FIRE ALARM DETECTOR WITH GSM CALL.

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DIPLOMA ELECTRONIC ENGINEERING
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By

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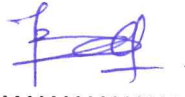
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ANNOUNCEMENT

I hereby declare that this report is the results of my own work and research except for quotes and citied in the references.

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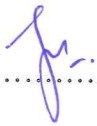(SITI NABILAH BINTI MOHAMMAD)

Tarikh :7 Oktober 2016

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(SALSABILA BINTI AHMAD FUAD)

Tarikh : 7 Oktober 2016

Di sahkan oleh Penyelia Projek :

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(Pn Junainah Bt Abd Kadir)

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Ketua Program
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ABSTRACT

This project is called fire alarm detector with GSM call. This project has been designed to send information via SMS system to the user when an accident of fire using GSM module. This project uses temperature sensor lm35 to detect high heat. In addition, the buzzer will give signal to the place was on fire. These projects also provide LCD to display temperature of the heat. The significant of this fire alarm detector with GSM call is designed to alert the distant property-owner efficiently and quickly by SMS via GSM network. The main advantages of fire alarms using modern communications technology is it can handle emergency situations.

CONTENT

APPRECIATION

Alhamdulillah, we were very grateful to the almighty ALLAH S.W.T for giving us the key and opportunity to accomplish our Final Year Project. We would like to take this opportunity to express gratitude to our dedicated supervisor, Pn Junainah Bt Abd Kadir for her guide that help this project at every stage and getting things done by sharing her valuable ideas and knowledge. We have to appreciate the guidance given by other supervisor as well as the panels especially in our project presentation that has improved our presentation skills thank you to their comment and advices. Our deepest thanks to our dearest family which is always supports and preys on us throughout this project. Their blessing gave us the high-spirit and strength to face any problem that had occurred and to overcome them appropriately.

CHAPTER 1:

INTRODUCTION

1.1 Background

Technological developments have further developments in the field of electronics. With the establishment of facilities and equipment as sophisticated as this will ease and speed up work processes, help and enable people to do the work that is light weight, and the difficult easy. The project titled is Fire Alarm Detector with GSM Call, the main function of this project is to send information via SMS System to the user when an accident of fire using GSM Module.

Fire Alarm Detector project will be completed with the use of GSM which this system functions as the sender of information to consumers in the event of a fire in a place that can cause fire. This project uses temperature sensor LM35 to detect high heat. In addition, the buzzer will give signal to the place was on fire. These projects also provide LCD to display current temperature in room while it detected the heat exceed the room temperature. It will give a signal thought the Arduino that have been set temperature value using command in Arduino windows.

1.2 Problem Statement

As humans, we often take lackadaisical attitude about security measures during a fire. If a fire, it may threaten the environment and the lives and property of those who are in the area of the scene. Therefore, with these tools we can detect the scene and quickly act to perform preventive measures.

Therefore, we intend to generate a security tool that provides SMS as soon as the fire alarm is detected. This project uses temperature sensor LM35 to detect high heat. The project also allows users to detect if there was a fire because it includes a buzzer. The buzzer will sound to send a warning signal that the region has experienced a fire and so GSM will send SMS to the user.

1.3 Objectives

The objective of this **fire detector** using Arduino is:

a) To sense the surroundings for occurrence of fire with help of LM35 temperature sensor

b) Send 3 SMS alerts to two mobile numbers stored inside the Arduino program if fire is detected (using GSM Module).

1.4 Scope and limitation of project

The scope and limitation of this project are:

a) This project is a prototype of Fire Alarm Detector with GSM Call.

b) The use of GSM Shield may be costly.

c) Message Delivery System may be affected when there is an interruption.

1.5   Significant of project

Fire Alarm Detector with GSM Call is designed to alert the distant property-owner efficiently and quickly by SMS via GSM network. Other than that, helps accelerate actions security measures by using Messages System. This device will send information about fire. Therefore, we can take action quickly. The main advantages of Fire Alarms using modern communications technology is it can handle emergency situations.

CHAPTER 2:

LITERATURE REVIEW

2.1   Introduction

A literature review is a body of text that aims to review the critical points of current knowledge and or methodological approaches on a particular topic. Literature reviews are secondary sources, and as such, do not report any new or original experimental work.

