

**POLITEKNIK SULTAN
SALAHUDDIN ABDUL AZIZ SHAH**

AUTOMATIC KITCHEN FAN

MUHAMMAD AZRI BIN MOHD ZAIN

(08DJK20F1001)

JABATAN KEJURUTERAAN ELEKTRIK

SESI 1:2022/2023

**POLITEKNIK SULTAN SALAHUDDIN
ABDUL AZIZ SHAH**

AUTOMATIC KITCHEN FAN

**MUHAMMAD AZRI BIN MOHD ZAIN
(08DJK20F1001)**

**This report was submitted to the Department of Electrical
Engineering as partial fulfillment of the award conditions**

Diploma of Electrical Engineering

JABATAN KEJURUTERAAN ELEKTRIK

SESI 1:2022/2023

CONFIRMATION OF THE PROJECT

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“I acknowledge this work is my own work except the excerpts I have already explained to our source”

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DECLARATION OF ORIGINALITY AND OWNERSHIP

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(Hereafter referred to as 'the Polytechnic').
2. I acknowledge that the 'Above Project' and the intellectual property in it are the result of my original work/design without taking or copying any intellectual property from other parties..
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Made and it truth recognized by;

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NOOR(821125-14-5106)

As a project supervisor on the date:)

.....
WAN NOR HIDAYAH
BINTI WAN
MOHAMED NOOR

:

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My thanks and appreciations also go to my colleague in developing the project and people who have willingly helped me out with their abilities.

ABSTRACT

Cooking is one of the main sources of indoor air pollutants, and may even exceed the contribution from external sources. Cooking can be a tiring experience if the kitchen is not properly ventilated. Despite good ventilation sometimes we need an exhaust fan to moderate the temperature in the kitchen during cooking. But when we are too busy cooking, we often forget the fan and end up cooking without it. A simple solution to this problem is to use a circuit to automate the exhaust fan in the kitchen to automatically turn on when cooking starts. This automatic exhaust fan circuit uses a temperature sensor to monitor the atmospheric temperature and turn on or OFF the fan based on temperature. The results of the study prove that there are advantages by this fan system .

ABSTRAK

Memasak adalah salah satu sumber utama pencemar udara dalaman, malah mungkin melebihi sumbangan daripada sumber luar. Memasak boleh menjadi pengalaman yang memenatkan jika dapur tidak mempunyai pengudaraan yang betul. Walaupun pengudaraan yang baik kadangkala kita memerlukan kipas ekzos untuk menyederhanakan suhu di dapur semasa memasak. Tetapi apabila kita terlalu sibuk memasak, kita sering melupakan kipas dan akhirnya memasak tanpanya. Penyelesaian mudah untuk masalah ini ialah menggunakan litar untuk mengautomasikan kipas ekzos di dapur untuk dihidupkan secara automatik apabila memasak bermula. Litar kipas ekzos automatik ini menggunakan sensor suhu untuk memantau suhu atmosfera dan menghidupkan atau mematikan kipas berdasarkan suhu. Hasil kajian membuktikan terdapat kelebihan sistem kipas ini .

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LIST OF SYMBOLS

Simbol

f	Frekuensi
m	Jisim
P	Tekanan
r	Jejari

LIST OF ABBREVIATIONS

CeTRI
Innovation

Centre for Telecommunication Research and

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Automatic Kitchen Fan system project is a project for air freshener system in the kitchen. When we cook smoke will fill the kitchen space. With this project we do not have to worry because when the sensor can detect smoke or gas automatically the fan will work to remove the smoke or gas which smells better because of the system of the project. The air in the kitchen will always be fresh and besides that can save electricity from the fan always operating.

1.2 BACKGROUND RESEARCH

SMART KITCHEN WITH IOT

(source: International Journal of Research in Advent Technology)

The results of the study found that the design of the gas leakage monitoring system is recommended for home security. The system detects LPG leaks and inform the consumer about the leak via SMS and as an emergency measure the system will turn off the power supply, while activating the alarm. An additional advantage of the system is that continuously monitor the level of LPG found in the cylinder uses a load sensor and if the gas level is reached below the gas threshold limit of about 2kg so the user can replace the old cylinder with a new inlet time and automatically order cylinders using a GSM module. The device ensures safety and prevents shortness of breath and explosion due to gas leak. The project has the concept of detecting the presence of gas.

1.3 PROBLEM STATEMENT

First,Being Smoke fills the kitchen space while cooking .Next,breathing will be disturbed due to smoke filling the kitchen space and difficulty breathing.Next discomfort for cooking and health will be affected due to constantly inhaling dirty air.

