IOT BASED WATER QUALITY AND WATER LEVEL MANAGEMENT SYSTEM

BY

Rubayat Bari Anik
ID: 183-15-2247

AND

Anika Aisha Megha
ID: 183-15-2337

This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering

Supervised By

Mushfiqur Rahman
Lecturer (Sr. Scale)
Department of CSE
Daffodil International University

Co-Supervised By

Md. Sabab Zulfiker
Lecturer (Sr. Scale)
Department of CSE
Daffodil International University

DAFFODIL INTERNATIONAL UNIVERSITY

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APPROVAL

This Project titled "**Iot Based Water Quality And Water Level Management System**", submitted by **Rubayat Bari Anik ,ID:183-15-2247** and **Anika Aisha Megha ,ID:183-15-2337** to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 13/09/2022.

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Faculty of Science & Information Technology
Daffodil International University

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Associate Professor
Institute of Information Technology
Jahangirnagar University

DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Mushfiqur Rahman** Lecturer (Sr. scale), **Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

Supervised by:

12.09.22

Mushfiqur Rahman
Lecturer (Sr. scale)
Department of CSE
Daffodil International University

Co-Supervised by:

12.09.22

Md. Sabab Zulfiker
Lecturer (Sr. scale)
Department of CSE
Daffodil International University

Submitted by:

Rubayat 15.09.22

Rubayat Bari Anik
ID: 183-15-2247
Department of CSE
Daffodil International University

Anika 15.09.22

Anika Aisha Megha
ID: 183-15-2337
Department of CSE
Daffodil International University

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ABSTRACT

Water is arguably one of the most primary and important resources on mankind. pH and ultrasonic sensors serve as the primary functions. The pH level of the liquid is detected by such a detector, which also shows the tank's water level and control pump motor. The Node MCU's Wi-Fi network is used to link the sensor to the system (ESP8266). Installed and linked to the package of the Arduino IDE is Blynk. The parameters are achieved and sent to the mobile device using the Blynk application for user access. The Blynk app is used as a third-party app. It offers open source for user to design automation at low cost. This makes the life of the common man very easy.

KeyWords: Iot, Node MCU (ESP8266), TDS (pH) Sensor, Ultrasonic Sensor, Pump Motor, Blynk app.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1
Introduction

1.1 Introduction

The measurement and comprehension of chemical and biological water quality as well as reactive remedial actions depend critically on environmental and water quality monitoring. Water management when using conventional and laboratory sample technologies, there is a significant financial burden, but sensors have the ability to lower these costs while also providing more valuable active monitoring capabilities. Details regarding the condition of the natural environment can be obtained by mean being able of the resources and environmental purity.

However, it is usually not possible to prove long-term changes as a result of anthropogenic activities. To stay up with current affairs. When environmental contaminants can be successfully measured and identified in a lab setting, continuous monitoring is the most difficult part of environmental sensing .Wireless sensing, more especially, the idea. In multiple disciplines, LAN wirelessly sensors are quickly emerging amongst the most active and significant fields. The ideal surveillance system for the near future may include network of sensors positioned at key points and able to work autonomously in the field. Water quality monitoring refers to the measurement of water status in relation to whose needs for biological species and human needs. It is of great importance and is used in many fields' pH sensor based on temperature, tracking the degree of contamination with fish farming water. Biomass is a significant source of several water supply. Unwanted bacterial activity and the utilization of coagulation chemicals, which is liable for overabundance organic matter accumulation, are multiple specific symptoms in the water filtration sector. keep a watchful eye on industries around the reservoir, so there will be landfill or leakage only then can control and regulatory action be taken. as deep as water quality effects human and ecological well-being, so it is important to check pollution levels because the more we study our waters, the better we can see and predict dirt problems.

1.2 Motivation

Firstly, this is our final year project. And we are interested in (iot) based water quality and water level management systems. We know that the use of this project will increase greatly in the future. And this project has extensive use of iot and embedded systems. As a result, water quality and use of leveling projects will increase and large fields will be created based on it.Smart technology with good effect gives better results when compared to current systems. This work around showing the pH level and sensing the water level inside the tank also connects it to the Node Micro Controller Unit to send the tank status to the Blynk app via Arduino ide. It gives the idea that things are being added on the grid, creating change for a better tomorrow. Everything these days depends on the smartphone and its apps. So, task will be useful for future scope.

1.3 Rationale of the Study

- Development creation of a remote pollution of water sources is the goal of such a work.
- It works on Node-MCU Microcontroller based system so we can easily understand how it works.
- The automation system will have the ability to be controlled by using Mobile application.

1.4 Research Questions

While making this project we had some questions .Through this Node MCU (ESP8266) module can PH sensor determine water quality? can sonar sensor determine water level? can pump motor supply water?

1.5 Expected Output

These phases of said process are as follows:

- Next, this same project scope will just be thoroughly examined in order to design the proposed water quality and water level management system using the mobile applications system. It will be used to finalize the specifications of the necessary physical devices.

- The racetrack circuit example will be created next. Information is collected using the Console.
- A section of track is then applied on a breadboard and tested in the research group.
- This same proposed method will be checked in an experiment.

