UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DEVELOPMENT OF COST EFFECTIVE MONITORING WATER QUALITY SYSTEM VIA IOT BY USING ARDUINO AND BLYNK

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

by

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I hereby, declared this report entitled Development of Cost Effective Monitoring Water Quality System VIA IoT by using Arduino and Blynk 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 Mechanical Engineering Technology (Telecommunication) with Honours. The member of the supervisory is as follow:

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ABSTRAK

Projek ini adalah mengenai pengembangan sistem kualiti air Internet of Thing (IoT) yang menjimatkan dengan menggunakan Arduino dan aplikasi Blynk. Projek ini membolehkan pengguna memantau kualiti air menggunakan sensor analog pH dan sensor suhu. Memantau sistem kualiti air adalah alat yang membantu menggambarkan parameter kualiti air seperti pH dan suhu air. Ia akan memantau proses pengambilan sampel dan menganalisis keadaan air. Objektif utama projek ini adalah dirancang untuk membolehkan Perbadanan Pembangunan Sungai dan Pantai Melaka (PPSPM) memantau kualiti air di Sungai Melaka dengan lebih mudah daripada sebelumnya. Selain itu, menggunakan teknologi internet masa kini dapat meningkatkan pemindahan data dengan lebih cepat dan berkesan dalam jangka waktu yang singkat. Aplikasi yang dikembangkan adalah menggunakan Aplikasi Blynk yang boleh dimuat turun dalam telefon pintar dan dihubungkan ke Arduino Uno.

ABSTRACT

This project is about the developing of cost-effective Internet of Thing (IoT) water quality system using Arduino and Blynk app. The project allows users to monitor water quality using a analog pH sensor and temperature sensor. Monitoring water quality system is a device that helps to describe the water quality parameter such as pH and temperature of water. It will monitor the process of sampling and analyzing the water condition. The main objective of the project was to be designed to allow Melaka River and Coastal Development Corporation (PPSPM) to monitor water quality in the Melaka River much more easily than before. In addition, using today's internet technology can improve data transfer faster and effectively in a short period of time. The application developed was to use the Blynk Application that can be download in smartphone and was connected to Arduino Uno.

DEDICATION

To my wonderful parents Norazmi bin Abdul Hamid and Nor Fatimah Binti Haron. You have raised me to be the person who I am to today. Thank you for your unconditional love and support, you provided me with Thank you for everything.

To the source of my success and achievements my siblings. You have stood by my side in each step of my life. You have nurtured me with knowledge and wisdom Thank you for your guidance and enlightenment.

To my supervisor, to whom I express My deep sincerity for their assistance and support through my studies.

To the reason of my happiness my friends. I dedicate this work to you, and I wish all the happiness.

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A great deal of guidance and help was required for the success and result of this project from many and I am very proud for completing the whole report. All this happened because of good supervision and help. I would not forget to thank everyone that involved with me through all the hardness in order to complete this project and report.

First, thank to ALLAH, without His will everything cannot be done until this phase. Besides, I would like to thank my great project supervisor, IR Mohammad 'Afif bin Kasno for his guidance, encouragement and support in order to make sure I did well for this project. Next, I also would like to thank all my lectures and friends who willing to help me and changing ideas to complete this project and report.

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CHAPTER 1

INTRODUCTION

1.1 Background

This project focusing on Development of Cost Effective for Monitoring Water Quality System IoT by using Arduino and Blynk. Water pollution is a serious problem in Malaysia and has an adverse effect the sustainability of water resources. Malacca River us one of numerous rivers that has in Malacca and near to the town wherein the visitor is focus. The Malacca River and Coastal Development Corporation (PPSPM) was classified that the status water quality of the Malacca River was in Class II based on Standard Quality Air Negara (ANNEX) [1]. The Malacca River Cruise area is actively involved in various sorts of activities including tourist spot and multifarious industries

The accommodation around the city and industrial site is within the Malacca River catchment and all discharges from the accommodation around the city and industrial site will enter this river system. All the discharges will affect the color, smell and the quality of water. In addition, it also will affect human sport and beauty of tourism in Malacca River Cruise. This observe become a conductor about the application to the development of cost effective IoT water quality system and develop the cost effective IoT water quality system using Arduino and Blynk. Besides that, the application will analyze the performance of developed system.

