UNIVERSITI TEKNOLOGI MARA

CAWANGAN JOHOR KAMPUS PASIR GUDANG

FINAL YEAR PROJECT 2 (EEE368)

REPORT

EARTHQUAKE MONITORING AND ALERTING SYSTEM USING VIBRATION SENSOR AND IR SENSOR WITH IOT

MUHAMMAD FAIZ BIN MOKHTAR

(2021814668)

J4CEEE1115E

DIPLOMA IN ELECTRICAL ENGINEERING (ELECTRONIC)

SUPERVISOR:

DR. RIJALUL FAHMI BIN MUSTAPA

ABSTRACT

This project attempts to address the crucial problem of the lack of earthquake detection and alarm systems in Malaysian structures by designing an earthquake monitoring and alerting system using an Arduino Microcontroller. The system can distinguish between seismic activity and changes in infrared radiation generated by people or objects thanks to the integration of vibration sensors and infrared (IR) sensors. The microcontroller plays a crucial part in analyzing the data from the sensors and then starting up several output devices such an LCD display, an LED, and a buzzer. The buzzer's sound warnings, the LED's visual alerts (flashing lights, colour changes), and the LCD's complete earthquake data (including vibration intensity specifics) all work together to create a powerful alerting system. This study's greatest importance comes from its ability to improve Malaysia's earthquake reaction and preparedness measures. Not only can building and occupant safety be greatly increased by putting an earthquake monitoring and alerting system into place, but timely and accurate information can also be shared with pertinent authorities, emergency responders, and the general public. The community's overall resilience and safety are enhanced by this multidimensional strategy, which combines vibration and infrared sensors with a microcontroller-driven warning system to provide a robust and dependable method of detecting and responding to seismic occurrences.

ACKNOWLEDGEMENT

First and foremost, I would like to use this chance to thank Allah SWT for providing me with guidance and support while I completed my senior year project. Without His Blessing, none of this would be possible. I have a lot of help from numerous people to do my final year project. My supervisor, Dr. Rijalul Fahmi bin Mustapa, has my sincere gratitude and a great thank you for believing in me to finish this task.

And next, I want to express my gratitude to my family, who have shown me so much love, support, and encouragement throughout the past year. I would also want to add that the Final Year Project is the best way for students to learn and gain confidence in their ability to create something using the knowledge we have gained as electrical engineering students. Undoubtedly, receiving all of the help and inspiration from the people listed above will always hold a special place in our hearts as a wonderful memory. God bless them.

TABLE OF CONTENT

CHAPTER 1

INTRODUCTION

1.1 Project Overview

An extensive project aimed at greatly enhancing early warning systems and seismic event detection capacities is the Earthquake Monitoring and Alerting System with Vibration and IR Sensors utilizing IoT. The foundation of this project is a system of carefully positioned vibration sensors that record ground movements and vibrations related to seismic activity, giving detailed information on the frequency and strength of the vibrations. When used in conjunction, infrared (IR) sensors provide an additional degree of sensitivity by keeping an eye out for variations in infrared radiation that could be signs of seismic activity. For reliable earthquake detection and a decrease in false alerts, various sensors must work together harmoniously. By utilizing the Internet of Things (IoT), the system creates channels of communication that are always open between the sensors and a central monitoring platform. This allows for quick data transfer and analysis. The project focuses scalability and flexibility in addition to detection and alerting. The architecture makes it possible to add more sensors with ease, which makes it easier to grow the monitoring network to cover a larger geographic region. Moreover, the system may be adjusted to various environmental circumstances, guaranteeing its efficacy in various areas vulnerable to earthquakes.

To sum up, the Earthquake Monitoring and Alerting System with Vibration and IR Sensors through Internet of Things is a state-of-the-art system that tackles the challenges associated with seismic monitoring. This research enhances the precision of earthquake detection and makes a substantial contribution to disaster preparedness, community safety, and overall resilience in areas susceptible to seismic activity by merging cutting-edge sensor technology with Internet of Things connection. This system is positioned as a useful tool in the continuing attempts to lessen the impact of earthquakes on people and infrastructure because of its emphasis on fewer false alerts, real-time communication, and flexibility.