rate technology accommodating data & voice Variable bit rate to 720 Mbps 1 mWatt typical, up to 10 mWatt, ~50 mA @ 3 Volts

Table 1

CompactPCI Systems / March 2001

The novel contribution of this paper is the introduction and implementation of a new location-aware mobile advertising system, which is based on Bluetooth pull-based technology, as opposed to other mobile advertising system that uses push-based technology such as B-MAD – Bluetooth Mobile Advertising [1] and MoMa – Mobile Marketing [13]. These systems use push-based technology that has several flaws as stated in the problem statement section.

1.2 Problem Statement

Currently, several mobile advertisement systems available in the market uses push based technology whereby the advertisement will be sent to mobile phone without the receiver asking for it.

Bluetooth marketing uses the short-range network Bluetooth to send messages to consumers' mobile phones within range of the originating equipment, be that a Bluetooth server or another Bluetooth-enabled mobile phone. This method raises several issues.

Issues related to the Bluetooth advertising using push-based technology are as follows:-

1.2.1 Bluetooth spamming

To enable users to receive advertisement using the push technology advertising system, the Bluetooth service must be turned on all the time, making them vulnerable to spamming attacks from other mobile devices.

1.2.2 Virus attack

Once exposed to spamming attack, it can lead to virus attack. This is considered as a serious security risk as most of Bluetooth phones user can't recognize the kind of files they are downloading. Unbeknown to them, they might be downloading viruses or other malware to the phone.

1.2.3 High battery consumption

When a mobile phone using Bluetooth communicates wirelessly, the data is transmitted at very specific frequencies. One person can talk on a mobile phone at a frequency of 2.0001 gigahertz, and someone else nearby can talk at 2.0002 gigahertz, and neither one will pick up the other's conversation. In order to make sure it is both listening for and sending information on exactly the right frequency at all times, the phone must maintain a very accurate and stable clock, which is generated by a special circuit called "phase-locked loop." This circuit consumes a dramatic portion of the battery usage on wireless devices. To reduce the battery consumption, it is advisable to use Bluetooth service only when needed [18].

1.2.4 Need many transmission points for location sensitive

Push-based advertising system needs a lot of Bluetooth sensors for location sensitive advertisement. Based on B-MAD system, the researchers use nine Bluetooth sensors to cover area surrounding eight stores. More Bluetooth sensors are needed to cover shopping mall completely. This will increase the cost.

1.2.5 Irritating

Advertisers will be on constant search for available mobile phone within range, and once found, attempts to push whatever information they have. Most probably they will be sending unwanted content that can be annoying to the users and eventually forces the user to stop using the system.

1.2.6 Lawsuit

The Knesset, Israel's parliament, has passed a law aimed at spam, unsolicited text messages and junk faxes. The new law requires a recipient's opt-in, meaning that a commercial message must be solicited – the recipient must have agreed to receive commercial emails from the sender first [25].

Most Bluetooth marketing involves spamming everyone in range, even if it's with a message to reply to receive content. Mobile Marketing Association in the United Kingdom has flagged up the legal issues involved with Bluetooth mobile marketing. The MMA points out that this may not be legal under European privacy legislation as the original message is still unsolicited.

1.3 Objective of Study

The objective of this study is to develop an advertising system that uses Bluetooth pull-based technology that can eliminate, or at least reduce the problems of Bluetooth push-based advertising system as mentioned above. This project should be able to solve the problem of spamming and high battery consumption in mobile advertisement system.

1.4 Scope of Study

This study will focus on Bluetooth pull- and push-based technology in advertising system in terms of feasibility and effectiveness of both systems. Listed below are the scopes of this study:-

1.4.1 Analyze the push-based mobile advertisement system

Current push-based mobile advertising systems will be looked into to pinpoint out the major flaws of the system.

1.4.2 Study the feasibility of pull-based mobile advertisement

Outline the criteria of pull-based technology that can be used to rectify problems of the push-based technology. Study the effectiveness of pull-based mobile advertisement in marketing.

1.4.3 Create an advertising system using Bluetooth pull-based technology

Based on criteria outlined, a prototype of a Bluetooth pull-based advertising system will be designed and developed. This is to test the effectiveness of the system in replacing current push-based advertising system.

1.4.4 Field train and survey

To qualitatively evaluate the prototype, system and the end user experience, a field trial in real use of environment will be conducted. The testing will be done customers at supermarkets in Ipoh. Testers will be given a set of questionnaires to be answered at the end of the testing.

1.4.5 Analyze and interprets user's response

Information gathered from the field trial will be analyze and interprets.

Based on issues pointed earlier, this study will test the feasibility of pull-based mobile advertising system solving the issues. These issues have been identified as problems of the push-based mobile advertising system. But to ensure the effectiveness of this system, deeper study and more detailed research is needed.

Data and information gathered before and after the field trial will be used in identifying the effectiveness of the proposed system. Several steps will be proposed to enhance the system for future works based on comments of testers.

CHAPTER 2

LITERATURE REVIEW AND THEORY

2.1 Related Works

Barwise and Strong [4] explored the effectiveness of SMS (Short Message Service) advertising in the United Kingdom. They identified six types of mobile advertisements: brand building, special offers, timely media teasers, service or information requests, competitions and polls.

Kaasinen [14] analyzed user needs for mobile location-aware services. In her interviews, most users did not mind being pushed information, as long as they really needed the information. Thus, location itself is not enough to trigger pushed advertisements, but it has to be complemented with personalization. This need for personalization is recognized in a number of other studies as well.

Yunos *et al.* [29] addressed the challenges and opportunities of wireless advertising. They surveyed existing advertisers like Vindigo, SkyGo and AvantGo, and approaches and technologies currently in use. They also presented five business models applicable to mobile advertising.

A number of location-aware service studies list the mobile advertising as one of the future possibilities in the application area. Barnes [3] introduced the concept of tempting nearby users into the stores and delivering geographic messaging related e.g. to security in particular area of a city. Varshney and Vetter [26] suggested mobile advertising to be a very important class of mobile commerce. They augmented location

information with the personalization of the delivery by obtaining the history of the user's purchases or consulting the user at an earlier stage. In addition, the users might be able to either receive push advertisements or actively pull the messages.

Ranganathan *et al.* [22] discussed mobile advertising in the context of pervasive computing environments. They presented a list of challenges and possibilities as well some ideas of solutions for advertising in pervasive environments. The challenges include: reaching the people with the right ads, delivering ads at the right time, serendipitous advertising, means for users to follow up on the ad, and how to collect revenue for ads.

Randell and Muller [21] presented the Shopping Jacket infrastructure, which used GPS and local pingers in stores for positioning. Wearers were alerted when passing an interesting shop. The system could also be used to guide the user around a shopping mall.

WideRay's Jack Service Point [27] is a product for delivering local content, such as advertisements, using Bluetooth or infrared. A number of these devices have already been deployed at mass events such as sports and conferences for distributing event related information.

Two different positioning methods are applicable with Bluetooth: either measure received signal power levels to obtain distance estimates to multiple known-location Bluetooth devices and triangulate the user device position [15], or do cell identity based positioning by mapping known Bluetooth device addresses to location information [2]. Further, these two methods can be combined into a hybrid system [12].

Oiso *et al.* [19] presented the architecture for a museum guidance system based on Bluetooth positioning. They also proposed a concept for improving the accuracy of the cell identity based positioning by placing several fixed Bluetooth devices with different

reachable distances into a given location and excluding paths that are not physically possible.

A very important concept in mobile advertising due to the experience with unsolicited direct advertising – especially spam-e-mails – is permission marketing [10]: consumers will only receive ads after they have explicitly opted-in and they can opt-out anytime if they no longer want to receive advertisement.

Lauri Aalto *et al.* come up with Bluetooth and WAP Push Based Location-Aware Mobile Advertising System (B-MAD) [1] – a system for delivering permission-based location-aware mobile advertisement to mobile phones using Bluetooth positioning and Wireless Application Protocol (WAP) Push.

Bulander *et al.* introduced MoMa [13] – a mobile advertising system as approach to enable personalized and context sensitive advertisement while guarantee data protection, whereas context isn't limited to just location.

Another approach for mobile advertising is the distribution of advertisement using multi-hop ad-hoc networks (MANETs), for example “AdPass” [24] or “eNcentive[23]. MANETs don't require an installed infrastructure consisting of base stations, cables or routers. If the distance between two mobile terminals is short enough they can establish a peer-to-peer communication (using Bluetooth or WiFi for example) to exchange advertisement messages.