1.6 Project Management and Finance

Inside this project, we have been using the cheapest IOT module available, the NODE MCU. As a result, the total cost of this project is lower when compared to the other IOT project. The table shows the total approx cost of the entire project:

Sl. No.	**COMPONENTS**	**COST**
1	Node MCU (ESP8266)	375
2	TDS (pH) Sensor	2950
3	Ultrasonic Sensor	100
4	IC7805	10
5	TIP32C (PNP).	20
6	DC Pump Motor.	160
7	Plastic Pipe.	25
8	Diode.	5
9	12V DC Power Supply.	100
10	5V DC Power Supply.	65
11	PCB Board.	50
12	PVC Board.	60
13	Jumper Wire.	15
	Total	**3935/=**

Table: 1.1: Project Management and Finance

1.7 Report Layout

Its thesis is split into six chapters, such as the introduction. Each section is unique and is described in detail, along with the essential theory to understand it.

Chapter 1: The introduction, motivation, rationale of the study, research questions, expected output, project management and finance, and report layout are all covered. From this chapter, we can see who else is working on this topic before our project and how our project differs and advances from such projects.

Chapter 2: Addresses the background in order to complete the project. There are descriptions of the basic operation of Preliminaries/Terminologies Related Works, Comparative Analysis and Summary, Scope of the Problem, and Challenges.

Chapter 3: Relates with the project's hardware modeling. Methodology of Research Data Collection Procedure/Dataset Used Statistical Analysis, Proposed Methodology/Applied Mechanism, Implementation Requirements The following sections describe the primary features, photographs, step-by-step implementation of the prototype component listing, and hardware interfacing of the major elements.

Chapter 4: Functional behavior assessment results and discussion, experimental setup, innovative results and analysis, and discussion of the prototype circuit's activity. On the actions, a flow chart is presented that defines the prototype's process principle. The HC SR 04 detects the water level and transmits it to the user's mobile device via WiFi.

Chapter 5: Suggests the work done thus far and the Effects on Society, Environment, and Sustainability,Impact on Society, Environment, Ethical Aspects, and Utilized To generate. The potential limitations of continuing research on this study are discussed. The potential future work that can be done to improve the current situation is noted. The possibilities for future work along these lines is also explored.

Chapter 6: Summary, conclusion, recommendation, and new research implications This chapter includes a summary of the study's findings as well as implications for future research.

References: are listed in this chapter.

CHAPTER 2

Background

2.1 Preliminaries/Terminologies

Living in the internet age has made life smarter and so more useful for us. The web provides humans with previously unimaginable and extraordinary choices available, such as the idea of developing an automatic smart system. The concept of an automatic smart system derived from the fast rise of internet could really reduce the chance in any system as well as human involvement. Universal research is being conducted to efficiently consume the power of an electrical system or device so that the sludge produced by human active participation physically can be diminished. For such a globally promising concept in the wiring sector, we had planned on something that could be beneficial in this area. The Internet of Things (IOT) system has a huge territory to study or work on. Hydrology and level management systems are among the most talked-about, promising, and globally researched (IOT) sectors. This water quality and water level management system has already had a serious influence in our current digital world, which is now staring for ways to reduce maximum energy waste. As a result, many research papers and developments from Institute of electrical and electronics and online authored flanks start sharing a broad and major idea on how we can save our lives. Those same ideas and their investigation prompted us to broaden our research sight. That is where the operation or ambitions for this scientific report have been clearly directed.

Through quick, humans could save the time and have more productive perspectives on some kind of daily [5].

A majority of researches have recently been conducted in order to improve effectual schemes for mapping and preventing water parameters. A device configuration has now been proposed for actual management of water and distribution. Its suggested technique prioritizes an ultra - light and poor rollout. That kind of configuration is well suited to a wide range of classifications that allow an approach to water pH value, water level [8].

2.2 Related Works

We will look at some of the existing systems in use for water quality and level monitoring that are predicated on IoT. Various tools have been used in the traditional water quality monitoring and level monitoring system to monitor the quality and level of water. The conventional method is simply insufficient for measuring water quality and identifying any major changes in it Manikaran S., In November 2018, a paper titled "IoT-based Water Quality Monitoring System Using Blynk App" was published. This paper discusses water quality monitoring strategies, working methods, sensors, components, and data dissemination methods, as well as the function of the government, organizational administrators, and locals in ensuring legitimate data dissemination. The Blynk App outputs water quality and level data. While working to improve water quality is now possible, effective use of innovations and financial processes can help improve water quality and attentiveness between participants.

2.3 Comparative Analysis and Summary

This same structure proposed approach is split into 2 parts: operating system special hardware styling. Hardware is created by organizing embedded system and sensors, while tool is created by writing and uploading code to the motherboard. Appliances are controlled using sensors via internet. The user is given option to click of the buttons present on the app interface. The command will be performed on BLYNK server side.
In this chapter we discussed a analytical summary review of this pump motor control, water quality and water level management system. The project is not a new idea, but its implementation is increasing by the day. It is one of the most popular independent automations. A separate project has been underway since the 1990s. Its automation market is growing by the day. This thesis offers an intelligent, cost-effective, dual (regional and remote) internet system with a soft consumer mobile application. For automated features, a smart, Internet-based and information-based.

