



**FACULTY OF ELECTRICAL AND ELECTRONIC  
ENGINEERING TECHNOLOGY**



**DEVELOPMENT OF SMART HOME: FIRE SAFETY SYSTEM  
USING IOT**

**MUHAMMAD FIRDAUS BIN JAMALUDDIN**

**Bachelor of Computer Engineering Technology (Computer  
System) with Honours**

**2023**

# **DEVELOPMENT OF SMART HOME: FIRE SAFETY SYSTEM USING IOT**

**MUHAMMAD FIRDAUS BIN JAMALUDDIN**

**A project report submitted  
in partial fulfilment of the requirements for the degree of  
Bachelor of Computer Engineering Technology in  
Computer System with Honours**



اونيورسيتي تيكنيكل مليسيا ملاك  
**Faculty of Electrical and Electronic Engineering Technology**  
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

**BORANG PENGESAHAN STATUS LAPORAN  
PROJEK SARJANA MUDA II**

Tajuk Projek : DEVELOPMENT OF SMART HOME : FIRE SAFETY SYSTEM USING IOT

Sesi Pengajian : 2022/2023

Saya MUHAMMAD FIRDAUS BIN JAMALUDDIN mengaku membenarkan laporan Projek Sarjana Muda ini disimpan di Perpustakaan dengan syarat-syarat kegunaan seperti berikut:

1. Laporan adalah hakmilik Universiti Teknikal Malaysia Melaka.
2. Perpustakaan dibenarkan membuat salinan untuk tujuan pengajian sahaja.
3. Perpustakaan dibenarkan membuat salinan laporan ini sebagai bahan pertukaran antara institusi pengajian tinggi.
4. Sila tandakan (✓):

**SULIT\***

(Mengandungi maklumat yang berdarjah keselamatan atau kepentingan Malaysia seperti yang termaktub di dalam AKTA RAHSIA RASMI 1972)

**TERHAD\***

(Mengandungi maklumat terhadap yang telah ditentukan oleh organisasi/badan di mana penyelidikan dijalankan)

**TIDAK TERHAD**



(TANDATANGAN PENULIS)

Alamat Tetap: K9-G-01 BLOK K9 KENARI COURT  
JALAN PANDAN INDAH 6/8,  
PANDAN INDAH  
55100 KUALA LUMPUR

Disahkan oleh:



**NOOR MOHD AKIFF BIN BRAHII**

(COP DAN TANDATANGAN PENYELIA)

Jabatan Teknologi Kejuruteraan Elektrik & Elektronik  
Fakulti Teknologi Kejuruteraan Elektrik & Elektronika  
Universiti Teknikal Malaysia Melaka

Tarikh: 24/1/2023

Tarikh: 27/1/2023

## DECLARATION

I declare that this project report entitled “Development of Smart Home: Fire Safety System Using IoT” is the result of my own research except as cited in the references. The project report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature

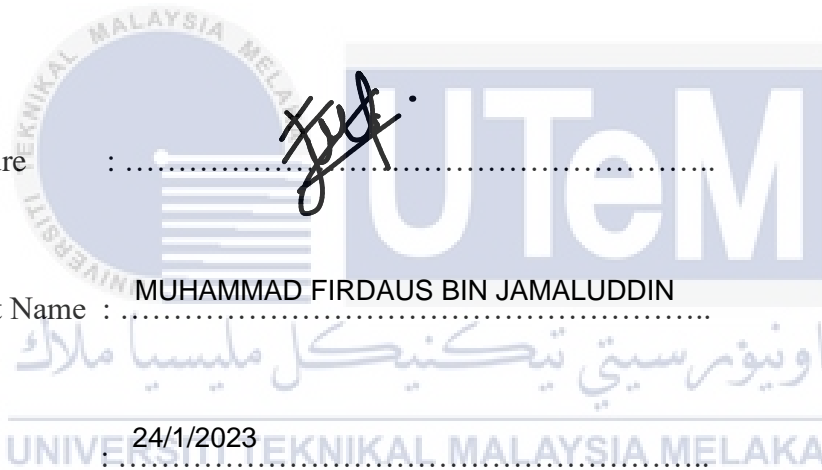
: .....  


Student Name

: MUHAMMAD FIRDAUS BIN JAMALUDDIN

Date

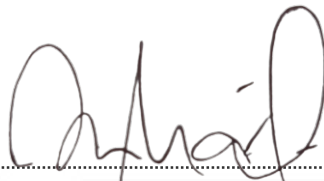
: 24/1/2023



## APPROVAL

I hereby declare that I have checked this project report and in my opinion, this project report is adequate in terms of scope and quality for the award of the degree of Bachelor of Computer Engineering Technology(Computer System) with Honours.

