i-SPiKE 2023

INTERNATIONAL EXHIBITION & SYMPOSIUM ON PRODUCTIVITY, INNOVATION, KNOWLEDGE & EDUCATION

"Optimizing Innovation in Knowledge, Education and Design"

EXTENDED ABSTRACT

e ISBN 978-967-2948-56-8

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eISBN 978-967-2948-56-8

Published by:
Universiti Teknologi MARA (UiTM) Cawangan Kedah,
Sungai Petani Campus,
08400 Merbok,
Kedah,
Malaysia.

CATEGORY: BSP YOUNG INVENTOR

Assalamualaikum warahmatullahi wabarakatuh,

First and foremost, I would like to express my gratitude to the organizing committee of i-Spike 2023 for their tremendous efforts in bringing this online competition a reality . I must extend my congratulations to the committee for successfully delivering on their promise to make i-Spike 2023 a meaningful event for academics worldwide.

The theme for this event, 'Optimizing Innovation in Knowledge, Education, and Design,' is both timely and highly relevant in today's world, especially at the tertiary level. Innovation plays a central role in our daily lives, offering new solutions for products, processes, and services By adopting a strategic approach to 'Optimizing Innovation in Knowledge, Education, and Design,' we have the potential to enhance support for learners and educators, while also expanding opportunities for learner engagement, interactivity, and access to education.

I am awed by the magnitude and multitude of participants in this competition. I am also confident that all the innovations presented have provided valuable insights into the significance of innovative and advanced teaching materials in promoting sustainable development for the betterment of teaching and learning. Hopefully, this will mark the beginning of a long series of i-Spike events in the future.

It is also my hope that you find i-Spike 2023 to be an excellent platform for learning, sharing, and collaboration. Once again, I want to thank all the committee members of i-Spike 2023 for their hard work in making this event a reality I would also like to extend my congratulations to all the winners, and I hope that each of you will successfully achieve your intended goals through your participation in this competition.

Professor Dr. Roshima Haji Said
RECTOR
UiTM KEDAH BRANCH

WELCOME MESSAGE (i-SPiKE 2023 CHAIR)

We are looking forward to welcoming you to the 3rd International Exhibition & Symposium on Productivity, Innovation, Knowledge, and Education 2023 (i-SPiKE 2023). Your presence here is a clear, crystal-clear testimony to the importance you place on the research and innovation arena. The theme of this year's Innovation is "*Optimizing Innovation in Knowledge, Education, & Design*". We believe that the presentations by the distinguished innovators will contribute immensely to a deeper understanding of the current issues in relation to the theme.

i-SPiKE 2023 offers a platform for nurturing the next generation of innovators and fostering cutting-edge innovations at the crossroads of collaboration, creativity, and enthusiasm. We enthusiastically welcome junior and young inventors from schools and universities, as well as local and foreign academicians and industry professionals, to showcase their innovative products and engage in knowledge sharing. All submissions have been rigorously evaluated by expert juries comprising professionals from both industry and academia.

On behalf of the conference organisers, I would like to extend our sincere thanks for your participation, and we hope you enjoy the event. A special note of appreciation goes out to all the committee members of i-SPiKE 2023; your dedication and hard work are greatly appreciated.

Dr. Junaida Ismail
Chair
3rdInternational Exhibition & Symposium Productivity, Innovation, Knowledge, and Education 2023 (i-SPiKE 2023)