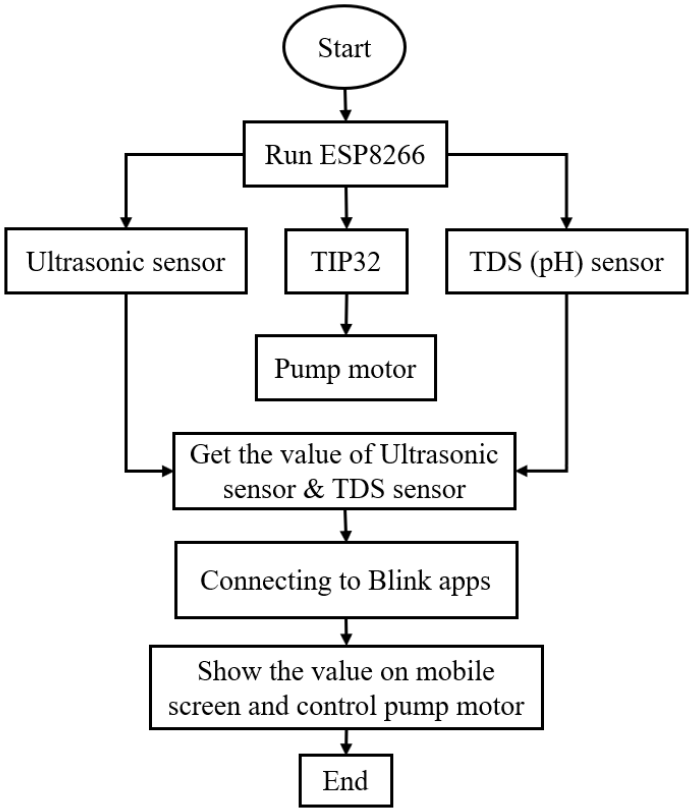

Figure 2.1: Flow Chart.

2.4 Scope of the Problem

We are going to work with this project system. At the present time, everything has devolved with the latest technology. We have to face many obstacles to keep face with it. This kinds of project and application is mainly for the purpose of improved our regular life easy and ensure the safety of the water.

There are some limitations that were found at some point in our project. Since our project is based on the Internet, our appliances are fully controlled by net access. As we manage the entire online system, we need to confirm the high speed of the Internet. Otherwise, system delays will occur because the Ethernet shield will not work as a network provider for the circuit.

2.5 Challenges

Water quality encompasses the physical, chemical, and biological properties of water in connection with a set of values. Water quality is essential because it is used in almost every aspect of life, from individual human utilization to commercial and industrial implementations, as well as aquifers. The emphasis in water evaluation in irrigation is on the chemical and physical properties of water, and other factors are rarely considered necessary. Irrigation water quality is typically determined by its total salt concentration or electrical properties, roughly comparable ratio, or exchangeable sodium ratio,as well as the water's potassium carbonate and boron content Water quality degeneration has become a concern as the population grows, industrial and agricultural activities expand, and climate change threatens to cause significant changes in the hydrological cycle. Water quality issues are complex and varied, and they require immediate global focus and action. Both natural systems and human activities have an impact on the quality of surface water and groundwater.

CHAPTER 3

Research Methodology

3.1 Research Subject and Instrumentation

Its goal of this project is really to create a system that supervises a liquid level or rather alerts the user when it becomes too low. A high frequency sensor detects between of tank's top and thus the water in order to alert the visitor when such water level falls below a certain threshold. The project begins with the assembly of components. That seems to be the detector in conjunction with said Microcontroller Board.

Hardware Requirements:

- Node MCU (ESP8266).
- TDS (pH) Sensor.
- Ultrasonic Sensor
- IC7805.
- TIP32C (PNP).
- DC Pump Motor.
- Plastic Pipe.
- Diode.
- 12V DC Power Supply.
- 5V DC Power Supply.
- PCB Board.
- PVC Board.
- Jumper Wire.

3.1.1 Node MCU (ESP8266)

A NodeMCU is an open-source design and system development kit based just on ESP8266, a low-cost System-on-a-Chip (SoC). This same Expressive systems ESP8266 includes every one of the essential parts of a system: CPU, RAM, connection (Wi-Fi), as well as an advanced operating system and SDK. As a result, it is a great replacement for all types of Internet of Things (IoT) works.

Fig. 3.1: Node MCU Module.

3.1.2.a Node MCU Pin Out Details

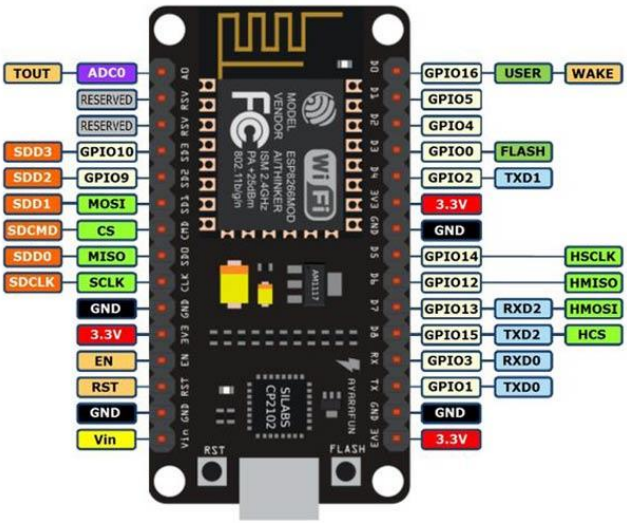

Fig. 3.2: Node MCU Module Pin out Details.

3.1.3 TDS (pH) sensor

Its pH values show whether the liquid is softer. True water has a pH of 7. Fluid with either a pH less than 7 is viewed an acidic option, while water with a pH greater than 7 is assumed an alkaline solution. This same optimal PH for waterways has been 6.5-8.5, as well as the PH levels for subsurface is 6 to 8.5. It's ideal pH depth of water demand is between 6 and 8.5.the human body retains pH balance and is unaffected by groundwater. In outside bodies, for e.g., have a severely low soil value of 2, which is a favored citric acid that aids in digestive health [10].

Fig. 3.3: TDS (pH) sensor.

