HOME SECURITY USING GSM SYSTEM WITH CAMERA

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PROJEK SARJANA MUDA II

Tajuk Projek : Home Security Using GSM System with Camera

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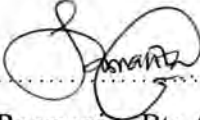
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Specially dedicated to my beloved parent:
Mohamad Hishammudin Yap Bin Abdullah and
Zaiton Bte Samat

To my Supervisor:
Mdm. Siti Rosmaniza Bte Ab Rashid
Also to all my fellow friends who have encouraged and inspired
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ABSTRACT

This report presents a design implementation of monitoring system of home security with IP camera, sensor network and Global System for Mobile Communication (GSM) network. The monitoring systems of project consist of two sub-systems which are notification system and alert system. Notification system enable user to be notified an incident of home condition via Short Message Service (SMS) which is through over the GSM network. Alert system performs visual or audible responses. Visual response is indicated by light while audible responses are indicated by buzzer. An RS 232 serial communication in this project is used to build a communication channel between microcontroller and GSM modem. The chosen microcontroller for this project is Microchip PIC 16F family series, PIC16F877A. GSM modem supports at command set to send data command via SMS. An external GSM modem is connected to a PC through a serial cable, a USB cable, Bluetooth or Infrared. Like a GSM mobile phone, a GSM modem requires a SIM card from a wireless carrier in order to operate. The firmware of this project enable with IR sensor monitoring and IP Camera monitoring. In addition GSM system and IP camera that is small and easy to hide to avoid detection by any thief know that a access control.

ABSTRAK

Laporan ini membentangkan perlaksanaan reka bentuk sistem pemantauan keselamatan rumah dengan kamera IP, rangkaian sensor dan Sistem Global untuk rangkaian Komunikasi Mudah Alih (GSM). Sistem pemantauan projek terdiri daripada dua sub-sistem iaitu sistem pemberitahuan dan sistem amaran. Sistem notifikasi membolehkan pengguna mengetahui kejadian yang berlaku di dalam rumah dimana mendapat notifikasi itu melalui pesanan ringkas daripada rangkaian GSM. Sistem amaran memberikan tindak balas visual atau audio terhadap kes penggera. Komunikasi bagi siri RS 232 dalam projek ini digunakan untuk membina satu saluran komunikasi antara pengawal mikro dan GSM modem. Mikropengawal dipilih untuk projek ini adalah siri keluarga Microchip PIC 16F, PIC16F877A. GSM modem menyokong arahan di set untuk menghantar arahan data melalui SMS, modem GSM boleh menjadi unit luaran atau kad PCMCIA atau juga dikenali sebagai Kad PC. Modem GSM luaran disambungkan kepada PC melalui kabel bersiri, kabel USB, Bluetooth atau inframerah. Seperti telefon bimbit GSM, modem GSM memerlukan kad SIM dari pembawa tanpa wayar untuk beroperasi. Perisian tegar projek ini menekankan pemantauan sensor IR dan IP Kamera pemantauan. Sebagai tambahan kepada sistem GSM dan kamera IP yang kecil dan mudah untuk disembunyikan bagi mengelakkan pengesanan oleh mana-mana pencuri tahu akan kawalan akses ini.

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LIST OF ABBREVIATIONS

GSM -   Global System for Mobile Communication

SMS -   Short Message Service

PIC -   Peripheral Interface Controller

GUI -   Graphical User Interface

PLC -   Programmable Logic Controller

IR -   Infrared

LED -   Light Emitting Diode

PC -   Personal Computer

SIM -   Subscriber Identity Module

IC -   Integrated Circuit

AC -   Alternating Current

PCB -   Printed Circuit Board

I/O -   Input Output

A/D -   Analog to Digital

IDE -   Integrated Development Environment

VCC -   Voltage at the common collector

TTL -   Transistor-Transistor Logic

RS232 -   Recommend Standard 232

GPRS -   General Packet Radio Service

LIST OF APPENDIX

CHAPTER I

INTRODUCTION

1.1   Background Project

A secured life guarantees a happy life where people do not need to think of their belongings which were leftover when they need to go for work or during traveling time. Therefore, researchers tend to make new ideas in ensuring the safety of one's belonging. For instance, a house security system where the idea will facilitate the house owner to get their home secured from any intrusion and alert them immediately when there thieve inside the house when nobody at home.

i. The goal of this project is to design and construct a 'Home security with Camera using GSM system' detection that notifies is there is a sudden open at the door or window when no body at home. After user knows the sudden movement is in and user can check surround house immediately using camera with control from smart phone.

ii. Home security notification via GSM system can be build using infrared, buzzer, camera and GSM (Global System for Mobile Communications) modem. This application will function just like those phone SMS (short message service). When motion is break inside the house, the infrared sensor will detect the motion and it will trigger buzzer together with camera. The buzzer and camera will alert people out of house. A smart phone number that has been set will receive the notification messages there is warning detector incoming object in the house.

iii. The 'Home Security with Camera using GSM system' allow people to avoid from a thief when people have a outside job and leave home.