Signature :



Supervisor Name :

EN NOOR MOHD ARIFF BIN BRAHIN

Date :

24/1/2023

Signature :

Co-Supervisor :

Name (if any)

Date :



اونيورسيتي تيكنيكل ماليسيا ملاك

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

## ABSTRACT

Every house now requires a fire safety detection system, as it has become increasingly common over the past year. This is due to the extensive damage caused by the fire, which resulted in the loss of human life. When a fire spreads to the surrounding area, those accidents can be far more catastrophic than we realize at the time. Fire safety systems are meant to detect fires early in their emergence, allowing for the emergency evacuation of occupants while the fire is still in its early stages of growth. As a result of this type of situation, the development of a Smart Home Fire safety system using IoT has been decided, which will involve the usage of the Internet of Things, which will be a critical component of the project's development. The objective of this project is to design a monitoring system using a smoke sensor, flame sensors, and a microcontroller, to develop a telegram bot to monitor & control home appliances, and to validate the developed project prototype for the smart home system. This project will be using ESP32 as a microcontroller that acts as the brain of the project. Then, the flame and smoke sensor will be deployed in the project as the main sensor for the detection of smoke, gas, and fire in the household. This project features that allow users can control any safety equipment with their smartphones if a fire happens unexpectedly. This project is user-friendly as it introduced a better improvement for life.

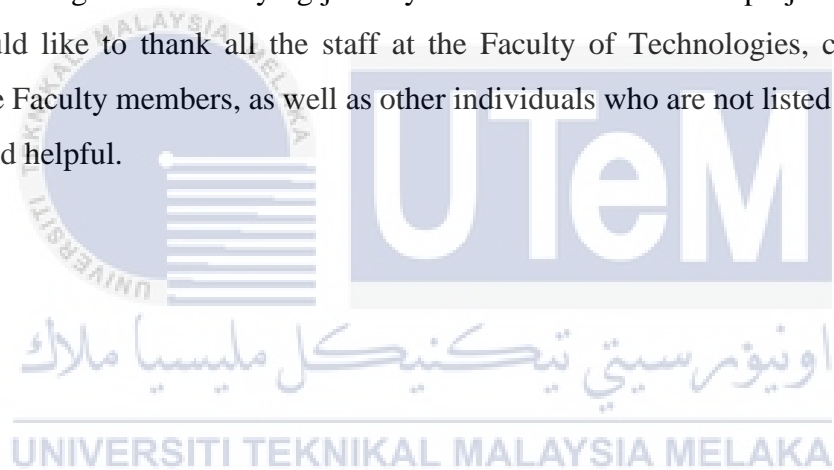
## ABSTRAK

Setiap rumah kini memerlukan sistem pengesanan keselamatan kebakaran, kerana ia telah menjadi semakin biasa sejak setahun lalu. Ini berikutan kerosakan besar akibat kebakaran yang mengakibatkan kehilangan nyawa manusia. Apabila kebakaran merebak ke kawasan sekitar, kemalangan tersebut boleh menjadi jauh lebih malapetaka daripada yang kita sedari pada masa itu. Sistem keselamatan kebakaran bertujuan untuk mengesan kebakaran pada awal kemunculannya, membolehkan pemindahan kecemasan penghuni semasa kebakaran masih dalam peringkat awal pertumbuhannya. Hasil daripada situasi jenis ini, pembangunan sistem keselamatan kebakaran rumah pintar menggunakan IoT telah diputuskan, yang akan melibatkan penggunaan Internet, yang akan menjadi komponen penting dalam pembangunan projek. Objektif projek ini adalah untuk mereka bentuk sistem pemantauan menggunakan penderia asap, penderia nyalaan dan mikropengawal, untuk membangunkan bot telegram untuk memantau & mengawal perkakas rumah, dan untuk mengesahkan prototaip projek yang dibangunkan untuk sistem rumah pintar. Projek ini akan menggunakan ESP32 sebagai mikropengawal yang bertindak sebagai otak projek. Kemudian, penderia api dan asap akan digunakan dalam projek itu sebagai penderia utama untuk pengesanan asap, gas dan api dalam isi rumah. Ciri projek ini yang membolehkan pengguna mengawal sebarang peralatan keselamatan dengan telefon pintar mereka jika kebakaran berlaku tanpa diduga. Projek ini mesra pengguna kerana ia memperkenalkan peningkatan yang lebih baik untuk kehidupan.