Some systems even provide a monetary incentive for the consumers for receiving advertisement like *misteradgood.com* by MindMatics or the one by Zagme [8], but entertaining (“advertainment”) or informative content can also act as incentive for receiving advertisement [28]

2.2 System Description

B.L.U.E stands for Bluetooth Location Ubiquitous Emphasizer, which means that this advertising system focus on the location and emphasize is to show that advertising is about emphasizing your product. The main components and operation sequence of the proposed B.L.U.E system are illustrated in Figure 2.1:

1. Client scan for available server within range
2. Once found, client can start requesting list of available advertisement from the server
3. Server will send the list to the requesting client
4. Client can select advertisement from the list that they found interesting to view
5. Server sends client the requested advertisement

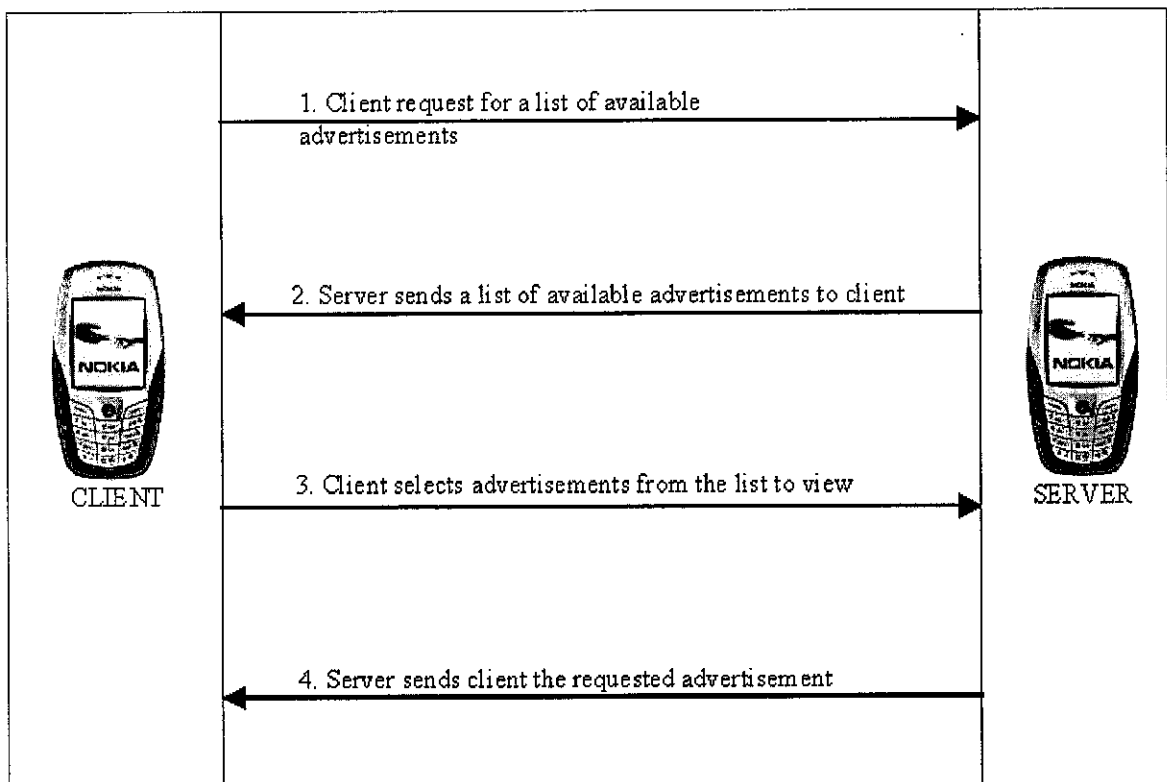


Figure 2.1: B.L.U.E. system architecture

Both the server and client can be any mobile phones, as long as it has Bluetooth service and can install java application. To use this system, user need to download the java application into the mobile phone, install it and it is ready to use.

In this study, the application is stored inside a laptop. It is transferred to the mobile phones using infrared or Bluetooth connection (whichever applicable.)

B.L.U.E allows advertisements to be transferred from one phone to another. It is intended to be run on two or more phones with one of them are a server.

This system consists of two modules – client and server. One server should be able to connect to seven clients simultaneously at any given time. On starting the server, the Bluetooth notifier is created to ask security question and able to accept clients automatically. The corresponding service record contains the attribute with the published advertisement information.

By default, no advertisements are published. Use ‘Publish image’ and ‘Remove image’ commands in the server menu to add/remove the corresponding advertisement to/from service record. The published advertisements are highlighted in the selection list.

On the client side, once the client is up and running and its Bluetooth system is initialized successfully, it can start searching for available advertisements from nearby server.

The search process includes both device and service discovering. The device search is done for preknown and cached devices, meaning that the client has the URL of the server beforehand. It is hard coded in the coding during the development phase. Client can cancel the searching process anytime they want.

Result of the searching process is a list of available advertisement. Client can view the advertisement by downloading them to their mobile phone. Client may also cancel the

download. After viewing the image, go back to the advertisement list to choose another advertisement to be viewed.

The server is created with the URL that indicates each connected client should be authorized. To be exact, when client is downloading the advertisement, the corresponding server shows client the security dialog with remote device friendly name and Bluetooth address.

During the time after the advertisement search and before the download, the server may shutdown or removes the selected advertisement from published list. In this case, the client fails to download the advertisement from this server.

Sequences of screenshot are shown in Appendix 2-1.

CHAPTER 3

METHODOLOGY

In this section, two main methodologies will be discussed; research and design methodologies. Research methodology addresses the method used in gathering data for the study. Design methodology discusses the methods used in developing the prototype.

3.1 Research Methodology

3.1.1 Questionnaire

Questionnaire is used in this study during the field test. Questionnaires are an inexpensive way to gather data from a potentially large number of respondents. Often they are the only feasible way to reach a number of reviewers large enough to allow statistically analysis of the results. A well-designed questionnaire that is used effectively can gather information on both the overall performance of the test system as well as information on specific components of the system. If the questionnaire includes demographic questions on the participants, they can be used to correlate performance and satisfaction with the test system among different groups of users. Although questionnaires may be cheap to administer compared to other data collection methods, they are every bit as expensive in terms of design time and interpretation. Questionnaires are easy to administer confidentially. Often confidentiality is the necessary to ensure participants will respond honestly if at all. Examples of such cases would include studies that need to ask embarrassing questions about private or personal behaviour.

3.1.2 Objective of the survey

For this project, the objectives of the survey are to find out how users react to the mobile advertisement and factors important to the users, to address any technical issues the user possibly confront during the use, together with comments and feedbacks, and also to gather demographic and other background information such as gender, age and familiarity with mobile technologies and services.

It will be supported with observation that will be conducted simultaneously during the field test. The focus of this observation is to find out how many people set their Bluetooth-enable mobile phone in discovery mode. Sample of the questionnaire is available in the Appendix 3-1.

3.2 Design Methodology

3.2.1 Incremental Development and Release

Developing systems through incremental release requires first providing essential operating functions, then providing system users with improved and more capable versions of a system at regular intervals [5]. This model combines the classic software life cycle with iterative enhancement at the level of system development organization. It also supports a strategy to periodically distribute software maintenance updates and services to dispersed user communities. This in turn accommodates the provision of standard software maintenance contracts. It is therefore suitable for this project. This approach will also be extended through the use of software prototyping tools and techniques which more directly provide support for incremental development and iterative release for early and ongoing user feedback and evaluation [9]. The system will be developed to enable user to feedback on the prototype during the development. A new prototype is then developed based on the feedbacks received.

3.2.2 Assembling Reusable Components

The basic approach of reusability is to configure and specialize pre-existing software components into viable application systems [7]. Such source code components might already have associated specifications and designs associated with their implementations, as well as have been tested and certified.

There are many ways to utilize reusable software components in evolving software systems. However, the cited studies suggest their initial use during architectural or component design specification as a way to speed implementation. They might also be used for prototyping purposes if a suitable software prototyping technology is available. As with this study, several of the source code components are taken from JSR082 API (Bluetooth) Demonstration Midlet that comes with Sun Java Wireless Toolkit 2.3 Beta Version (WTK). The prototype is tested using the WTK for debugging purposes before transferred into the mobile phones for field testing.