3.1.4.a TDS (pH) sensor pin out details

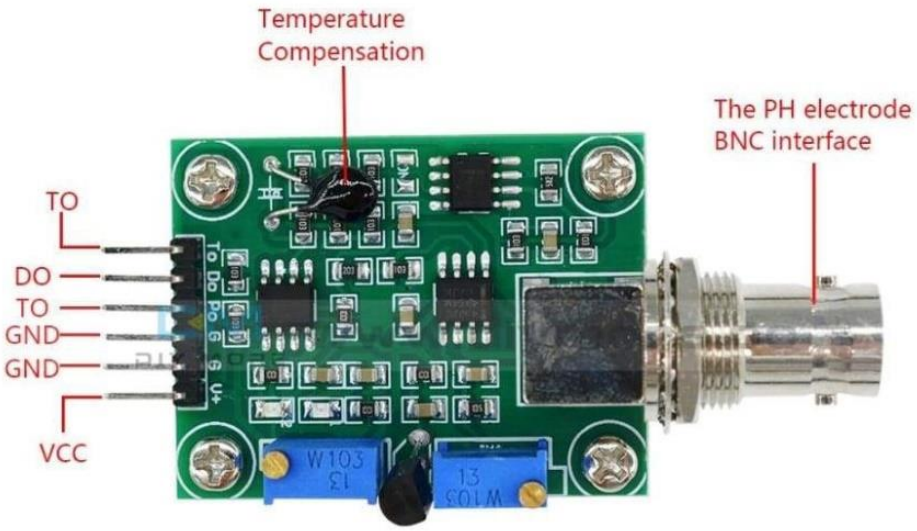

Fig. 3.4: TDS (pH) sensor pin out details.

3.1.5 Ultrasonic sensor

An electric device that detects detachment from a body by using high - frequency sound waves. ultrasonic employs a probe to deliver messages that relay about the proximity of a thing. Maximum noise vibrations reflect, from busting locations to evoke specific, resonate better curves.

Fig. 3.5: Ultrasonic sensor.

3.1.6.a Ultrasonic Sensor Pin Configuration

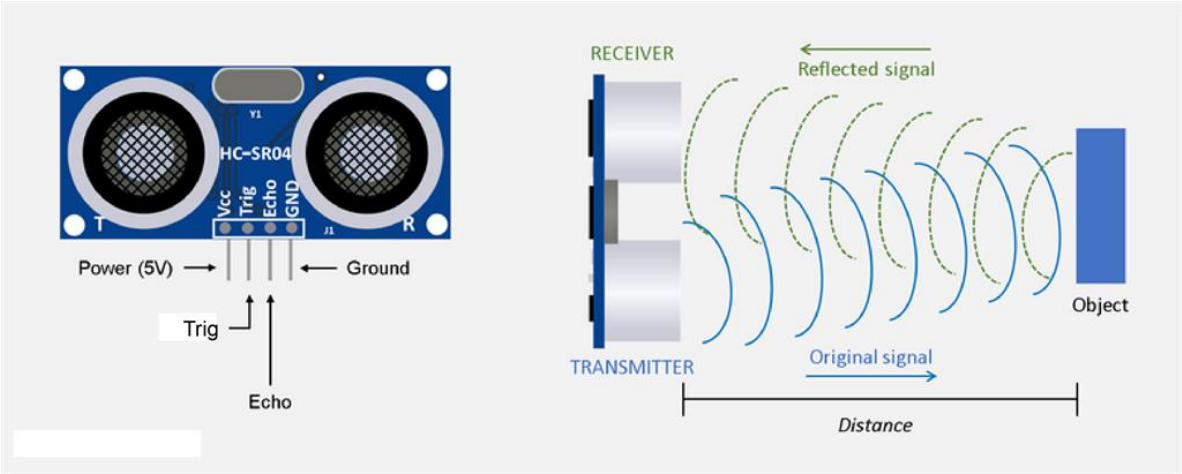

Fig. 3.6: Ultrasonic sensor pin configuration.

Table: 3.1 Ultrasonic sensor pin configuration.

Pin Number	Pin Name	Description
1.	Vcc	The Vcc pin powers the sensor, typically with +5V
2.	Trigger	Trigger pin is an Input pin. This pin has to be kept high for 10us to initialize measurement by sending US wave.
3.	Echo	Echo pin is an Output pin. This pin goes high for a period of time which will be identical, to the time taken for the US wave to return back to the sensor.
4.	Ground	This pin is connected to the Ground of the system.

3.1.7.b Working Principal of Ultrasonic Sensors

High - frequency sound vibrates at a rate that exceeds the spectrum of different hearing. Sensors are also the speakers that receive and transmit vibration sound. Our sound waves, like many others, use a specific amplifier to mail a pulse and receive a response. The sensor determines the disconnection to an objective by measuring the time between the sending and receiving of an interference pattern.

3.1.8 IC7805

Boost converters are frequently used in computer chips. They supply sustained dc output for variable efforts. In our case IC 7805 is a well-known regulatory IC that you apply to most projects. The name 7805 indicates the meaning of two, "78" indicates that it is indeed a hopeful rectifier, and "05" indicates that now it outputs 5v supply As a result, our 7805 will produce a time and energy + 5V efficiency.

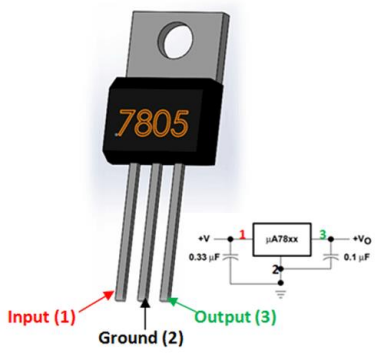

Fig. 3.7: IC7805.