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

## ACKNOWLEDGEMENT

First and foremost, I would like to express my gratitude to my supervisor, En Noor Mohd Ariff Bin Brahin for the precious guidance, words of wisdom and patient throughout this project. I am also indebted to both my parents and Universiti Teknikal Malaysia Melaka (UTeM) for the financial support, which enables me to accomplish the project. Not forgetting my close acquaintance, En Iqbal Zulkarnain for his willingness of sharing his thoughts and ideas regarding the project. My highest appreciation goes to my parents and family members for their love and prayer during the period of my study. An honourable mention also goes to my friends and my housemate with the matrix number (B081910066), (B081910068), (B081910239), (B081910238), (B081910086), and (B081910016) for all the motivation and understanding throughout the studying journey until the creation of the project development. Finally, I would like to thank all the staff at the Faculty of Technologies, colleagues and classmates, the Faculty members, as well as other individuals who are not listed here for being cooperative and helpful.





## TABLE OF CONTENTS

<b>DECLARATION</b>	
<b>APPROVAL</b>	
<b>ABSTRACT</b>	<b>i</b>
<b>ABSTRAK</b>	<b>ii</b>
<b>ACKNOWLEDGEMENT</b>	<b>iii</b>
<b>TABLE OF CONTENTS</b>	<b>iv</b>
<b>LIST OF TABLES</b>	<b>vi</b>
<b>LIST OF FIGURES</b>	<b>vii</b>
<b>INTRODUCTION</b>	<b>1</b>
1.1 Research Background	1
1.2 Problem Statement	2
1.3 Project Objective	2
1.4 Scope of Research	3
1.5 Project Outline	4
<b>LITERATURE REVIEW</b>	<b>5</b>
2.1 Introduction	5
2.2 Concept of Smart Home in Safety System	5
2.3 Concept of the fire detection system	7
2.4 Concept of Internet Of Things	7
2.5 Previously Related Projects	8
2.5.1 IoT Based Intelligent Smart home Environment for Fire Prevention and Safety.	9
2.5.2 IoT based Fire Detection System	10
2.5.3 Smart Home System using Internet Of Thing	11
2.5.4 IoT Based Automatic Fire Alarm System	12
2.5.5 Smart Home System Using Arduino	12
2.6 Comparison of previous related projects	14
2.7 Summary	16
<b>METHODOLOGY</b>	<b>17</b>
3.1 Introduction	17
3.2 Study Design	17
3.3 Project process flowchart	18
3.3.1 Project Implementation flowchart	18
3.3.2 Project Block Diagram	19
3.3.3 Project Development Flowchart	20
3.4 Hardware Specifications	22
3.4.1 ESP32	22
3.4.2 Flame sensor	23

3.4.3	Smoke Sensor (MQ 2 gas sensor)	24
3.5	Software Specification	25
3.5.1	Arduino IDE	25
3.5.2	Telegram bot	26
3.6	Summary	26
<b>RESULT AND ANALYSIS</b>		<b>27</b>
4.1	Introduction	27
4.2	Project Circuit Design	27
4.3	Software Development	28
4.4	Hardware Development	31
4.5	Prototype Development	33
4.6	Project Workflow	34
4.7	Data Analysis	45
4.7.1	Flame Detection Result	45
4.7.2	Smoke/Gas Detection Result	46
4.7.3	Response Time For Telegram Notification To Reach Smartphone	48
4.7.4	Response Time For User to Control The Home Appliances	49
4.8	Summary	50
<b>CONCLUSION AND RECOMMENDATION</b>		<b>51</b>
5.1	Introduction	51
5.2	Conclusion	51
5.3	Project Potential	51
5.4	Future Works	52
<b>REFERENCES</b>		<b>53</b>

## LIST OF TABLES

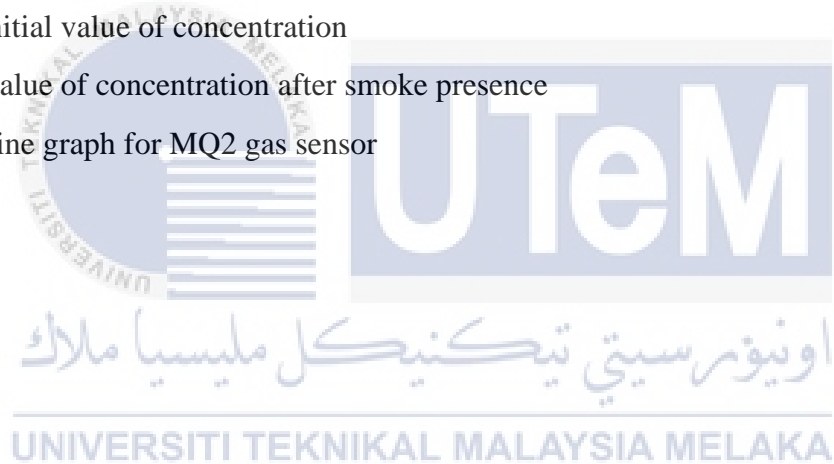
Table 2. 1: Project comparison	14
Table 4. 1 Experimental result using MQ2 gas sensor	47
Table 4. 2 Recorded data and average time response for the telegram bot to push notification	48
Table 4. 3 Recorded data and average time response for user to control home appliances using telegram bot	49