In this project a review of existing fire-detector types has been carried out along with the development of a low cost, portable, and reliable microcontroller based automated fire alarm system for remotely alerting any fire incidents in household or industrial premises.

Hence, systematic and detailed planning must be arranged for produce a complete and perfect project. First step that we need made it, was design daub (sketching) to get the real image of machine that we want to be produced. Due to this, the work design and study that we made is a continuing process and it involving problem solving activity creatively namely which is known as literature study.
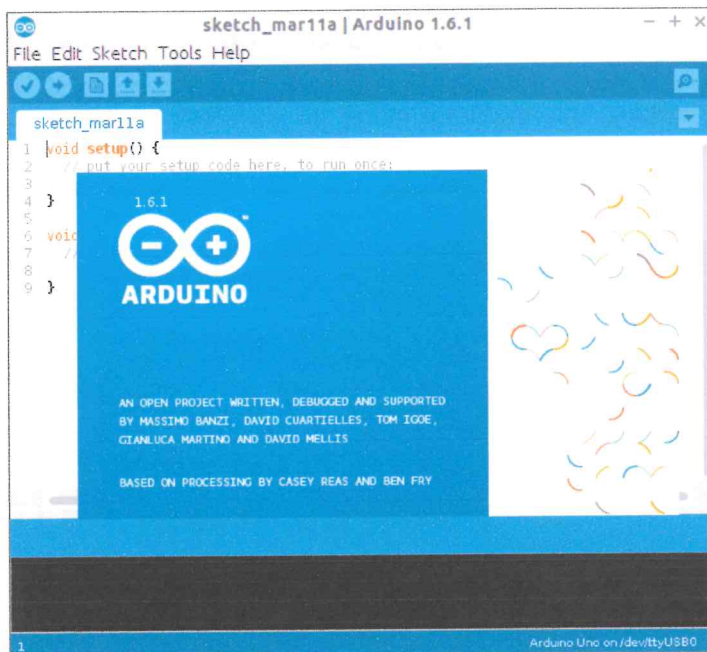
2.2 SOFTWARE

2.2.1 Arduino Uno

a) Software

The Arduino project provides the Arduino integrated development environment (IDE), which is a cross-platform application written in the programming language The Arduino IDE supports the languages C and C++ using special rules to organize code. The Arduino IDE supplies a software library called Wiring from the Wiring project, which provides many common input and output procedures. A typical Arduino C/C++ sketch consists of two functions that are compiled and linked with a program stub main () into an executable cyclic executive program:

- setup(): a function that runs once at the start of a program and that can initialize settings.
- loop(): a function called repeatedly until the board powers off.

After compiling and linking with the GNU tool chain, also included with the IDE distribution, the Arduino IDE employs the program argued to convert the executable code into a text file in hexadecimal coding that is loaded into the Arduino board by a loader program in the board's firmware.


Figure 2.2.1: Arduino Software

2.2.2   Proteus 8.1

Proteus is stand for *PROcessor for TExt Easy to Use*. Proteus is a software package for computer-aided design, simulation and design of electronic circuits. It consists of two main parts, the ISIS, the circuit design environment that even the simulator VSM includes, and the ARES, the PCB-Designer. Developer and manufacturer of the software package is the company Labcenter Electronics. With Proteus PCB design can be designed with computer assistance, electronic circuits and printed circuit boards (Eng. Printed circuit boards).

The ISIS, Intelligent Schematic Input System (Intelligent Switching Input System) is the environment for the design and simulation of electronic circuits. The component library includes claims to more than 10,000 circuit components with 6000 Prospice simulation models.

The VSM, Virtual System Modelling (Virtual System Modelling   )   provides   a graphical SPICE circuit simulation and   animation directly   in the ISIS environment.   The SPICE simulator is based on the Berkeley SPICE375 model. It may microprocessor based system are simulated. With the VSM Engine can interact during the simulation directly to the circuit. Changes of buttons, switches or potentiometers are queried in real time, LED indicators, LCD displays, "Hot/Cold"- Wires displayed.
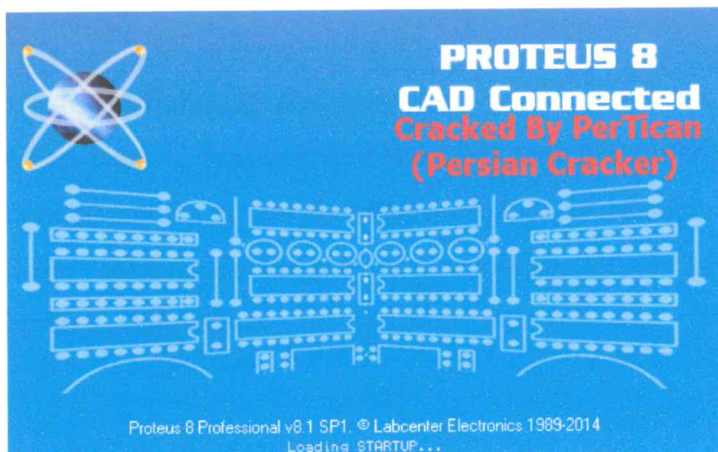
Figure 2.2.1: Proteus Design

