
**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

# DEVELOPMENT OF SMART HOUSE SECURITY USING SMARTPHONE

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electrical Engineering Technology (Industrial Power) with Honours.

by

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This report is submitted to the Faculty of Electrical and Electronic Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the degree of Bachelor of Electrical Engineering Technology (Industrial Power) with Honours. The member of the supervisory is as follow:

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-

# ABSTRAK

Sistem keselamatan rumah kini menjadi isu utama di mana jenayah berleluasa dan semua masyarakat wajib mengambil langkah berjaga-jaga untuk mengelakkan pencerobohan berlaku. Projek ini bertujuan memberi sistem keselamatan yang akan mengingatkan pengguna dengan khidmat pesanan ringkas. Melalui sistem ini, pengguna akan diberi amaran jika gangguan berlaku di dalam kawasan rangkaian sensor yang ditetapkan. Sistem ini menggunakan sensor, video kamera, Arduino, modem GSM dan telefon pintar sebagai komponen utama. Pelaksanaan sistem kerja bagi teknologi modem GSM ialah untuk meningkatkan sistem keselamatan dengan menghantar mesej amaran kepada pengguna jika mereka berada jauh dari zon pencerobohan. Matlamat utama projek yang dicadangkan ini adalah untuk meningkatkan sistem keselamatan supaya setara dengan cara hidup hari ini yang membolehkan pengguna dimaklumkan dalam masa sebenar tentang gangguan yang berlaku. Kaedah digunakan dalam projek ini telah digariskan menggunakan carta alir. Simulasi, dan prototaip telah direalisasikan. Carta Gantt membantu perjalanan aktiviti dengan matlamat yang akan dicapai dalam masa tertentu diperlukan. Ke arah penamat projek, sistem keselamatan disambungkan kepada prototaip. Setiap kali gangguan dikesan, “Pencerobohan” mesej diterima daripada telefon pengguna.

## ABSTRACT

Home security systems are now a major issue where crime is increasing, and everyone is required to take precautionary measures to prevent the intrusion. This project aims at giving a security system that will caution the user by SMS. Through the system, the user will be given an alert if interruption happened inside the range area of the attached sensor. This system utilizes the sensor, Webcam, Arduino, GSM modem and smartphone as main components. Security system connect completely wired easily to troubleshoot and complete in speed compared with a wireless system. An implementation working on GSM modem technology is to enhance the security system by sending an alert message to the user as they are away from that intrusion zone. The main goal of this proposed project is to improve the security system so those equivalents to the way of life these days which enable the user to be alerted in real time as interruption happens. The method utilized as a part of this project was outlined using a flowchart. Simulation, prototype, and calibration were actualized. Gantt chart helps the project follow the flow. Activities with the goal that will be accomplished in particular time required. Toward the finish of the project, the security system was connected to a prototype home. Whenever interruption detected, an "Intrusion" message received from user phone.

## DEDICATION

Alhamdulillah. I am full of appreciation to Illahi with His loveliness, I have finished this Final Year Project with incredible accomplishment for two semesters. Through this period, it would not have been potential without the assistance of those close me.

Thank you for the individuals who helped me very much especially my supervisor, NurBahirah Binti Norddin for giving me a support, advice during these two semesters. Besides, I might want to precise my special appreciation and thanks to my dearly loved parents and friends who constantly pray and give moral support for me to continue to complete this final year project. From this final year project, I grabbed new information and acquire more experience that I never get before.

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# CHAPTER 1

# INTRODUCTION

## 1.1 Project Background

Technologies innovations created by individuals to improve the nature of human lives in this modern life, mostly are utilizing innovative advances in various ways and one of ways is the security system. The home security system is an important element for both the private residential and office setups (Wu, Peng, and Chen 2006).

A Home Security System have to give safety for a home, by alarming the home from interlopers, theft, and common disasters, for example, fire accident, gas spillage, animal attacking and so on (Parab and Amol 2015). Home security is stressed one of the important issues in the current year. Individuals are scared of letting home to rest unbothered without an appropriate security (Pandey et al. 2015). So security is a major challenge wherever in light of the fact that robberies are expanding day by day owing to the risky and uncertain security systems in homes, business complexes and enterprises (Chaudhuri 2015).

The idea of home automation security has too developed with time, sensors and actuators were incorporated into the home to recognize, alarm and avoid interruptions. Previously, a normal home required to be able to common slash and get criminals, whereas an advanced home needs to manage modern and technically knowledgeable attackers identify how to discover liabilities and control the security gadgets to obtain entrance or make trouble the tenants (Jose and Malekian 2017).

In the main focuses for this project is on the security purpose when the owners are not at home. It can be utilized to prevent any burglar from going into the house as well as inform the owner as we utilized a sensor to identify the intruder. Other than that, the signal will create sound to shock them. Arduino Mega is a microcontroller that utilized for this project. Arduino will implement detailed operation based on receive signal from the dissimilar sensor. Next, the alerting system consists of indicated of alarm, which is siren or buzzer. Last is communication system to send the notification. It synchronizes with GSM sim900 module in real time and sends data command. Once there is input buzzer signal from any sensor, data command will be managed, and a notification SMS will be directed sent to the user.