1.4 RESEARCH OBJECTIVE

The main objective of this Project is make air in the kitchen always fresh .More specifically the principle objective of this research are to inhale the smoke that is in the kitchen while cooking and released out of the house and smell fragran.Next,to make the air in the kitchen will always be fresh and can save electricityfrom the fan is always rotating

1.5 SCOPE OF RESEARCH

This Project is focusing to design a system to inhale a gas in the kitchen. The emphasis is to the make air in the kitchen will always be fresh and can save electricity too.This project is using gas sensor, arduino relay and fan .

1.6 PROJECT SIGNIFICANT

Based on the study, this project has several significances,among of them are Humidity Control,Controlling Steam, Smoke and Smell,Gas and Smoke Removal,Heat Removal, Maintain health and Walls and Fabrics in good condition

1.7 CHAPTER SUMMARY

Currently, Cooking is one of the main sources of indoor air pollutants. Overall in this chapter such as background study, problem statement, study objectives, scope of study and importance of the project have been discussed to address the issue Smoke fills the kitchen space during cooking Breathing will be disturbed due to smoke filling the kitchen space and breathing difficulties discomfort for cooking and health will be affected because it constantly inhales dirty air.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter is provided description of literature review done regards to the project title of design and fabrication for cat feeder. The literature review started with the other product of cat feeder that is widely used. There are several products that are common in the production of cat feeder. With the explanation of each product, the advantages and disadvantages can be seen in those products and can help to make upgrade for another better product

2.2 SMART KITCHEN (Literature Review Topic 1)

NO	TITLE/AUTHOR	OBJECTIVE	METHOD	RESULT
1	<p>➤ Smart kitchen using IoT Mr. Gaurav V Tawale-Patil, Miss. Kalyani H Kulkarni, Miss. Pooja U Kuwad, Miss.Pooja R Pawar Department of Information Technology, Vishwakarma Institute of Information Technology, Savitribai Phule Pune University, India.</p>	<p>Design of gas leakage monitoring system for home safety. The device ensures safety and prevents shortness of breath and explosion due to gas leak</p>	<p>. The system detects LPG leaks and inform the consumer about the leak via SMS and as an emergency measure the system will turn off the power supply, while activating the alarm</p>	<p>Monitoring the all sensors and its value for safty detection of gas leakage,tem perature and Humidity of room,and daily usage of system to the user. Automatic Booking for gas refill</p>

NO	TITLE/AUTHOR	OBJECTIVE	METHOD	RESULT
2	<ul style="list-style-type: none"> ➤ Smart kitchen ➤ M. A. M Azran Faculty of Computing, Sri Lanka Institute of Information Technology Colombo 	<p>The purposes of this project is to detect gas levels and show warnings accurately.</p> <p>To connect the data from the kitchen and present it through an android application to the user.</p>	<p>Units to be measured, materials and gas levels are measured using a load cell. This data is sent to the hosted server that contains the database. The budget component is associated with this and so are the gas centers which will accept orders according to the gas level. Users will can view data from android applications.</p>	<p>The Smart Kitchen System consists of three main components such as Load cells, Android apps for users and budgets system for home users. Primarily, the container is designed for reading and sending weight level details. This data with gas levels to read and sent to the main server.</p>

NO	TITLE/AUTHOR	OBJECTIVE	METHOD	RESULT
3	<ul style="list-style-type: none"> ➤ N. A. A. Hadi ➤ Centre for Telecommunication Research and Innovation (CeTRI), Faculty of Electronic and Computer Engineering, Universiti Teknikal Malaysia Melaka 	To remove heat and smoke in the kitchen is detected by smoke detectors.install safety precautionary elements to warn the public.buzzer is installed to inform people when the temperature reaches a maximum value	The temperature sensor detects the ambient temperature and it is displayed on the LCD. The motor speed is controlled using PWM technique according to the ambient temperature.	. To process analog signals, microcontrollers have analog to digital converters that convert analog signals to digital. The LM35 temperature sensor connected to the analog port acquires the environment

NO	TITLE/AUTHOR	OBJECTIVE	METHOD	RESULT
4	<p>➤ Navindran A/L Alagari1 , Jais Lias1* 1Faculty of Electrical and Electronic Engineering , Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Batu Pahat, Johor, MALAYSIA</p>	<p>This project objective to design and build an IoT based smart exhaust fan which can turn ON and OFF automatically depend on temperature and air quality. Then, the system is able to measure and record data for data collection of temperature and air quality in a space and finally, the IoT system was implemented in the prototype.</p>	<p>IoT Based Smart Exhaust Fan is well-designed, easy and affordable for home user. This project is an IoT based exhaust fan which can control and monitor the performance of the exhaust fan. This device can help the user to monitor, control and can reduce power consumption because it works automatically.</p>	<p>Initially, the exhaust fan was OFF, when flammable gas from lighter affect the surrounding air quality level inside the acrylic house model. The exhaust fan is turned ON when the air quality level was exceeded more than required level which is 149 Ppm. The exhaust fan turn OFF when the poisonous harmful gas removed from the surrounding and the surrounding air inside the acrylic house model is maintained to its required air quality level</p>