Its throughput channel has a maximum current of 1.5A. Even so, the IC suffered from terrible skin irritation and is thus advised to sink heat for higher present levels works. For instance, if the power factor is 12V and you use 1A, (12-5) *1=7W. It will be destroyed by the hot water of 7 w.

3.1.9. a IC7805 Features

- Continuous Current Control board 5V
- The lowest power factor is 7V.
- The output current initiative is 25 volts.
- This same present process (IQ) is set to 5mA.
- There's more heat structure but instead latest halts useable.
- 125°C is the air temperatures interplay.

3.1.10 TIP32C (PNP)

TIP32 is a power PNP transistor. That can be used for motor rotates or huge signal transduction due to its high collector current of about 2A. Because 2A is not much of a larger capacity, the transistor is best defined by high amplification capacity.

Fig. 3.8: TIP32C.

3.1.11 DC Pump Motor

This DC 3-6 V Mini Micro Submersible Water Pump is a small, low-cost Submersible Pump Motor which can be powered by a 2.5 6V electrical supply. It has a maximum capacity of 120 liters per hour or a very low current consumption of 220mA.

Fig. 3.9: DC Pump Motor.

3.1.12 12V Adapter

This is an excellent power supply. It alters supply to one that is limited, lamp, or reliable. This is so thin it can fit into extension cords without interfering with some other outlets. The output is governed when you get 12V continuously up to a current drag of 2000mA (2 amp). Positive tip 5.5mm/2.1mm barrel jack ,This showcase is meant to work everywhere in the planet, using 100V-240V AC wall power and requiring even just a smaller chip dongle.

Fig. 3.10: 12V Adapter.

3.1.13 PCB Board

The breadboard (PCB) or oriented strand committee (PWB) is indeed an engineered wood bread composed of resistive and protecting tiers.

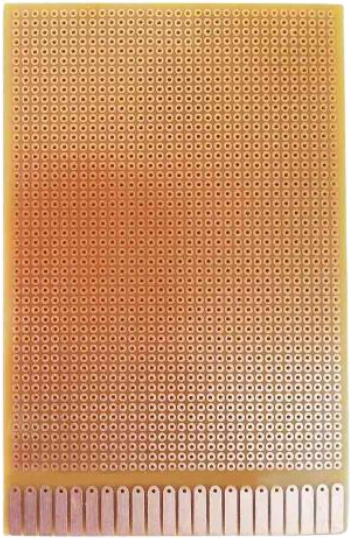

Fig. 3.11: PCB board.

3.1.14 PVC Board

PVC board panel, known as Chevron Board or Andy Board, is widely used for both internal and external applications. It contains chemical installation, PVC, which is used in industries, furniture, construction and advertising.

Fig. 3.12: PVC Board

Made of lightweight PVC and foam, this PVC foam board is moisture resistant and corrosion. It is completely lighter. They are also resistant to chemicals. The total thickness of the material will be from 6mm to 45mm. It is possible to carve, engrave, paint, print, laminate and grind the surface of the foam plate according to your needs. One of the most highlighting characteristics of this foam board is that it will not decay over time and the color is still in the same new form for long without fading.

3.1.15 Jumper Wire

Cables were indeed that was with electrical connections upon every close which can be used to always go without work piece. Relays were being commonly used by circuits as well as other equipment to make it simple to start changing a controller as considered necessary.

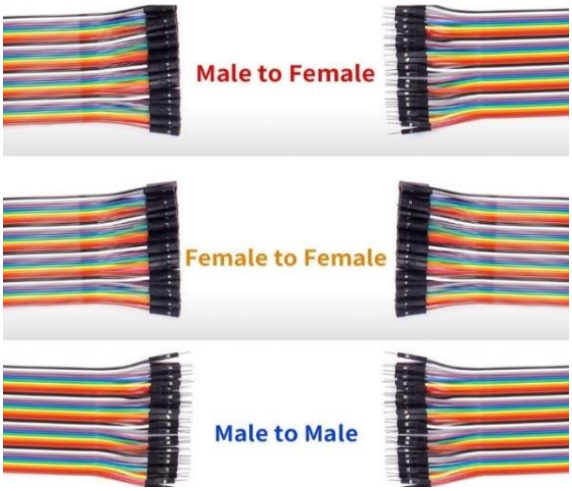

Fig. 3.13: Jumper Wire.

3.2 Data Collection Procedure/Dataset Utilized

Data collection is the method of gathering data for a wide range of purposes, such as monitoring quality and level, as well as other health and safety services, weather monitoring, design development, industrial and commercial applications, and science and research. Monitoring is the collection and analysis of data with the goal of detecting and highlighting changes in specific systems, particularly extreme changes. Monitoring data can be used for a number of different purposes. They can be used as indicators of health and safety risks, as policy change triggers, or as a foundation for research on hydrogeologic variability and developments.

3.3 Statistical Analysis

This chapter is about the components used in this water quality and water level management system project. The components used in this project are in good condition and working perfectly and the sensor should work properly. In this chapter, we will try to discuss the details of each hardware work details used and their work.

3.4 Proposed Methodology/Applied Mechanism

This chapter explains the methods used in the water quality and level management systems.The main topics covered in this chapter are how this project is to simulate.