## LIST OF FIGURES

Figure 2. 1: Example of smart home concept	6
Figure 2. 2 : Example of IoT concept	8
Figure 2. 3: The proposed concept of IoT Based Intelligent Smart home Environment for Fire Prevention and Safety	9
Figure 2. 4: Circuit diagram of the project (IoT based Fire Detection System)	10
Figure 2. 5: Block diagram of the proposed project	11
Figure 2. 6: Prototype of the smart home system using Arduino	13
Figure 3. 1: Project implementation flowchart	18
Figure 3. 2: Project block diagram	19
Figure 3. 3: Project development flowchart	20
Figure 3. 4: ESP32 board	22
Figure 3. 5: IR Infrared flame detection sensor	23
Figure 3. 6: MQ2 gas sensor	24
Figure 3. 7 Arduino IDE	25
Figure 3. 8: Telegram bot	26
Figure 4. 1: Circuit design using Proteus 8	28
Figure 4. 2 Telegram bot layout (1)	29
Figure 4. 3 Telegram bot layout (2)	30
Figure 4. 4 Telegram bot layout (3)	31
Figure 4. 5 Initial hardware used	32
Figure 4. 6 Project Prototype	33
Figure 4. 7 Internet configuration	34
Figure 4. 8 Notification that indicate the system have been activated	35
Figure 4. 9 Flame sensor been trigger	36
Figure 4. 10 Notification after the outbreak of fire	36
Figure 4. 11 Solenoid door lock being unlocked	37
Figure 4. 12 Exhaust fan being activated	37

Figure 4. 13 Water sprinkler being activated	38
Figure 4. 14 Smoke sensor (MQ2 gas sensor) being triggered	39
Figure 4. 15 Notification after smoke sensor (MQ2 gas sensor) being triggered	39
Figure 4. 16 Notification after flame sensor and smoke sensor (MQ2 gas sensor) being triggered simultaneously	40
Figure 4. 17 Control option on telegram bot	41
Figure 4. 18 Status of smart home appliances on telegram bot	42
Figure 4. 19 Solenoid door lock	43
Figure 4. 20 Exhaust fan	43
Figure 4. 21 Fan	44
Figure 4. 22 LED lamp	44
Figure 4. 23 Serial plotter graph	45
Figure 4. 24 Initial value of concentration	46
Figure 4. 25 Value of concentration after smoke presence	46
Figure 4. 26 Line graph for MQ2 gas sensor	47



# CHAPTER 1

## INTRODUCTION

### 1.1 Research Background

Every house now requires a fire safety detection system, as it has become increasingly common over the past year. This is due to the extensive damage caused by the fire, which resulted in the loss of human life. When a fire spreads to the surrounding area, those accidents can be far more catastrophic than we realize at the time. Fire safety systems are meant to detect fires early in their emergence, allowing for the emergency evacuation of occupants while the fire is still in its early stages of growth (Ahrens, 2020). Early detection is also critical in ensuring the protection of emergency responders on the scene. Due to early detection, it is possible to decrease property damage and minimize downtime for the operation. This is possible since control efforts are initiated when the fire is still in its early stages. In most cases, emergency personnel is provided with specific details relating to a fire, which speeds up the process of putting out the flames (Maciej Serda, 2013).

There are a variety of factors that contribute to the occurrence of fires in residential buildings. In addition to causing property damage and life-threatening incidents. One of the most common causes and contributing factors to such accidents is the use of kitchen utensils in the household. Because of their mentality, most people do not pay attention while using cooking tools such as toasters or ovens, and the majority of them are preoccupied while cooking in their unconscious minds (Ahrens, 2020). Lightning strikes can also cause fires in homes, which is something to be aware of because of the influence of changing weather patterns disasters like this cannot be predicted. Other problems also can happen when electrical appliances and components are used in the home. This problem will be caused by a short circuit that occurs unexpectedly and will invariably result in a fire happened.

