FIRE ALARM WITH SECURITY SYSTEM

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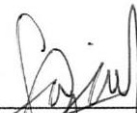
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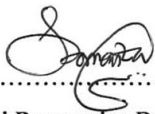
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Specially dedicated to my beloved parent:
Mohamed Musa Bin Hj Mansor and Roslina Bte Hj Rosdan

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

The project title is " Fire Alarm With Security System" . The project is used to notify user about the fire at home in the absence of people. Otherwise, user can monitor their house wherever they are using android application . It is designed to reduce the risk of more severe fire damage when the fire broke and make it minimum. With this system, it can help users in many aspects, especially to notify the user to make a call and send a message to user, so you can take early steps that can overcome the blaze spread rapidly. Renewal is done by doing research on the problem or deficiency in any part of the system we do this. Problems and weaknesses are reviewed in detail and found the source to obtain the desired product quality. The hardware implementation in this project is a webcam camera, raspberry pi , phone device, Wireless Adapter and smoke sensor. The result from this project is useful to be implemented in home and industrial to help in the risk of death and injuries furthermore to avoid the losses that need to be borne by the victims.

ABSTRAK

Projek ini diberi tajuk "Fire Alarm With Security System". Projek ini digunakan untuk memberitahu pengguna mengenai kebakaran di rumah jika ketiadaan orang. Projek ini juga mempunyai ciri-ciri untuk memantau rumah mereka di mana sahaja mereka berada menggunakan aplikasi android. Ia bertujuan untuk mengurangkan risiko kebakaran yang lebih teruk jika kebakaran berlaku dan meminimumkannya. Dengan sistem ini, ia dapat membantu pengguna dalam pelbagai aspek, terutama sekali untuk memberitahu pengguna dengan membuat panggilan dan menghantar mesej kepada pengguna. Dalam hal ini pengguna boleh mengambil langkah-langkah awal untuk mengatasi kebakaran. Pembaharuan dilakukan dengan melakukan penyelidikan mengenai masalah atau kekurangan dalam mana-mana bahagian sistem yang dilakukan. Masalah dan kelemahan dikaji secara terperinci untuk dijadikan sumber supaya mendapatkan kualiti produk yang dikehendaki. Pelaksanaan perkakasan dalam projek ini adalah kamera, raspberry pi, peranti telefon, dan sensor asap. Hasil daripada projek ini amat berguna untuk dilaksanakan di rumah dan industri untuk membantu dalam risiko kematian dan kecederaan, di samping dapat mengelakkan kerugian yang perlu ditanggung oleh mangsa.

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CHAPTER 1

INTRODUCTION

1.1   Introduction

Safety is a condition of being safe from undergoing or causing hurt, injury, or loss. There are several types of security such as vehicle safety, safety in the workplace and the most important is home safety. One of the safety issues that need to be concerned of is the fire occurrence at home. Based on the statistics of accidents caused by fire in the house, the number of deaths is increasing as show in Figure 1.1 . This is due to the lack of supervision by parents, especially towards the children's safety at home.

This project is created due to the awareness of the increasing number that caused by the fire accidents. This project is proposed to help in reducing the risk of

1.4   Problem Statement

When people leave their house, they will not know what will happen to their house either they leave for a short or long period, especially in the case of fire that can cause losses. If fire occurs without any notice, there would be a lot of losses that need to be borne by the owner of the house compared to earlier notice of the fire.

1.5   Scope Of Project

This project is designed to ensure the security of houses against the gas leaking or fire accident when the owners were away. This project will alert users by Call and SMS. Call and SMS received by users will enable the users to take immediate action against the gas leak or fire accident.

For this project, it will use PIC AT89C2051 as a microcontroller, smoke detector, buzzer and device. The MQ-2 gas sensor has high sensitivity to Liquefied petroleum gas (LPG), propane, smoke and hydrogen, also could be used for methane and other combustible steam, and suitable for different application. This semiconductor gas sensor detects the presence of combustible gas and smoke at concentrations from 300 to 10,000 ppm. The sensor's simple analogue voltage interface requires only one analogue input pin from the microcontroller. The sensor can operate at temperatures from -20 to 50°C and consumes less than 150 mA at 5 V.

The programming for PIC AT89C2051 is developed using C++ programming software and for circuit design using Proteus software that include ARES and ISIS. This software, can be used to create a circuit and simulate the circuit. Instead of it, the software also can design a circuit for PCB.

1.6   Project Methodology

There are three main parts to complete this project :

❖ Smoke sensors circuit
- o The component use in this circuit is MQ-2 sensor. This sensor used in gas leakage detecting equipment in family and industry, are suitable for detecting of Liquefied petroleum gas (LPG), i-butane, propane, methane ,alcohol, Hydrogen, smoke. This sensor call MQ-2.

❖ Microcontroller Circuit
- o The microcontroller use is PIC AT89C2051. The AT89C2051 is a low-voltage, high-performance CMOS 8-bit microcomputer with 2K bytes of Flash programmable and erasable read-only memory (PEROM). The relay module is combine with this circuit to trigger button function of mobile device.

❖ Mobile device
- o The mobile device is a medium transmission data to alert user from call and send a message.

❖ Raspberry Pi
- o To controlled the CCTV and this features make user more easier to monitor their house.