NO	TITLE/AUTHOR	OBJECTIVE	METHOD	RESULT
5	<p>➤ AUTOMATIC FAN CONTROLLER BASED ON TEMPERATURE SENSOR AND REACTIVATED SYSTEM</p> <p>➤ By Nur Mohd Fadzli Bin Nordzi Submitted to the Electrical & Electronics Engineering Programme in Partial Fulfillment of the Requirements for the Degree Bachelor of Engineering (Electrical & Electronics Engineering) Universiti Teknologi PETRONAS Bandar Seri Iskandar 31750 Tronoh Perak Darul Ridzuan</p>	<p>To build an automatic fan controller based on temperature sensor.</p> <p>To create detection system that aims to detect human's motion appearance</p> <p>To implement a controller based model to count number of persons visiting particular room</p> <p>Keypad controller for user purpose</p>	Functionality check on temperature sensor	<p>The project needs a very careful study and consistent work.</p> <p>Based from the result, the prototype managed to be finished on time set. There will be many obstacle that need to be handled in accomplished the task. The result proves out the capabilities the entire sensor like LM35 sensor, Ultrasonic sensor and Passive Infrared Sensor (PIR) by using C programming on PIC16f877A.</p>

2.2.1 PREVIOUS RESEARCH (Subtopic Literature Review Topic 1)

Security plays a major role in today's world and rightly so necessary so that a good security system is implemented in place of education and employment. This work is modifying existing safety models used in the home. Main objective work is design in microcontroller detection and warning system. Gases such as LPG and propane are detected and displayed every second in the LCD display. If these gases exceed normal levels then an a warning message is sent to the authorized person. The the advantages of this automatic detection and warning system compared to the manual method is that it offers a fast response timing and accurate detection of emergencies and beyond leading to a faster spread of critical situations.

Based on the study of the history of air suction fans there are several types of air suction fan

Table 0.1: Types of air suction fan

PANASONIC FV-20TGU:	wall
Maspion Ceiling Exhaust CEF2510:	Roof Ceiling
Panasonic FV-15EGK1ABN	Bathroom

2.3 CONTROL SYSTEM(Literature Review Topic 2)

Control System theory has played an important role in a set of mechanical or electronic devices that regulates other devices or systems by way of control loops. Typically, control systems are computerized. Control systems are a central part of industry and of automation.

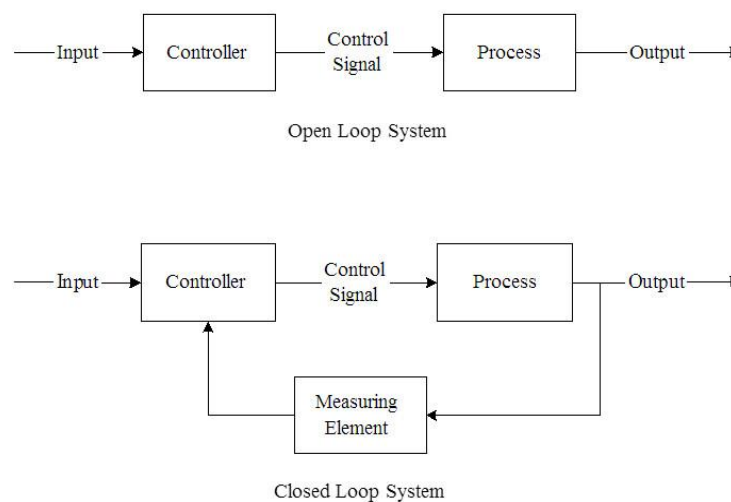


Figure 2. 1: Block diagram of open loop and closed loop system

2.3.1 MICROCONTROLLER

A microcontroller is an integrated circuit that contains a microprocessor along with memory and associated circuits and that controls some or all of the functions of an electronic device (such as a home appliance) or system.

2.3.2 PROGRAMMABLE LOGIC CONTROL(PLC)

A programmable logic controller (PLC), or programmable controller is an industrial digital computer is a type of tiny computer that can receive data through its inputs and send operating instructions through its outputs.

2.3.3 ARDUINO

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online.

2.4 CHAPTER SUMMARY

This section focusing on two different section, the first is some information from the control system, microcontroller, Programmable Logic Control (PLC), and Arduinode identifies its function. The second section is discovered about the technical part, including the selection of the type of controller.