## 1.2 Problem Statement

These days, the home security system is the main key to each house for the reason that there are have a lot of burglary cases occur all over the place. This home security system really can caution or alert a resident from any interloper. It is key to protect the homes on an ordinary basis, particularly when residents' journeys or away for a certain time. Thus, before making any trips, residents must ensure that their home is protected before leaving. That why is a security system was made to take care and solve this issue. By means, this system is a speculation for the peace of the residents. The security implies the life of persons is being ensured against danger, loss, risk, and criminals. In the general sense, security is an idea of well-being. So, when utilizing this system, it will make the home and life of the resident more securely from any interloper.

## 1.3 Objective

The objective of this project is:

1. To build a complete alarm system utilizing the open-source Arduino.

2. To plan and develop an alarm system that triggers and alerts the owner via SMS.

3. To simulate and analysis suitable component for the hardware part, also suitable software to build up the system.

4. To monitor the operation of the circuit home security system.

## 1.4 Scope

The scopes of the project are:

1. To aims experience the improvement procedure of a home security system and deliver a theoretical system.

2. To design and actualize a security alarm system that alarms the property owner by an SMS if the unexpected movement is identified.

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# CHAPTER 2

# LITERATURE REVIEW

This part presents devices, methodologies and communication technologies that have been executed in the current home security system. Next, to of clarifying various kind of home security system, it also clarifies most recent SMS based applications.

## 2.1 Home Security System

Home security is both the security equipment set up on a property and in addition individual security reviews. Security equipment incorporates entryways, locks, alert systems, lighting, motion detectors, and surveillance camera system. The types of a home security system are a phone-based system (PBS), the web-based system (WBS) and hardware-based system (HBS). For the phone-based system, checking and control for the home-based are finished by the worldwide system for cell phone correspondence network. For web-based system is completed over internet or wireless router. For the hardware-based system, observing and control is completely done by hardware (Bangali, Shaligram, and Service 2013).

### 2.1.1 Web-based System (WBS)

The Internet of Things (IoT) can be characterized as a worldwide foundation which combines understanding administrations with situational mindfulness and permits shared correspondence between a certain something and another, and among individuals and intelligent things over a system. Machine to Machine (M2M) correspondence is not the same as IoT because a man does not straightforwardly control the hardware or clever instruments, they are in charge of conveying in the interest of individuals (Olalekan and Olalekan 2015).

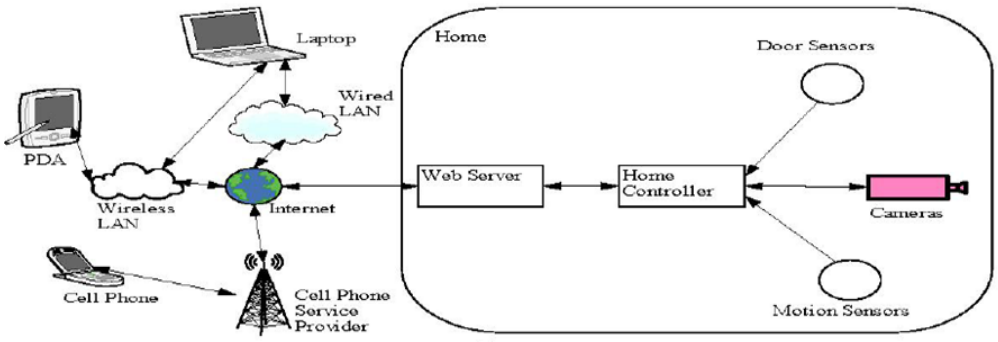


**Figure 2.1. WBS diagram (Olalekan and Olalekan 2015)**

### 2.1.2 Phone-based System (PBS)

In a phone-based system (PBS) the observing and control should be possible utilizing the public phone system. Since cell phones have turned out to be winning, while house and property security requests are constantly expanding, the mix of the versatile cell phone and a reconnaissance system turns out to be more important with the goal that individuals can know the security of their properties whenever anyplace

(Anitha 2017). A cell phone can not only be regarded as a communication unit, however as a camera, a web program, a music box, or even a remote controller, since such a significant number of administrations are given on a cell phone.