FLOOD, EARTHQUAKE, AIR POLLUTION (FEAR) ALERT AND MONITORING SYSTEM WITH WIFI MODULE

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ABSTRACT
In recent years, Malaysia has seen a major flood that has submerged some part of Peninsular Malaysia. Flooding has essentially devastated a million people and lots of infrastructures are destroyed. Millions of ringgits must be spent by the government to aid flood casualties. The earthquake warning system has seen extensive use in Japan, particularly in regions where earthquake risk is significant. Due to Malaysia's location outside the Pacific Ring of Fire, this system is still hardly ever utilized by the local populace. However, since the earthquake in Aceh, Malaysia has been impacted to some degree and precautions need to be taken immediately. Air pollution is becoming a larger issue, so keeping an eye on it is critical for a better future and a healthier lifestyle for every humanity. Government actions on air quality are steadily growing, but implementation and capacity gaps hinder progress towards clean air. The lack of information and failure to deliver the message to the people about the disasters is a major problem. Consequently, people did not alert about the emergency and therefore, precautions before disaster cannot be prepared. In line with the advanced technological development, Wi-Fi technology can be implemented to overcome this problem. The objective of this project is to alert people to major disasters which is flood, earthquake, and air pollution. The FEAR (Flood, Earthquake, Air-pollution) alert and monitoring system is based Wi-Fi system will be applied in this project to alert peoples about the risk of the disaster. Unlike the existing systems, this project intends to develop a more durable system which consists of three inputs which are ultrasonic, vibration and gas sensor. For the outputs this project uses buzzer, LED and LCD. Both input and output integrated with NodeMCU that act as brain to the system.

Keywords: Flood, Earthquake, Air Pollution, Wi-Fi Technology

FLOW OF DESIGNING "FEAR" ALERT AND MONITORING SYSTEM

This section discussed the design process for the "FEAR" Alert and Monitoring System circuit. The initial step is to identify all the system's components. Following that, a machine block diagram is shown to differentiate between input, output, and the circuit's main controller. The next step is to design the circuit using Proteus Software. Before connecting the hardware, the simulation technique is done and tested until the simulation is successful.

Block Diagram of the "FEAR" Alert and Monitoring System

The main objective of this project is to build a prototype of a flood, earthquake, and air pollution (FEAR) monitoring and alert system utilizing an Arduino Uno as a microprocessor. Figure 1 is a block diagram of a "FEAR" Alert and Monitoring System. The block diagram depicts the entire project components. The project makes use of three sorts of inputs: ultrasonic, vibration, and gas sensors. Ultrasonic sensor (HC-SR04) is used to measure the level of water by utilizing ultrasonic waves, while the vibration sensor (SW-420) is used to detect if there are any concussions and lastly the gas sensor (MQ135) is to detect the quality of the air. The Wi-Fi module that is used in this project is Wi-Fi Module (ESP2866) which acts as (IoT) platform. For the output terminal, LED and LCD were used. The LCD will display the system's current condition, for example water level, air quality and vibration level.

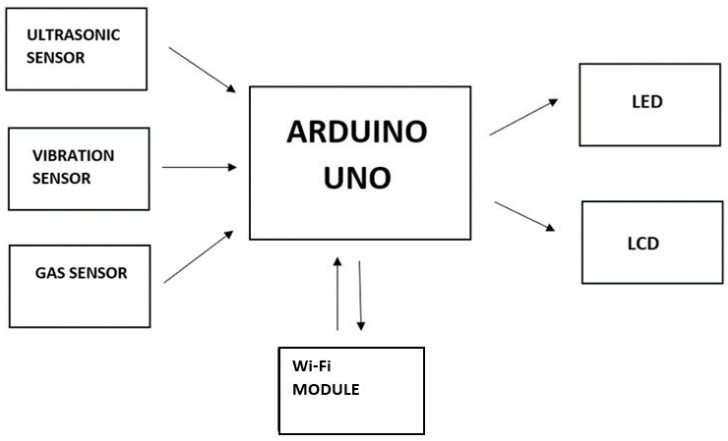

Figure 1. Block Diagram of FEAR Alert and Monitoring System

Circuit Design of the "FEAR" Alert and Monitoring System

Figure 2 shows the circuit design for the "FEAR" Alert and Monitoring System. Before beginning with project hardware connections, the circuit is constructed using Proteus Software to enable project simulations and to write encodings work. The "FEAR" Alert and Monitoring System is demonstrated using Proteus 8 Professional. The program is linked to precise animations of system components used to model the system's process.