As a result of this type of situation, the development of a Smart Home: Fire Safety System Using IoT has been decided, which will involve the usage of the Internet of Things, which will be a critical component of the project's development. Since the Internet of Things can be accessed from any location and may also inform users via their smartphones when a terrible situation occurs. The system also can give freedom for the user to control any home appliances in their home using the telegram bot. The usage of the Internet of Things in the project will help it adapt to the new standard of the system that is currently in use this day.

## **1.2 Problem Statement**

To understand the project's relevance, it needed basic study that may lead to its development. This project's research employed a dataset from an English and Welsh study on statistics that includes the percentage of households with fire alarms and the overall number of fire deaths. According to the report, 93% of households have fire alarms, but many people still die in fires (Saeed et al., 2018). More than ten deaths per million inhabitants still occur annually, as well as severe property damage, which can be attributed to an alarm malfunction, no reaction, and other inexplicable circumstances. This event gives the inspiration to design the notion of a smart home, which incorporates an Internet of Things-based fire safety system that is low-cost production, provide control in house and easy to be deployed throughout the house to increase awareness.

## **1.3 Project Objective**

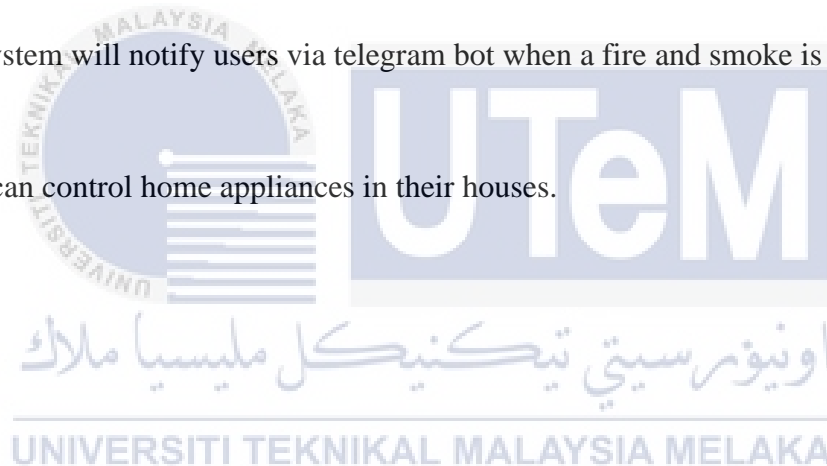
It is necessary to meet several goals to complete this project, and the achievement of these goals will define the project's overall success. In this project, the primary goal is to design a Development of Smart Home: Fire Safety System Using IoT. The following are the objectives that have been established:

- I. To design a monitoring system by using flame sensor, MQ2 gas sensor and microcontroller.
- II. To develop a telegram bot to monitor & control home appliances.
- III. To validate the developed project prototype for the smart home system.

## 1.4 Scope of Research

This project is concerned with the development of new product technology that is in line with existing requirements. Additionally, this project will be followed by the development of product designs and the completion of some research into how the fire occurred and how to avoid a recurrence of the occurrence utilizing the specified system. Furthermore, the analysis of it is the primary emphasis of this study. As a result, this project adheres to the scope of the study outlined below:

- I. Design the prototype of Smart Home: Fire Safety System Using IoT.
- II. The system will trigger the sensor included in it (IR infrared Flame detection Sensor, MQ2 Smoke LPG CO Sensor)
- III. This system will notify users via telegram bot when a fire and smoke is detected in the house.
- IV. Users can control home appliances in their houses.





## 1.5 Project Outline

This report is broken down into four different chapters, each of which discusses a different aspect of the project's execution. Following the purpose that has been discussed before, this project is broken up into four (4) chapters, the contents of which are summarised as follows:

- I. In Chapter 1, the background of the Smart Home: Fire Safety System Using IoT is introduced. There is a problem statement and a list of objectives to be attained to solve the problems.
- II. Chapter 2 reviews the literature. In this part, describe researcher project implementation and functionality-related research. A comparison of the projects reveals the main idea, theory, and substance of implementation for this project.
- III. The methods utilized to carry out this project are described in Chapter 3. Taking specific measures to build this project while adhering to the given objectives constitutes the technique. In addition, a flowchart is intended to depict the entire operation of this project's system.
- IV. Included in Chapter 4 are the specifics of the preliminary outcomes gained from the execution of this project.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Introduction

This chapter will discuss some data and research gathered from prior projects. Thus, this study is founded on the significance of numerous aspects, including the requirement for IoT in a project, the significance of past projects, and the benefits of the established project. This is critical to ensuring that the project that will be developed meets the stated objectives. In summary, the end of this chapter will compare the project that was previously developed and implemented, as well as the project's shortcomings and advantages.