CHAPTER 4

RESULT AND DISCUSSION

4.1 Qualitative Evaluation With A Field Trial

To qualitatively evaluate the end user experience and B.L.U.E system in solving spamming and high battery usage in mobile advertising system, a field trial is conducted in real use of environment.

4.1.1 Setup

One Bluetooth Server (Nokia 6600 phone running the B.L.U.E system) was placed at one of the lobby in a shopping complex in Ipoh. The location was selected so that many users can participate in this testing. Field trial booth was set up in the corner near the entrance. The system produced three advertisements in total, containing some special offers and/or discounts. Figure 2 shows two examples of the advertisement.

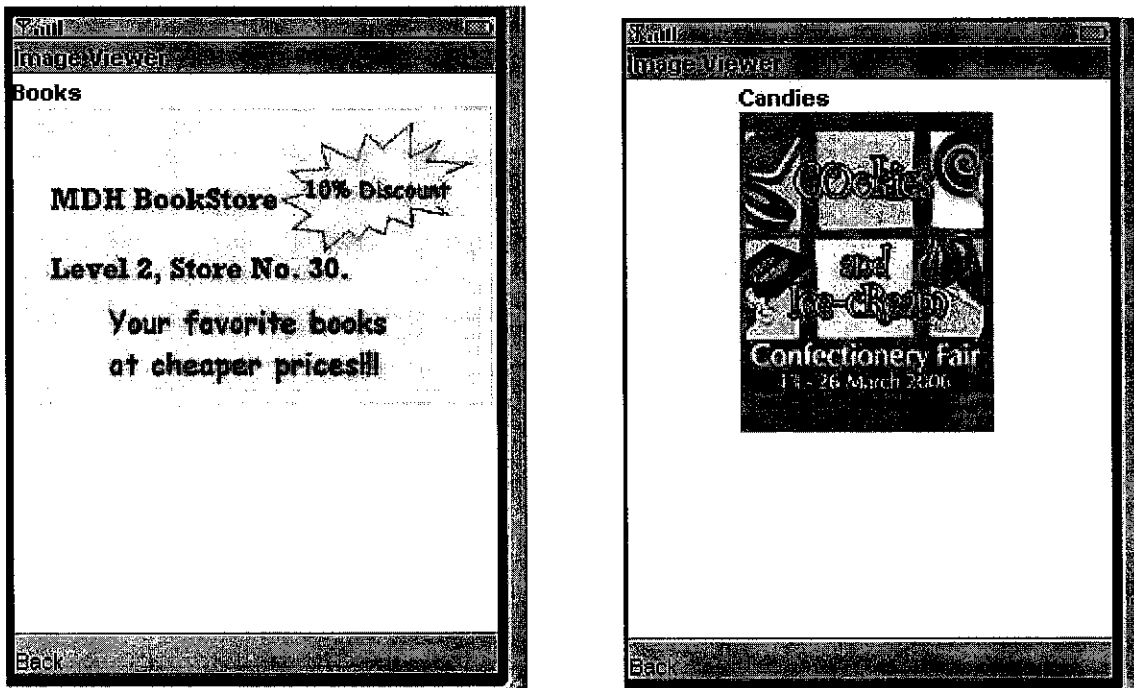


Figure 4.1: Examples of advertisement

At the field trial booth, test users were handed a Nokia 7610 device. We call this the user device to distinguish it from a Bluetooth Server device. The users were given a short introduction on the device usage.

Data was collected via a questionnaire presented to the test users. The questionnaire consisted of three pages. The first page was reserved for background information like gender, age and familiarity with mobile technologies and services. The second page contained questions on user reaction towards the system. The last page addressed user preferences between pamphlet, poster and the B.L.U.E system, together with space for free-text comments and feedback. Sample of the questionnaire is available in the appendix.

4.1.2 Field Trial Execution and Test Users

The field trial is done on May 12 between 12pm to 6pm. 30 users took the test. About half of them (19) were colleagues from the university who were asked to participate. The rest were friends or volunteers recruited from the mall. Of the 30 test users, 18 were males and 12 females. Majority of the users were young

adults: 15 (50%) were 20–35 and 9 (30%) were 11–19 years old. There were three person (10 %) in 36–50 and in >50 age groups each.

All users were frequent mobile phone users: for example, 80% of the respondent stated that they use SMS messaging very frequently and the rest uses frequently.

Other mobile services were used less often as seen in Figure 3.

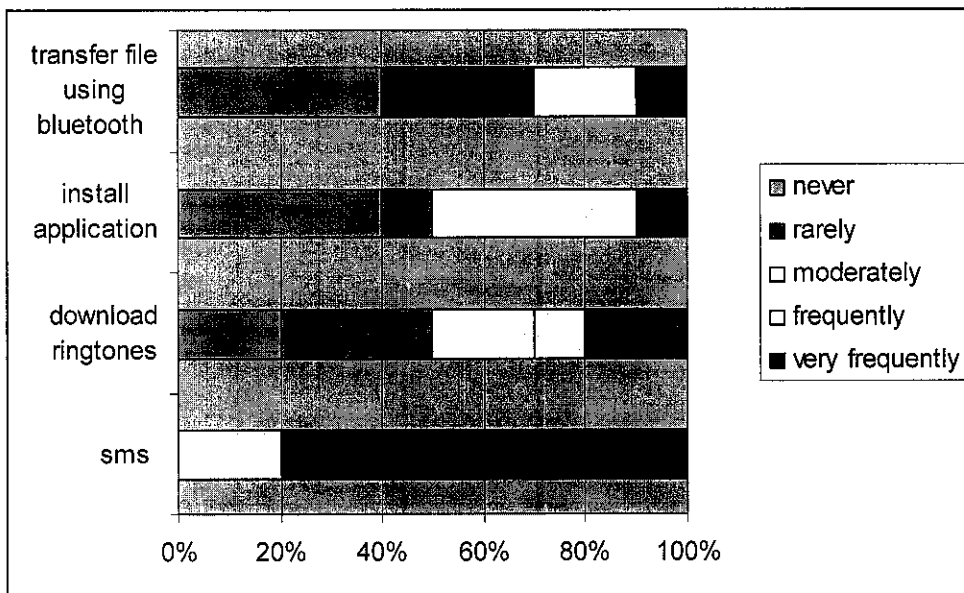


Figure 4.2: Mobile services

4.1.3 Pulled Advertisements

The test users spent an average of 12 minutes on the street with the device. They were 3 advertisements in total. There was one test user who did not download any advertisement. When asked, she said the device shows message, ‘no server was found’. It turns out, the user device has unexpected technical problem.

4.1.4 User Reactions to Advertisements

Figure 4 contains summaries of the answers to selected questions in the questionnaire.

Only two users stated "I will most likely prefer mobile ads" compared to pamphlets and posters. Majority of the respondents (60%) prefer posters over the other two medium.