The 'Home Security with Camera using GSM system' detection system detected a motion once it has been inserted into through the door using infrared sensor. If an motion is detected, the in-home receiver provides a notification and the out-home will receive SMS using GSM system through to your smartphone that the house had motion object incoming. The 'Home Security with Camera using GSM system' simple, a solution for alerting the user regarding secure home and can view the picture on mobile screen what had in the home using IP camera(Internet Protocol Camera).

1.2 Project Objective

The objective of this project is to design and construct a "Home Security using GSM System with Camera" for integrated system which that notifies a user when they have detect an motion.

1.3 Problem statement

Nowadays, all of people leave for work early in the morning and stay at home only in the evening. Most people also have to travel to other cities for their work. When all people are away, that house is empty and no safety monitoring. So, which is without knowing presence of secured inside that house whether the unpredictable motion, thief or any motion inside the house.

Based on the events above, the project was developed to make home a secure and safe place. To design the entire system a microcontroller is required which acts as a medium of communication between the infrared and the GSM modem. The major advantage of this system of the GSM modem that will quickly sending a short notification for a user. So this project is to design and develop a 'Home Security Using GSM System With Camera' that can provide security against intrusion and other emergency situation by alarm via SMS using GSM system and if the user want to identify the detected object in the house by seen via IP camera through the smart phone.

1.4 Scope Project

In order to achieve the objectives of the project, the scope of this project has been identified and divided into two important parts, which are hardware and software development.

For hardware development, microcontroller, GSM modem, CCTV and some selected components in this project. From the observation, IR sensor was chosen because it is easy to detect the motion inside the house. movement detected by the sensor has signalled to the GSM system to send a short message to the user. From the notifies users can act quickly to monitor the situation at home. The importance of the motion object detected will know the object had been detected by sensor through the smart phone. The distance between four IR is about 1cm to 80 cm. The Home security using GSM System with Camera will notify the user regarding the category of detector of object in the home.

PIC16F877A can optimize the use to interact with the outside world via the on-board interact. Home security using GSM System with Camera is operating using 12V adapter. The supply 12V will convert to 5V through voltage regulator LM7805 to flow current to the Microcontroller PIC PIC16F877A and 12V to GSM through RS 232 level converter driver or receiver MAX 232.

For software development, research on PIC Microcontroller only by doing programming for the functionality of the circuit. From the study observation, MPLAB IDE (Integrated Development Environmental) was chosen because it provides a single integrated "environment" to develop command for microcontrollers. Put manual of IP camera in the mobile and use menu to view the picture.

1.5   Project Methodology

To complete this invention has several parts that need parts to be designed power supply circuit, sensor circuit, GSM circuit and an alert circuit where all of that need to had a connection with PIC circuit. The initial part of the circuit should be designed to know the functionality and the right way of connection. Besides that, to troubleshoot the circuit design transform from software on the PCB board.

The specifications required in building the project were listed below.

i.   The system has IR sensor to detect an incoming object then sending a signal to PIC16F877A Microcontroller.

ii.   There are two outputs. Which are the output for user which is alarm/buzzer and another output is by using the GSM technology (sending the warning message).

iii.   There are had connect to the controller with IP camera for user checking the motional object.

iv.   For GSM technology it needs GSM modem to interface the system.

v.

