UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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DEVELOPMENT OF WATER QUALITY MONITORING SYSTEM WITH IOT

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I declare that this project report entitled “Development Of Water Quality Monitoring System With 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.

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ABSTRACT

In our daily lives, water is a resource that is essential. We must make sure that it is of a quality that is appropriate for use consequently. Total dissolved solids (TDS) refer to the number of dissolved particles in a volume of water, and water is often referred to as an all-purpose solvent. High dissolved solids (TDS) concentrations can change the taste of our water but rarely pose a threat to our health. Readings above 1000 ppm are deemed unsafe for human consumption, while those above 500 ppm necessitate additional investigation for dangerous particles and heavy metals. We typically use a standalone TDS pen to measure the TDS of water, however we are unable to connect the pen to the Arduino or any other microcontroller. As a result, there are TDS metres specifically designed for use with the Arduino or any other microcontroller.

ABSTRAK

Dalam kehidupan seharian kita, air merupakan sumber yang penting. Kita mesti memastikan bahawa ia berada dalam kualiti yang sesuai untuk digunakan bukan sebaliknya. Jumlah pepejal terlarut (TDS) merujuk kepada bilangan zarah terlarut dalam isipadu air, dan air sering dirujuk sebagai pelarut serba guna. Kepekatan pepejal terlarut (TDS) yang tinggi boleh mengubah rasa air kita tetapi jarang sekali mendatangkan masalah kepada kesihatan kita. Bacaan melebihi 1000 ppm dianggap tidak selamat untuk penggunaan manusia, manakala bacaan melebihi 500 ppm memerlukan penyiasatan tambahan kerana ia mungkin mengandungi zarah berbahaya dan logam berat. Kita kebiasaannya menggunakan pen TDS kendiri untuk mengukur TDS di dalam air, namun kami tidak dapat menyambungkan pen ke Arduino atau mana-mana mikropengawal lain. Akibatnya, terdapat meter TDS yang direka khusus untuk digunakan dengan Arduino atau mana-mana mikropengawal lain.

DEDICATION

This report is dedicated to my family and close friends. A special thank you to my mother Mrs. Juriah Binti Japri and my father Mr. Irwanshah Bin Hussin who have always supported my ideas and encouraged me to complete this project. I also want to thank the friends and family who have always supported me in completing this endeavour. Finally, thanks to my boss, Mr. Zulhairi Bin Othman, who has shared many ideas and information with me about how to complete the report and the prototype.

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CHAPTER 1

INTRODUCTION

1.1 Overview

This section will give a brief overview of the project that was completed. Furthermore, this chapter presented the user with critical information such as the project's background, problem statement, objectives, scope of work, and report structure.

1.2 Background

Pollution and lack of water have become major challenges in recent years. Having said that, the government has suggested numerous projects, and numerous NGO's are also striving to improve the situation. Water is a necessary resource in our daily life. As a result, we must ensure that it is of sufficient quality for use. Because of its ability to dissolve and absorb molecules from a variety of substances, water is referred to as a universal solvent, and the total dissolved solids (TDS) level refers to the amount of dissolved particles in a volume of water. Total dissolved solids (TDS) can have an impact on the quality of our water, health, home plumbing system, and even everyday tasks like cooking and cleaning. By testing our water for TDS, we can have a better understanding of the quality of our water and how it affects our daily life, allowing us to make an informed decision about how to address our water quality issue and install the most efficient filtration system for our home. Though high TDS levels

can alter the flavour of our water, they are rarely detrimental to human health. Results exceeding 500 ppm, on the other hand, necessitate further research for hazardous particles and heavy metals, while readings above 1000 ppm are considered unfit for human consumption. It's vital to remember that the type of dissolved solids in our water is more important than the amount when it comes to our health. To measure the TDS of water, we usually use a TDS pen. However, we are unable to connect the pen to the Arduino. As a result, there are dedicated TDS metres that may be used with the Arduino. However, I have opted not to utilise the TDS pen for this project.

1.3 Problem Statement

The first problem is determining the water quality in our immediate environment. As a result, no one will know if the water is fit for human consumption or not.