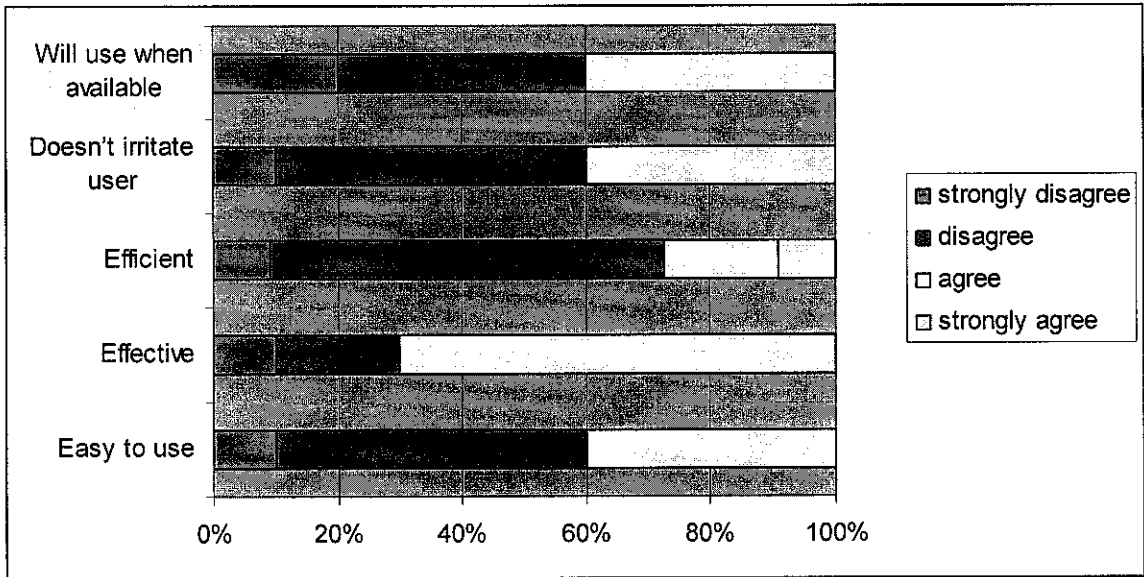


Figure 1.3: Users' responses toward B.L.U.E

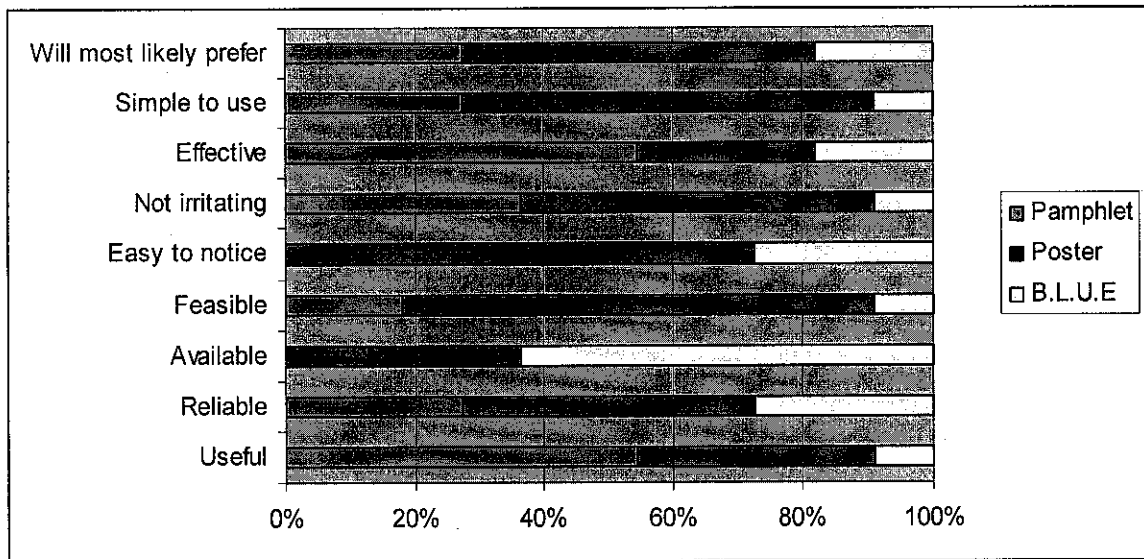


Figure 4.4: Users' preferences

There were also other usability issues. Although all test users were mobile phone users, the Nokia 7610 model and its user interface was new to some test users. One user, a male aged above 51 wrote a comment; *try to produce an application that can be used easily by all age range. It may be good but for people like me cannot understand how to use it.*

However, most test users agreed that it was easy to figure out how to view the advertisements and that the user interface was easy to understand.

Some users were delighted to try this system. One of them wrote; *I would like to try new things, why don't we try new tech of Bluetooth application.* Another user wrote; *my mobile have Bluetooth but I don't know yet how to implement it wisely. I think this application might be a very good starting point to get to know more about the benefits of Bluetooth and evaluate it.*

Because of the selecting capabilities in the system where user can select which advertisement they want to view, none of the test user complaint about receiving advertisement that did not interest them.

The need for user acceptance towards Bluetooth mobile phones in Malaysia is well visible in user comments:

Not all people have mobile phones with Bluetooth. Mobile advertising maybe can be implemented in Japan.

Mobile advertising is a good idea but I don't think so I can use the application as my hand phone is only 3310 (Nokia model without Bluetooth service)

4.1.5 Spamming

Other than finding out how users react to this type of advertisement system, this field test was done to see if this system have similar problem of spamming as pull-based system. Responses from testers confirms that this system do not have that problem. When asked about the spamming, majority of the respondents replied that they did not receive any spam messages. Some of the respondents did receive spam messages from unknown spammer nearby, but only one or two messages.

4.1.6 High battery usage

When users carry out the testing, battery level before and after using the system is noted. This way, the battery usage can be monitored. From the observation, it can be concluded that this system does not use large numbers of battery resources. Not much difference in battery level before and after the testing is done. This is due to the limited usage of the Bluetooth services.

4.1.7 Technical Problems and Positioning Distance

Some of the user complained that the system could not find the server and they needed to search for the device several times before found it. This could be due to the technical problem with the Bluetooth devices. No specific test has been done to rule out the glitch could also be caused by the system itself.

4.1.8 Observations

Generally, delivering advertisements to mobile phones using Bluetooth pull-based technology works. As smart phones like the Nokia 6600 and 7610 become more abundant and people become more familiar with them, the usability problems become less severe. In this field trial we should have spent more time teaching the test users how to use the devices.

Bluetooth-based searching devices were not very reliable or real-time. Some of the users could stand within the range without detecting any server. This is not so severe from user point of view for an advertisement service, as users generally do not know if there's any advertisement available at that time.

Despite the technical limitations of the field trial, the users' attitude towards this kind of mobile services was very positive. When asked whether the user would want to use similar mobile services in the future, only 20% user strongly disagreed. On the other hand, in their comments they seemed quite positive about the system. 40% of the user stated that they will use the system when available. Of course, we have to keep in mind that people willing to volunteer as

test users in this kind of a field trial are generally sympathetic towards mobile services.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

This study introduced a system for delivering mobile advertisements to mobile phones using Bluetooth pull-based technology. It presented a thorough quantitative and quantitative evaluation of the system. This section will conclude the study and provide some recommendation for future work.

Experimental results showed that the system provides a viable solution for realizing mobile advertising. Based on the result gathered from the field testing, none of the respondent comment on receiving any spam while using the system. This is due to the limited use of Bluetooth service which is turned on only when the respondents want to download advertisement. This also reduces the high battery usage as compared to pull-based advertising system.

5.1 Future Work

The Bluetooth searching system needs to be made more reliable. To achieve this, the Bluetooth sensor needs to be more accurate. This would make the searching more reliable, compared to result achieved during the field test were some of the user device cannot detect the server even when they're within the range.

More server could be set up to accommodate more user at one go as Bluetooth Piconet only allow maximum of seven user connect at a time. The server could be placed at

each section in the department store that will publish only advertisement related to the department.

However, a much more extensive and longer lasting user study would be needed to provide real assessment of the acceptance of mobile advertisements. Further, a larger scale deployment would require a thorough validation of the underlying candidate business models.