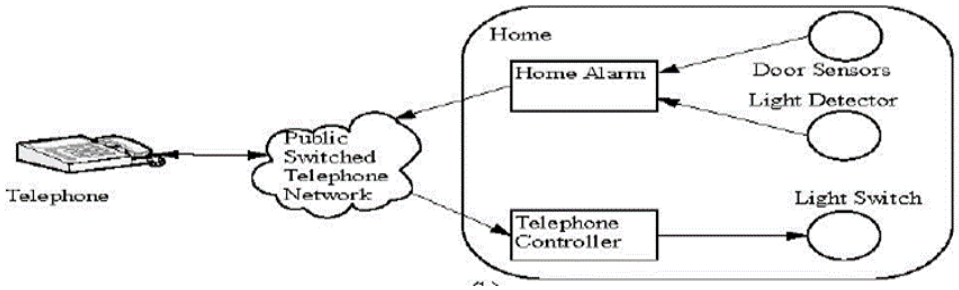


**Figure 2.2. PBS diagram (Anitha 2017)**

### 2.1.3 Hardware-based System (HBS)

In an HBS when sensors are set off not any data is sent to several outside organization including the property holder, the controller takings the choice then triggers actuators to make a quick move. For instance, in many homes when there is a hindrance to the end of the carport entryway, the carport entryway stop closing (Bangali, Shaligram, and Service 2013). This is the quickest technique for guaranteeing security. In any case, this gives the property holder the minimum control, other than being costly too. We call such system HBS, despite the fact that the controller may have a few programming to make choices, in light of the fact that the equipment is controlled by a tight feedback loop.

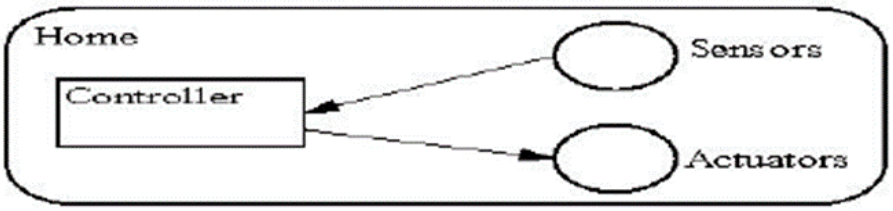


**Figure 2.3. HBS diagram (Bangali, Shaligram, and Service 2013)**

## 2.2 Previous Project

This part will show the investigation about the past work that identified with the Home Security System. A few studies have been done on the past investigates and venture to acquire data to build up another task with the innovation of GSM. This study is vital with a specific end goal to know and comprehend in the meantime how the software programming and equipment advancement. This will give the plan to build up another project.

### 2.2.1 Home Security System with Text Alert and Motion Detective

Tried and true security that can perceive human body (intruder) movement and send a warning text message to illuminate the owner (at any area on the planet where there is GSM portable system scope). The system configuration is in three fundamental stages: for the most part, the sensory, handling and the errand. The sensory is the observation segment that is completed through PIR sensor mounted at watch-zone, the handling stays finished by a customized microcontroller, then the activity is completed through a collaboration of a connected GSM module to the processor that at that point

send an SMS caution to the client (Olalekan and Olalekan 2015). By essentially sending a message to the cell phone number of the SMS attached to an opening in the circuit, this naturally sets the system to either one "inactive or active" state, and on several endeavors of the robbery, the system sends an SMS to the gadget proprietor. Using this, the house is constantly secured.

### 2.2.2 GSM based Home Security System

A basic however extremely effective home security that has a function of calling the property holder on his/her cell phone number if there should arise an occurrence of an interloper caution. PIR sensor identifies movement by detecting the dissimilarity in infrared or radiant heat levels discharged by encompassing things. The minute the PIR sensor recognizes any movement, the output of the sensor is high. This is recognized by the Arduino. Arduino at that point communicates through the GSM module by means of serial communication to make a call to the prearranged cell phone number (Chaudhuri 2015).

### 2.2.3 Home Security System based on PIC18F452 Microcontroller

Monitor entryways and windows of a house and can set caution and warning sign to the closest police headquarters in the event that anyone tries to break in. This security system likewise gives the usefulness to recognize the resident's ID card to gain admittance to the house without turning on the warning signal and alert. Additionally, the security system gives a status that isn't observing the entryway and windows since there is some possibility that the host doesn't need the system dependably checks the status of their home (Islam 2014).

### 2.2.4 Implementation of Home Security System using GSM Module and Microcontroller

A system designed to preserve home safe from an intruder. The design and usage of a GSM-based wireless home security system. Which take a less power. The system can react quickly as gate crasher distinguish and GSM module will do prepared homeowner. This security system designed for cautioning a homeowner wherever he will. In this system a relay and magnet installed at section point to a priority deliver a signal over a public telecom organize and communicates something specific or else divert a call that keeps informing about your home update or predefined message which is implanted in the microcontroller. Suspected exercises are conveyed to a remote client through SMS or Call utilizing GSM innovation (Parab and Amol 2015).

### 2.2.5 A Practical Home Security System using Mobile Phones

An accessible home security system (PHSS) is tended to and has been acknowledged by means of cell phones. μCLinux is picked as the embedded OS on the minimal cost server of PHSS. The doorbell, Infrared sensors, and other movement sensors assume the parts of trigger sources to enable PHSS to carry out its observation work. End-users can monitor their properties in-house or on vehicle anyplace and whenever by the cell phone close by. When PHSS was activated, users get a warning and browse the desired pictures caught from the CCD/CMOS cameras linked with the installed embedded surveillance (ESS) of PHSS on the screen of their cell phone. The test of this security system is that PHSS must work freely under the current Internet Services Provider (ISP) and telecom (Wu, Peng, and Chen 2006).