This project is a cost-effective project as we used Arduino in preference to the wireless sensor network (WSN). It is going to recognition on monitoring the usage of

sensors based on the Internet of Thing (IoT). To make this project attached to IoT such as a mobile application it's may be tracking via smartphone.

1.2 Problem Statement

A monitoring device with the technology nowadays to monitor a water quality via IoT very useful but in some ways, it could be a dangerous electronic component and sensor to be used because some component is not waterproof. However, due to Malacca River and Coastal Development Corporation (PPSPM) monitor water quality can provide the limited analyzed with slower to get the result while phased issues of high cost. In order to rectify these problems, the technology plays a role to develop the system introduced with electronic component and cost effective. The digital device and computer are the two most commonly used for the monitoring water quality system. However, applying the digital device and computer to the individual is increase the uncomfortable to researcher for a monitor based on laptop and computer. Therefore, in this work, a new reconfigurable system for monitored water quality will be produced. The cost effective for the water monitoring system is developing by using Arduino and Blynk application. The analyzed of the water pollution will be sending through Blynk application.

1.3 Objective

The objectives of this study are listed below:

1. To study the fundamental issue of pollution in Malacca River and related project.
2. To develop and apply the Cost Effective IoT water quality system using Arduino and Blynk.
3. To analyze the performance of developed system.

1.4 Scope

The study location for this research is at Malacca River, which is situated near the Cruise River Malacca. The objective of this project is to monitor Malacca River's water quality parameters, and to classify water quality over wireless technology. The scope is useful for ensuring that the project is going in the right direction to achieve the objective. The aim of this project is also to study the basic of Arduino from several published papers and books and study the code used to detect the water quality parameter. The main focuses of the project are to study the basic parameter of the water quality with using Nodemcu ESP8266 module, Arduino Uno, an analog pH sensor and DS18b12 Waterproof temperature sensor.

1.5 Expected Result

The wireless internet is supposed to work completely and provide an answer to Arduino's IDE program, and the result will be seen at Blynk Application so that data can be accessed from anywhere. Additionally, the sensor will work well and provide water temperature pH and waterproof. The water quality parameter will be monitored for all outcome.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The literature review for this project will focus on the system with the development of the Internet of Things (IoT), based on monitoring the water quality. Information and studies for this project were gathered from numerous sources, such as a journal, an article, and an appropriate website. In this chapter, all information used as a guide for ensuring the project will be a success. The Arduino Uno will be used to build the mechanism for all of this program and the computer will be connected to the Internet of Things (IoT).' This project may however be summarized with any sensor form from the previous study in connection with the Internet of Things. Previous Related Project Research

2.1.1 Smart Device to Monitor Water Quality to Pollution in IoT Environment by (Ibn-,2015)

According to this project, the water analysis is carried out manually by taking samples from the water resources and being dispatched for investigation to the laboratory. Water quality control is the critical desired-for human life. Creation of a water quality control device for human use to test water without sending it to the laboratory for investigation. The monitoring of high-quality water consists of Arduino, sensors organized in bread board, and module Zigbee. The Arduino will connect to USB cable

and dispatch the high-quality water parameter measuring from the sensor via the Zigbee module.

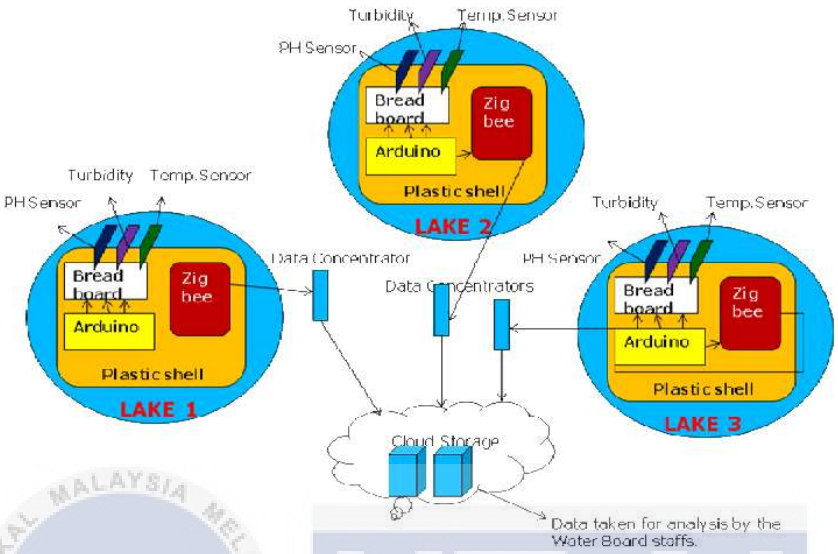

Figure 2.1: System Design

Data Concentrator is a software and hardware that helps to handle the data sources of variation at one key point. Three sensors such as the pH, temperature, and turbidity sensor that attach to Arduino are used in this project. The water quality parameter is calculated by the sensors, and the data is transmitted to the cloud for analysis.

