INTEGRATED HOME SECURITY SYSTEM: MODULE ON MOBILE APPLICATION

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ABSTRACT

Home security system is needed for occupants' convenience and safety. Nowadays, there is lot of burglary happening across the city, the reason is no one helping or getting late for help. Sometimes, guard in housing area also not helping because of the big area housing environment. Nowadays, Malaysian still uses old technology alarm for their home security. How people react for the alarm? Can the guard in housing area hear it? For this paper, I have design and implementing a security system for home using Bluetooth and SMS notification which is smart in helping owner to get helps from neighbor, friend, police station or guard in housing area faster. The user can choose the recipient number from contact's phonebook and set SMS by self. This system was implemented in J2ME to operate in mobile.

ABSTRAK

Alat penggera dirumah diperlukan untuk keselesaan penghuni dan keselamatan. Sehingga kini, ada banyak kecurian berlaku di seluruh bandar, alasannya adalah tidak ada yang membantu atau terlambat mendapatkan bantuan. Kadang-kadang, penjaga di kawasan perumahan juga tidak membantu kerana kawasan perumahan yang luas. Pengguna di Malaysia saat ini masih menggunakan penggera lama untuk keselamatan rumah mereka. Bagaimana orang sekeliling bertindak balas? Bolehkah penjaga di kawasan perumahan mendengarnya? Untuk kajian ini, saya telah merancang dan melaksanakan sistem keselamatan untuk rumah dengan menggunakan Bluetooth dan notis SMS yang bijak dalam membantu pemilik untuk mendapatkan bantuan dari tetangga, teman, pihak polis atau penjaga di kawasan perumahan dengan lebih cepat. Pengguna boleh memilih nombor penerima daripada buku telefon dan menetapkan SMS sendiri. Sistem ini dilaksanakan di J2ME untuk beroperasi secara mobile.

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LIST OF ABBREVIATIONS

SMS	Short Message Service
PSM	Projek Sarjana Muda
ICT	Information and Communication Technology
PDAs	Personal digital assistants
GPS	Global Positioning System
GSM	Global System for Mobile Communication
PANs	Personal Area Networks
IHSS	Integrated Home Security System: Module on Mobile Application
HCI	Host Controller Interface
TCS	Telephony Control System
SDP	Service Discovery Protocol
WAP	Wireless Access Point
OBEX	Object Exchange
L2CAP	Logical Link Control and Adaptation Protocol
RFCOMM	Radio frequency communication

SMSC	Short Message Service Center
HLR	Home Location Register
GPRS	General Packet Radio Service
3G	Third Generation
OS	Operating System
RIM	Research In Motion
APIs	Application Interface Programming's
LCD	Liquid Crystal Display
SIMCard	Subscriber Identity Module
USB	Universal Serial Bus
RJ45	Register Jacks 45
MSA	Mobile Service Architecture
JTWI	Java Technology for the Wireless Industry
JCP	Java Technology for the Wireless Industry
CLDC	Connected Limited Device Configuration
MIDP	Mobile Information Device Profile
OTA	Over-The-Air
DPD	Desktop Publishing Program
SSADM	Structured System Analysis and Design Method
SDLC	Software Development Life Cycle
RAD	Rapid Application Development

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CHAPTER I

INTRODUCTION

1.1 Project Background

Currently, there are many systems developed in order to meet user requirements. In this modern lifestyle, the important thing to know is what to input in order to receive the desired outputs of a system. In this global world, technologies growth wider and makes user wish for a system that can assist them in their daily life. With this growing demand, it is recommended to develop a system that can achieve user's target and expectation.

Nowadays, mobile phone is one of the most essential things of people. It takes much convince for people. The technology of mobile phone is increase rapidly every day. Form 1st generation up to now. When phone had been found at the first time, Phone just use to completing our voice communication need. When newer technology was found, we only know that SMS (short message service), as text communication service. SMS service has been caught pager user to use SMS and nowadays anything can be done using mobile.

The system that will be developed is Project Sarjana Muda (PSM) Integrated Home Security System: Module on Mobile Application (IHSS). The target users of this project are the household who wants to secure their house. IHSS can help the owner of their house to get helps

from neighbor, security guard or people they know and knowing them without panicking. So in this situation, it will exist the cooperating in their neighborhood and improve the level of the home security.

1.2 Objective

The main objectives for the development of Security System on Mobile Application are:

i. To develop mobile application on security system.
ii. To implement new technology for Home security using mobile.
iii. To implement wireless networking using Bluetooth protocol for signal transmission.
iv. To make easier for household to inform and get helps from neighbor, security guard and friends earlier without panicking.