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APPENDICES

Appendix 2-1: Screen shot of application

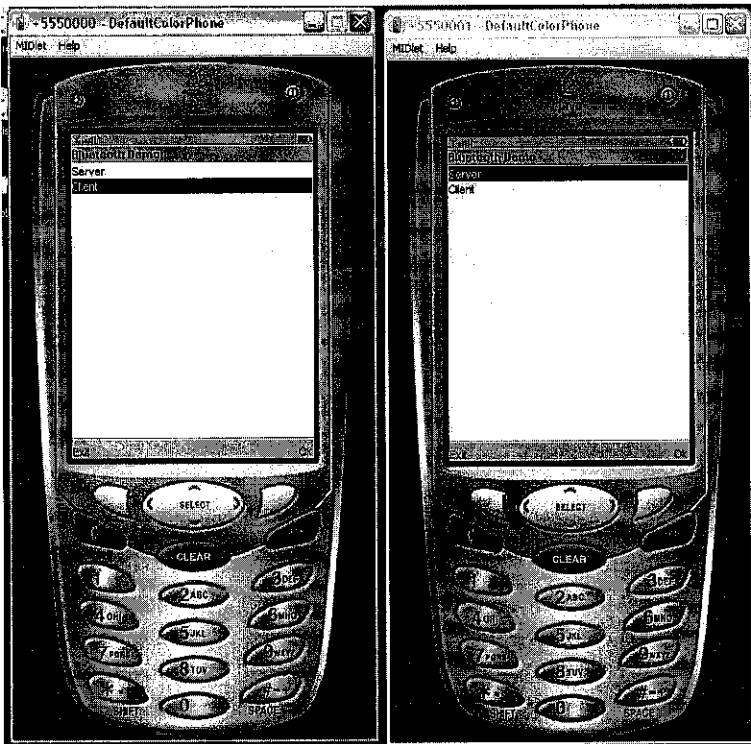


Figure 2.1.1: Overall view of the Java Wireless Tool Kit

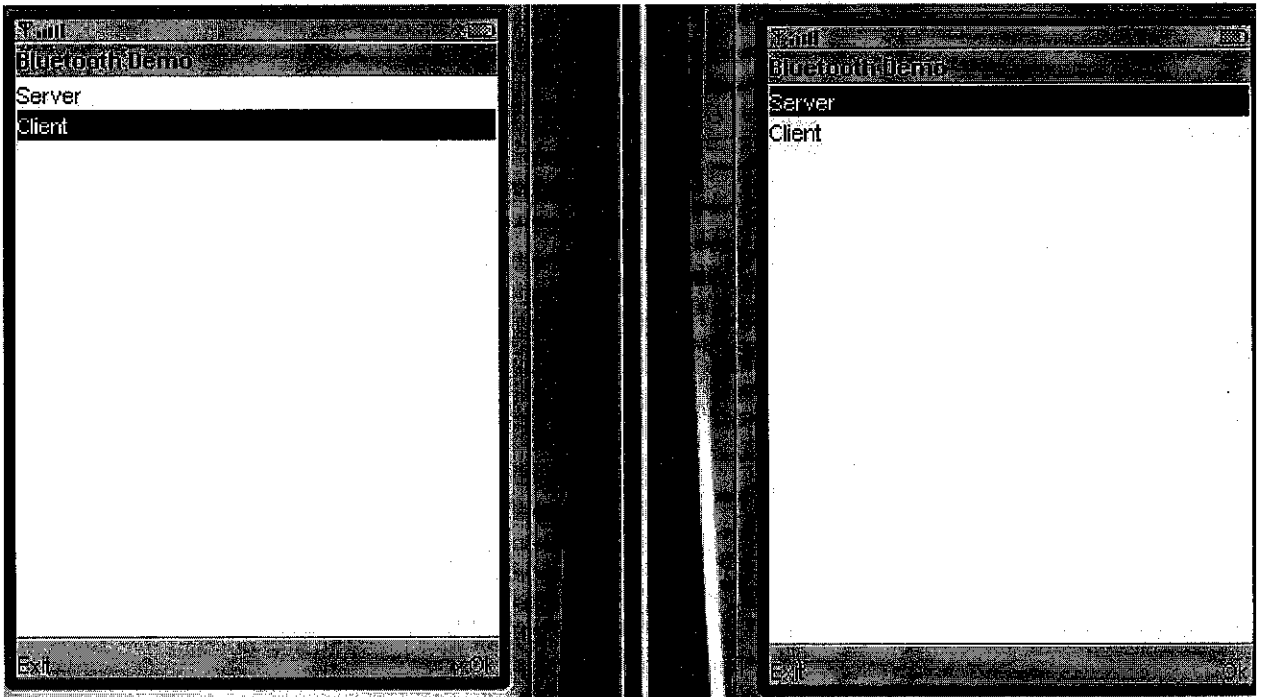


Figure 2.1.2: Close up picture of the client and server startup screen. Click Ok on both applications to proceed.

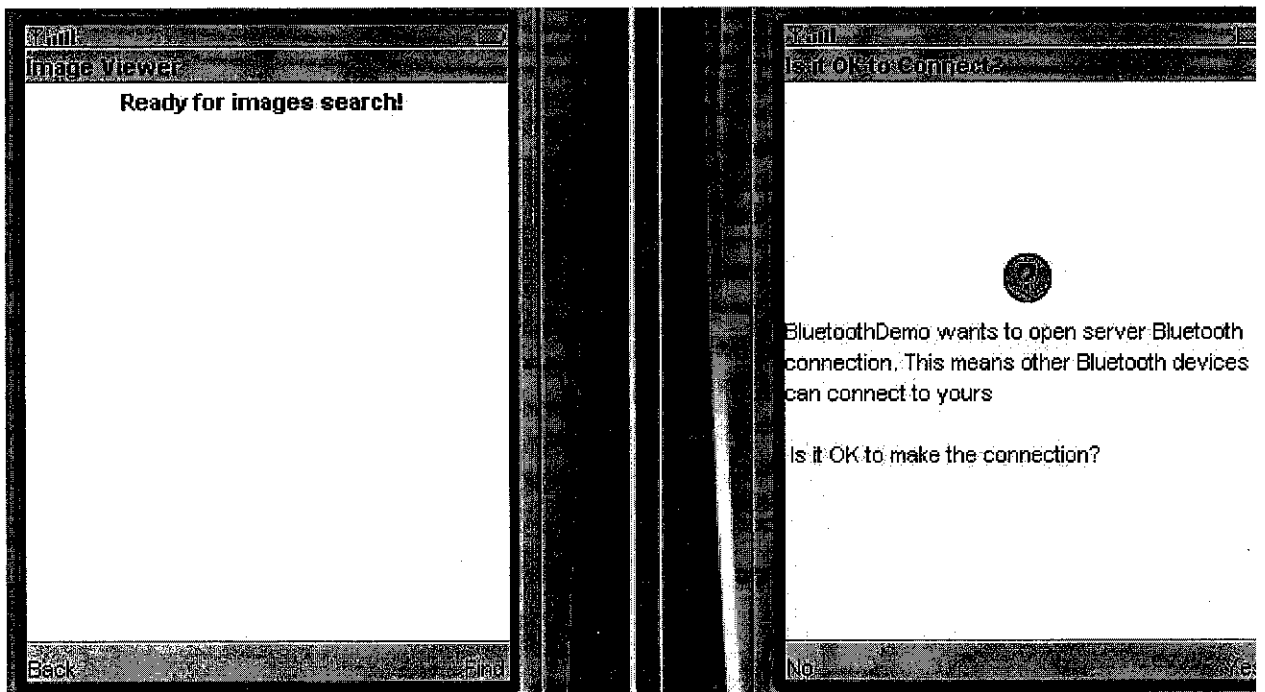


Figure 2.1.3: After clicking 'Ok', the client application will prompt user to search for images (advertisement) while the server application ask for permission to make connection.

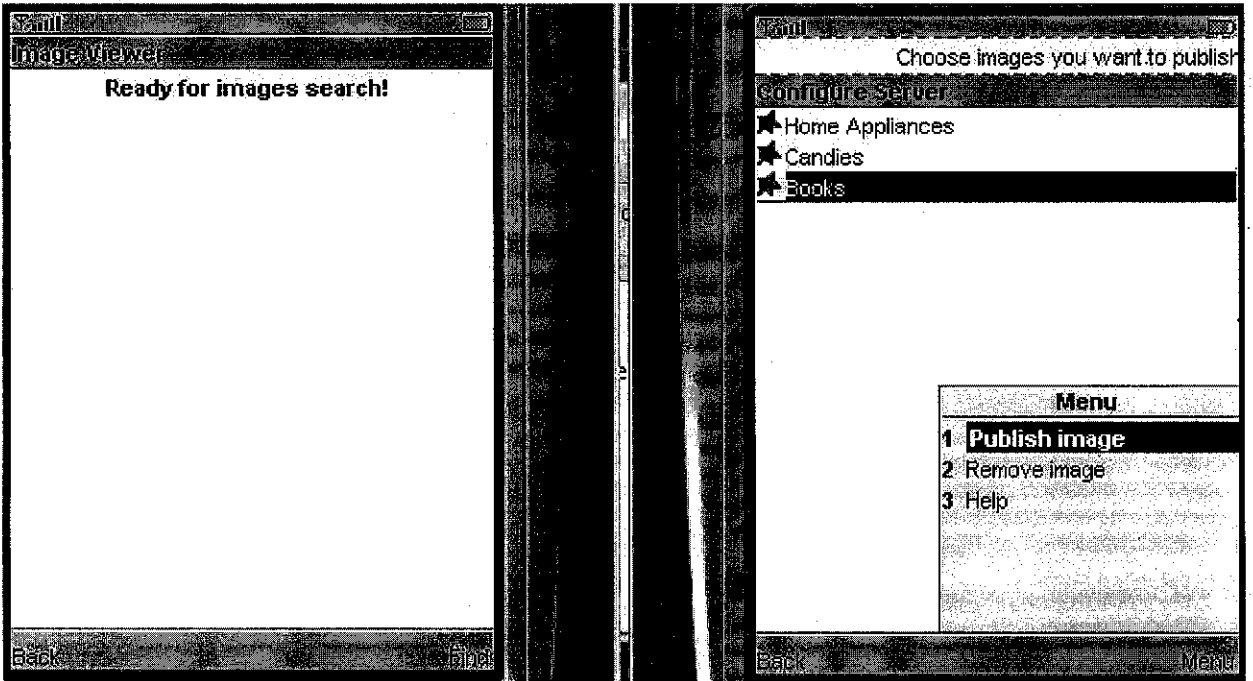


Figure 2.1.4: After allowing the server to make the connection, it will ask user to choose images to publish. This sample application has three pictures available. To proceed, click 'Find' in the client application and 'publish image' in server application.

