SMART WIRELESS SECURITY SYSTEM

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Sesi Pengajian

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This thesis is dedicated to
my beloved parents, Zainal and Robiah
my supportive siblings, Muhd Amirul Fikri and Nur Sabrina
and my helpful friends

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ABSTRACT

The purpose of this project is to improve the existing home security devices. There are some particular areas that cannot be entered by the public without permission. Examples of areas that cannot be easily accessed by the public without having permission such as radiation area, country border, private area and many more. The act of entering the mentioned restricted areas is called as trespassing. This project is created to find out the most suitable system that can be used to monitor any attempt from irresponsible individuals to trespass the restricted area including the residential home. The complete intrusion monitoring system in this project is the result of system integration between the detection system and the monitoring system. The current security system is using wired connection to turn on and off and not convenient to all user especially for "Orang Kurang Upaya" (OKU) user or wheelchair person. They can't turn on or off the system when the control panel is attached at wall. Therefore, wireless system is introduced to counter all this problem. Unfortunately, by using wireless connection, there is delay problem. However, the delay is not so much, about two to three second. This system input devices is passive infrared (PIR) sensors and beam sensor, it will sense any movement of trespasser across detection area and send the state of the triggered sensor to the web browser for monitoring purposes. A wireless connection (WiFi) module is used to send the state of the triggered sensor via WiFi whenever there are any trespassing activities detected while an integrated alarm is sounded. HTTP webserver is created programmed and use for monitoring or display the state of the sensor. Through this project, a reliable and effective system is achieved to prevent trespassing activities.

ABSTRAK

Tujuan projek ini dibina adalah untuk menaik taraf sistem peranti keselamatan yang sedia ada. Terdapat beberapa kawasan tertentu yang tidak boleh dimasuki oleh orang awam tanpa kebenaran seperti kawasan radiasi, sempadan negara, kawasan peribadi. Perbuatan memasuki kawasan terhad disebut dipanggil sebagai menceroboh. Projek ini dicipta untuk memantau sebarang cubaan daripada individu yang tidak bertanggungjawab menceroboh kawasan larangan. Sistem pemantauan dalam projek ini adalah hasil daripada sistem integrasi antara sistem pengesanan dan sistem pemantauan. Sistem zaman sekarang menggunakan wayar untuk mengaktifkan sistem sekuriti dan sistem seperti ini tidak sesuai untuk Orang Kurang Upaya (OKU) dan pengguna yang menggunakan kerusi roda. Pengguna seperti ini tidak dapat mengaktifkan sistem kerana panel kawalan terletak di dinding. Disebabkan itu, sistem teknologi wayarles telah diperkenalkan. Walaubagaimana pun, penggunaan teknologi wayarles ada kelemahannya tersendiri iaitu kelengahan menghantar dan menerima isyarat. Tetapi kelengahan yang terdapat di dalam sistem wayarles tidak terlalu banyak, hanya dua saat atau tiga saat. Peranti input sistem adalah sensor pasif inframerah dan kamera litar tertutup, ia akan mengesan sebarang pergerakan penceroboh pada seluruh kawasan pengesanan dan menghantar keadaan sensor untuk di semak pada pelayar web untuk tujuan pemantauan dan menghantar notifikasi ke telefon mudah alih pengguna. Penggunaan sistem teknologi wayarles (*WiFi*) diperoleh daripada modul *WiFi* yang mampu untuk menghantar dan menerima data secara wayarles. Satu modul *WiFi* digunakan untuk menghantar keadaan sensor yang dicetuskan melalui *WiFi* apabila terdapat sebarang aktiviti pencerobohan dikesan semasa penggera bersepadu dibunyikan.

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PIR	-	Passive Infrared Sensor
PCB	-	Printed Circuit Board
UV	-	Ultra Violet
ARES	-	Advance Routing and Editing Software
ISIS	-	Intelligent Schematic Input System
V	-	Voltage
USB	-	Universal Serial Buses
UART	-	Universal Asynchronous Receiver/Transmitter
HTTP	-	Hypertext Transfer Protocol
FKEKK	-	Fakulti Kejuruteraan Elektronik dan Komputer
Mbits/sec	-	Megabits per Second
WiFi	-	Wireless Fidelity
IDE	-	Integrated Development Environment
HTML	-	Hypertext Markup Language
CMD	-	Command Prompt Window
OS	-	Operating System
GSM	-	Global System for Mobile
NO	-	Normally Open
NC	-	Normally Close

LIST OF APPENDICES

CHAPTER I

INTRODUCTION

This chapter will discuss about the introduction, scope and methodology of this project.

1.1   Introduction

Security is very important in our life. People seem to ignore about the danger surrounding them. This will lead to burglarizing because burglars are opportunistic by nature and are on the hunt for easy targets. With a good security system, we can reduce the risk of getting burglarized or abuse by this irresponsible people. The most common security system used nowadays is the home security system.

Basically, security system is literally a means or method which something is secured through a system of interworking components and devices. This interworking components and devices must be configure to be connected and working with one another. Home security system work on the simple concept of securing entry points into a home with sensors that communicate with control panel or command centre installed in a convenient location somewhere in a home.