#### 2.2 Concept of Smart Home in Safety System

In the simplest concept and general, any house configuration that allows appliances and equipment to be automatically controlled from anywhere with an internet connection using a smart telephone or other networked device is referred to as a "smart home." In a smart home, devices communicate with one another through the internet, allowing the user to control features such as home security access, door, exhaust fan, and the function of the other. On the other concept according to (Ricquebourg et al., 2006), Smart Homes, alternatively referred to as automated homes, intelligent buildings, integrated home systems, or domotics, are a relatively new concept in architecture nowadays. With the emergence of this smart home, it will essentially make it easier for us to operate the equipment or certain components in the house according to our preferences.



Figure 2. 1: Example of smart home concept

The concept of the smart home enables consumers to experiment with new features, such as (Chan et al., 2009) :

1. The smart home may improve the comfort, safety, convenience, and interactivity of home life, as well as maximize people's way of life by utilizing technology.
2. Smart homes can track and communicate with their surroundings through the use of telephones, smartphones, and remote networks, allowing them to detect and respond to anomalies in real-time.
3. Enable the "three networks" business model and provide the best intelligent service possible.

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

Thus, it can be concluded that there are numerous benefits associated with the existence of the smart home concept, which has become a phenomenon in the twenty-first century. This is because the smart home's role might be a convenience to the entire house in terms of ensuring the family's safety and property.

### **2.3 Concept of the fire detection system**

Essentially, a fire safety detector or system is a type of safety system that assists in the prevention of fires. The system incorporates many sensors that act as inputs for determining the source of the incident, such as the presence of fire and unexpected smoke detection, as well as alarm features that detect when anything is wrong, deter possible threats, and alert the appropriate authorities. rapidly and efficaciously. This is a summary of the notion of a fire safety system that the public constantly hears about but possibly few people understand how the concept of this system works and functions properly. As previously said in the earlier chapter, having this type of fire prevention system will enable the entire house to be protected if something horrible happens, such as a fire. According to the National Fire Protection Association (NFPA), two-thirds of all household fires in the United States occur on-premises without functioning smoke alarms, alarms that are not maintained properly, or alarms that are lost (Ahrens, 2011). Therefore, having good maintenance of the alarm and the system is a good idea to practice in every household to keep the system up to date and properly functioning.

### **2.4 Concept of Internet Of Things**

As a general concept, the term "IoT" (i-o-t) refers to the Internet of Things. This term is gaining popularity in today's fast-paced technological world. Now and then, the Internet of Things is discussed everywhere. It is a network-based concept in which equipment, machines, sensors, and devices are connected to the internet, and data collection, as well as transfer, occur through a network. According to (Adhao & Mapari, 2017), The Internet of Things (IoT) concept was coined in 1999 by a member of the Radio Frequency Identification (RFID) development community, and it has only recently gained practical relevance, owing largely to the growth of mobile devices, embedded and ubiquitous communication, cloud computing, and data analytics. Consider the following examples of how the Internet of Things concept is applied:

1. Without IoT, the user's home door is simply another door. When installed, a gadget detects when the door is opened or closed and sends a notification to the user's smartphone.
2. Motion detection (motion detection) is used by home CCTV cameras to capture images and deliver them to the host.

- Cat is equipped with a chain-mounted GPS tracker, and the user can view the cat's whereabouts via a phone app. A more complex system will send an alert if a cat leaves a specified geographical radius.

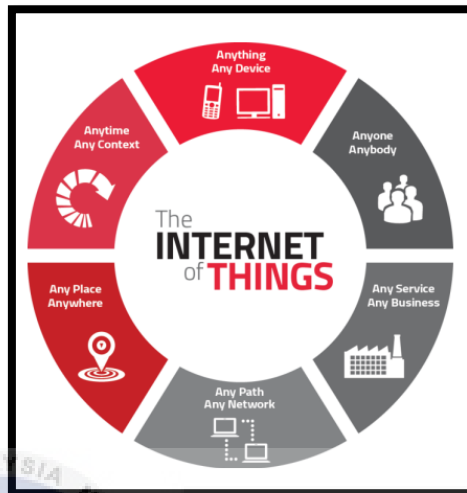


Figure 2. 2 : Example of IoT concept

The Internet of Things (IoT) is a concept and a paradigm that refers to the pervasive presence in the environment of a variety of things/objects that can interact with one another and cooperate with other things/objects via wireless and wired connections and unique addressing schemes to create new applications/services and accomplish common goals. The research and development problems associated with creating a smart world are tremendous in this context. A world in which the physical, digital, and virtual converge to produce intelligent settings that improve the efficiency of energy, transportation, and cities, among other areas (Patel et al., 2016).

