NEIGHBORHOOD WIRELESS SECURITY SYSTEM FOR FAST EMERGENCY RESPONSE

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Special dedicated to my beloved father, NOH BIN ABDUL ZABIL and also to my lovely mother, HASHIMAH BINTI ISHAK

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ABSTRACT

The Neighborhood Wireless Security System For Fast Emergency Response (NWSS) is developed in order to provide the highest safety level for the community especially in residential areas. Besides, NWSS is a new invention to improve a security system by providing efficient emergency response with a single push button and replace a conventional home security that requires the higher power consumption. The purpose of the NWSS is to provide a security system that facilitates neighborhood to get immediate help and save them when they are in emergency. Burglary is expected to occur in a blind spot area that security guard on patrolling is potentially overlooked at a sheltered housing. Not only that, NWSS is developed based on Zigbee Wireless Network and GSM Technology. The Zigbee specifications are designed to accommodate sensing and control networks with a wide variety of devices, a large number of devices (up to 65,000). In addition, the GSM provides the wide coverages, making the whole system available for almost all the time. Furthermore, NWSS has to be updated with the rapid development of technology to ensure wider coverage, best reliability, and real time operation.

ABSTRAK

Sistem keselamatan kejiranan tanpa wayar untuk tindak balas pantas ketika kecemasan dibangunkan untuk menyediakan tahap keselamatan yang tertinggi bagi masyarakat terutama di kawasan perumahan. Selain itu, NWSS adalah ciptaan baru untuk menambahbaik sistem keselamatan dengan menyediakan tindak balas kecemasan yang cekap bersama butang tekan tunggal dan menggantikan keselamatan rumah konvensional yang memerlukan penggunaan kuasa yang lebih tinggi. Tujuan NWSS adalah untuk menyediakan satu sistem keselamatan yang memudahkan kejiranan untuk mendapatkan bantuan segera dan menyelamatkan mereka apabila berada dalam kecemasan. Pecah rumah dijangka boleh berlaku di kawasan tempat yang kabur dimana pengawal keselamatan rondaan berpotensi terlepas pandang perumahan yang terlindung. Bukan itu sahaja, NWSS dibangunkan berdasarkan rangkaian tanpa Zigbee dan Teknologi GSM. Spesifikasi Zigbee direka untuk menampung rangkaian penderiaan dan kawalan dengan pelbagai jenis peranti, sebilangan besar peralatan (sehingga 65,000). Selain itu, GSM menyediakan liputan meluas, menjadikan keseluruhan sistem tersedia untuk hampir setiap masa. Tambahan pula, NWSS telah dikemaskini dengan perkembangan pesat teknologi untuk memastikan liputan yang lebih meluas, kebolehpercayaan terbaik, dan operasi masa nyata.

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LIST OF ABBREVIATIONS

AT command	-	Attention Telephone/ Terminal commands
DIY	-	Do It Yourself
GND	-	Ground
GPRS	-	General Packet Radio Service
GSM	-	Global System for Mobile communication
GUI	-	Graphical User Interface
IWHSS	-	Intelligent, Wireless, Home Security System
LCD	-	Liquid Crystal Display
NWSS	-	Neighborhood Wireless Security System
PAN	-	Personal Area Networks
PC	-	Personal Computer
PDRM	-	Polis DiRaja Malaysia
PIC	-	Programmable Integrated Circuit
PSoC	-	Programmable System on Chip
RF	-	Radio Frequency
SecSys	-	Security System
SMS	-	Short Message Service
WSN	-	Wireless Sensor Network

LIST OF SYMBOLS

Ft	-	Feet
mA	-	mille Ampere
V	-	Volt
GHz	-	Giga Hertz
mW	-	mille Watt
kbps	-	kilo bits per second
vb	-	visual basic
MHz	-	Mega Hertz
KB	-	Kilo Bytes
TX	-	Transmitter
RX	-	Receiver

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CHAPTER 1

INTRODUCTION

1.1 Introduction of project

The violent crime, robbery, aggravated assault, property crime, and also a burglary has been increase in Malaysia. With the rise of a crime statistic, it is most important ways to take action with the community to preserve the highest safety level of residential area. The main concern of communities is resident safety. Unfortunately, even the safest and protected community is susceptible to a crime. Due to high rates of crimes, home security systems have become one of the requirements to be owned by the resident**.** Nowadays, mostly in the residential area are using a private security guard by paying monthly to ensure resident safety. On the other way to protect residential area is through the Neighborhood Watch. The Neighborhood Watch is a program that involves members of a community is agree to

take responsibility for keeping an eye on each other's property together, as a way of preventing crime. While security guard can help keep the eyes on the resident house, they would not be watching continuously. The security guard has their own in charge schedule. Emergencies can happen anywhere and at any time, so it is important for everyone to be prepared. As known, the security forces have served time schedule. They will take turns to look after the safety of residential area. However, when security held an exchange of work time, a residential area may be exposed to danger. The burglar will be happen in the blind spot area. The blind spot area is a hiding place where a person's view is obstructed. The residents should not only rely on the security guard because they may overlook some of the blind spot area which is cannot be seen all the time. Thus, the Neighborhood Wireless Security System for Fast Emergency Response (NWSS) is developed. Furthermore, this NWSS has been updated with the rapid development of the technology to ensure a wide coverage, best reliability, and real time operation. When an emergency occurs, the resident often do not react immediately to grab the mobile phone to call the authorities for seeking help. NWSS is developed to let the resident to contact security assistance in an efficient way by simply triggering a single button on the remote control. The information about the resident will be sent once emergency occurred to the NWSS Graphical User Interface (GUI) at security control center.

1.2 Objective

The goals of this Final Year Project:

i. To develop a security system that facilitates neighborhood to get immediate help and save them when they are in emergency.

ii. To improve a security system by providing efficient emergency response with a single push button.

iii. To design a neighborhood home security system based on Zigbee Wireless Network and GSM Technology.

1.3 Problem statement

NWSS is a new idea and invention to replace a conventional home security, such as the burglar alarm that using the higher power consumption. NWSS offers low cost, low power consumption, low complexity and low transmission rate, which is this entire requirement, is really important in considering developing an excellent system. Currently, most of the residential areas would hire private security guards. The cost of using their services is expensive. Burglary crimes often occur in the residential's blind spot area. Thus, the residents should not only rely on the security guard because they may overlook some of the blind spot area. In addition, a conventional home security system operates through a network of wires that is complicated and requires more electrical energy. The conventional security systems are not only difficult to install, but also more susceptible to simple means of sabotage.

1.4 Scope of work

The scope of this home security system is involved in residential area, which is a private neighborhood area. NWSS is using the Zigbee wireless network that can accommodate up to 65,000 nodes per networks. However, in this Final Year Project, NWSS only covered on three nodes, which including three houses in residential areas by using DigiMesh topology connection. The GUI is provided to display homeowner details for security reference and also a security guard on duty schedule. Database type is chosen in GUI development to display all details. Besides GSM that can send alarm short message to the security guard on duty immediately. SMS is used in the way to facilitate the delivery of emergency messages to the authorities without any boundaries and networking problem such as losing a connection in internet network coverage.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction of security system

The security system is the devices designed to protect human property and guard persons' safety against a crime. The most basic definition of any security system can be found out in that given name of a system itself. As an example, this security system's name is the Neighborhood Security System for Fast Emergency Response. The neighborhood is a district, especially one forming a community within a town or city. Then, the fast emergency response is a dangerous situation requiring immediate action.