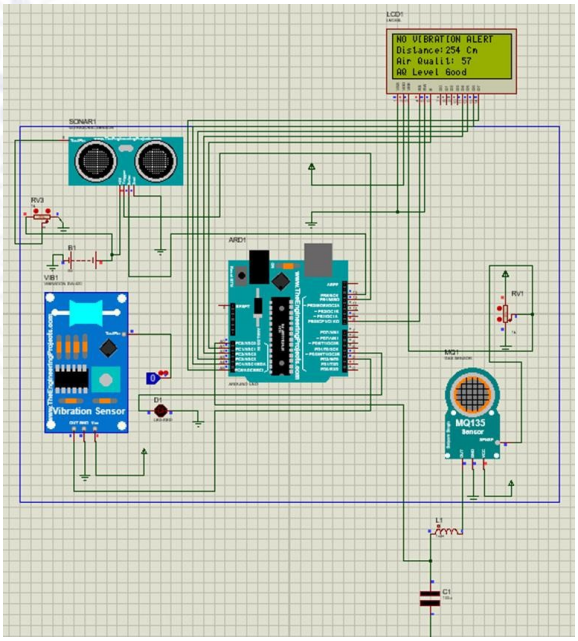

Figure 2. Circuit Design of the "FEAR" Alert and Monitoring System

PROCESS FLOW OF "FEAR" ALERT AND MONITORING SYSTEM

The general procedure and final prototype of the "FEAR" Alert and Monitoring System were explained in this part. A flow chart will be used to depict the procedure. Adobe Photoshop CC software was used to create the prototype.

Flow Chart of the "FEAR" Alert and Monitoring System

The process starts when the switch is turned on and Arduino will trigger all pins, vibration, ultrasonic and gas sensors, LCD, and Wi-Fi Modules. The vibration sensor will detect if any concussion around and notification will be sent via Wi-Fi module.. For the first input is ultrasonic sensor. It is measuring the range of water level. If the range is high, LCD will display 'water level high'. For the IOT, I am using Telegram apps for the output, so user get the notification. When the water level is high, the user will get notification 'WARNING WATER HIGH'. For the second input is the vibration sensor. The vibration sensor will detect the concussion. If the sensor has been detecting concussion LCD will display 'EARTHQUAKE'. For the IOT, Telegram apps will send to user the notification. When earthquakes have been detected, user will get the notification 'WARNING EARTHQUAKE'. For the last input is the gas sensor. The gas sensor will detect the quality of air. If the sensor detects the bad quality of air LCD will display 'BAD' and percentage of air. For the IOT, Telegram apps will send to user the notification. When air quality bad have been detected, user will get the notification 'WARNING AIR POLLUTED'. The flow chart of the "FEAR" Alert and Monitoring System as illustrated in Figure 3.

