UNIVERSITI TEKNIKAL MALAYSIA MELAKA

HOME WATER MONITORING SYSTEM USING ANDROID APPLICATION

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Computer Engineering Technology (Computer System) with Honours.

by

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I hereby, declared this report entitled HOME WATER MONITORING SYSTEM USING ANDROID APPLICATION is the results of my own research except as cited in references.

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APPROVAL

This report is submitted to the Faculty of Mechanical and Manufacturing Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the degree of Bachelor of Computer Engineering Technology (Computer System) with Honours. The member of the supervisory is as follow:

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ABSTRAK

Air merupakan salah satu elemen penting pada manusia dalam kehidupan seharian mereka. Populasi pertumbuhan manusia and revolusi perindustrian menjadi sebuah masalah yang besar untuk manusia dan hidupan lain dalam bumi untuk mendapatkan sumber air yang bersih. Pada era globalisasi ini, sistem pengawasan air menjadi sistematik hari ini. Pembentang kerja ini mencadang sebuah sistem pemantauan air menggunakan aplikasi android di dalam rumah. Pendekatan ini akan meningkatkan sebuah sistem pemantaun air kos rendah. Dengan menggunakan teknologi Bluetooth. Projek yang dicipta ialah dengan menggunakan modul Bluetooth untuk menghantar data yang diperolehi untuk dipaparkan pada aplikasi android. Sensor yang digunakan untuk projek ini adalah sensor pH, sensor Ultrasonik, sensor Aliran Air dan sensor Kekeruhan.

ABSTRACT

Water is very essential element to human for their daily life. The growth of populations and the industrial revolution become a major problem for the people and creatures on earth to receive the clean water. In this era of globalization, the water monitoring system are almost systematize these day. This paper propose a water monitoring system using android applications for observing the condition of water environment in household. This approach will improve a low cost water monitoring system by using Bluetooth technology. The invented project is used a Bluetooth module for transmitting the data obtained to be display on android applications continuously. The sensors used for this project are pH sensor, Ultrasonic sensor, Water flow sensor and Turbidity sensor.

DEDICATION

To my beloved parents: Hairudin Bin Adnan and Jamilah Binti Sahman, and for my family whose help and encourages me, also to whom may involve to finish this project successfully. Lastly, a big thanks to my supervisor, En Effendy Onn who always provide an information and guide me till the end of this project.

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LIST OF SYMBOLS

D, d	-	Diameter
F	-	Force
g	-	Gravity = 9.81 m/s
I	-	Moment of inertia
1	-	Length
m	-	Mass
N	-	Rotational velocity
P	-	Pressure
Q	-	Volumetric flow-rate
r	-	Radius
T	-	Torque
Re	-	Reynold number
V	-	Velocity
w	-	Angular velocity
x	-	Displacement
z	-	Height
q	-	Angle

LIST OF ABBREVIATIONS

PCA	Principal Component Analysis

CHAPTER 1

INTRODUCTION

1.1 Introduction

Water is basically essential elements in our lives. All humans being, animals and plants need water to survive. Water literally gave many impacts on every creature in earth. Water monitoring system is a system that is used to monitor the quality of water in household. This project is profitable and useful for people from health issues that came from the water in our home and it also can be clarified as a precaution step to prevent from illness. Besides, the wastage of water can be minimized by detecting the flow of the water inside house. The water level inside tank also can be detect insufficient amount of water. There are several parameters which use for this project to monitor the quality of the water such as pH water, turbidity, water flow and Ultrasonic sensor.

The system is used to monitor and observe the water by using android application. In monitoring is defined as the collection of information about a set of locations and at regular intervals in order to provide data which may be used to define the current conditions. The manual water quality monitoring method involves sampling and laboratory research. These methods is however time consuming where it is leading to the delayed detection of and response to contaminants and not a very cost effective.

Studies conducted by the United States Environmental protection (USEPA) have shown that water parameters are affected by contaminants in specific ways and can be detected and monitored using appropriate water quality sensors (Cloete, Malekian

and Nair, 2016). The microcontroller that is using for this system is Arduino Mega and there are also several sensors are used as the major components for implementing this system. The values or information obtain from the sensor are processed by the microcontroller and forward to the devices by using Bluetooth module.