2.3 DEVICE USE

1) Arduino Uno
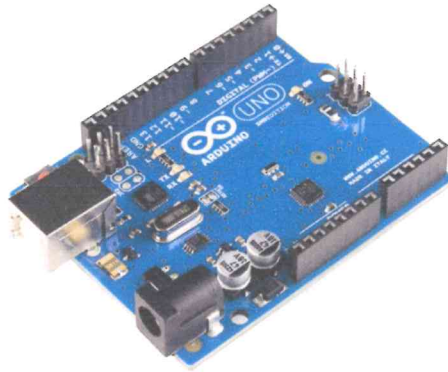
Figure 2.3.1

Arduino is an open-source project that created microcontroller-based kits for building digital devices and interactive objects that can sense and control physical devices. Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). 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.

This project using Arduino by connected Lm 35 with pin that we set in the coding windows. When there is heat detected the LED and Buzzer automatically ON and Arduino automatically turns ON the devices that attached to it. GSM Module will send a message. Here based on our room condition the threshold value we took was **30°C for** the LM35 sensor.

2) Buzzer

A buzzer or beeper is an audio signalling device, which may be mechanical, electromechenical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers and confirmation of user input such as a mouse click or keystroke. This buzzer provided a sound when LM 35 detected temperature **30°C** or over value until the temperature was decrease the buzzer will turn OFF.
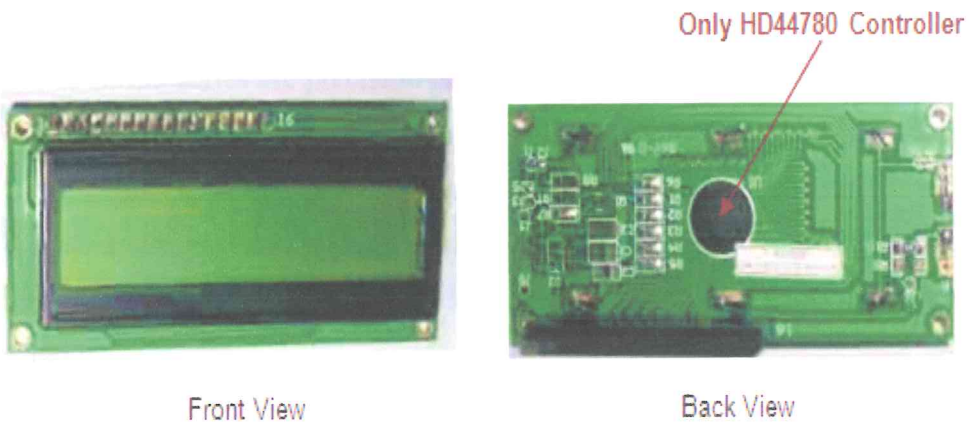

Figure 2.3.2

3) Liquid Crystal Display (LCD)

LCD is liquid crystal display board is one of the electronic component that serves as a data display, numbers, letters or graphics. It is a flat display technology that uses electrodes and polarity filters to allow the light to reflect on the eye of the beholder.

The image on the LCD screen created by the reactive material between two electrodes and output color on this matter can be changed by increasing or decreasing the electric current. LCD has a pin data input and output, voltage control, and control the color display.

This LCD will displayed what have been set in arduino windows. Then coding will be upload into arduino. It will show the current temperature in room.

Only HD44780 Controller

Front View   Back View

Figure 2.3.3

4)   **LED**

A light-emitting diode (LED) is a two-lead semiconductor light source. It is a p–n junction diode, which emits light when activated. This LED was connected anode to the ground and cathode connected to the pin 6 in Arduino. This LED provided a blinking light when LM 35 detected temperature **30°C** or over value, until the temperature was decrease the LED will turn OFF.