Water Quality and Water Level Management System Block Diagram:

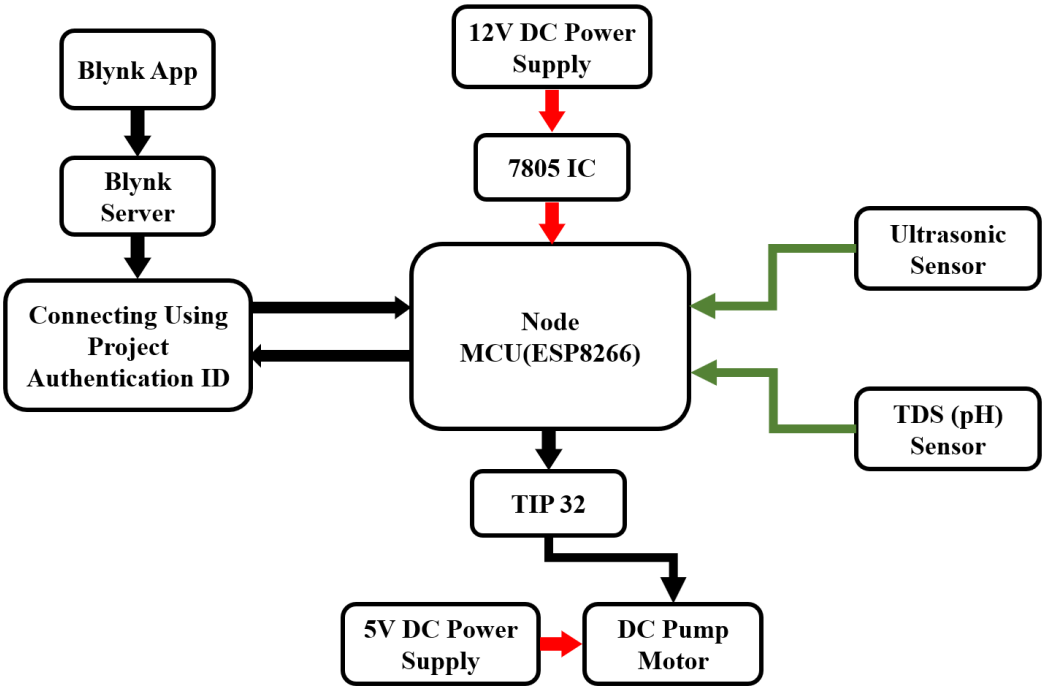

Fig. 3.14: Water Quality and Water Level Management System Block Diagram.

3.5 Implementation Requirements

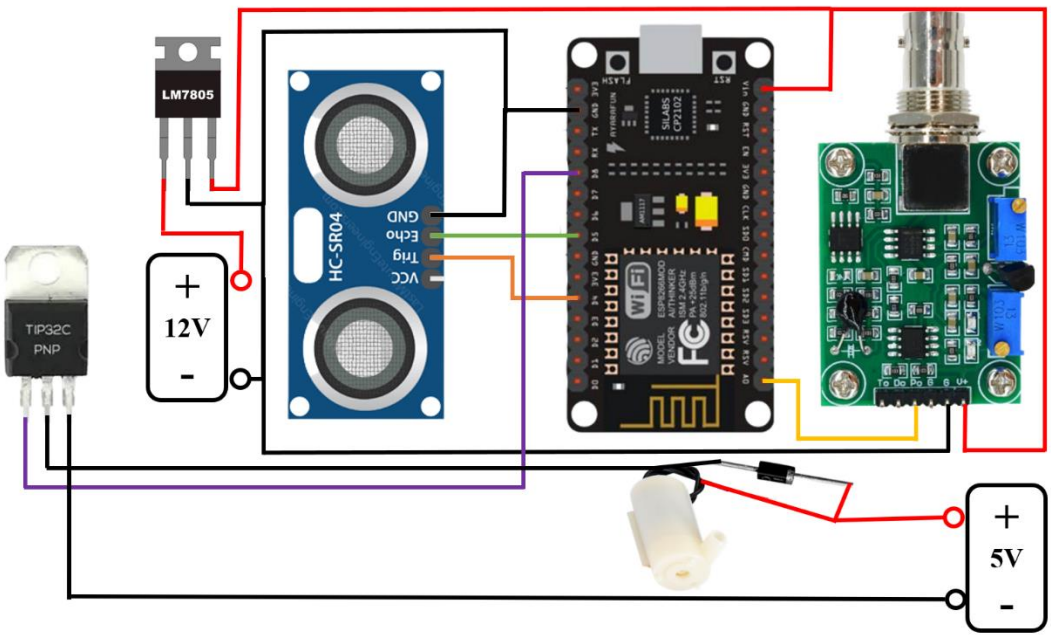

Fig. 3.15: Circuit Diagram.

Once all procedures are completed according to this chapter, the IoT-based water quality and water level management system will be ready to work. The main difficult thing about this chapter was to build a hardware connection on the behavior that work from this project based. A primary goal of this chapter was thus to comprehend the block diagram and even the linkage diagram.

CHAPTER 4

Experimental Results and Discussion

4.1 Experimental Setup

Under this endeavor, users using the Blynk app to monitor water appropriate value, that will be extremely useful in your Internet - of – things connected home works. Open the free from Android Market and would then generate a task with it. We will use the Blynk app and the ESP8266 to control the pH sensor and the infrared sensor. Blynk is an app that works well with the Arduino IDE to establish Internet - of – things solutions.