1.2 Project Background

Generally, water is an important component for every creature that exists on earth. Human especially, need a sufficient amount of water in daily life. Water is essential as it helps human to hydrate. Basically, a human body weight contains an amount of need water. Thus, the water that is inside the body is then used for several purposes such as regulating the body temperate or helps in maintaining the function of the body. Besides maintaining and helping for a healthy body, water is also important as for human to bath and maintain a hygiene lifestyle. Other than drinking and for bathing, water is also used for cooking and also washing the clothes. Thus, getting a clean water source is very useful in preventing human from getting diseases easily. Drinking unhygienic water can affect the system inside human body. Besides, bathing or washing clothes using unhygienic water can cause bacteria to easily attack the human body. Bacteria that came from unclean water can risk the human's health. Thus, getting a hygiene water source is very important as it will definitely affect human especially the health issues. In order to obtain a clean and hygiene water source, water should be regularly monitored.

In this era where technology mostly takes over human, monitoring a water became a simple task as it is covered and fully safe to implement. Based on various

researches that have been made on water monitoring, there are many water monitor system that have been developed. The previously developed water monitoring system basically helps the users to monitor their quality of water regularly. Monitoring the water is not just making sure that the water is clean, but it can also monitors the level of the water in a way that it can also help in reducing the overflow of water. Mostly, the water is being overflowed is usually caused by some leaking. There are various water quality monitoring system that have different features implemented in it. Basically, the parameters which have been used in various systems are likely to be similar but each of the system implemented different features such as the microcontroller used and the type of communication used.

There are various water monitoring systems that have been developed throughout the years. Each of the developed water monitoring systems have different features implemented on the system. Some of the systems are controlled based on GSM, Wi-Fi, or Bluetooth. This project does not only focuses on monitoring the water, such as the water level but it also monitor and detect the purity of water and PH value. The purity of water and PH value is important as it is essential especially when using the water as the drinking source. In general, the level of water that is pure is 7. Based on study made by (Riché *et al.*, 2006) it is indicated that the water is in state of ultrapure and when the pH value is naturally 6.998. Thus, this project implement a feature where it detect the pH level of the water in order to verify that the water is safe to be used as drinking purpose.

1.3 Problem Statement

Clean water is the one of the most important elements to all living things. Nowadays, sufficient amount of water is required by human for many purposes in order to continue their daily life and quality of drinking water. One of the most concerned problems encountered by every household or any people is regarding the cleanliness of the water source. An unhygienic water source is undeniably can jeopardize our health as it can bring many diseases. Thus, having an unhygienic water source is the most common problem related in water. Thus, a water monitoring system is developed to overcome this problem. By having the water monitoring system, user of household can easily monitors their hygienic level of water source. Other than that, the traditional method is very time consuming where it is needed to take the sample and run the test.

Based on researches made for the previous developments of the water monitoring system, most of the system are using technology such as Wi-Fi and GSM. There are few problems encountered when the water monitoring system used as the controller. One of the problem is that controlling the system by using Wifi need a strong connection and also internet connection in order for it to function as controller and also to retrieve information from the system. Thus, this project is design with the Bluetooth feature as the controller as Bluetooth does not require any internet connection to make the system functional. It is undeniable that some area has low coverage for the internet. Thus, having this technically can destroy the productivity of the water monitoring system. When the connection is low, hence it cannot function well and the transferring and receiving data might be difficult.

1.4 Objectives

The objectives of this project are explained by referring the project problem statement obtained and also the project scope. The objectives of this project are as follows;

1. To design the Home water monitoring system using android apps
2. To monitor the condition of water
3. To produce the suitable prototype of the projects

1.5 Scopes

This project focuses on designing a water monitoring system that is user friendly and easier to use. The system is emphasized to household usage only but still can be used for large system if enhanced the system. This project focuses on implementing a water monitoring system with a several features such as pH level monitor, turbidity sensor, water flow monitor and Ultrasonic sensor. Besides, this water sensor is equipped with Bluetooth communication where it can be monitored through smartphone by using Bluetooth. There are various water monitoring systems have been developed with some few major different features implemented on it. Thus, this water monitoring system is designed that is based on Arduino and implemented and monitored by using Bluetooth

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