Figure 2.3.4

5)   Heat Temperature LM 35

The LM35 series are precision integrated-circuit temperature devices with an output voltage linearly-proportional to the Centigrade temperature. The LM35 device has an advantage over linear temperature sensors. The LM35 device does not require any external calibration or trimming to provide typical accuracies of ±¼°C at room temperature and ±¾°C over a full −55°C to 150°C temperature range.

The LM35 temperature sensor is interfaced to the analog input pins of the Arduino. Vcc pin (pin 1) of the LM35 is connected to A0 pin of the Arduino. Output pin (pin 2) of the LM35 is connected to A1 pin of the Arduino. GND pin (pin 3) of the LM35 is connected to A2 pin of the Arduino.
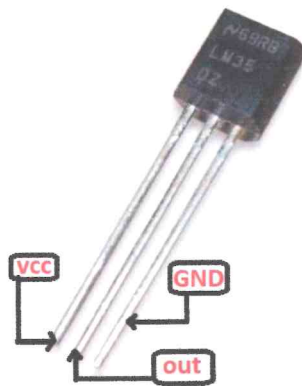

Figure 2.3.5

6)   Potentiometer

Potentiometer is a simple device used to measure the EMF, TPD, internal resistance of a cell. It consists of a board where a tungsten or manganese wire is fitted on it. It works on the principle that the potential dropped between two points in a wire of uniform cross section is directly proportional to the distance between points. This project used potentiometer to adjust brightness in LCD and temperature for LM 35.

Figure 2.3.6

7) **Jumper Wire**

A jump wire is an electrical wire or group of them in a cable with a connector or pin at each end, which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, soldering. In this project we used jumper Male to Female and Male to Male wire.

Figure 2.3.7

8) Battery 1.5 V

An electric battery is a device consisting of one or more electrochemical cells with external connections provided to power electrical devices. When a battery is supplying electric power, its positive terminal is the cathode and its negative terminal is the anode. In this project, we used battery 1.5V x 4 pcs to support GSM Shield Module.
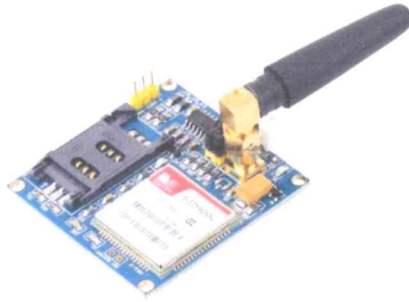

Figure 2.3.8

9) GSM Shield Module

GSM is stand for Global System for Mobile Communications. A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone.

This project uses the fastest data transmission system, namely GSM. This is because the GSM can save time to make a call to the user. GSM is a system of mobile communication frequency and transmission of digital mediation. GSM function as the sender of information to a user's phone when receiving data programmed only by the circuit may require.

Figure 2.3.9

2.4 Electric Soldering Tools and Soldering Stand

Electric soldering tools used to do the work of installing or removing soldering electronic components on the circuit. It is also used to specify a wire connector permanently. The power the used for soldering electronic components is 15W-25W (lower power). Soldering tools is divided into three main sections:

i. The solder head
ii. The upper heater
iii. Holder

Figure 2.4.1: Electric Soldering Tool

The soldering stand is a tool that used to put electrical soldering tool to prevent accidents such as burns, exposed to plastic components and so on.

Figure 2.4.2: Soldering Stand

2.4.1   Tin Soldering

Tin soldering is used during the soldering process is carried out. During the soldering is done, tin soldering is required to connect or attach a foot hole in the component on the PCB board (Printed Circuit Board).

Figure 2.4.3 Tin Soldering

Soldering tin is made of an alloy consisting of a mixture of tin and lead. Tin filled with material along fine wire in the hole to facilitate soldering.

2.4.2 Sucker Tin Soldering

A sucker tin soldering is used at the time of inhaling tin soldering work overload, do not use and continued on the foot tin component in PCB board (Printed Circuit Board).

**Figure 2.4.4: Sucker Tin Soldering**

2.4.3 PCB Cutter

PCB cutter is used to cut the PCB board so that the cut is clean and undamaged.