The second problem is how to monitor water quality because there are numerous properties that can be used to evaluate water quality. So, the simplest technique to evaluate if water is drinkable or not for humans is to measure the quantity of total dissolved solids (TDS) in it.

The third problem is determining how to obtain and when to preserve water quality data. There aren't many people who have access to an equipment that can monitor and collect data on water quality.

1.4 Objective

- To identify the quality of water whether it's safe or not for human consumption
- To monitor the amount of total dissolved solids (TDS) in the water
- To get and display information of the TDS using BlynkIOT application

1.5 Scope of work

The scope of this project is to determine the water quality by collecting a numbers of samples from the surrounding area. This project focuses on measuring the level of TDS in water to assess its quality. Apart from that, an arduino and an android app will be used to control this project (BlynkIOT).

Because it requires a number of variables to identify water quality, such as temperature, acidity (pH), and so on, this project is not suitable for use in the livestock, agriculture, or fishing industries.

1.6 Report structure

The study is already broken into three chapters: an associate introduction, literature review, and methodology, in order to allow clear detail about this entire project. Furthermore, each of the three chapters demonstrates the logical progression necessary to comprehend the entire project. Aside from that, it's also to obtain an understanding of and proof for the methods utilised to develop the system.

Chapter 1: This chapter will first present the project's basic concept and provide an overview of the entire project. This chapter also comprises a project summary or

background, objectives, project work scope, a problem description, and the project's outcome.

Chapter 2: This project's second chapter focuses on how to get information about the project. All of the information regarding this project will be divided into various publications, including a journal, a book, and other important sources.

Chapter 3: This chapter will go through all of the methodology used and how the project was implemented in order to achieve the project's aim. Aside from that, the computer code and technical specifics of the hardware are also covered in this chapter.

Chapter 4: This section will examine the results and outcomes of the Development of Water Quality Monitoring System With IOT. At the same time, the software setup will be established using the Arduino and BlynkIOT. The projects have been successfully developed, and it will also be discussed how this system works and operates.

Chapter 5: This chapter examines the development of the monitoring of total dissolved solids (TDS) in water. It also discusses how effectively the project's goals were met, has an emphasis on overall performance and assessments, and provides a brief overview of the BlynkIOT monitoring system.

1.7 Conclusion

This chapter gives a high-level overview of the project, including project background, project objectives, drawback statements, and project scope. Based on the examination of the toilet flush system, which was used as a reference in order to produce the idea for this project system's execution. The problem statement is then used to improve the creation of a water quality monitoring system that can inform people

whether the water is safe to drink. This is especially important for people who live in areas where it is difficult to monitor water quality, such as distant areas or areas in poor condition.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter, which contains articles of connected analysis of the development of a water quality monitoring system with IOT, could serve as a guide for project users. In order to conclude this chapter and the project, the source of information is referred to as references to the user. This data was gathered from a variety of sources, including articles, journals, books, and other related materials. The information from the related research has been gathered from a variety of sources as references in order to effectively complete this chapter, including papers, journals, and other studies that are significant to improving knowledge and guiding the user through the project. In addition, during this chapter, all of the project's data is included. All relevant material has been gathered and will be used as a guide to complete this chapter. Certain information from the references that have been reviewed is about some significant components and themes relevant to this project as it will be valuable for the project in both software and hardware aspects.

2.2 Research by Journals

2.2.1 Journal 1: Development of IoT for Automated Water Quality Monitoring System, October 2019

Rizqi Putri Nourma Budiarti, Anang Tjahjono, Mochamad Hariadi and Mauridhi Hery Purnomo. From this article, the project is about water quality monitoring system using internet of things(IoT) . This journal propose the use of IoT water quality monitoring system that can be operated as an automated water monitoring system for surface water and it's real-time online. The main body for the project contains of raspberry pi as a microcontroller. This project used an IoT platform that included a water condition monitoring sensor, an embedded system capable of processing sensor data and delivering it to a data centre, and data transmission using the MQTT protocol. The research results and discussion reveal that the system monitoring of Automated Water Quality Device utilising passive and active sensors report all status monitoring system through Things to Things connections across the internet while providing data and transmitting the report status using MQTT protocol. The study aim for the next step is to integrate the IoT Platform with the use of a Big Data System to classify river water quality using classification analysis.