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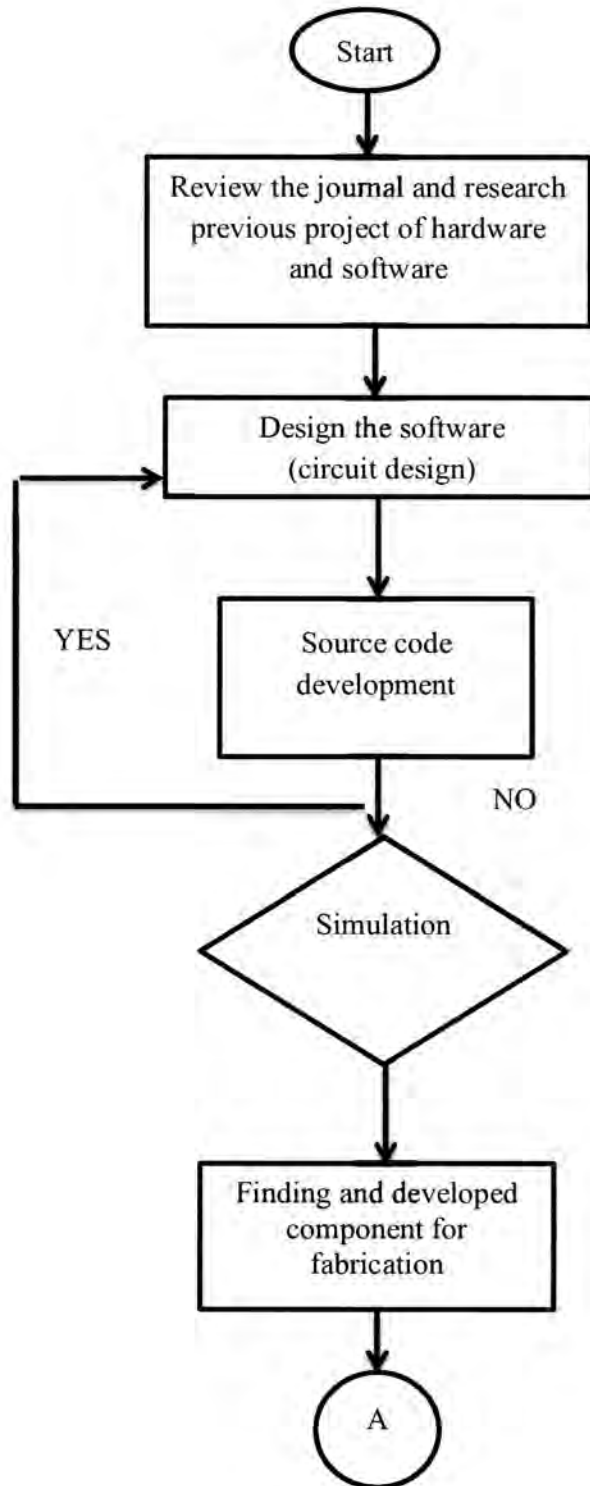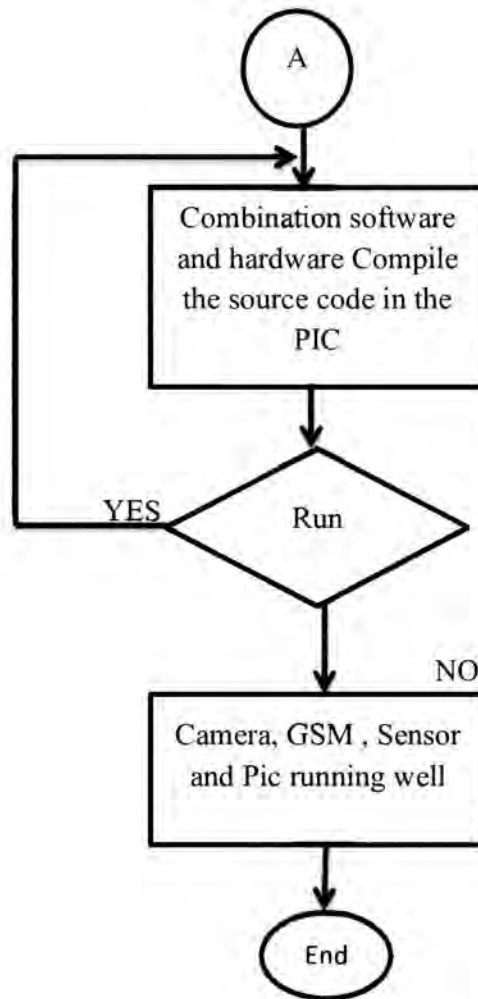
Figure 1.1 flow chart

The projects are summarized into the flow chart as shown in Figure 1.1. First, the information about Home Security using GSM System with Camera is search and collects the data to analyse the problem facing the current available product. After the analysis, the hardware component and software has been selected. This, suitable circuit searched for assemble well all components in this project. Then design the software and the development of source code and the circuit. MPLAB IDE is used for source code and Proteus used for development of circuit layout. Then, the circuit is simulated with the coding. In the simulation success, process of PCB fabrication took place next step is to design and build the electronic circuit for Home Security using GSM System with Camera. After the hardware part is done and the program is write to communicate to hardware built and display the message and show on the

camera viewers in the smart phone. Furthermore, the hardware and software built is tested. Find the source of error and finally is to solve the problem.

1.6   Report Structure

This report is divided into five chapters. In Chapter I, an introduction of 'Home Security with camera using GSM system' is presented along with the project objective and scope in order to achieve the desired goal. While Chapter II provides a literature reviews on the research of the components that are used in the project. In Chapter III describes the overall project that has been identified along with an explanation of programming and hardware design. The result and discussion will be presented in Chapter IV. Last Chapter V discusses the conclusion of this project and future work that can be done.