The main thing in the security system is a sensor device and also a security camera. Sensors are typically placed on doors that lead to and from a house as well as easily accessible windows especially the one at the ground level. Open spaces inside of homes can be secured with motion sensors while at the back of the house can be secure by beam sensor. Security camera can be installed around the house to monitor the surrounding. Motion and beam sensor is a device that detects moving object, particularly people while camera is for monitoring purpose.

There are several types of motion sensor used in a home security system including passive infrared, microwave or ultrasonic sensor. Passive infrared is the type of the sensor that is widely use in a security system because its ability to only detect the movement made by living thing through the changes of infrared level that emitted only by human or animal body. For beam sensor, it can detect the presence of someone by emitting the beam and beam will break if there is something blocking the beam. The security camera with motion sensor in it is able to record the surrounding if movement is presence in its area.

1.2   Problem Statement

Presence of a professional security system is a positive thing. However, this professional security system provided by certain companies comes with very expensive fees and terms that sometimes abuse the users.

This project provides an alternative way to prevent burglarizing that is often occur nowadays. The traditional home security system is mainly depends on the neighbour that saw the incident of bur glaring and then alerting the home owner or authorities. With this cheap and user-friendly home security system, all users can enjoy the benefits of having a good and stable home security system without tearing their pockets away.

It is important to develop some devices that can track or detect the presence of unwanted creature. Current system using wired connection and all the button or

switch is located inside control panel and the panel is mounted at wall. This conventional ways is not suitable for disable people. With this device which consists of wireless technology, if a motion is detected it will alert the home owner by triggering a buzzer or an alarm that is integrated in the devices. The ability of monitoring the sensor wirelessly through an access point would be a bonus features in this project.

The use of sensor technologies in a right and manner way can help lowering the risk of burglarizing and can make the user feel safe and comfort hence improving their sleep quality.

1.3   Objective of Project

The main objectives of this project are:

1. To upgrade an existing motion detection system to incorporate with wireless system.
2. To provide cheap and user-friendly home security system.

1.4   Project Scope

Development of this **Smart Wireless Security System** is divided into two working scope which is software and hardware integration. The first scope includes the program that is used for controlling the input and output of the wireless fidelity (WiFi) module. Arduino integrated development environment (IDE) and Proteus software is used for this working scope.

The second scope is hardware development. This hardware development started just after the project is successfully been simulated in the Proteus ISIS. The required components were bought and the working simulated circuit has been developed on the breadboard. After the circuit on the breadboard was working fine, the fabrication of printed circuit board (PCB) was done for placing the entire components in a safe and neat environment.

1.5   Research Interest

The interest of this project is about acquiring knowledge in developing an electronic circuit. With the right information, each of the function of the components used in this project can be detailed studied and applied. Apart from that, the installation process of the electronic component such as placing the components with the right poles, value and type also can be learnt.

Student also can gain an enormous experience when completing this project. There is so much process and step needed to be done in order to achieve stable and working electronic devices. All knowledge that has been learned on the previous bachelor studies surely would be used for completing this project including the basic and important one which is determining the resistor values, designing a simulation system, designing the printed circuit board, fabricating the printed circuit board and also soldering the electronic component.

New ideas or knowledge that cannot be learnt in classes is obtained when student face a problem while developing the circuit. Troubleshooting process is needed in order to make sure the device is completely working. An experience of developing a full complete electronic device is a very useful experience and cannot be learnt in a short time, student must face the hard moment before they can gain a whole new valuable experiences.

1.6   Report Guidance's

This bachelor project report contains five chapters for explaining about the development of the **Smart Wireless Security System**. This report starts with introduction, literature studies, methodology, results and discussion, conclusion and suggestion.

Chapter I - Introduction to the project background. Basic explanations are discussed on this chapter. This introduction discussing about the background of the project,

problem statement and the objective of the project development. It is also discussing about the importance of this project.

Chapter II - This chapter contain the literature studies of the theoretical concept that applied on this project. It also contains the information obtain for completing the project.

Chapter III - The methodology explained is about how the development of this project is accomplished. The main content discussed in this chapter is flow chart, circuit operation, hardware, and software configuration.

Chapter IV - Focusing on the results and discussion of the project. All discussion was done based on the results of the successful implemented project.

Chapter V - Contain a conclusion regarding this project. After the project is completely been developed, a few suggestions is proposed for improvement of the project on the future.

CHAPTER II

LITERATURE STUDIES

This chapter contains the literature studies of the theoretical concept that applied on this project. It is also contains the information for completing the project.

2.1   Previous Security System Studies and Projects.

This section will discuss about the system that has been created before. This information has been studied prudently in order to enhance the quality and reliability of this project. By analyzing the ideas and recommendation of previous project, a lot of information is obtained and can be used as a references or guidance's for completing this project. By studying the preceding works, a proper thing or design is considered in order to make this project become reliable and marketable. In addition to that, there are little findings from internet and books that are extremely contribute to this project.