DEVELOPMENT OF WIRELESS PERIMETER FENCE ALARM SYSTEM

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ABSTRACT

the development wireless perimeter fence alarm system will be triggering intruders before they manage to enter your home. In this thesis, it represents a design and implementation of monitoring system of fence security system with the used of sensor and Global System for Mobile Communication (GSM) network. The monitoring system include of two sub system which might be notification system and alert system. notification system enable user to be notified of any alarm incident via Short Messages Service (SMS) which is carried out through execution from GSM. alert system performs visual response which its indicates light. the chosen microcontroller in this project is Arduino UNO. GSM supports AT command which is set to instructed GSM to send SMS notification. In addition the chosen sensor for this project is IR sensor. Data or signal will be transmit to Arduino UNO , then it will pass the data to GSM network to be execute for sending user notification via SMS. The software used in this project is Arduino ide, which is the place where to design coding for this project. Beside in this project , the used of basic cellphone with the Short Message Service application is needed to be notified from the GSM.by having this wireless perimeter fence alarm system, it will cut the cost by installing alarm system at every inch and each of the house, it will control and monitor any activity around your house resident.

ABSTRAK

Perimeter Sistem Penggera Pagar tanpa wayar akan mengesan penceroboh sebelum mereka berjaya untuk memasuki rumah . Dalam kajian ini, ia merupakan satu reka bentuk dan pelaksanaan sistem pemantauan sistem keselamatan pagar dengan mengggunakan sensor dan Sistem Global untuk Komunikasi Mudah Alih (GSM). Sistem pemantauan termasuk dua sistem sub iaitu sistem pemberitahuan dan amaran sistem. Sistem pemberitahuan membolehkan pengguna diberitahu tentang sebarang kejadian penggera melalui pesanan ringkas (SMS) yang diprogramkan melalui pelaksanaan dari GSM. Sistem amaran melakukan tindak balas visual yang yang menunjukkan cahaya. pengawal mikro yang dipilih dalam projek ini adalah Arduino UNO. GSM menyokong arahan AT yang ditetapkan untuk menghantar pemberitahuan SMS. Selain itu, sensor yang dipilih untuk projek ini adalah sensor IR. Data atau isyarat akan dihantar kepada Arduino UNO, maka data yang diterima akan dihantar kepadaGSM untuk melaksanakan untuk menghantar pemberitahuan pengguna melalui SMS. Perisian yang digunakan dalam projek ini adalah Arduino ide, yang merupakan tempat di mana untuk mereka-bentuk pengekodan untuk projek ini. Selain dalam itu, dalam projek ini juga meggunakan telefon bimbit asas yang mempunyai servis pesanan ringkas bagi menerima pesanan yang dihantar oleh GSM jika ada sesuatu pencerobohan. Projek ini dapat menjimatkan kos bagi memuat turun penggera di setiap perincian rumah dan dengan adanya penggera dia setiap sudut pagar di kawasan perumahan, ia dapat mengesan dan megawal sebarang aktiviti di kawasan perumahan

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LIST OF ABBREVIATIONS

AT   -   Attention Commands

GSM   -   Global System Mobile Communication

GPM   -   GSM Power Meter

IR   -   Infrared

PDA   -   Personal Digital Assistant

PCB   -   Printer Circuit Board

PIR   -   Pyroelectric Infrared

SMS   -   Short Message Service

Wi-Fi   -   Wireless Fidelity

WLAN   -   Wireless Local Area Network

FFT   -   Fast Fourier Transform

CST   -   Computer Simulation Technology

CCTV   -   Closed-Circuit Television

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

In this chapter, the overall requirement that needed in the implementing on this project will be explain briefly. It will include overview, objectives , problem statement, scope of work, and how this project will be done.

1.1. Project Overview

Nowadays criminals cases such as house break-in and burglary is increasing which lead peoples to secure their life properties against damages, losses or attacks. Long time ago, people usually placed a few pairs of shoes or turn on the light at the front f house. However, this tradition is no longer reliable

anymore. Next, house monitoring by employing home security or safeguard. Due to the expensive cost hiring safeguard, especially for ordinary family. Due to reasons mention above the fast approach idea has come to satisfy the need of people and secure life and to improve the security system In this project, By using wireless Perimeter alarm system will be triggered the intruders which before they enter into our home. By using this system, user can detect any activity around the fence for example climbing or cutting the fence. This system can be applied at resident area, or inside UTeM campus itself. It will be triggered and notice any of intrudes activity around of the fence and will notify you. Wireless Perimeter alarm system distribution is a step of improvement in wireless perimeter security system. This project also provides a technology which aid in the capture of intruders to the secure area. Moreover, this system guide and monitor I real-time the perimeter of resident area.