1.3 Scope

The scopes of this project are as follows:

i. Target Users
   - The main user of the system will be the owner of their house

ii. Modules
   - The system will automatically send SMS to the chosen numbers.
   - The system is using Bluetooth connection to retrieve connection from the device detector.
   - The system is going to develop using the JAVA programming language for the software application.
   - The main software to develop this software is using Wireless toolkit.

- The system will provide a simple user interface for the users, and will mostly be focused how to setup the uses of the application.
- The mobile phone will make alert sound from the phone after retrieve the connection from the device detector.

1.4 Problem Statement

Security has been the main issues in any organization or enterprise. A large number of security systems existed in the whole world that has the same goal which is to create an efficient and formidable security system. Out of all these systems, only a number of systems truly achieve the goal. And to be more specific on the scope, there is lack of security system applied that truly organized and efficient in handling home security with SMS notification.

Mobility in security has always been slow in progression nowadays. It will be a great achievement if the mobility aspect in security could be integrate or combined. To give an example, often, when a home intrusion occurs, the owner of the house should be the first to be informed and he should inform to their friends or neighbor to get helps. But with the old system alert using wired that triggered the alarm sound, the owner maybe can be panicked and will be late to inform to the others friend or neighbor to get helps. And usually, they will get to know about the intrusion late. But nowadays, people hate to hear the noisy alarm sound and that always does not helping in home security. This is due to the lack of mobility aspect provided in security.

These problems are extracted during the project identification process:

i. There is lack of security system applied that truly organized and efficient in handling home security with mobile application through SMS notification.

ii. Often, when breaking and entering home occurs, the safety unit, friends, or neighbor will get to know about it a bit late or just ignore it because hate the noisy sound alarm.

This is due to the lack of mobility aspect. So, SMS notification will be used in order to encounter the issues.

iii. The old home security systems that have been use today make a noisy alarm to rouse other people. But people hate the sound and this is not helping.

1.5 Thesis Organization

This thesis contains 6 chapters. Chapter 1 gives an overview of the research conducted. It consists of 5 subtopics which are introduction, problem statement, objective, scope and thesis organization. Chapter 2 reviews the previous research works that was conducted and method usually used by researcher. All of the relevant books, report and internets taken from those researches will be discussed in detail. Meanwhile, chapter 3 reveals the techniques and the algorithms that will be used in performing this study. Discussion about the process flow of this research in detail is in this chapter. Chapter 4 discusses the details of the implementation. Results of the testing are to be described in Chapter 5. Finally, chapter 6 concludes the entire thesis.

CHAPTER II

LITERATURE REVIEW

2.1 Introduction

Chapter II is the important chapter for any project that will be develops. The purpose of this chapter is to present a selected literature review, which is very important for the research. This chapter also describes and explains on the literature review carried out on the system that be used in developing in IHSS. Besides that, previous research also will be discussed in this section and at least three existing system that being used in to make as a research which is related to IHSS will be explained and compared to highlight the differences.

For the project required section, where all the requirements such as software and hardware as well as the operating system requirement will be listed so that developer can understand all the features that are available in the requirement before proceeding to the proposed project.

Finally, the last section of the chapter discusses the project schedule and milestones. In this section, a Gantt chart will be attached together with this section. The Gantt chart listed details of all task and activity required during the progress of the project and the conclusion section will end the entire explanation for this chapter.

2.2 Literature Review

Literature review is aims to review the critical points of current knowledge on a particular topic. Therefore, the purpose of the literature review is to find, read and analyze the literature or any works or studies related to this system. It is important to well understand about all information to be considered and related before develop this system.

For this project, some researchers have been done to understand the concept and purpose of alert using mobile (SMS notification), programming language, protocol language, and existing system that related to this project.

2.2.1 Domain

Every project has its own domain. In the IHSS for home protection, the domain for the project is Information and Communication Technology (ICT) in Wireless Technology that using the Bluetooth connection.

Bluetooth on Wireless connection normally used to refer to any type of electronic operation that does not require a wired connection. Bluetooth is a standard and a communications protocol primarily designed for low power consumption, with a short range (power-class-dependent: 100m, 10m and 1m, but ranges vary in practice; (see Table 2.1) based on low-cost transceiver microchips in each device. Bluetooth makes it possible for these devices to communicate with each other when they are in range. Because the devices use a radio (broadcast) communications system, they do not have to be in line of sight of each other.