Figure 2.4.5: PCB Cutter

2.4.4 Drilling Machine

Drilling machine table is used to punch holes in the PCB board. This machine is suitable for use because of its small size and convenient in this punching process. Drill bit used to drill a hole is 0.08mm and 0.1mm.
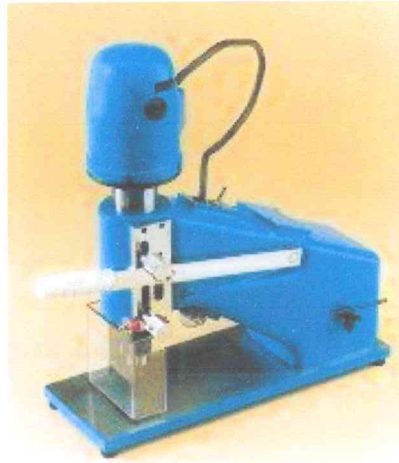
Figure 2.4.6: Drilling Machine

2.4.5 Etching Machine

Etching machine is used for corrosive parts that are not needed during fabrication circuit automatic clothesline. Corrosive liquid used for etching unnecessary parts on the circuit board.

Figure 2.4.7: Etching Machine

2.4.6 Ultraviolet Machine

Ultra violet machine used for clapped schematic diagram of tracing paper on the circuit board with the appropriate temperature.

Figure 2.4.8: Ultravoilet Machine

CHAPTER 3:

METHODOLOGY

3.1   Introduction

Methodology can be the 'analysis of the principles of methods, rules, and   postulates employed by a discipline', 'the systematic study of methods that are, can be, or have been applied within a discipline' or 'a particular   procedure or set of procedures'.

Methodology refers to more than a simple set of methods, rather it refers to the rationale and the philosophical assumptions that underlie a particular study relative to the scientific method. This is why scholarly literature often includes a section on the methodology of the researchers.

Each step of project is a process to complete the project. Every step must be followed one by one and must be done carefully. If some error occurs it can make a project probably could not operate or do not look neat and perfect.

Before the project finish, various process needs to be done according to proper procedures to ensure that projects do not have any problems. There are a few methods that must be following to complete this project. The methods is as   below:

- The project had started with study the literature of the project. Its including the operation of the project and the purpose of the project.
- Then, it will continue to identify and list down the problem or factor to be analysis.
- After that, Check the Item that should be used in project and make research for the project.
- Then, Construct the prototype for the project.
- Record and analysis the output from the prototype. If fails, start back again construct the prototype for the project.
- If success, design the schematic of project by using PCB wizard design software and printing PCB board.
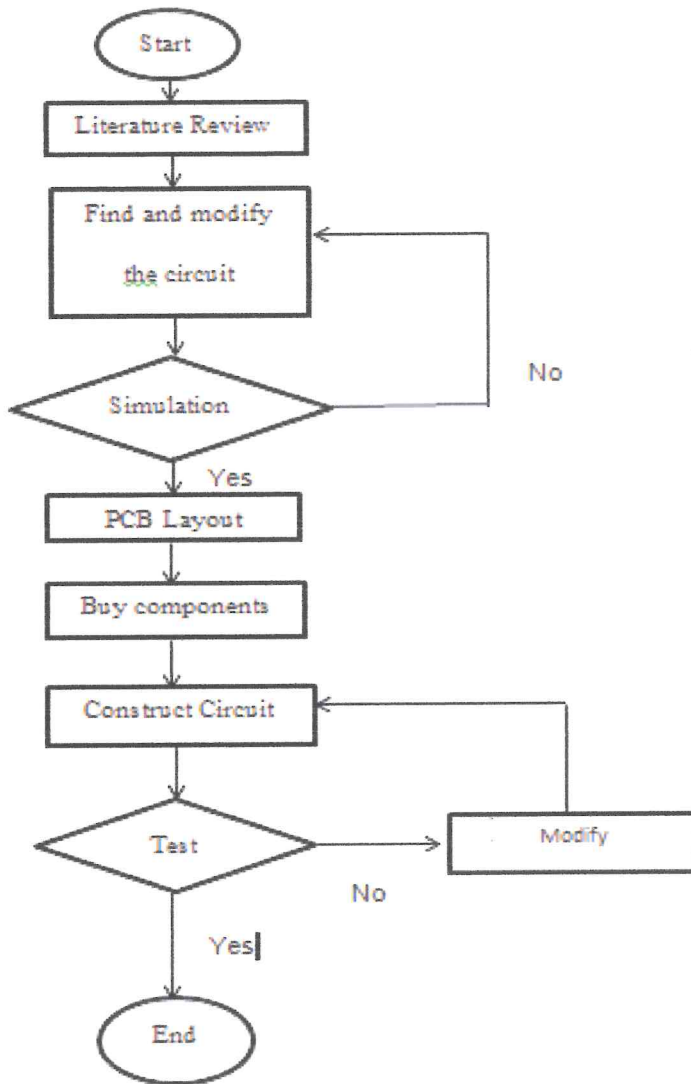
3.2 The flow chart of the project