1.7   Report Structure

Conclusively, this report is inclusive of 5 main chapters which are introduction, literature review, methodology, results and analysis and also recommendation and conclusion. In Chapter 1, the introduction explained the overview of the whole project and the needs to be implemented. It highlights the background, project objectives, problem statement, methodology and scope of work on the operation of the Fire Alarm With Security System. On the other hand, in Chapter 2, literature review discusses about the project background and some

specification about the market ready products related to this project. Methods that have been used to attain the objectives are explained in Chapter 3. This chapter also concisely explains the project development. Project development included the integration of hardware and software. Therefore, Chapter 4 is results and analysis. In this chapter explained the analysis of the circuits while the recommendation and conclusion is covered in chapter 5 where the conclusion of the project and suggestion to further improve this project is incorporated.

CHAPTER 2

LITERATURE REVIEW

2.1   Chapter Overview

This chapter will discuss about previous projects and some journals that related to the project. These journals and reports have been analyzed carefully to improve the effectiveness and quality of this project. By analyzing previous journals and research, the possibilities that affect the quality in their projects can be analyzed and reviewed. From the previous project, ideas can be implemented and to improve the project. The previous project has used Global System for Mobile communications (GSM) module that can send SMS only compared to a mobile phone that can send a message and dial to a user. Therefore, the literature review process starts from beginning of project until the end of the project. Besides analyzing the previous project, reviews of the internet and books which are very

effective for this project is done. Throughout the analysis at the beginning of the project, the special feature in this project is determined and the components used in this project are decided.

2.2 Previous Project

2.2.1 Embedded system for Hazardous Gas detection and Alerting.[1]

The main objective of the work is designing microcontroller based toxic gas detecting and alerting system. The system will automatically generate an alert which sends the form of short messages. The hazardous gases like Liquefied petroleum gas (LPG) and propane were sensed and displayed each and every second in the liquid crystal display (LCD). If these gases exceed the normal level, then an alarm is generated immediately and also an alert message (SMS) is sent to the authorized person through the Global System for Mobile communications (GSM), which leads to faster diffusion of emergency situation. So, These gases have to be monitored; such that increase in the normal level of them could be known and proper precaution measures can be taken. The system is affordable and can be easily implemented in the chemical industries and in a residential area which is surrounded by the chemical industries or plants, to avoid endangering of human lives. The system also supports to provide real-time monitoring of concentration of the gases, which presents in the air. As this method is automatic the information can be given in time such that the endangering of human lives can be avoided, but this system just can send a message only to a user. This system only can detect gas and only send a message to alert a home users. So for the enhancement, the sensor used is multi sensor that can detect smoke, gas and etc.

2.2.2 Design & Development of ARM7TDMI-S based GSM Mobile for Home Automation & Security.[2]

This journal is to alert the home user in the event of fire, smoke, water tank overflow, LPG leakage, theft detection and many more things. This system involved various sensors like AS-MLC, MQ 6, MQ2, LM 35, IR sensor, door vibration sensor. The LPC 2148 ARM7TDMI-S microcontroller has used in this system received the information. The LPC2148 microcontroller is based on 32/16 bit ARM7TDMI-S CPU with real-time emulation and embedded 8 trace support, that combines the microcontroller with embedded high speed flash memory ranging. The comparator is used by a sensor unit to decide the threshold level range for the presence of sensible things like smoke, fire, door vibration, Carbon Mono oxide presence. GSM modem is also attached with microcontroller which would send the SMS to the home user as well as the emergency service providers like fire brigade or police. This system use C-Language program to developed with help of Keil compiler. This program is transferred to the microcontroller using Flash Magic software. This system just can send a message to alert a home users, the enhancement for this system is by added the function that is make a call to a home users.

2.2.3 Wireless Home And Industrial Automation Security System Using GSM.[3]

The journal is about home user at the time of insecurity, fire accident and unwanted movement of persons. The system for this journal is fully controlled by the 8 bit P89V51RD2 microcontroller. All the sensors and detector are interconnected to microcontroller by using various types of interface circuits. This system involved various sensors like PIR sensor, gas and smoke sensor and fuse failure detector. The PIR (Passive Infra-Red) sensor is a pyroelectric device that detects motion by measuring changes in the infrared level emitted by surrounding objects and the fuse failure detector is a special type of sensor, which will be activated when the security areas fuse breakdown by some unwanted person or by artificial means This motion can be detected by checking for a high signal on a signal I/O pin. The microcontroller will monitor all the sensors and if it senses any security problem, the

microcontroller will send the SMS to the home user mobile through GSM modem. The main control program is developed by using embedded C language and converted to exe file by using Keil package. This program enables the interaction between all hardwares connected in microcontroller and sends appropriate signal to the home user through GSM. The weakness of this project is the system automatically send a message to police station even the smoking not coming from inside of house, maybe smoke from outside. So it will give a troble to police and fireman.

2.3   Hardware

2.3.1   MQ-2 Sensor

Figure 2.1 : MQ-2 Sensor

This flammable gas and smoke sensor as shown in Figure 2.1 detects the concentrations of combustible gas in the air and outputs its reading as an analogue voltage. When the target combustible gas exist, the sensors conductivity is more higher along with the gas concentration rising. The sensor can measure concentrations of flammable gas of 300 to 10,000 ppm. The sensor can operate at