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: CSC 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)

IOT BASED DRAINAGE MONITORING SYSTEM

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ABSTRACT

The IoT drainage monitoring system is an innovative solution that utilizes Internet of Things (IoT) technology to address drainage blockages in urban areas. By deploying sensors and devices within the drainage infrastructure, the system continuously collects data on water flow rates, levels, and quality. This real-time data is wirelessly transmitted to a central monitoring system, where it is analysed using advanced algorithms. The system enables early detection of blockages and abnormal patterns, triggering immediate alerts for timely intervention. By proactively identifying issues, the system minimizes the risk of backups, overflows, and flooding. Additionally, it provides insights for proactive maintenance planning, optimizing resource allocation and improving overall drainage system efficiency. The IoT drainage monitoring system enhances the resilience and reliability of urban drainage systems, ensuring public health, safety, and environmental protection while offering cost savings through reduced reactive maintenance and minimized damages.

INTRODUCTION

Drainage blockage is a common issue in urban areas and can have serious consequences if not detected and resolved in a timely manner. Blockages can occur for a variety of reasons, such as the build-up of debris, fats, oils, and grease, or the intrusion of tree roots into the drainage system. When blockages occur, the flow of water and sewage can become restricted or stopped entirely, leading to backups, overflows, and flooding. This event can have serious consequences for public health and safety, as well as the environment.

PROBLEM STATEMENT

Despite the critical role of drainage systems in managing and controlling the flow of stormwater and wastewater, blockages and overflows remain significant challenges in many

urban areas. These blockages can lead to property damage, public health risks, and increased maintenance costs. Traditional drainage monitoring methods are often reactive and not sufficient to prevent these blockages. Therefore, there is a need for an innovative and proactive approach that leverages the Internet of Things (IoT) technologies to monitor the drainage system's performance in real-time and enable quick response and maintenance actions.

OBJECTIVES

The main objective design and develop a prototype IoT-based drainage monitoring system that can measure and transmit relevant drainage parameters, such as water level, flow rate, temperature, and pressure, to a central server or cloud platform.

Conduct field tests and experiments to evaluate the performance of the IoT-based drainage monitoring system in detecting and preventing blockages and overflows in real-time.

Evaluate the cost-effectiveness of the IoT-based drainage monitoring system compared to traditional drainage monitoring methods and assess its potential for wider adoption in urban drainage networks.

METHODOLOGY

The proposed methodology is based on IoT, which helps in monitoring the level and flow rate of sewage.

Two sensors were used as input devices for the project: an ultrasonic sensor to identify blockages, and a water level sensor to identify water overflows. The ESP8266, a microcontroller and WiFi module in one, receives and processes the data from these sensors. The block diagram for our project is shown in the image below.

All logical and mathematical calculations are carried out internally by the ESP8266, which then transmits the relevant signals to the Blynk cloud for the required actions. Here, the real -time ultrasonic distance is communicated to the Blynk application, and in the event of a blockage or overflow, a push notice is also delivered to the mobile device.