## 2.5 Previously Related Projects

The analysis of prior relevant projects focuses mostly on the IoT-based smart home and fire detection features contained in the system. The previous related project's research will serve as a benchmark for the development project stated in the final chapter of the introduction. As such, this section will include projects that employ comparable tactics and ideas in order to accomplish the project's aim.

### 2.5.1 IoT Based Intelligent Smart home Environment for Fire Prevention and Safety.

Faisal Saeed, Anand Paul, Abdul Rehman, Won Hwa Hong, and Hyun Cheol Seo are the authors of the project, and they stated that the suggested smart home fire detection system is composed of four essential components which are a sensor, a processing unit that serves as the primary house sink, a GSM communication system, and an alarm system (Saeed et al., 2018). They also stated that they were deployed multi-sensor examples like smoke/gas sensors and heat sensors for each portion of the smart homes. All these sensors have their own unique event detection mechanism when the system is fully operating. The figure below will show the complete model for the proposed project of it. The processing unit includes a home sink that communicates with the sensors through ZigBee. The sink decides whether to detect a fire based on sensor data and user input. If a single sensor node detects a fire, the sink instantly enables GSM communication and alerts the user. The sink decides based on the user's response or alerts from other sensors. The sink triggers an alarm after two or more detectors, or the user confirms a fire incident. At the same time, the system sends event data to the cloud and local server, helping to reach emergency service units.

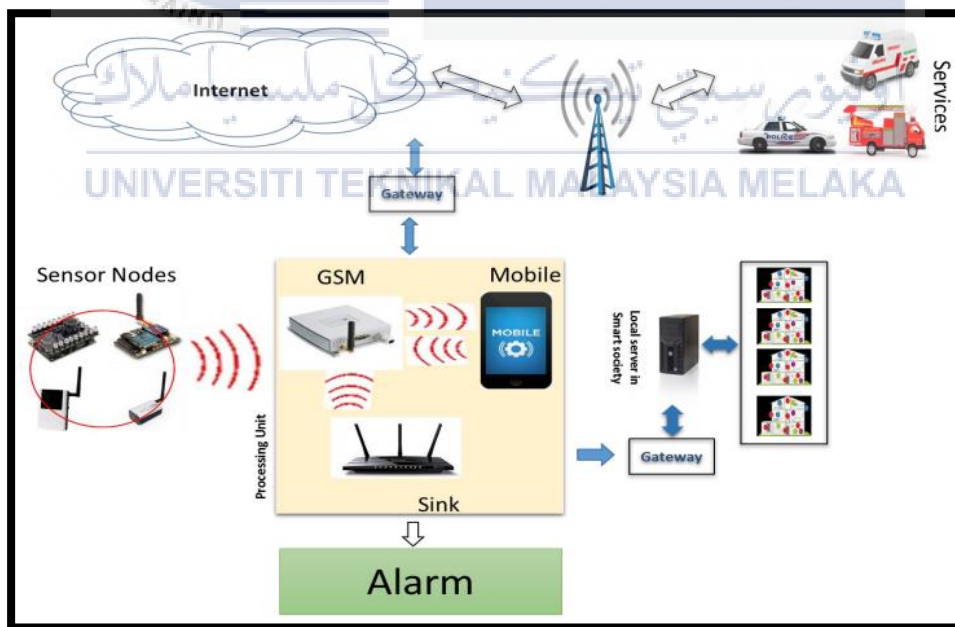


Figure 2. 3: The proposed concept of IoT Based Intelligent Smart home Environment for Fire Prevention and Safety

### 2.5.2 IoT based Fire Detection System

The project's authors, Devanshi Pandey, Rutuja Pawar, Jyoti Sharma, Santosh Rathod, and Chetan Mahajan, claim that the Smoke Sensor (MQ2 gas sensor) was used to detect the concentration of gases such as liquefied petroleum gas (LPG), propane, methane, hydrogen, alcohol, flue gas, and carbon monoxide in the air by using an electronic sensor (Patil et al., 2021). When operating at a constant voltage of 5 V, the sensor in the proposed invention can detect gases with concentration ranges up to 10,000 parts per million. The ESP8266 is used as a Wi-Fi module, which allows any microcontroller to connect to a wireless network using the designed solution. The ESP8266 can be used to host an application, or it can be used to load all Wi-Fi network functions from a separate application processor. The ESP8266 is employed as a Wi-Fi module in this project because the Arduino Uno is the microcontroller that is being deployed. Whenever a smoke or heat detector is activated, a signal is sent to the alarm system, which then triggers a pre-programmed response to take place. Most users have their systems configured to send emergency calls to the central monitoring station as soon as the gadget is activated by the user to ensure that the fire department arrives on the scene as soon as possible.