CHAPTER 3

RESEARCH METHODOLOGY

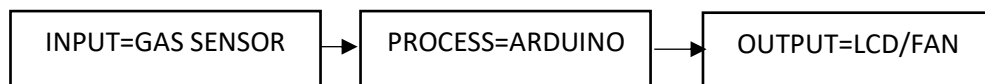
3.1 INTRODUCTION

To realize this Project as a ready to use product with security features, a very comprehensive plan is being implemented. A step by step procedure is done so that the Project can be completed within the stipulated time. This includes collecting mechanical part design data, circuit design testing and validation.

3.2 PROJECT DESIGN AND OVERVIEW

As mentioned in the previous chapter, the controller is designed using a closed loop system with the Arduino as the main controller. The design of the controller circuit using Arduino is realized using Proteus Software and then converted to PCB circuit. In proteus arduino processes the input provided by the sensor gas and the output is used such as LCD and fan.

3.2.1 BLOCK DIAGRAM OF THE PROJECT



3.2.2 FLOWCHART OF THE PROJECT 2

Figure 3. 1 shows the circuit diagram of the whole system. It is show that gas sensor if detected gas will proceed to Arduino.If no ,it will not proceed.Next Arduino process will proceed to LCD and fan.

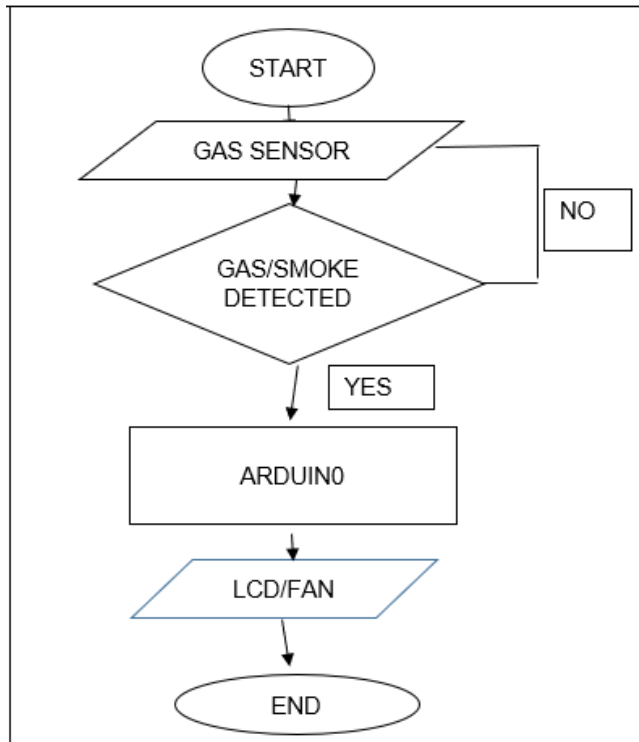


Figure 3. 1: Flow chart of operation of the system
*Images may be subject to copyright

3.2.3 PROJECT DESCRIPTION

This project is a project for air freshener system in the kitchen. Gas detected by sensor (MQ-2 gas sensor) and the fan will be rotated and emits smoke detected by the sensor.

3.3 PROJECT HARDWARE

As mentioned in the previous chapter, the designed controller is using Arduino UNO. Then, the output of Fan/ LCD will on.

3.3.1 SCHEMATIC CIRCUIT

Figure 3. 2 shows the overall circuit diagram of this Project Automatic kitchen Fan