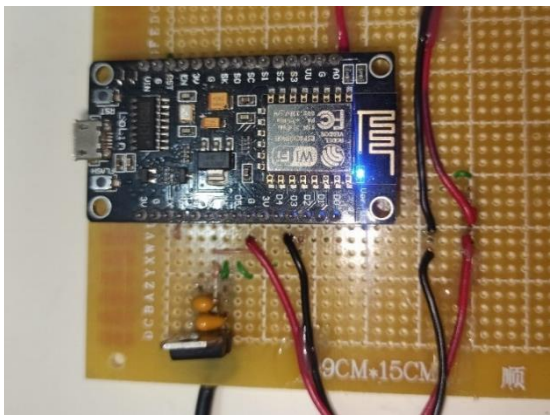

Fig. 4.1: Main Circuit Board.

A 5V IC and capacitor are used to power the NodeMCU.

Fig. 4.2: pH Testing Tube.

The pH value of water is determined through this testing tube.

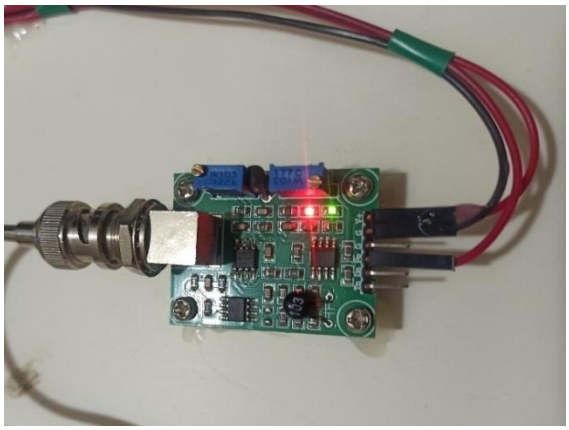

Fig. 4.3: pH Sensor Module.

This is the sensor module of pH tube and also added a jack port.

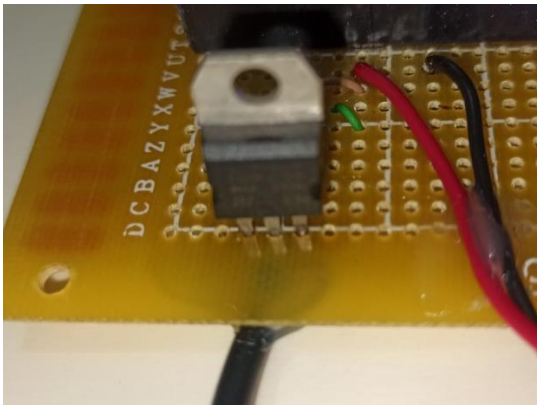

Fig. 4.4: 7805 IC.

7805 IC for supply 5V to the circuit.

Fig. 4.5: Ultrasonic Sensor.

Using Ultrasonic sensor to measuring the water level.

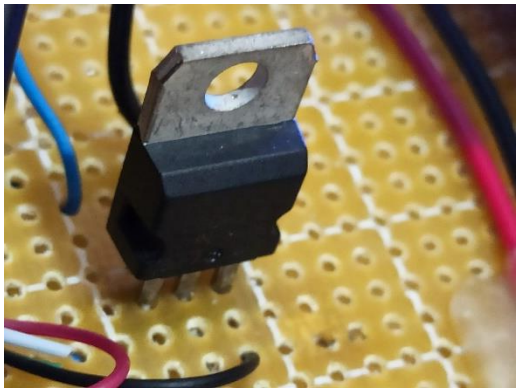

Fig. 4.6: TIP32C.

TIP32C transistor using for trigger the water pump motor.

Fig. 4.7: Water Pump.

5V pump motor use to fill up the water level.

4.2 Experimental Results & Analysis

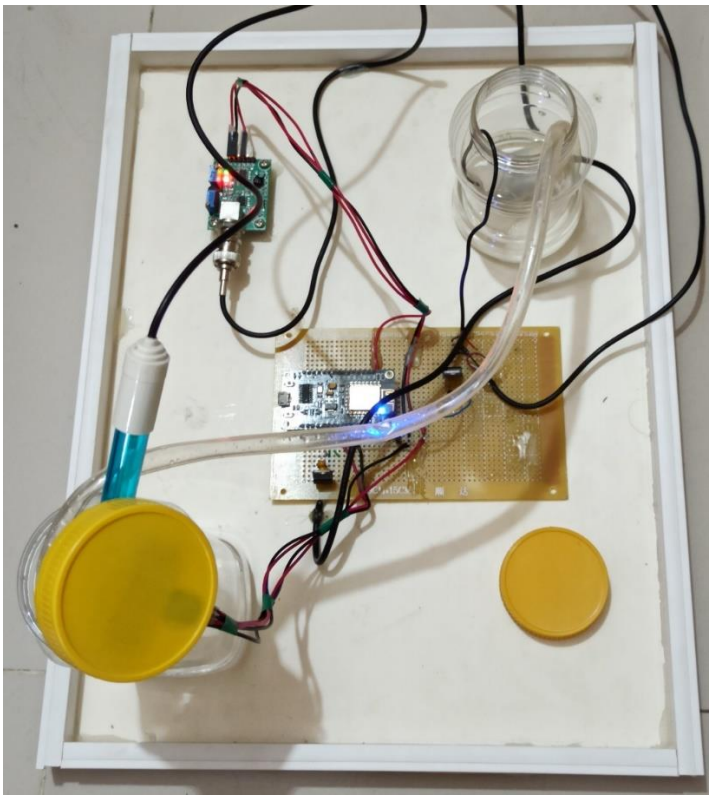

Fig. 4.8: Final Project.