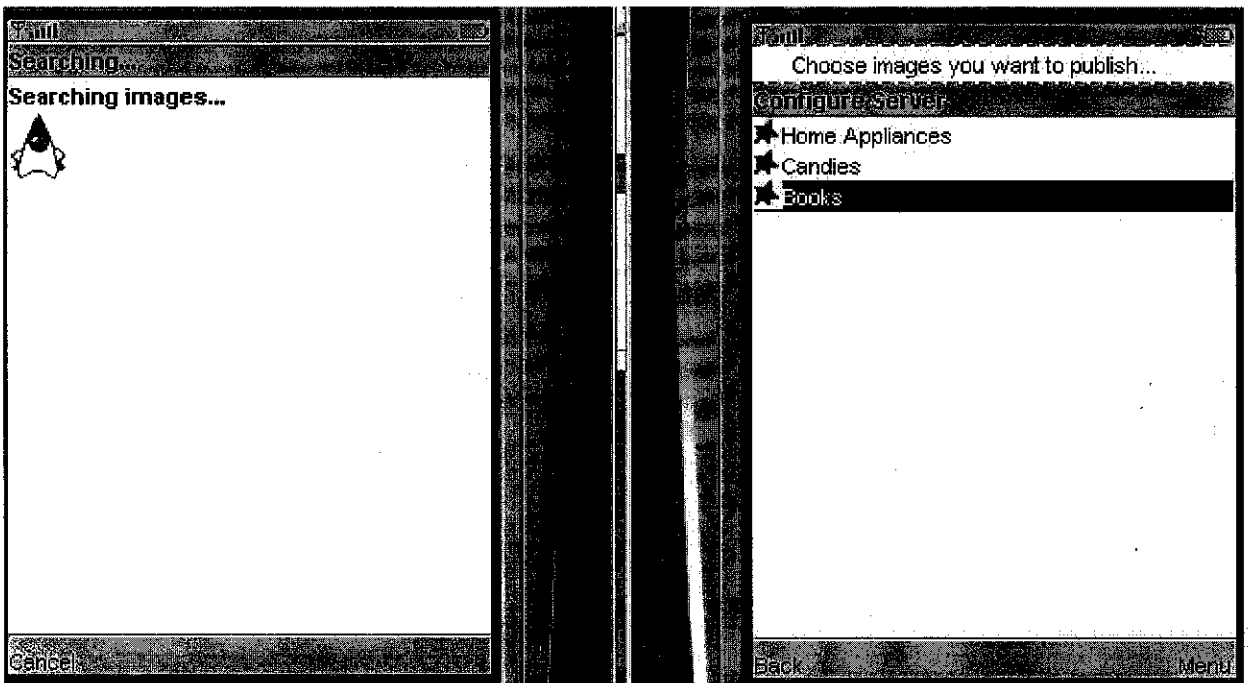


Figure 2.1.5: The client application will search for available images.

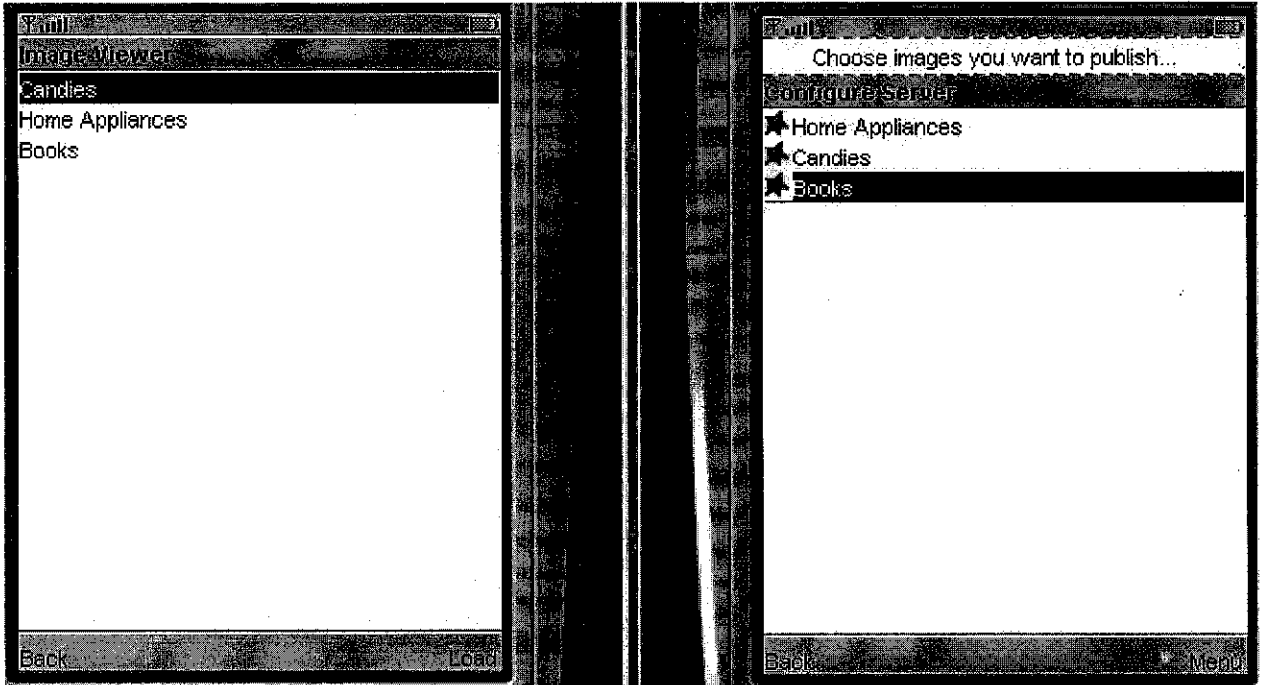


Figure 2.1.6: After listing available images, the client will select which image to be displayed and click 'Load'

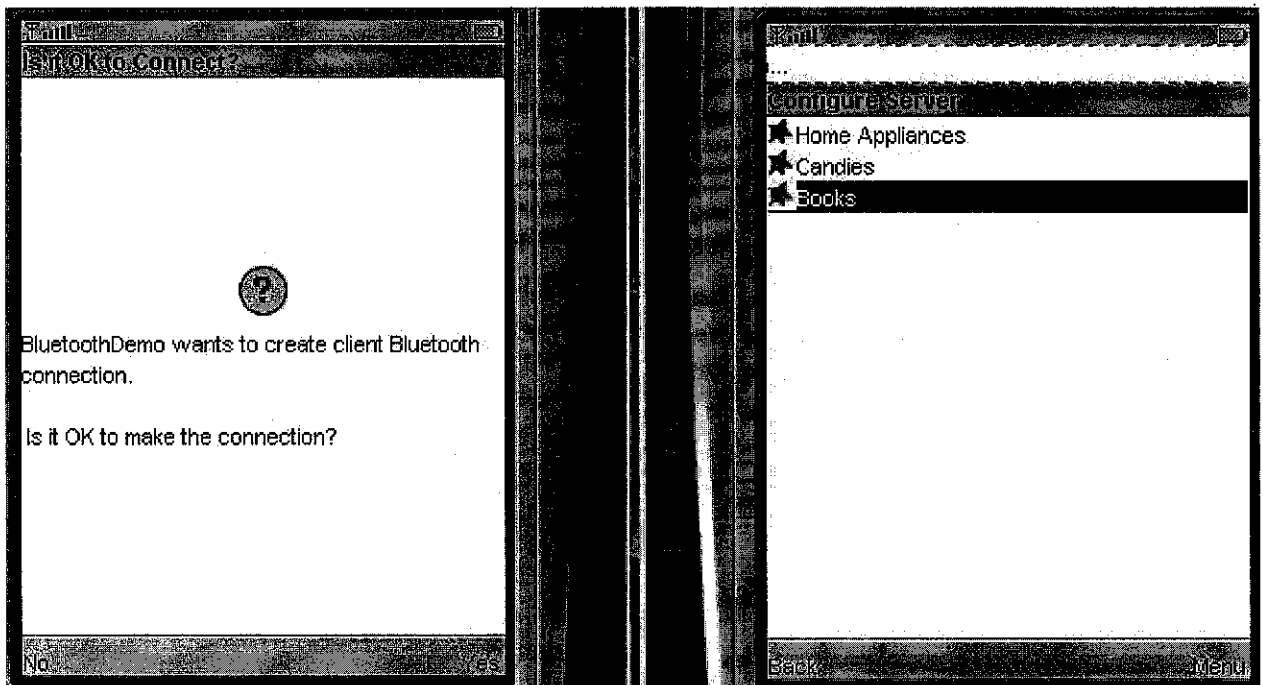


Figure 2.1.7: The client application will ask for permission to make a Bluetooth connection.

