

GSM BASED HOME SECURITY ALARM SYSTEM

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ABSTRACT

This project deals with the design & development of a theft control system for home, which is being used to prevent/control any theft attempt. The developed system makes use of an embedded system (comprises an open hardware microcontroller and a GSM modem) based on Global System for Mobile communication (GSM) technology. The designed & developed system can be installed in the home. An interfacing intrusion-detector unit is also connected to the microcontroller-based security system. In case of an intrusion attempt, a warning message is being transmitted by the system (as a message) to the owner's mobile phone, or to any pre-configured mobile phone number for further processing.

ABSTRAK

Sistem keselamatan rumah berasaskan GSM adalah satu konsep yang kuat sukar, yang menggunakan sensor sebagai mengesan pencuri pecah rumah. Sistem ini direka untuk membuat untuk menjaga keselamatan rumah daripada pencuri. Komponen utama projek ini adalah sensor PIR, sensor ultrasonic dan Arduino MEGA (mikro). Idea ini adalah pada dasarnya dengan mempunyai sensor untuk mengesan dan mencegah pecah rumah dan menghantar output untuk Arduino yang akan menghantar pesanan telefon bimbit tuan rumah iaitu dengan GSM (SIM900A). Dengan menggunakan sistem keselamatan ini, pengguna hanya boleh menghidupkan sistem ini untuk mengesan pencuri memecah rumah. Metodologi dan skop kajian dilakukan dengan melakukan tinjauan literatur dan kajian terhadap pelbagai sensor, Arduino, dan pengaturcaraan Arduino. Sistem ini juga akan mempunyai beberapa kriteria yang cekap, teratur dan mesra pengguna. Selepas melakukan beberapa pemerhatian ke arah kemudahan pembangunan semasa orang sentiasa mahu.

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VERIFICATION

We hereby declare that this report is the effort of our own to make successful project with information retrieved from the sources that were mentioned in the accreditation. This project report titled "GSM based Home Security Alarm System using Arduino" has been submitted, reviewed and confirmed as meeting the conditions and requirements of writing projects as required.

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LIST OF ABBREVIATION

GSM	Global System for Mobile
GPRS	General Package Radio Service
LCD	Liquid Crystal Display
PIR	Passive Infrared
PSTN	Public Switching Telephone Network
Rx	Receiver
SIM	Subscriber Identification Module
SMS	Short Message Service
Tx	Transmitter

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Recent days, increasing criminal rates such as burglary and house break-in make people wants to secure their life and properties against attacks, damages or losses. In older time, measures such as lock the doors and windows, turn on lights when nobody home, put few pairs of shoes in front of house when away from house can prevent house from being broken-in. However, these traditional ways are not reliable anymore. Next, close house monitoring has been introduced into market. Its purpose is to keep an eye or surveillance people's home by employing a safeguard or home security company. People dissatisfy close house monitoring because of the too expensive employment fees especially for ordinary family. Besides, people feel that they are lack of privacy when they are under surveillance of third party. Due to reasons mentioned above, a fast approach idea has come out to satisfy the need of people and to improve and secure life and property. In this research, an idea to design and develop a home security system with monitoring purpose for ordinary family has been proposed. In this new technology era, latest technologies have always been implanted to system in order to produce excellent output performance. Therefore, a more reliable system consists of more sophisticated and expensive devices. A still productive system which consists of cheaper devices or older technologies has its own limitations. Concluded from mentioned aspect, a practical low cost and reliable home security system Global System for Mobile Communication (GSM) network via Short Message Services (SMS) for real time monitoring has been designed. The system has advantages such as inform user of update home status and allow user to reset alarm when it is confirmed a false alarm. Another indirect advantage for home security system is that to prevent house becomes an easy target for burglars. A house which is obviously

installed a security system can scare away burglars. Criminals take priority to house without any security system. The expected outcome for this research is an implementation and prototype of home security system for real time monitoring. A home security system focuses on intruder detection will be developed.

1.2 PROJECT BACKGROUND

For final year project, we decide to make **GSM based Home Security Alarm System**. This project is about providing security system alert for a place (Eg: home) through the SMS for security system. This project is combining security system technology and GSM technology. The function of SMS is to inform user for any contraction or intrusion in the absence of owner in real time. The system covered two type of sensors as the basic of security system for home. The sensors is PIR and ultrasonic sensor. The GSM technology is used for SMS notification to user mobile phone. The short notification message will used in form of AT (attention) command.