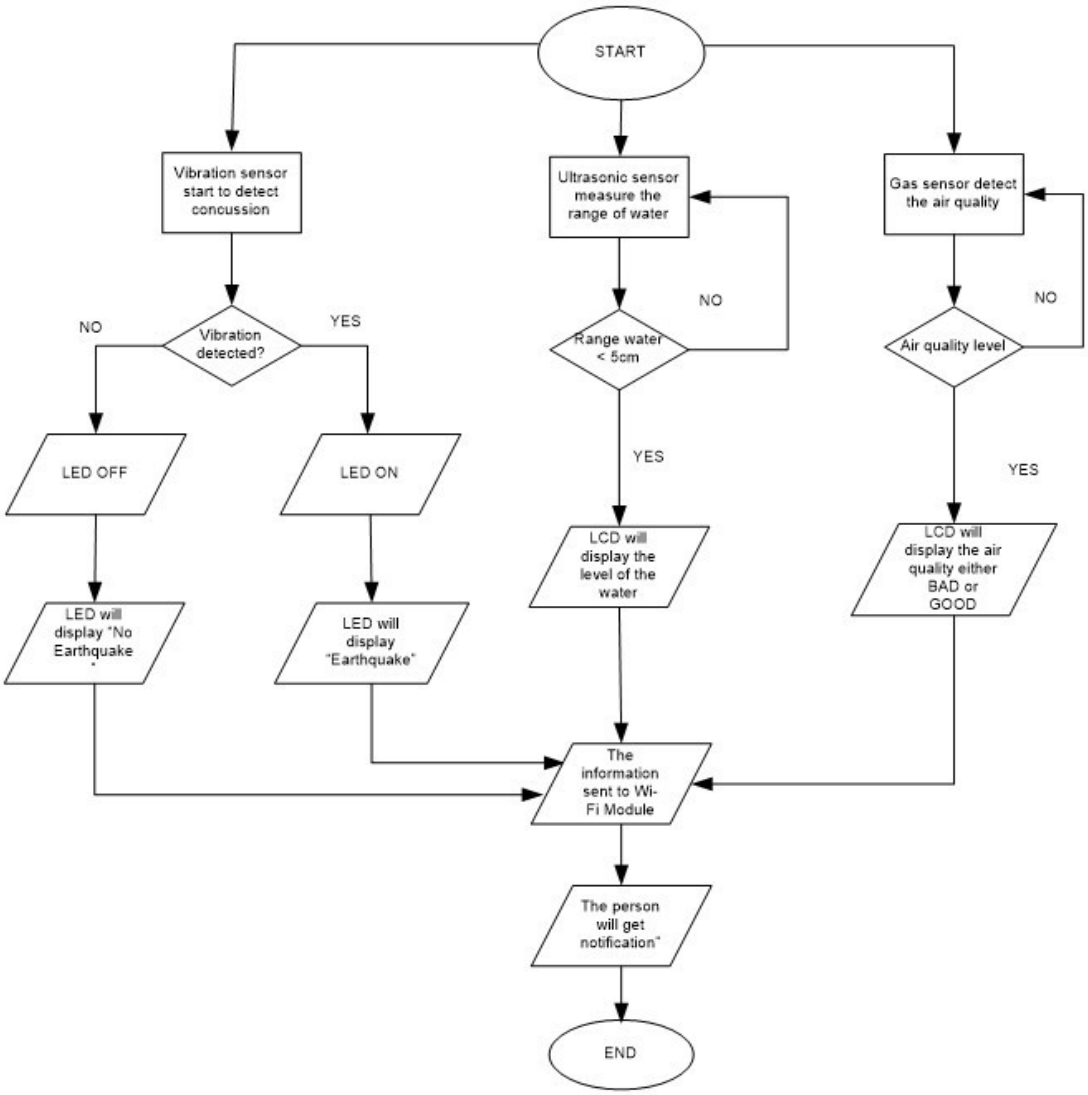

Figure 3. Flow chart of the "FEAR" Alert and Monitoring System

RESULTS AND DISCUSSIONS

Figure 4 shows the alert messages if the natural disaster occured.

Figure 4 Natural disaster alert messages

Flood Monitoring: The water level sensors will continuously monitor water levels in nearby bodies of water. If the water level rises above a predefined threshold, the system triggers an alert and activates the alarm or notification mechanism.

Earthquake Detection: The accelerometer or vibration sensor detects seismic activity. Upon detecting significant vibrations or tremors, the system triggers an earthquake alert and activates the alarm or notification mechanism.

Air Pollution Monitoring: Gas sensors continuously measure the concentration of pollutants in the air. If the pollution level exceeds predefined thresholds, the system triggers an air pollution alert and activates the alarm or notification mechanism.

CONCLUSION

This project can help authorities to control the disaster situation using ultrasonic sensor, vibration sensor and gas sensor. Besides that, this project also provides notification to the user with the integration of WiFi Module through Telegram apps approached. It was able to record the current situation and transmit the data to the base station using the system. If the alerting system is kept being used by most people, it would reduce the number of deaths. Lastly, an affordable monitoring and alerting system has been created.

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e ISBN 978-967-2948-56-8