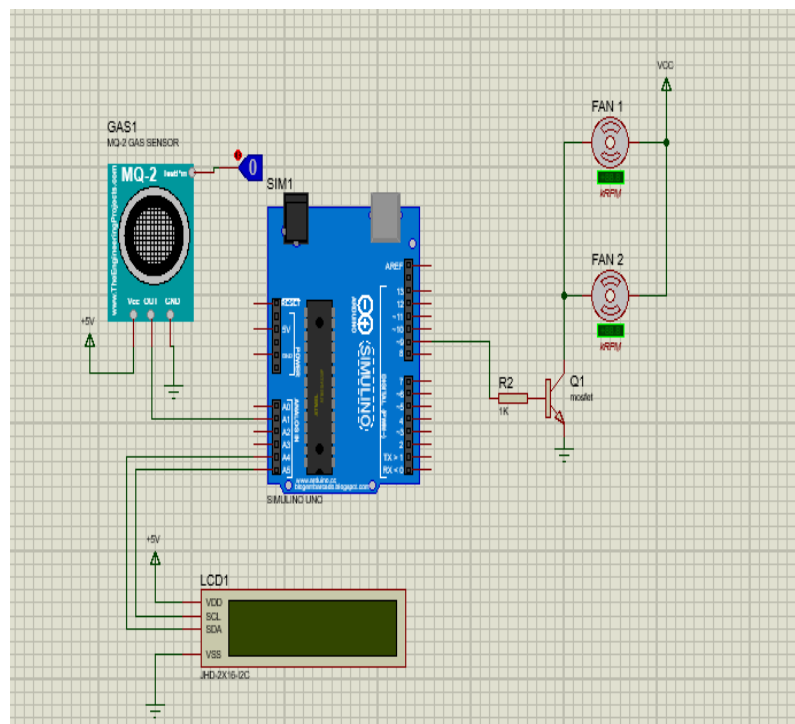


Figure 3. 2: Circuit Diagram

*Images may be subject to copyright

3.3.2 DESCRIPTION OF MAIN COMPONENT

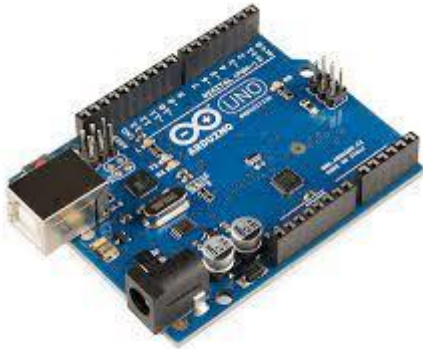
3.3.2.1 COMPONENT 1



Gas sensor

Devices that can detect the presence and concentration of various hazardous gases and vapors

3.3.2.2 COMPONENT 2



Arduino

Arduino is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc.

3.3.2.3 COMPONENT 3



Fan

Electric fans have a motor that moves blades that are attached to a central rotating hub.