Figure 3.2.1: Flow Chart

3.3   Research & Analysis

- Fire alarm using modern communications technology can handle emergency situations.
- Build system GSM Call upon the occurrence of fire.
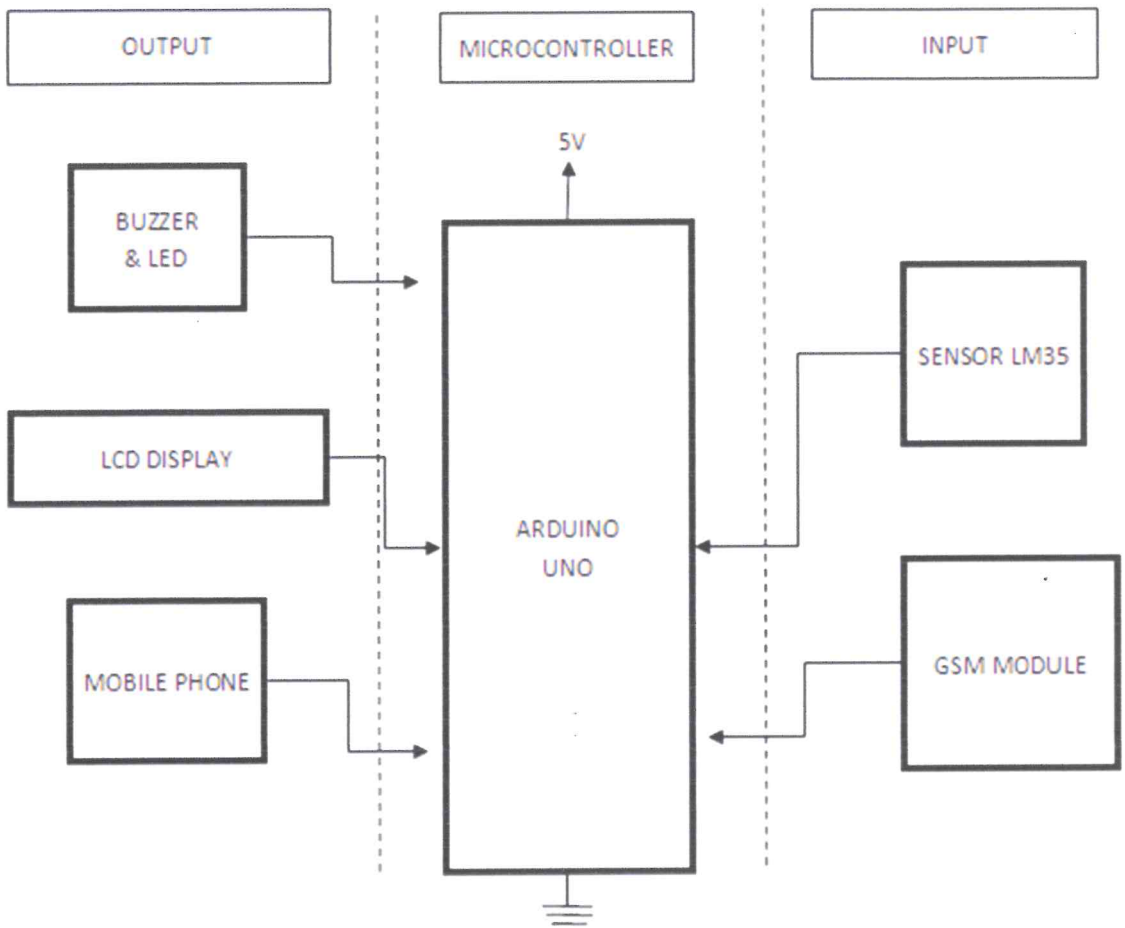- Detect fire as soon as possible by using SMS.

3.4   Planning

- The block diagram of Fire Alarm Detector With GSM Call

Figure 3.4.1: Block Diagram