1.3 PROBLEM STATEMENT

People nowadays are busy with daily activities. Adult deals with career while children busy with academics. Only elderly people left at home or most of the time there is nobody home especially day time. Recently, the numbers of break-in and attack of these easy targets is increasing. Therefore, there is a need to install a home security system which can detect illegal intrusion. Current home security system which is sensor based can detect intrusion and trigger the alarm. For example, when a door contact is illegally opened, siren is triggered. However, user who is away from home does not immediately get notification of the alarm incident. The problem can be solved by employing an alarm system monitoring company but it is not affordable ordinary family due to the expensive payment. For this reason, a low cost GSM based home security system is proposed to overcome the problem. This system will provide real time home monitoring by sending a notification to user via SMS through GSM module. Monitoring of the system can be done anytime and anywhere as long as there is GSM signal available.

1.4 OBJECTIVES OF PROJECT

This project proposed in order to overcome the problems stated before. The objectives of the project are:

1. To enhance the security system using technology so that equally following the standards of living nowadays. This system is focus on providing the safety and guarantee for home owner as they are away from home by using sensor and GSM technology.
2. To enable user to be alerted in real time as intrusion occur through SMS. This system enable user to be acknowledged about the intrusion even away from home.
3. To provide productive security system that easy installation and produce low power consumption.

1.5 PROJECT SCOPE

The scope of work in this project are given:

- a) Study the microcontroller programming concept that can operate the whole system project.
- b) Construct the circuits by using PROTEUS (ISIS 7 Professional) software.
- c) Construct the connection of the circuits for the system.

1.6 IMPORTANCE AND IMPACT OF PROJECT

Installing, arming, disarming, paying monthly fees, and dealing with false alarms are all things that are tied to monitored security systems which may cause you to wonder if home security systems are worth the inherent hassle. This is a good question to ask as you consider how you can best protect your valuables and your loved ones. There are a lot of elements to think about when it comes to home security systems and that includes how the security system could benefit you and your family. Here are a few reasons how that is true. Protects the valuable things is one of the importance of project. This is, of course, the benefit most people immediately think of. We likely all know someone who has lost electronics, jewelry, or other high-value items due to a home invasion. The tragedy is compounded when the item is an irreplaceable family heirloom. A home security system has an alarm that scares off many would-be burglars and can notify the local authorities if someone does attempt a break-in. Then, prevent crimes also one of the importance of this project. A 2009 study by Rutgers found that, as the number of home security systems increased in an area, the number of residential robberies decreased in that area, even for people who didn't have their own security system. Having a security system not only protects you, but helps your neighborhood be a safer place for everyone. Not also crimes being stopped, it also lowers homeowner's insurance. You may be paying a monthly fee for your security system, but having the system in your home can lower your homeowner's insurance by up to 20%. That, combined with the other benefits makes an alarm system a pretty good deal.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Home security has been a major issue where crime is increasing and everybody wants to take proper measures to prevent intrusion. In addition, there is need to automate home so that the user can take the advantage of technological advancement. This project presents a model that will provide security to their home, office or cabin etc via SMS using GSM technology. Keeping in view the rapid growth of wireless communication we are inspired to work on this project. The idea behind this project is to meet the upcoming challenges of the modern practical applications of wireless communication and to facilitate our successors with such splendid ideas that should clear their concept about wireless communication and control system. The applications of SMS/GSM Based security system are quite diverse. There are many real life situations that require control of different devices remotely and to provide security. There will be instances where a wired connection between a remote appliance/device and the control unit might not be feasible due to structural problems. In such cases a wireless connection is a better option. Basic Idea of our project is to provide GSM Based security even if the owner is away from the restricted areas. For this we adopted wireless mode of transmission using GSM. Beside this there are many methods of wireless communication but we selected GSM in our project because as compared to other techniques, this is an efficient and cheap solution also, we are much familiar with GSM technology and it is easily available.

2.2 CONCEPT AND THEORIES OF EXISTING MODELS

The concept of this project is chosen with the help of our supervisor. We were influenced by peoples thought and also some brainstorm where it made us to take up this project. Traditionally, guards are carries out patrol and may use surveillance cameras for monitoring the designated area. Due to this, guard fatigue which may result in inadequate monitoring or even sleeping on the job. Boredom which may result in the guards being busy with something else other than the main objective. The three common types of home security system in the market are phone based system (PBS), web based system (WBS) and hardware based system (HBS). For phoned based system, monitoring and control for home is done by global system for mobile communication network. For web based system is done over internet or wireless router. For hardware based system, monitoring and control is fully done by hardware.