3.3.3 CIRCUIT OPERATION

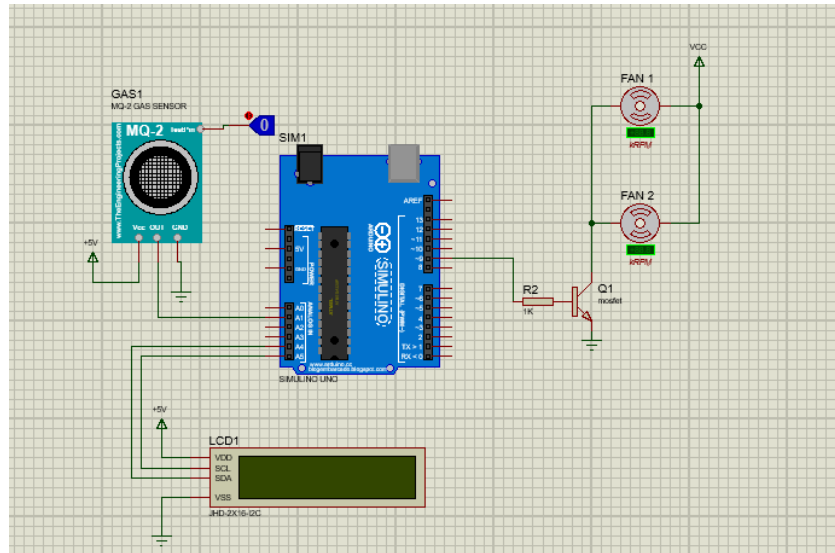


Figure 3.3: Circuit Operation

3.4 PROJECT SOFTWARE

- PROTEUS 8 PROFESIONAL
- SOFTWARE ARDUINO 1.8.9
- ThinkerCad

3.4.1 FLOWCHART OF THE SYSTEM

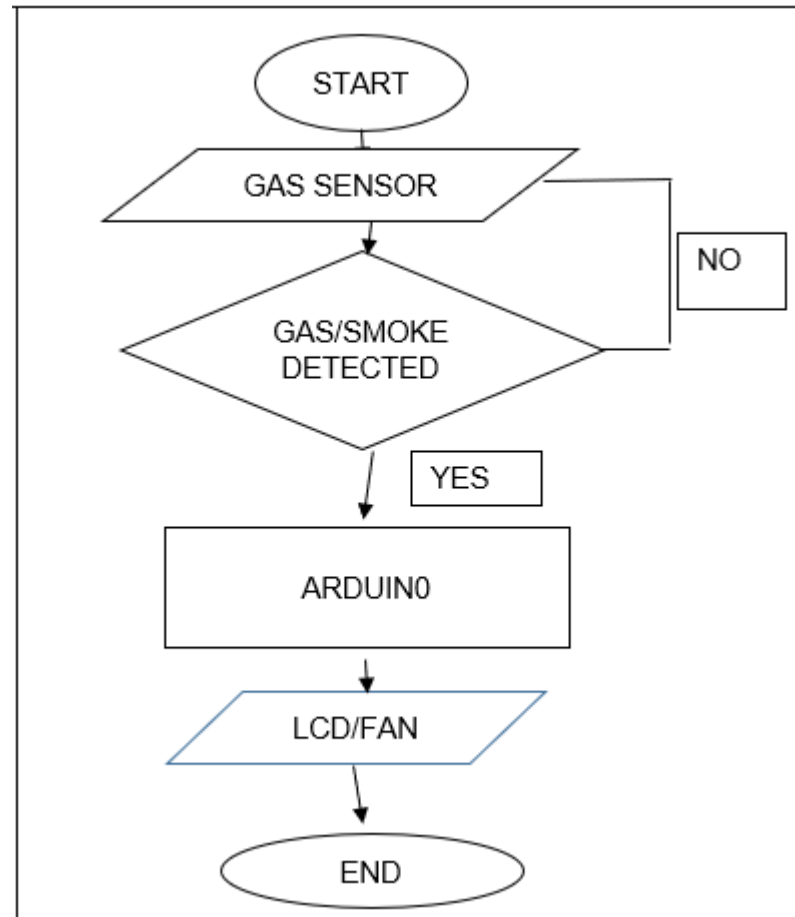


Figure 3.4:Flowchart system

3.4.2 DESCRIPTION OF FLOWCHART

The flowchart is show that gas sensor if detected gas will proceed to Arduino.If no,it will not proceed next Arduino process will proceed to LCD and fan.

3.5 PROTOTYPE DEVELOPMENT

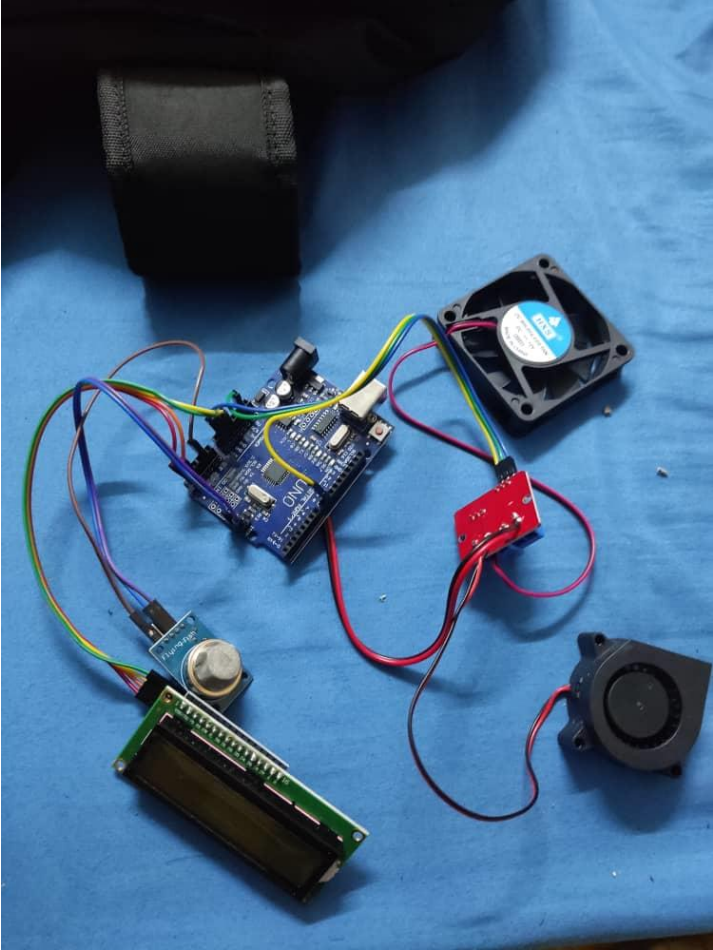


Figure 3.5:Prototype

3.5.1 MECHANICAL DESIGN/PRODUCT LAYOUT

Figure 3.3 shows the design of the product for the circuit using gas sensor,arduino,fan and LED.

