GAS DETECTION MICROCONTROLLER-GSM BASED SECURITY SYSTEM

YEONG WEI HENG

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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GAS DETECTION MICROCONTROLLER-GSM BASED SECURITY SYSTEM

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This report is submitted in partially fulfillment of the requirements for the Bachelor of Computer Science (Networking)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2011

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DECLARATION

I hereby declare that this project report entitled

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is written by me and is my own effort and that no part has been plagiarized without citations.

STUDENT : _____ Date : 6/7/2011

(YEONG WEI HENG)

SUPERVISOR : _____ Date : 6/7/201

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DEDICATION

To my beloved parents and family, thank you for providing a variety of support in terms of financial and moral.

To my supervisor, DR. Abdul Samad Bin Shibghatullah, evaluator, PM Rabiah, and PSM committee, thank you for guidance and encouragement during project implementation.

To my friends who always give me support and together we can pursue a broad knowledge.

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Last but not least, I would like to deliver my thanks to evaluator, PM Rabiah for evaluating and reading this report.

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ABSTRACT

Gas Detection Microcontroller-GSM Based Security System is a security system to prevent fires or gas leak crimes developed by applying gas sensor and GSM technology is presented. It can detect leaking of raw gas, and send alert message remotely. The hardware of this system includes the TGS 2600 gas sensor, PIC16F877A microcontroller, as well as the MOD 9001D RS232 GSM/GPRS Modem. The system software developed in Hi-Tech C language has the ability of collecting, receiving and sending data, and can send a piece of alarm short message (SMS) to the user's mobile phone when some dangerous condition (gas leak) has been detected. The Gas Detection Microcontroller-GSM Based Security System is intended to provide security for houses when house owners are away. This system suitable for the users who are absence-minded, for example always forget to switch off the gas when go out. Besides that this project not only can be use for houses, it is also work for industry factories where fires and gas leak are easily happen in a industry factories. This system monitors the house or factory with sensors and informs the house or factory owners, police station and fire department when it detects a gas leak with gas sensor. Sensor is connected to a circuit which is a PIC microcontroller circuit, which have program and replace the character of PC, and the circuit is connected to GSM modem. Once the sensor is detected, the circuit retrieves data from sensor, and sends SMS to users through GSM modem. Therefore, improve the chances for reducing the risks to life and property in order to make sure the their properties is secure and take the action as soon as possible, anywhere and anytime, although they are abroad.

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ABSTRAK

Gas Detection Microcontroller-GSM Based Security System merupakan satu system keselamatan yang dapat mencegah kebakaran atau kebocoran gas yang dibentukkan dengan menggunakan sensor gas dan teknologi GSM. System ini dapat mengesan kebocoran gas, dan menghantar mesej (SMS). Perisian keras system ini termasuk sensor gas, *TGS 2600, PIC16F877A microcontroller serta MOD 9001D RS 232 GSM/ GPRS Modem.* Peranti perisian system yang digunakan adalah dalam bentuk *Hi-Tech C programming language.* System ini juga mempunyai kemampuan untuk mengumpul, menerima dan menghantar data, dan dapat menghantar *Short Message Service (SMS)* ke telefon pengguna ketika dalam keadaan yang berbahaya (kebocoran gas) telah dikesan. *Gas Detection Microcontroller-GSM Based Security System* ini bertujuan untuk memberikan keselamatan bagi pemilik rumah semasa mereka tiada di rumah. Sistem ini sesuai bagi pengguna yang linglung, misalnya selalu lupa menutup gas ketika keluar._Projek ini bukan sahaja boleh digunakan untuk rumah, tetapi juga sesuai untuk kilang-kilang industri di mana kebakaran dan kebocoran gas mudah terjadi di kilang-kilang industri. Sistem ini memantau rumah atau kilang dengan sensor gas dan memberitahu jabatan berkenaan, pemilik rumah atau kilang,balai polis dan balai bomba ketika mengesan kebocoran gas.Litar sensor akan disambungkan ke litar microcontroller PIC, yang telah diprogram dan memainkan peranan PC serta litar yang disambung ke modem GSM. Apabila sensor dapat mengesan gas yang berkenaan, litar akan menghantar isyarat yang diterima dari sensor dan menghantar SMS kepada pengguna melalui modem GSM. Dengan itu, project ini dapat mengurangkan risiko terhadap nyawa dan harta benda dengan cara pengguna dapat mengambil tindakan secepat mungkin selepas menerima SMS walaupun mereka di luar.