This main reason of this project is to control the safety of the resident area with the used of Arduino to control the fence sensor (IR). It has 14 virtual input or output pins which 6 can be used as PWM outputs, 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains the whole thing needed to assist the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get began. In this system also will be a Proteus 7 ISIS, this software is a VSM or known as Virtual System Modelling which combines circuit simulation, animated components and microprocessor models to co-simulate the entire microcontroller based designs. This is the splendid engine for engineers to finalize their microcontroller designs before set up a hardware in real. This project also linked with GSM and that will alert the alarm via message for you and notify which fence is interrupted

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1.2. Objective

The objective of this project consists of:

1. To develop a system of wireless perimeter fence alarm
2. To guide and monitor real time perimeter of fence at the area .
3. To analyze the performance of the develop wireless perimeter alarm.

The main objective of this project is to develop a system by using program that capable on analyze the motion around the resident area by implementing GSM, so that owner will get notification by GSM on the fence if someone is trying to break in the area by giving real time alarm with specification of fence. It will determine the position of fence that have been triggered intruders. Other than that the security of area manage to cut cost by having alarm in each of the house due to te wireless perimeter alarm system will take care of the whole resident are. This program will be able to analyze the approximate same result as the real analysis.

1.3. Problem Statement

Nowadays, people are busy with daily life activities. Teens and child busy with their academics while adults is dealing with their career. Basically there's nobody home especially daytime, this easy target phenomenon leads to increase the number of break-in[1]. Perimeter Fence Alarm system is somehow a way to protect our home while we are away, sleeping or during preoccupied with our household responsibility and might not aware of the intruders. Most systems are

easy to learn and operate. Even though there are strong safety advantages, alarm systems might be troublesome for homeowners who don't take time to arm and disarm them. The power of alarm system is its very useful in deterring crime. When the potential burglars noticed you have an alarm system, they might go somewhere else because it is not worth the time to try deactivate the system. They also might not taking a risk entering a house that have alarm system since when the alarm goes off the law enforcement arriving the house before they themselves can flee the scene. Nowadays most of the alarm system is normally placed inside the house near the door. It is works to against the theft and also a protection from any intrusion. But somehow inter home alarm is not so relevant today. This is due to the system's alarm is only triggered and burst out when the intruders enter the house or in other words is he is already inside the house. The intruders might be threaten you by brandishing a gun, and ask you to switch off the alarm. By then, the guard and also neighbor will assume it was a false alarm and didn't bother to call police. This kind of alarm system might effect your safety.

Moreover, most of resident nowadays having guard system. But the scenario is the guards is usually They work by shift, and will patrolling the area one time at a time. Besides that, most of the guards patrolling by a motorcycle, therefore the intruders will detect them and hiding somewhere before they notice the intruders. Then, another low security from the guard service is, the person on duty only pass through the area, and does not particularly patrolling the area. this makes the intruders easy to break the house. For this reason, low cost GSM is proposed to overcome the problem. This system will provide real time one monitoring by sending notification of update home status to user via SMS through GSM network. Monitoring of the system can be done anytime and anywhere if there is GSM available

1.4. Scope of Project

For this project, it can be divide into two parts, the first is the software part and second is the hardware part. Firstly, Proteus ISIS 7 professional is a VSM (Virtual System Modelling) that combines circuit simulation, animated components and microprocessor models to co-simulate the complete microcontroller based designs. This is the perfect tool for engineers to test their microcontroller designs before constructing a hardware in real time .

For hardware part, the section that responsible with the designing and constructing the circuit and does troubleshooting to the circuit. This project \used an Arduino Uno which is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller, simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. A sensor is a device which detect motions or measure physical properties or respond to it. Arduino UNO will connect to FIR sensor. If there is any alarm or interruption happen at the fence the FIR sensor will detect and LED will blinking. GSM will give you message about the location of interruption of the fence to the main controller.

This plan permits users to interact with the design using on-screen indicators and/or LED (Light Emitting Diode) and LCD and, if attached to the PC, switches and a button. One of the primary components of Proteus 7.0 is the Circuit Simulation a product that uses a SPICE3f5 analogue simulator kernel combined with an issue-driven digital simulator that allow users to utilize any
SPICE model from any maker. Proteus VSM comes with extensive debugging features, including breakpoints, single stepping and variable display for a neat