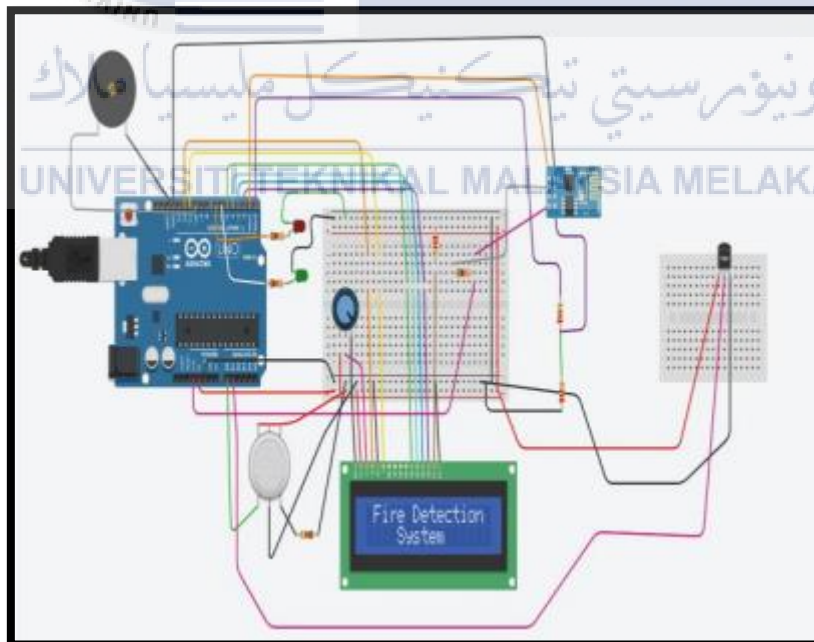


Figure 2. 4: Circuit diagram of the project (IoT based Fire Detection System)

### 2.5.3 Smart Home System using Internet Of Thing

The authors of the project, Leo Willyanto Santoso, Resmana Lim, and Kevin Trisnajaya, indicated that they used a WeMos ESP8266 as the microcontroller. As mentioned, ESP8266 is a low-power Wi-Fi chip that includes a complete TCP/IP stack and an MCU (Santoso et al., 2018). When the WeMos ESP8266 is connected to RFID in order to read data from existing ID tags, switches are important for organizing the connected solenoid with the 12-V adapter and WeMos ESP8266. PIR sensors are used to detect the movement of people, animals, and other things in the proposed project. They are frequently employed in alarm systems and lighting systems that operate on their own. The sensor transforms the ensuing change in the infrared radiation received into a change in the output voltage, which initiates the detection. Additionally, the database is used to store data that is received from a server and user input. The database stores information about user accounts, such as tokens and RFID tags.

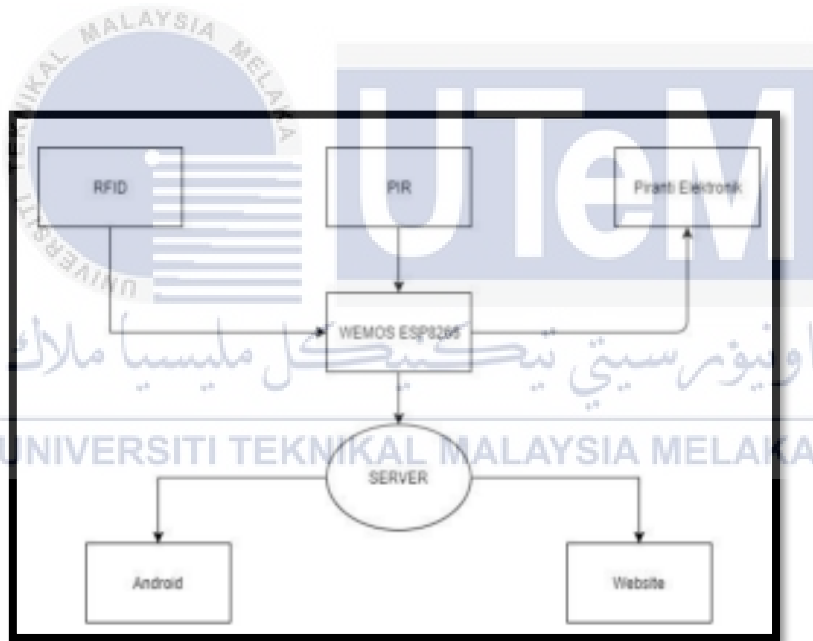


Figure 2. 5: Block diagram of the proposed project