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5	Process of Making PCB Board
6	PIC16F877A Diagram
7	Proposal
8	Questionnaires

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CHAPTER I

INTRODUCTION

1.1 Project Background

Gas Detection Microcontroller-GSM Based Security System is a security system to prevent fires or gas leak incident developed by applying gas sensor and GSM technology is presented. It can detect leaking of raw gas, and send alert message remotely. The hardware of this system includes the TGS 2600 gas sensor, PIC16F877A microcontroller as well as the MOD 9001D RS232 GSM/GPRS Modem. The system software developed in Hi-Tech C language has the ability of collecting, receiving and sending data, and can send a piece of alarm short message (SMS) to the user's mobile phone when some dangerous condition (gas leak) has been detected.

The Gas Detection Microcontroller-GSM Based Security System is intended to provide security for houses when house owners are away. This system suitable for the

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users who are absence-minded, for example always forget to switch off the gas when go out. Besides that this project not only can be use for houses, it is also work for industry factories where fires and gas leak are easily happen in a industry factories. This system monitors the house or factory with sensors and informs the house or factory owners, police station and fire department when it detects a gas leak with gas sensor. Sensor is connected to a circuit which is a PIC microcontroller circuit, which have program and replace the character of PC, and the circuit is connected to GSM modem. Once the sensor is detected, the circuit retrieves data from sensor, and sends SMS to users through GSM modem.

This system is developed to industry factories especially the factory that involved chemical, gas, petrol, and householders to protect them from gas. Current system maybe not exist but market today with high technology nowadays maybe exist the product like this system that already built in all circuits and programs inside.

This system will be developed using microcontroller which is use Hi-Tech C PIC (Programmable Interface Controller) language to program it. PC is not used in this project where the microcontroller circuit will replace it. A microcontroller is a single chip that contains the processor (the CPU), non-volatile memory for the program (ROM or flash), volatile memory for input and output (RAM), a clock and an I/O control unit. Also called a "computer on a chip," billions of microcontroller units (MCUs) are embedded each year in a myriad of products from toys to appliances to automobiles.

A GSM modem will be used on this system to connect from microcontroller circuit which retrieves data from sensors. SMS sent to users' hand phone through GSM modem when sensor is activated.

Gas sensor is used to detect when gas leak happened.

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1.2 Problem Statements

Nowadays fires or gas leak cases are increasing dramatically. Therefore this project is designed to reduce these incident and easier the human daily life. Due to no security in the house when the owners leave their houses or just leaving the children at home, it is easy for an incident happening. In addition, it is also work for industry factories where fires and gas leak are easily happen in industry factories. This system monitors the house or factory with sensors and informs the house or factory owners, police station and fire department through sms when it detects a gas leak with gas sensor since they are not able to monitor their houses or factories every twenty-four hours. Therefore, the system to detect the gas leak and sms to users will facilitate users and be much useful to them as they can make sure the their properties is secure and take the action as soon as possible, anywhere and anytime, although they are abroad.

1.3 Objectives

- To develop a system that help to reduce fires or gas leak cases.
- To provide a full security for houses and factories when owners are either home or away.
- To develop a system that monitors the house and factory with sensors and informs the users, police station and fire department when it is detected.
- To ensure safety of the house and industrial factory.
- To avoid damage of the house and industrial factory by fire incident or gas leak.
- To update user latest status of their house by SMS.
- To make user able to take immediate action against the gas leak or fire incident after receiving the SMS

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1.4 Scope

This project is designed to ensure the security of houses against the gas leak or fire incident when their owners are away. SMS to users will enable users to update the latest status of their houses. SMS received by users will enable the users to take immediate action against the gas leak or fire incident by reporting to the police after received from SMS.

The scope for this project also developed to industry factories especially the factory that involved chemical, gas, and petrol to protect them from gas affects in order to prevent fire incident happened.

1.5 Project signification

This system is suitable to use by anyone and anywhere. It is designed for use in any houses and factories. The users can monitor the house or factory with sensors and informs the users, police station and fire department when it is detected. This alert can warn the people when the gas is detected. Besides that, it can help to update user latest status of their house by SMS. Therefore, it is easier for the users to take immediate action against the gas leak or fire incident after receiving the SMS. As a result, it avoid damage of the house and industrial factory by fire incident or gas leak

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