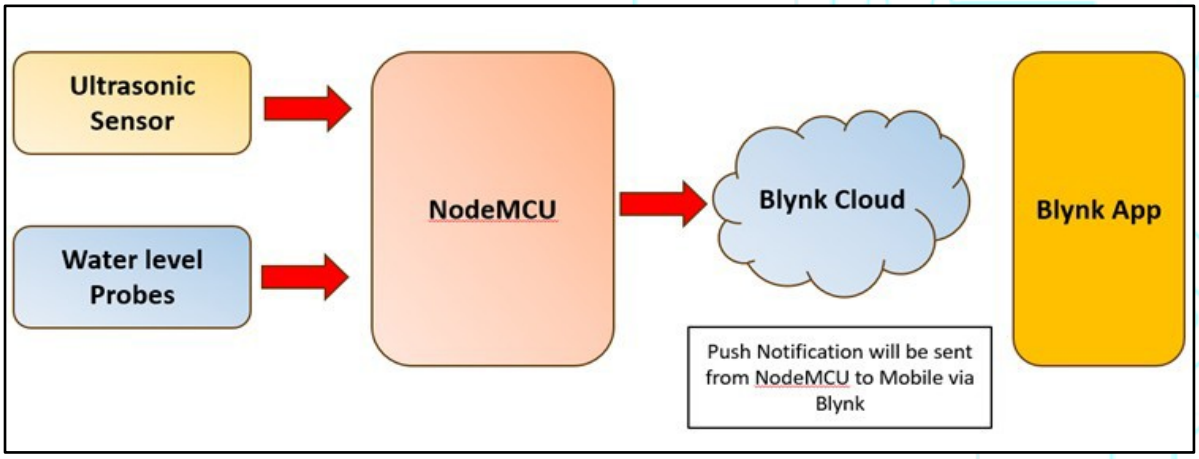

Figure 1. System design architecture of this project

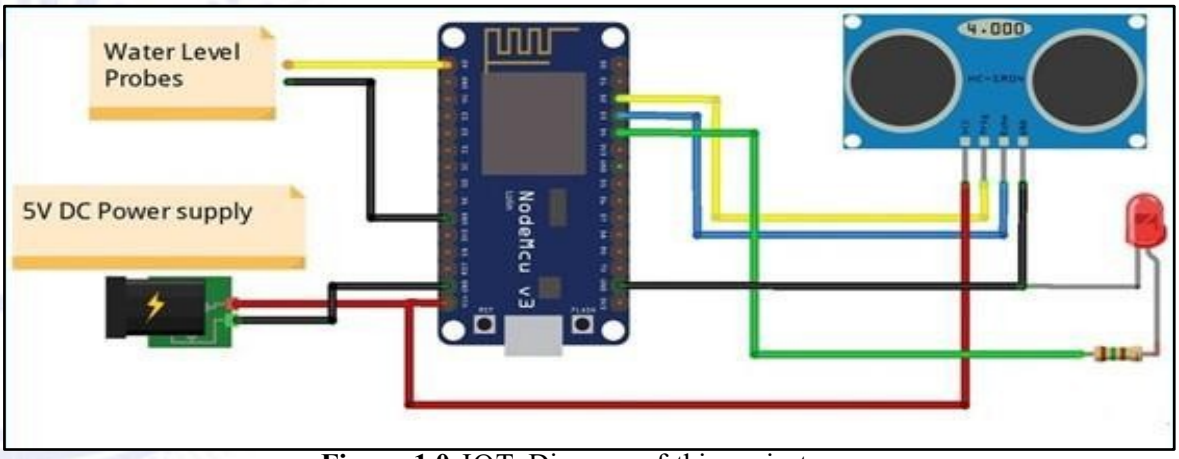

Figure 1.0 IOT Diagram of this project

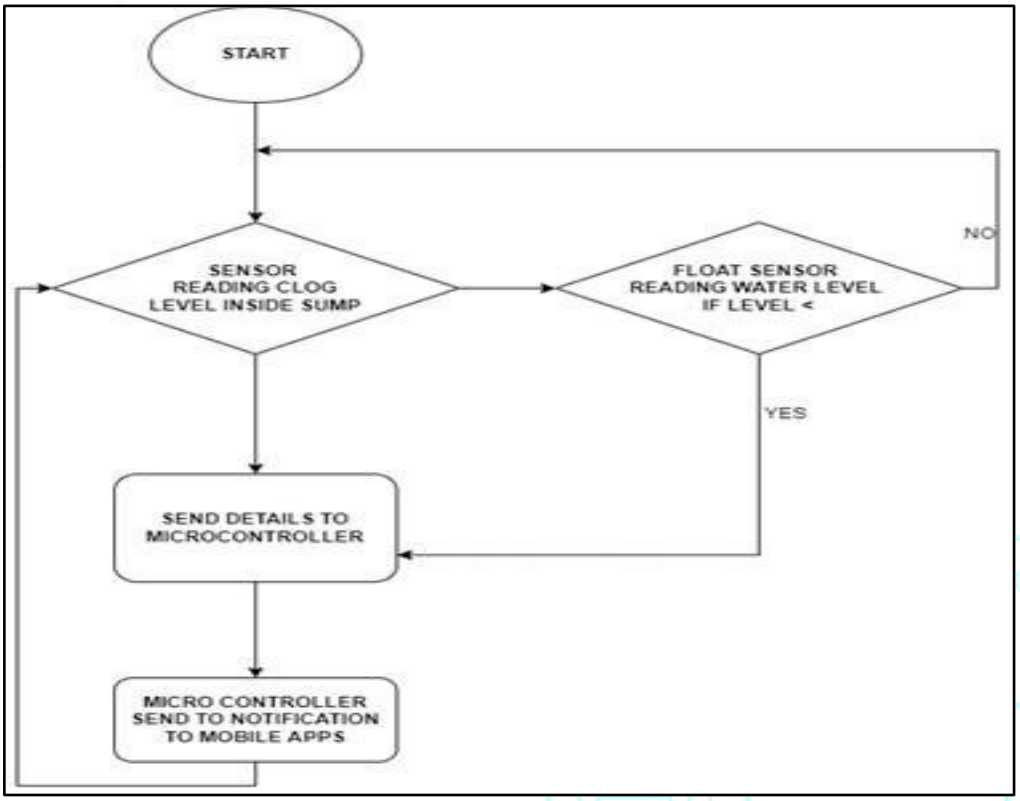

Figure 1.1 Flow chart of this project

CONCLUSION

The use of IoT-based drainage monitoring systems can contribute to achieving several Sustainable Development Goals (SDGs), primarily Goal 6: Clean Water and Sanitation, Goal 9: Industry, Innovation and Infrastructure, and Goal 11: Sustainable Cities and Communities. By preventing blockages and overflows in urban drainage networks, IoT-based drainage monitoring systems can improve access to clean water and sanitation, as well as protect public health and prevent property damage. These systems can also promote innovation and infrastructure development by leveraging advanced technologies, such as sensors, wireless communication, and machine learning, to improve the efficiency and resilience of urban

drainage networks.

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e ISBN 978-967-2948-56-8