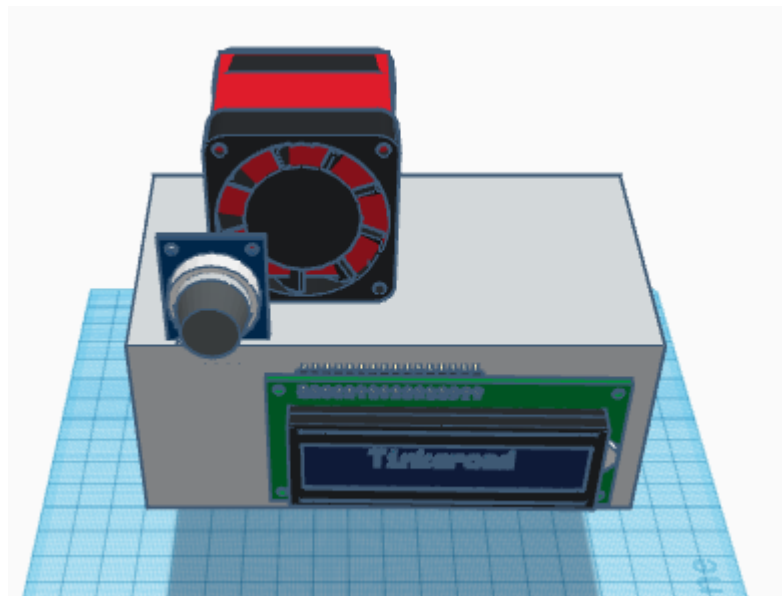


Figure 3. 3: Mechanical Design

3.6 SUSTAINIBLY ELEMENT IN THE DESIGN CONCEPT

In this project, environmental hygiene has been applied, that is, the smoke coming out of the fan will smell fragrant, there is a filter in the fan that will change the smell of smoke.For human it will be comfortable.

3.7 CHAPTER SUMMARY

In this section focuses on the process and circuit of the project program. The first is some information from the main components in the simulation namely Gas sensor, fan and arduino used. Next is information about the design of the resulting project.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 INTRODUCTION

Regarding the research that has been done, it can help us to know about our project in more detail for each component and function so that this project can work according to the purpose that we have wanted.

4.2 RESULT AND ANALYSIS

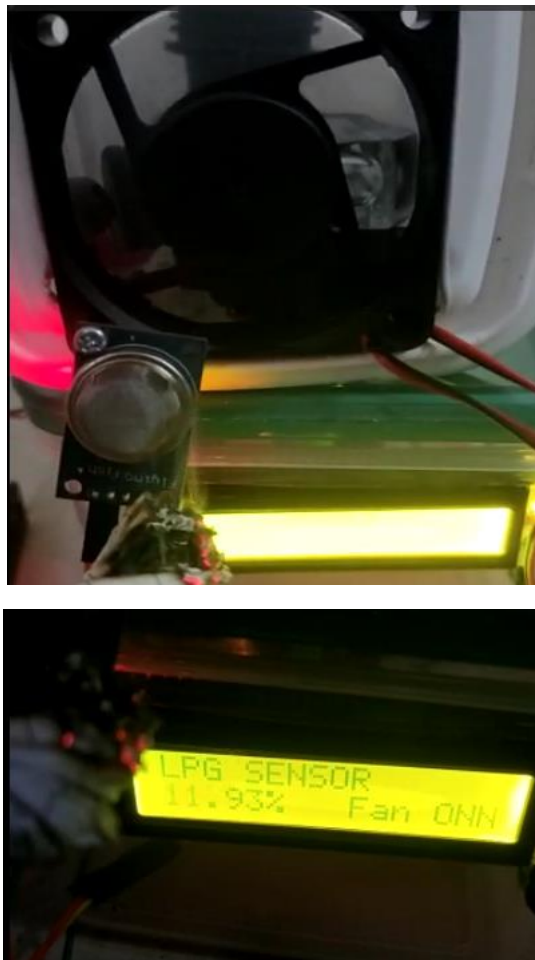


FIGURE 4.1.RESULT

4.3 DISCUSSION

In planning an activity and work related to the project carried out, Discussions with the supervisor to reach the best consensus has been made to ensure that the activities run smoothly as planned and arranged. Each week there will be a meeting with the project supervisor to discuss the latest developments related to the report as well as the progress of the planned project. In addition, all problems encountered such as project shortcomings, problems to obtain information related to the project and so on are also voiced to get the best views and solutions from the views of our supervisors. All planning is done carefully. With this, the issues and developments of this project can be shared. All doubts and problems related to the project are discussed at this time until a solution is reached by mutual agreement.

4.4 CHAPTER SUMMARY

As a conclusion to this chapter, analysis and findings have been made. This project has many advantages but there are every bad to good. Therefore, challenges are taken as room for improvement and more development for the next generation and also to increase their knowledge about the projects we are running. Run tests are conducted to determine the full potential and proven to satisfy users

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

Follow up at the end of the project until it is completed and successfully made tests, studies, get results such as data analysis and so on. Here it gives a lot of new knowledge lessons about each project information in detail and is beneficial during the project making process.

5.2 CONCLUSION

This project brings together several components and ideas to achieve the common goal of designing an automatic kitchen fan using Arduino UNO. The main component of the project includes a fan that will suck in smoke to be released in the air space automatically. With this, users will be more comfortable.

5.3 SUGGESTION FOR FUTURE WORK

The recommendation of this project can be based on things viz user friendly features and electricity savings. Disadvantages of the project, due to limited time and budget, speed mechanism AC motors can be improved by using the phase angle technique to provide variation required fan speed such as more than 5 speeds. The speed of the fan is accelerated and can suck the smoke quickly. With this project can also be placed in the hotel in the kitchen. for the supply voltage for this project can also be used solar to save electricity consumption.