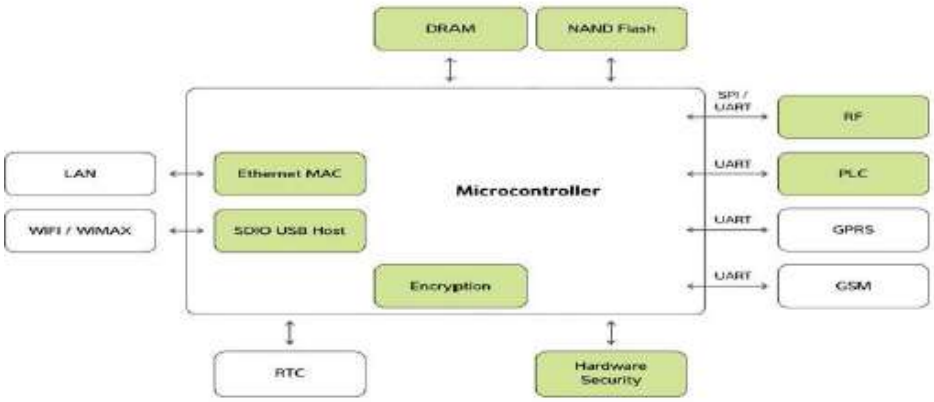

Figure 2.2:Data Concentrator Block Diagram

Sensor Vcc output pin attaches to Arduino. Board 5.0 V input. Sensor Data output Pin is connected to Arduino Board Virtual Pin 3 data. Pins (0-13). Sensor Gnd output Pin is appended to the Arduino Board Gnd input.

2.1.2 Design of Low-Cost Autonomous Water Quality Monitoring System (Ibn-,2015)

According to this article, the systems develop one component of the Autonomous Live Animal Response Monitor (ALARM).

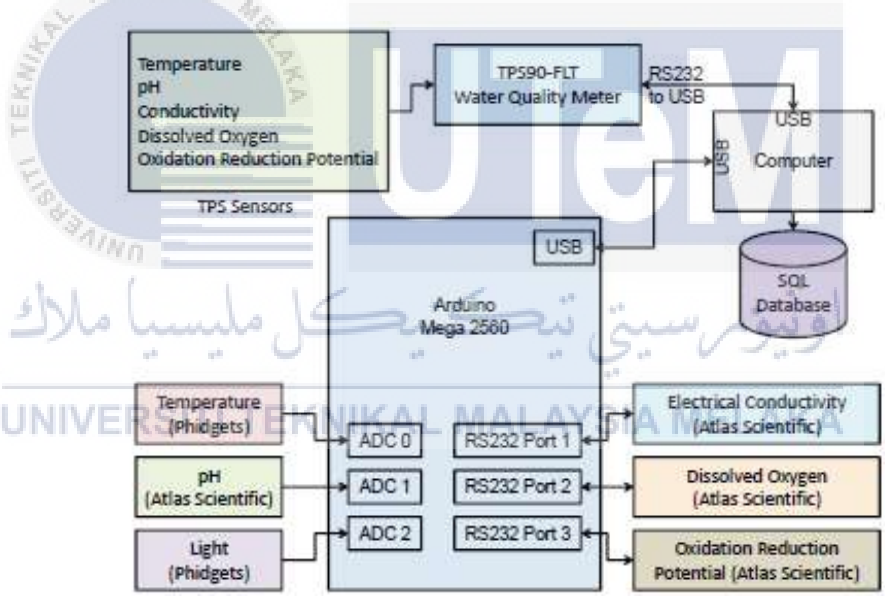

Figure 2.3:Overview of prototype and data collection procedure

An Arduino Mega 2560 is used as our censoring node to acquire and process sensor data for the part on this project [1]. Arduino Mega 2560 is an open-source product, providing ample analog / digital pins and at a low cost. In this project six sensors are used