design prior to hardware prototyping. In summary, Proteus 7.0 is the program to employ when you want to simulate the interaction between software running on a microcontroller and any analog or digital electronic device plugged in to it.
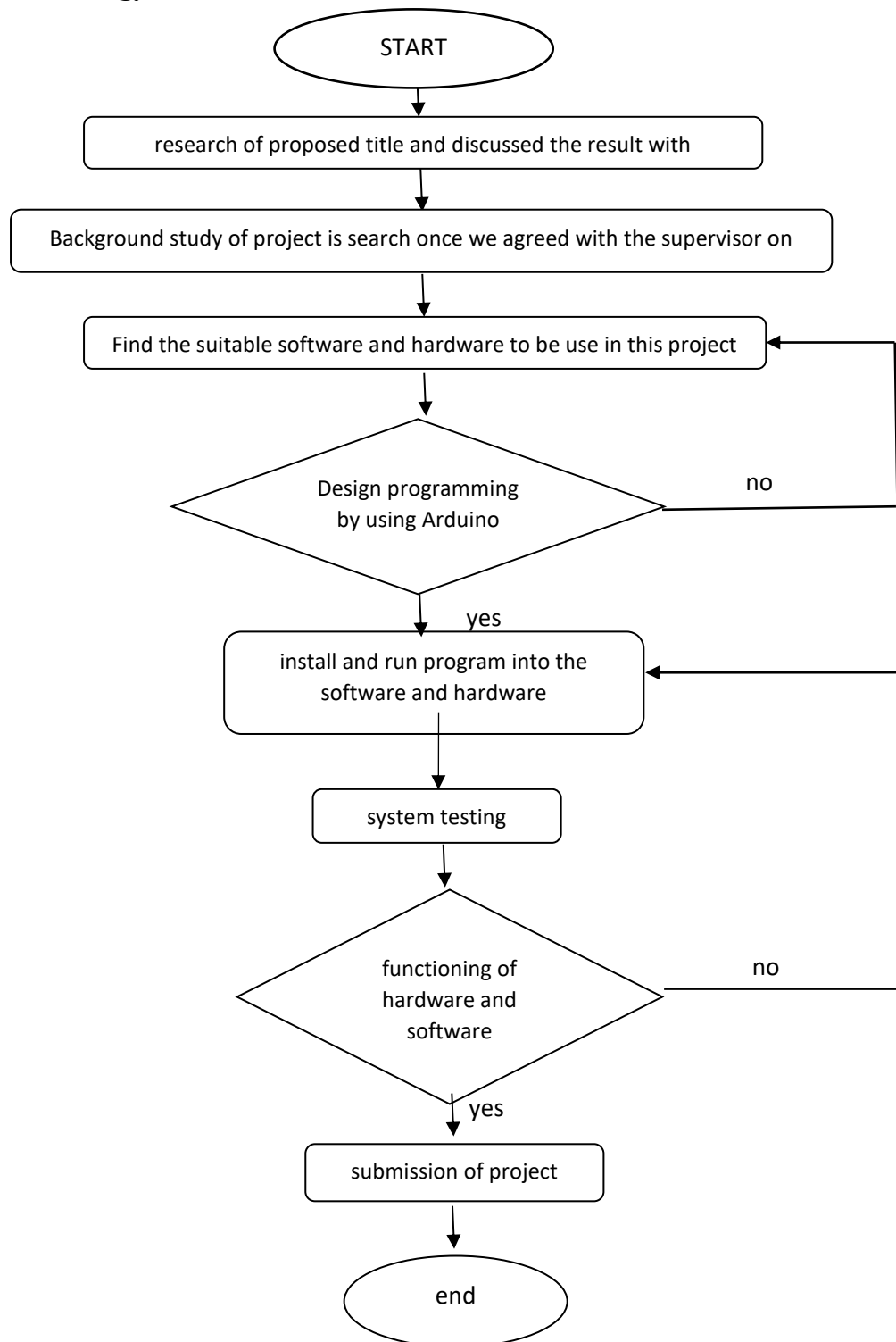
1.5 Methodology

Figure 1: Project Flowchart

1.6 Contributions

The project results were as following

1. Support security system by upgrading form wired security to wireless security system.
2. Reduce man power due to the security is controlled by the system which can be monitored from the main panel.
3. Achieved the improvement performance when the sensor working perfectly

1.7 organization of Project.

1. First chapter explains the thesis in general and monitored user to general problem statement. Objective and scope of the research are also been stated. This chapter are also represented method process to aid as well as accomplish the main objective.
2. Second chapter contribute reader to deep and massive briefing review to identify suitable answer to the problem that had been stated in the first chapter.
3. Third chapter is about interpreting issue for tolerate the research objective, so outcome that supposed to argue the hypothesis made before. The design and implement of the project. Methodology to test and measure the system might be explained
4. Fourth chapter provide results acquired from the calculation activity. Result are reviewed and associated and significant discovery reviewed further.
5. Fifth chapter emphasized final result of the project. It can be conclude what is viewed as an essence from every chapter and also what is the main point of the project has been offered. Some suggestion for future works also are analyzed.

CHAPTER 2

LITERATURE REVIEW

In this chapter, it will discuss about the literature discourse and review of structural analysis and some definition of the components used in this project such as Arduino board, GSM module, infrared sensor and etc. Through the world, there have many difference sources and researches about the concept, design and implementation of the Arduino board based on infrared sensor with the used of GSM. It is also included the analysis of what others have able in this country. This work included the areas of electric, electronic and software evolution. Literature reviews are based on data that gained from varied causes, articles, expert stories, general stories, web sites, books and personal communication.