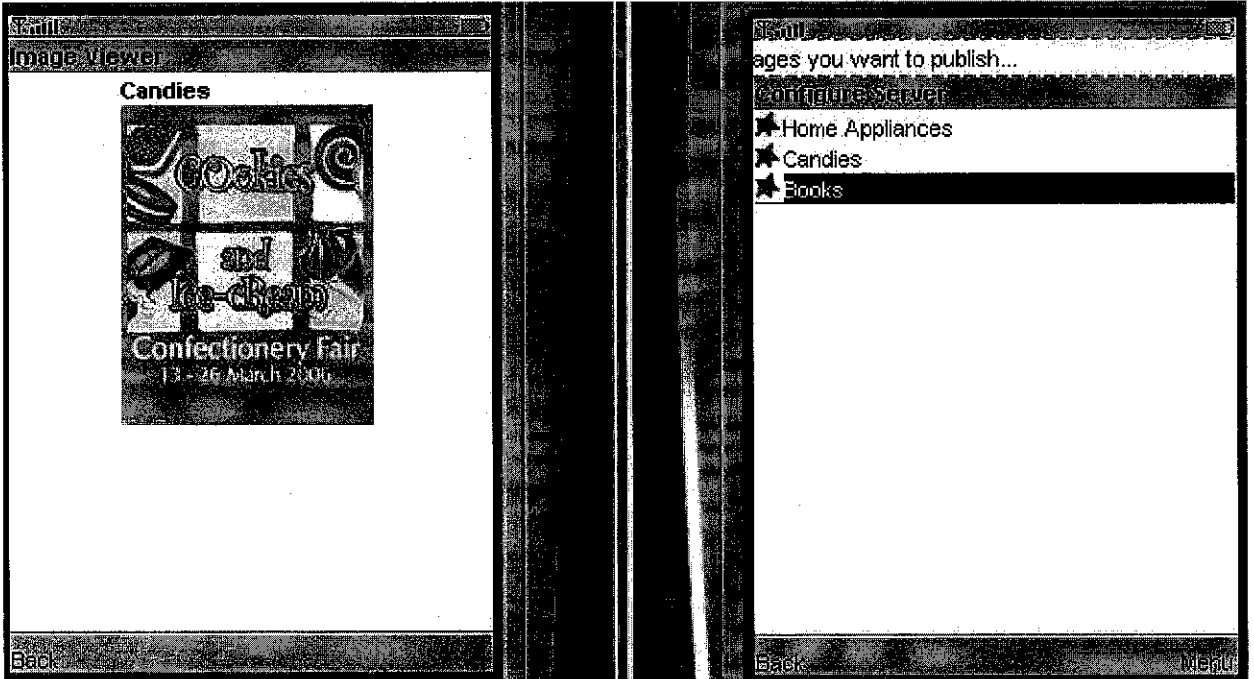


Figure 2.1.8: The client application displays the selected advertisement. User can click 'back' to go to the previous page.

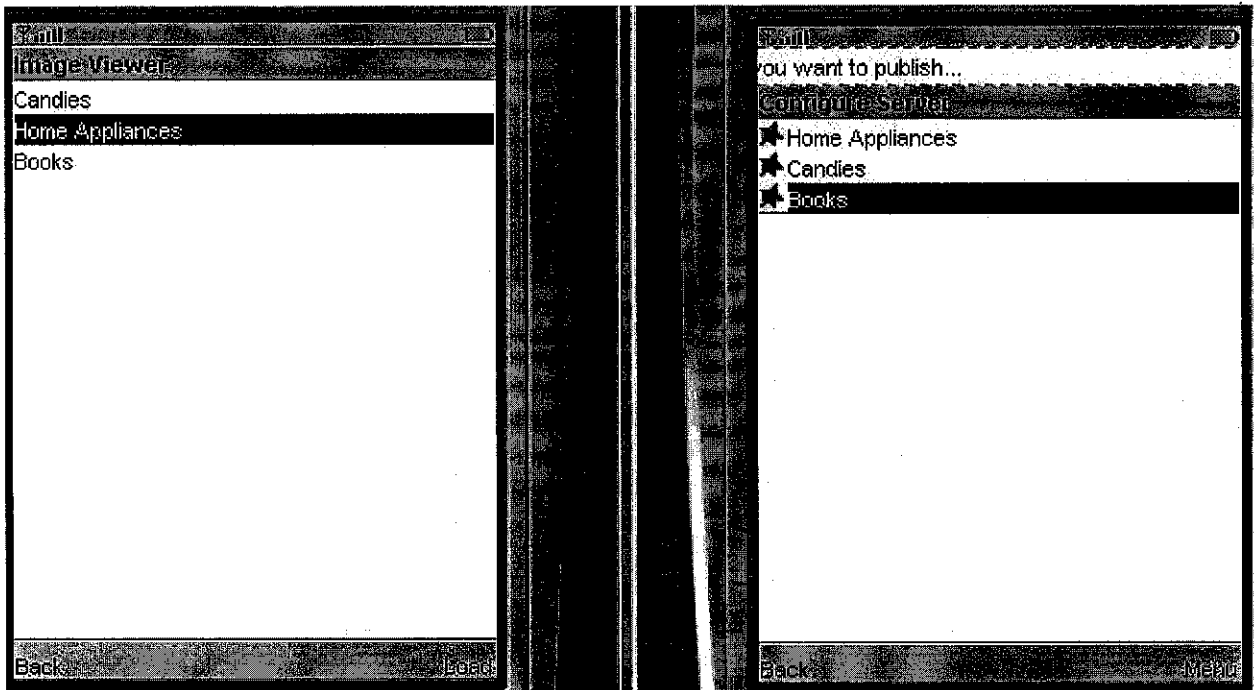


Figure 2.1.9: User can select another advertisement to view.

