

UNIVERSITI TEKNOLOGI MARA

**AUTOMATIC FOREST FIRE
MONITORING SYSTEM VIA IOT
TECHNOLOGY**

MUHAMMAD FIRDAUS BIN SUHAIMI

Thesis submitted in fulfillment
of the requirements for the degree of
Diploma of Electrical Engineering

**Electrical Engineering Studies
College of Engineering**

FEB 2024

ABSTRACT

The forest may be impacted by unpredictable weather or weather changes, particularly when the surrounding weather or temperature appears to be extremely hot. The main crucial problem is to set crucial safety measures in place to avert disasters, smoke, and gas leakage detectors which highly helpful for the environment. The objective is to analyze the data collected by the temperature sensor, gas sensor and soil sensor to alert the current situation in the forest in a real-time. This report aims to design Smart Forest Fire Monitoring System Via IoT Technology using Arduino Microcontroller. In this project, main input that used are gas sensor, temperature sensor and soil sensor which determine the condition of the environment. As for the output, ESP8266 is used to simulate the LCD screen which to monitor the environment in real-time and the LED to alert the situation within the area of the environment that monitored. People can evaluate the system's capability to accurately detect fires, reduce false alarms, and send timely alerts to any important participants in the area by simulating the real-time data processing. As for the upcoming future work, the monitoring system's communication infrastructure can be upgraded by incorporating new technologies like satellite communications or wireless mesh networks to ensure dependable and timely data transmission from far away forest locations.

ACKNOWLEDGEMENT

In the greatness of Allah, the Most Gracious, the Most Merciful. I'm thankful to Allah SWT for His blessings and for helping me finish this Final Year Project (FYP) report. I would like to start by expressing my sincere gratitude and appreciation to my supervisor, Dr. Zakariah Bin Yusuf, for all her efforts, ideas, motivations, and support throughout the completion of this project.

I would want to use this opportunity to express my gratitude to everyone who has assisted me, directly or indirectly, throughout the course of this project. For their love, concern, and support throughout my adventure as a student in the Faculty of Electrical Engineering, I owe my parents and all other family members a great deal of gratitude. In addition, I would like to express my gratitude to all the instructors and my beloved lecturers, without those guidance, concern, and assistance this significant project could not have been finished.

Finally, an immense appreciation and thank you to me, myself, and I for the arduous work, for never taking a day off, and for never giving up; I sincerely appreciate all the amazing work that has gone into creating this masterpiece.

TABLE OF CONTENT

	Page
AUTHOR’S DECLARATION	ii
Approval SHEET	iii
ABSTRACT	iv
ACKNOWLEDGEMENT	v
TABLE OF CONTENT	vi
LIST OF TABLES	viii
LIST OF FIGURES	ix
CHAPTER ONE INTRODUCTION	1
1.1 Research Background	1
1.2 Problem Statement	2
1.3 Objective	3
1.4 Project Scope	3
CHAPTER TWO	4
2.1 Introduction	4
2.2 Past Related Project Comparison	4
2.3 Equipment and Component	8
CHAPTER THREE	15
3.1 INTRODUCTION	15
3.2 Block Diagram	16
3.3 System Operation (Flowchart)	18
Schematic Diagram	20
3.4 Project Costing	23

CHAPTER ONE

INTRODUCTION

1.1 Research Background

The health and biodiversity of our planet are fundamentally dependent on forests. They offer crucial ecosystem functions like storing carbon, water regulation, and habitat preservation. Forests do, however, face many difficulties, with forest fires being one of the biggest threats to their long-term possibility. One of the most frequent natural disasters that affect many forest systems worldwide is a forest fire. Natural succession, the landscape, and the environment are all severely impacted by forest fires. The world experiences a significant number of forest fires each year. Forest fires which can spread unconsciously can affected the ecosystem and not only cause ecological destruction but also put human lives and livelihoods at risk. It is purposedly need to [1] be early as the fire detection and prevention of spread are essential for preventing uncontrollable wide-spread forest fires.

Forest ecosystems around the world, biodiversity, and human lives are all seriously at risk due to the frequency and intensity of forest fires that are both increasing. There are significant environmental and socioeconomic damages as a result of the limitations of current forest fire monitoring systems in terms of early detection, accurate assessment, and timely response. To secured the situation, technologies should perform in condition where it is can accurately achieved the situation as fast as it can. It is [2] according to a survey, which 80% of fire-related losses could have been avoided if the fire had been discovered sooner. For the sake of the environment, biodiversity, human safety, efficient fire management, technological development, policy creation, and global knowledge exchange, it is crucial to create a smart forest fire monitoring system which can remain the concept of eco-friendly.