2.3 PREVIOUS RESEARCH

Ooi Soo Hoey, Zetty Nurazlinda Zakaria, Muhammad Shakir Laili, 2015, presents the design of the security of home against intruders, fire and leakage of gas by alarming the specific person via Short Message Service (SMS) through Global System for Mobile Communication (GSM) modem. The system required the integration of PIC16F877A microcontroller with input and output devices such as GSM module, gas detector, vibration sensor, LDR sensor, keypad and magnetic door lock. As the author used the GSM module, we also used GSM module for sends message to house owner once the alarm triggered. Therefore, SA Kazmi, S Jani, A Bhelekar, N Sanghavi, 2017, proposing the use of various types of sensors such as PIR motion sensor, Gas Leakage sensor and Fire Sensor to detect the change in surrounding of the home and notify the user by sending an SMS via GSM module SIM900A. From the research, we found the PIR sensor is suitable for our project because the sensor detects a human being moving around within approximately 10m. Vishy Karri, Daniel J.S. Lim, 2005, the invention relates generally to a security device for the protection of vehicles, offices, homes and any other location where foreign access is of concern. In particular, the present invention is a device for notifying the owner when any of the above locations has been accessed or broken into. The device is made up of three components: one or more sensors set up in a remote array depending on the application; a PIC micro-controller; and a GSM module. As the author used the GSM module, we also used GSM module in our project to be useful for the house owner to be alert in anytime by getting the message from it. Sadeque Reza Khan, Ahmed Al Mansur, Alvir Kabir, Shahid Jaman, Nahian Chowdhury, 2012, the project is aimed at developing the security of Home against Intruders and Fire. In any of the above cases if any one met while you are out of your home then the device sends SMS to the emergency number provided to it. As the author aimed at developing the security of Home against Intruders, we got some ideas from that for our project to develop Home Security Alarm System. AyushAgarwal, R.C.Joshi, 2012, the author has developed a low cost GSM/GPRS based wireless home security system which includes wireless security sensor nodes and a GSM/GPRS gateway. It has the following features: (a) low cost, (b) low power consumption, (c) simple installation, (d) fast response and (e) simple user interface. In general, GSM modem acts as the interface between the users and the sensors nodes. There are 3 types of sensor nodes applied in the system which

include the door security nodes, infrared sensor nodes, and fire alarm nodes. This architecture includes components such as filters, amplifiers, analog to digital converters and communication interfaces. The system used a wireless transceiver module to transfer data between gateway and sensor nodes. Every sensor node comprises a microprocessor and a wireless transceiver module. The function of the microprocessor is to receive and analyze the signal from the sensors' node as well as the current status of the nodes. This system also consists of a sleep timer and switch mode pump circuit, which reduces of the power consumption. The idea from the author which developed low cost and simple installation is very helpful to us. While, Syam Krishna, J. Ravindra, 2005, the author has developed a wireless security system where an alarm system is programmed in a graphical user interface (GUI). The system is used to monitor the RFID reader, RFID tag and the GSM terminal. The information obtained from the tag is sent to the server in a RF link that is exhibited in a GUI. If the laptop is stolen from the covered region, the alarm system will start to draw attention. Meanwhile, the laptop owner will be notified by an alert message. In addition, the alarm system will not be stopped until the laptop is put back in the covered region, or the program is stopped/terminated. RFID have been available for many years for reading bar codes RFID tag located several meters away. It is increasingly being used in other applications ranging from inventory management to anti-counterfeiting protection. As the author developed, used the GSM module, we also used GSM module in our project for sends message to house owner once the alarm triggered. Then, V. Karri and J. S. Daniel Lim, 2005, in a wireless security system (WSS), a RFID tag is attached to the laptop and RFID reader is connected to server. If the laptop is stolen from the reader, the alarm system will be triggered to draw attention with loud noise. The laptop owner will be notified with short messaging service (SMS) from the server via GSM module system in a few seconds. Alternatively, it can be improved with Bluetooth technology which is embedded in most of mobile laptop today. The GSM terminal is used as the SMS interface to send messages. Generally the notebook acts as the base station to run the program. Usually GSM terminal comes with a RS232 connector to external terminal equipment, and the Subscriber Identity Module (SIM) cardholder and the external connector. From the author, we learned more about GSM module how to use and how they used in their project. Meanwhile, Z. Bing, G. Yunhung, L. Bo, Z. Guangwei and T. Tian, 2001, the authors developed a security system against asset theft by using radio frequency identification technology. The system consists of five main parts: (a) RFID reader and tag, (b) GUI, (c) database system, (d) CCTV and (e) wireless transmitter