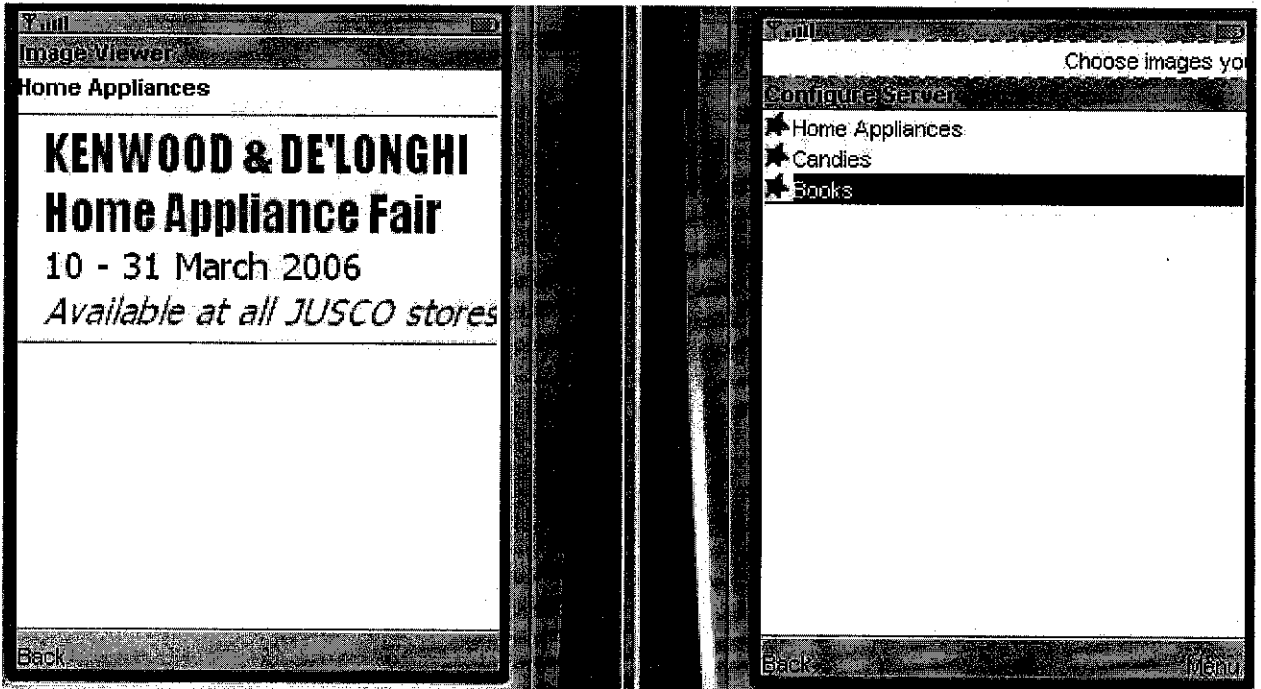


Figure 2.1.10: Screen shot of another advertisement named 'Home Appliances'.

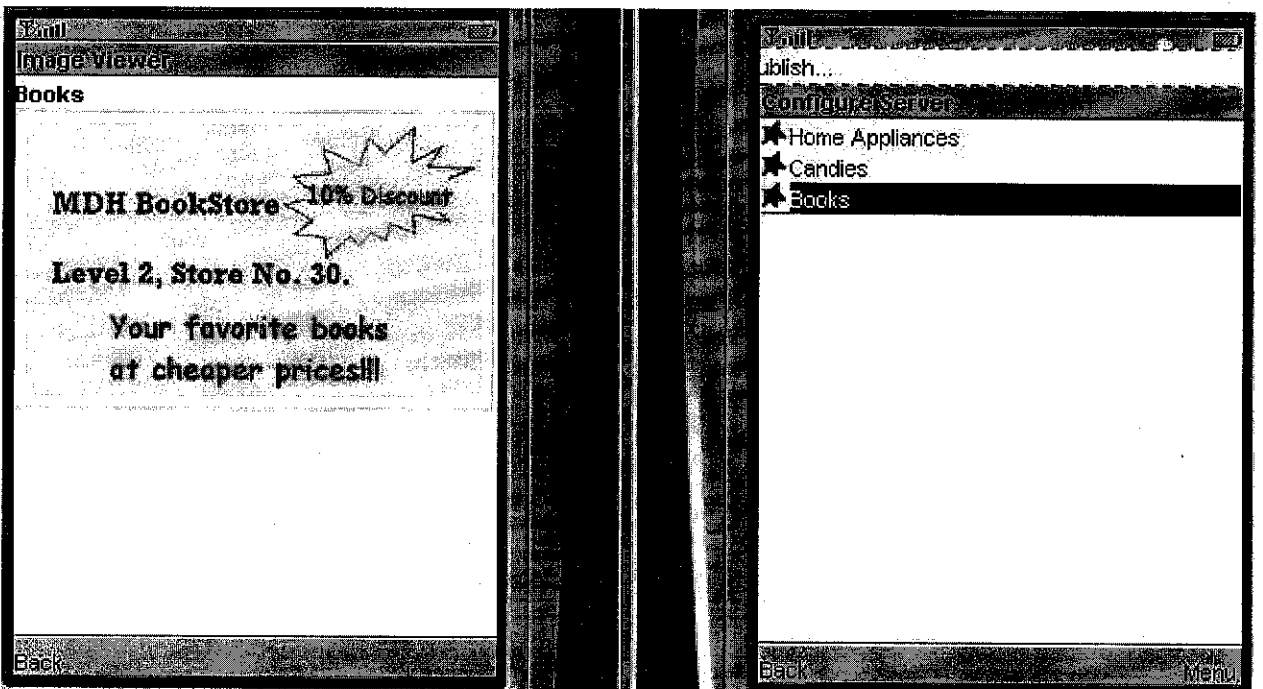


Figure 2.1.11: Screen shot of another advertisement under the category 'Books'.

Arahan/ Instruction

Sila tandakan [x] di kotak yang disediakan/
Please tick [x] in the box given.

Sekyen A: Latar Belakang Responden
Section A: Respondent's Background

1. *Lingkungan umur/ Age range*

< 11 tahun/ years	
11-19 tahun/ years	
20-35 tahun/ years	
36-50 tahun/ years	
> 51 tahun/ years	

2. *Jantina/ Gender*

Lelaki/ Male	
Perempuan/ Female	

3. *Sekerap manakah anda menggunakan perkhidmatan yg disenaraikan dibawah/*

How often do you use the services listed below

- 0 – *Langsung tidak/ Never*
1 – *Jarang/ Rarely*
2 – *Sederhana/ Moderately*
3 – *Kerap/ Frequent*
4 – *Sangat kerap/ Very frequent*

Service/ Service	0	1	2	3	4
SMS, MMS					
<i>Muat turun lagu, logo operator/</i> Download ringtone, operator logo					
<i>Muat turun dan peminan, aplikasi/</i> Download and install game, application					
<i>Pemindahan fail melalui Bluetooth/</i> Transfer files using Bluetooth connection					

Sekyen B: Reaksi Responden Terhadap Sistem Pengiklanan Bluetooth
Section B: Respondent's Reaction towards Bluetooth Advertising System

1. *Bagi setiap kenyataan, pilih yang terbaik menerangkan perasaan anda/*
For each statement, select the option best describe how you feel

- 0 – *Sangat Tidak Setuju/ Strongly disagree*
1 – *Tidak Setuju/ Disagree*
2 – *Setuju/ Agree*
3 – *Sangat Setuju/ Strongly agree*

	0	1	2	3
<i>Senang digunakan/ Easy to use</i>				
<i>Berguna/ Effective</i>				
<i>Servis tidak mengambil masa yang lama/ Efficient</i>				
<i>Tidak menyusahkan pengguna/ Does not irritate user</i>				
<i>Akan menggunakan sistem ini dimasa hadapan/</i> Will use the system when available				

Seksyen C: Pilihan Responden antara Pamphlet, Poster dan Mobile Iklan
Section C: Respondent's Preferences between Pamphlets, Posters and Mobile Advertisement

Tajuk/ Title : Bluetooth Mobile Advertising
 Disediakan oleh/ Prepared By : Uzvani Mahmud
 Emel/ Email : uzvani@gmail.com

1. Pilih satu dari tiga medium pengiklanan yang paling menghampiri kriteria yang disenaraikan/ Select advertisement medium best describe by the criteria listed.

Criteria	Pamphlet	Poster	Mobile
Berguna/ Usefulness			
Boleh diharap/ Reliable			
Sentiasa ada/ Available			
Sesuai digunakan/ Feasible			
Mudah dilihat/ Easy to notice			
Tidak mengganggu/ Not irritating			
Berkesan/ Effective			
Senang digunakan/ Simple to use			
Kemungkinan besar saya akan memilih/ I will most likely prefer			

Komen/ Comment:

Pendahuluan/ Preface:

Iklan terus kepada telefon bimbit pengguna mempunyai potensi yang besar untuk dikomersialkan. Projek ini dinamakan Sistem Pengiklanan Bluetooth, satu sistem untuk menghantar iklan kepada telefon bimbit menggunakan 'pull technology' Bluetooth.

Soal selidik ini bertujuan untuk mengkaji penerimaan pelanggan di pasaraya terhadap iklan terus kepada telefon bimbit sebagai medium pengiklanan dan penyampaian maklumat. Borang soal selidik ini terdiri dari empat seksyen A, B, C dan D. Responden dikehendaki menjawab kesemua soalan dalam setiap seksyen

Advertising on mobile devices has large potential to be commercialized due to the very personal and intimate nature of the device and high targeting possibilities. This project is called Bluetooth Advertising System, a system for delivering location-aware mobile advertisement to mobile phones using Bluetooth pull technology.

The objective of this survey is to study the acceptance of customers at shopping mall towards the Bluetooth mobile advertising as a medium of advertisement and information among the customers. This survey consist of four sections, A, B, C, D. Respondents are required to answer questions in each section.

Terima kasih kerana meluangkan masa anda ☺

Thank you for your time ☺