Table 2.1 Bluetooth device classes

Type	Power Consumption	Operating Range
Class 1	100mW (20 dBm)	Up to 100 meters (300 feet)
Class 2	2.5mW (4 dBm)	Up to 10 meters (30 feet)
Class 3	1 mW (0 dBm)	0.1-10 meters (less than 30 feet)

Source: Karygiannis and Owens. Wireless Network Security: 802.11, Bluetooth and Handled Device table 4.2, page 4-5

2.2.2 Keyword

2.2.2.1 Wireless Communication

Wireless is normally used to refer to any type of electrical or electronic operation which is accomplished without the use of a hard wired connection. Wireless is a transmission or Information transport method that enables Mobile computing over a distance. The distances involved may be short or long range that refers to any wireless technology used.
The examples of Wireless technology include:

- Two way radios
- Cellular telephones
- Personal digital assistants (PDAs)
- Wireless networking
- GPS units
- Wireless computer mice and keyboards
- Satellite television and cordless telephones.

For the IHSS, the wireless technology that will be use is Bluetooth and GSM network that using Short Message Service (SMS).

2.2.2.1.1 Bluetooth

Bluetooth is an industrial specification for wireless personal area networks (PANs). Bluetooth provides a way to connect and exchange information between devices such as mobile

phones, laptops, personal computers, printers, GPS receivers, digital cameras, and video game consoles over a secure, globally unlicensed short-range radio frequency. The Bluetooth specifications are developed and licensed by the Bluetooth Special Interest Group.

Bluetooth is a standard and communications protocol primarily designed for low power consumption, with a short range (power-class-dependent: 1 meter, 10 meters, 100 meters) based on low-cost transceiver microchips in each device.

Bluetooth enables these devices to communicate with each other when they are in range. The devices use a radio communications system, so they do not have to be in line of sight of each other, and can even be in other rooms, as long as the received transmission is powerful enough.

Bluetooth exists in many products, such as phones, printers, modems and headsets. The technology is useful when transferring information between two or more devices that are near each other in low-bandwidth situations. Bluetooth is commonly used to transfer sound data with phones (i.e. with a Bluetooth headset) or byte data with hand-held computers (transferring files).

Bluetooth simplifies the discovery and setup of services between devices. Bluetooth devices advertise all of the services they provide. This makes using services easier because there is no longer a need to setup network addresses or permissions as in many other networks.

2.2.2.1.1.1 Topology

Bluetooth device are grouped in piconets. Each piconet consists of master and different slave. A master and a slave are connecting through the point-to-point communication. So if they are more than one slave, a point-to-multipoint is established. The master is the unit which initiates the communication. A device in one piconet can connect to a device belonging to another piconet, forming a scatternet.

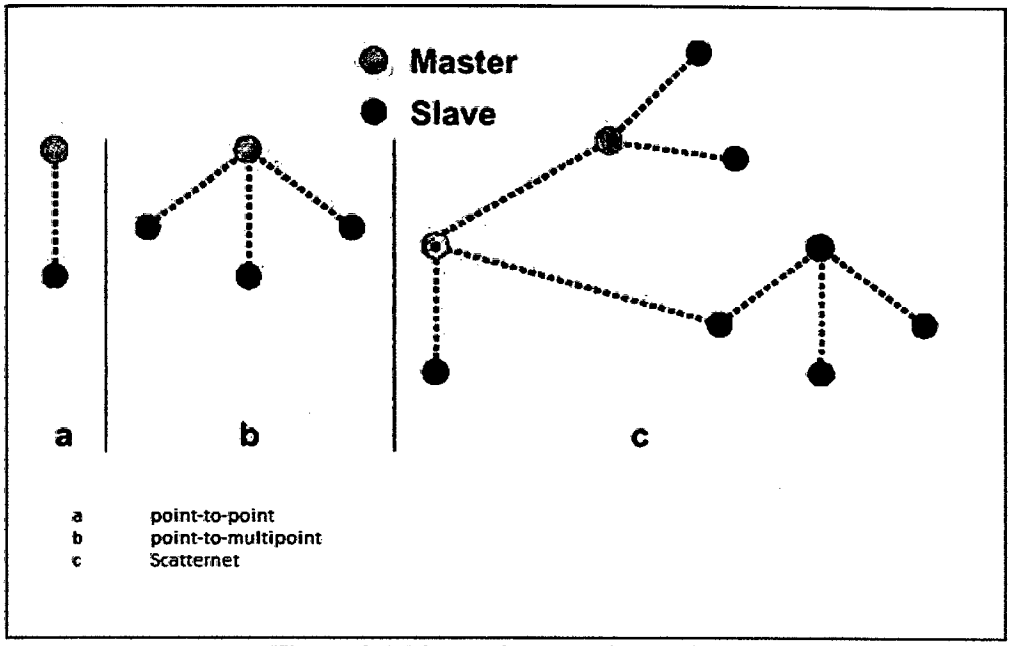

Figure 2.1 Bluetooth Network Topology

Source: Introduction to Bluetooth and Bluetooth enabled Java Applications for Mobile Phones, Tran Cong Hung Ph.D. & Dang Hong Minh figure 1.2, page 2.