5.4 CHAPTER SUMMARY

In this chapter, it focuses on the conclusions that I got at the end of this project in terms of every aspect that has been done successfully. In addition, in the end this project can bring benefits to the users who use it.

CHAPTER 6

PROJECT MANAGEMENT AND COSTING

6.1 INTRODUCTION

This project involves the cost of purchasing components and materials throughout its implementation. components involving cost are hardware Arduino,GAS sensor module, 20 ways jumper wire,motor,LCD,Fan,Relay. All of these components are purchased through online purchase methods to make it easier aswell as save on costs.

The overall gross budget estimate in the implementation of this project is RM 133.00 and other expenses is at RM 40 according to this budget cost, this project is can be considered as a less costly project compared to other projects that can cost over a thousand ringgit. The cost of the project is also in line with one of the key features of a good project developer that is low cost but have a high quality project.

6.2 GHANT CHART AND ACTIVITIES OF PROJECT



Figure 6.1:Ghant Chart

6.4 COST AND BUDGETTING

Table 6.1;Cost Of Project

No.	Component and materials	The unit price	Quantity	Total
1	Arduino set	RM 30.00	1	RM30.00
2.	LCD	RM 15.00	1	RM10.00
3.	Relay	RM5.00	1	RM5.00
4.	GAS Sensor module	RM 10.00	1	RM 7.00
5.	Battery	RM 3.00	4	RM 15.00
6.	20 ways jumper wire	RM 6.00	2	RM 12.00
7.	Fan	RM7.00	2	RM14.00
8.	Other materials	RM 40	-	RM 40
	Total :			RM 133.00
	List of other costing			
1	Transportation			Rm25.00
2	Postage			RM15.00
3	Internet			RM10.00
	Total :			RM50.00
			Overall total	RM183.00

6.5 CHAPTER SUMMARY

This section is show the Program schedule project manufacturing travel process, First is the project milestones and then the project cost calculated throughout the project manufacturing and cost for the other list.

REFERENCES

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APPENDICES

APPENDIX A- DATA SHEET

[BP Projek Pelajar Diploma Politeknik 2021 Final 11Mac-converted.docx](#)

APPENDIX B- PROGRAMMING

```
#include <LiquidCrystal_I2C.h>
```

```
// Set the LCD address to 0x27 for a 16 chars and 2 line display
```

```
LiquidCrystal_I2C lcd(0x27, 16, 2);
```

```
int mq2=A1;
```

```
int fan=9;
```

```
int buz=12;
```

```
int d;
```

```
float p;
```

```
void setup()
```

```
{
```

```
Serial.begin(9600);
```

```
pinMode(fan,OUTPUT);
```

```
pinMode(buz,OUTPUT);
```

```
digitalWrite(fan,LOW);
```

```
digitalWrite(buz,LOW);
```



```
// initialize the LCD  
  
lcd.begin();  
  
// Turn on the backlight and print a message.  
  
lcd.backlight();  
  
lcd.print("LPG SENSOR");  
  
}  
  
void loop()  
  
{  
  
d=analogRead(mq2);  
  
lcd.setCursor(0,0);  
  
lcd.print("LPG SENSOR");  
  
Serial.println(d);  
  
if(d<260)  
  
{  
  
p=0;  
  
}  
  
else  
  
{  
  
p=(d-260)/9.64;  
  
}  
  
lcd.setCursor(0,1);  
  
lcd.print(p);  
  
lcd.setCursor(5,1);
```

```
lcd.print("%");  
  
if(p>=1)  
{  
    digitalWrite(fan,HIGH);  
    digitalWrite(buz,HIGH);  
    lcd.setCursor(9,1);  
    lcd.print("FAN ONN");  
  
}  
  
else  
{  
    digitalWrite(fan,LOW);  
    digitalWrite(buz,LOW);  
}  
  
delay(500);  
  
lcd.clear();  
}
```

AUTOMATIC KITCHEN FAN

MUHAMMAD AZRI BIN
MOHD ZAIN
08DJK20F1001

Problem statement

- Smoke fills the kitchen space while cooking
- Breathing will be disturbed due to smoke filling the kitchen space and difficulty breathing
- Discomfort for cooking and health will be affected due to constantly inhaling dirty air

OBJECTIVE

2. To inhale the smoke that is in the kitchen while cooking and released out of the house and smell fragran
2. To make the air in the kitchen will always be fresh and can save electricity from the fan is always rotating

IMPACT

- Humidity Control
- Controlling Steam, Smoke and Smell
- Gas and Smoke Removal
- Heat Removal
- Maintain health and walls and Fabrics in good condition



BLOCK DIAGRAM