2.2.2.1.1.2 Protocol Stack

The Bluetooth specification aims to allow Bluetooth devices from different manufactures to work with each other, so it is not sufficient to specify just a radio system. Because of this, the Bluetooth specification does not only outline a radio system but a complete protocol stack to ensure that Bluetooth devices can discover, explore and use these services with each other. The Bluetooth protocol stack is shown in Figure 2.2.

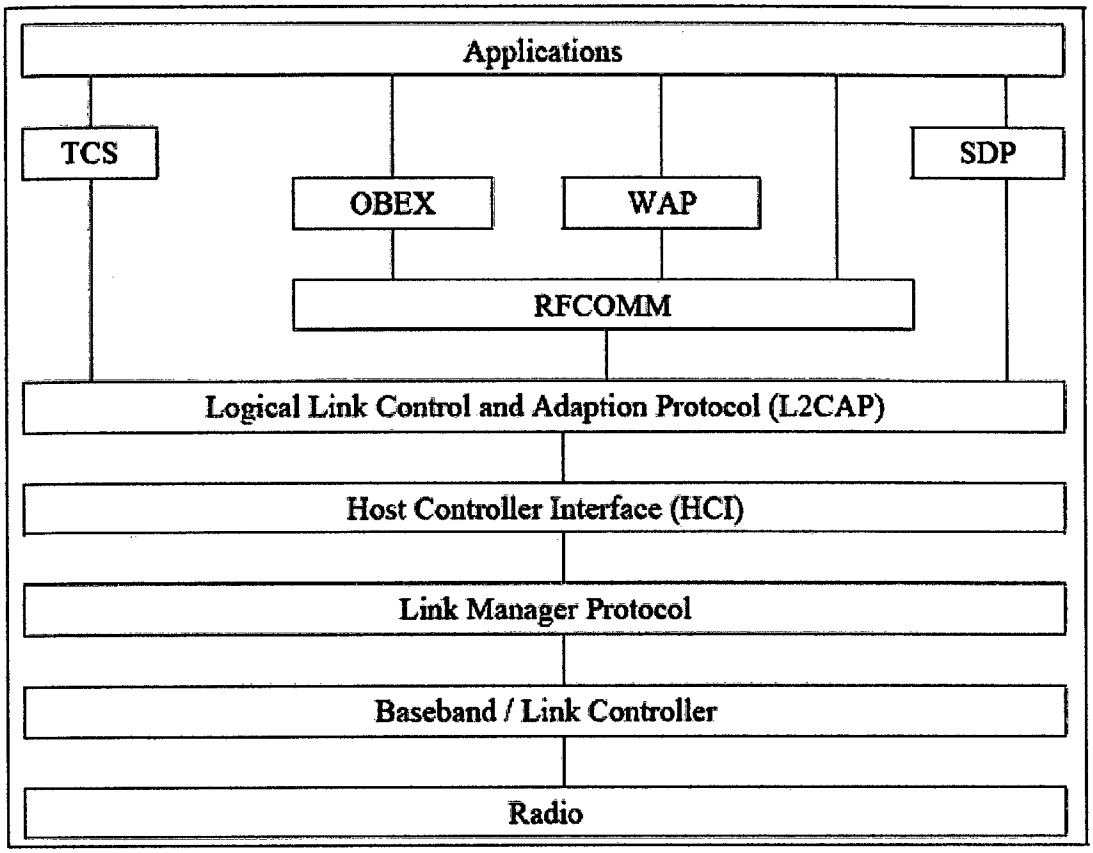

Figure 2.2 The Bluetooth Protocol Stack

Source: Anne Margrette Q. Caccam, Myra Colina, B. Dideles, Bienvenido H. Galang, Jr. and Ian C.Wong, Development of a Bluetooth Host-side Protocol Stack Using Formal Design Technique. http://www.omimo.be/magazine/00q4/2000q4_p028.pdf

The Bluetooth stack is made up of many layers. The HCI is usually the layer separating hardware from software and is implemented partially in software and hardware. The layers below HCI are usually implemented in hardware and the layer above the HCI is usually implemented in software. Tables 2.2 give a short description of each layer shown on figure 2.1.