Here is the completed project for the water quality and level management system. Water pH can now be determined using Blynk apps, and water depth can be determined using an ultrasonic sensor. When the water level is low, the motor will activate by activating the button in the Blynk apps.

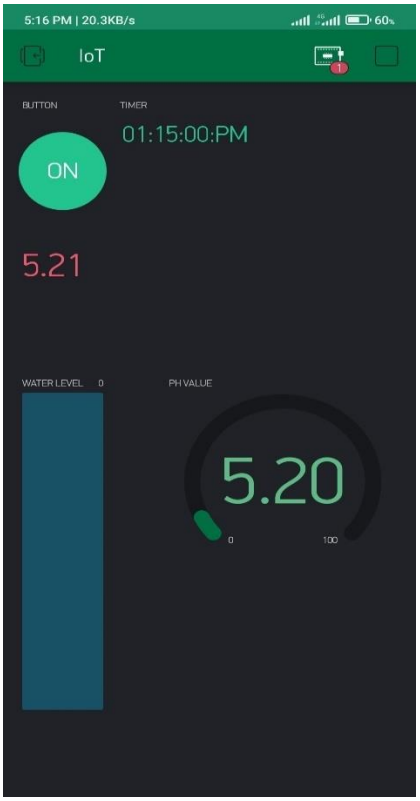

Fig. 4.9: Blynk Mobile App.

Here is the Blynk app interface. We can use this app to check the water quality, level, and control the pump motor. This app also includes a timer system.

Sl. No.	Water Sample Name	pH Values
1.	Drinking Water	6.73
2.	Washing Water	3.15
3.	Boiled Water	7.13
4.	Hair Soap Water	8.18
5.	Soft Drinks Water	2.37

Table 4.1: Finding different pH value from sample water.

4.3 Discussion

In this section, the results and conversation were discussed. With our project, we have productivity to show in terms of project objectives. Finally, the completion of this part of the project is ready to take advantage of it. We quickly review and show the result of our test.

CHAPTER 5

Impact on Society, Environment and Sustainability

5.1 Impact on Society

A TDS meter can be used to measure the TDS of our drinking water supplies as well as other things.

1. Fish tanks and aquariums

Fish require TDS and pH levels that are similar to those found in their natural environment. Aquatic plants involve less than 400ppm, with some species mandating even less. TDS levels between 5000 and 50000ppm are required for saltwater fish.

2. Hydroponics

A TDS meter is just a useful tool for determining the nutrient content of a hydroponic solvent fast.

3. Pools and spas

A low TDS interpretation can aid in the prevention of maintenance problems, skin rashes, and algal blooms.

4. Colloidal silver

Many silver nanoparticle users today use a TDS meter to quantify about there silver nanoparticle concentration in parts per million (ppm). The TDS meter provides a pretty accurate quantification.

5.2 Impact on Environment

Impact on the environmental is a critical tool for the long-term control of water bodies. Based on risk analysis methodology, a new approach to assessing eco-psychological impact has emerged. In dealing with environmental threats, we have always faced numerous challenges. Researchers and engineers must evaluate the nature and uncertainties surrounding a specific risk in order to characterize it. Social scientists are also required. Describe the variables that influence risky behavior. Finally, risk management necessitates the development of strategies involving risk communication, financial forces, standards, and regulations. We used risk criteria to determine acceptable levels of environmental risk. We cannot hope to achieve a risk level of zero. As a result, we must define what level of risk we recognize allowable for the environment under consideration. Risk criteria must be based on environmental acceptance demands.

5.3 Ethical Aspects

Individual rights: since there is no living without water, and those who are denied it are denied life.

Involvement: All humans, particularly the poor, must still be entailed in water design and management, with gender and economic hardship troubles accepted as important in cultivating this method.

Cooperation: for both upstream and downstream interconnectedness within one hydrologic positions difficulties for water management, necessitating the use of a sustainable drainage framework.

Human equality: means that all people should have access to the basic necessities of life on an equal level.

Common good: Water is a common good, even without decent water administration, human capacity and honor suffer.

Governance: is required for the safeguards as well as considerate usage water supplies for familial and outcome equity, and it encourages the self sustaining use of existence ecologies.

Disclosure as well as timeless availability to knowledge information: unless statistics is not obtainable in an understandable form, an option for an applicant to inconvenience everyone else arises.

5.4 Sustainability Plan

Going to define water quality and level equity and sustainability To just be valuable, each growth sector's sustainability and fairness must be defined. Water supply and sanitation sustainability has many dimensions. The following discussion examines five distinct but interconnected aspects of sustainability, each with its own find feasible. Technology long-term viability. This refers to the technology's dependability and correct operation, as well as the delivery of sufficient water of good enough quality in the case of water supplies. Aspects of equity concern technology that meets the needs of all audiences Technology sustainability requires a technically sound design that is followed during construction and operation, as well as excellent quality of work and equipment. Financial viability. Systems can only function if financial resources cover at least the expenses associated with operation, upkeep, and common repairs. Equity concerns who pays for everything and how transactions are distributed fairly between and within families. Environmental sustainability. Water resources face numerous threats. Over-extraction and impact on water sources due to irrigation, industrialization, and sewage treatment endangers reliable and safe drinking water supplies .Water supply and sanitary facilities

CHAPTER 6

Summary, Conclusion, Recommendation and Implication for Future Research

6.1 Summary of the Study

In the Water Quality Monitoring Management system, we will demonstrate how to create an IoT-based water quality surveillance system with a pH Sensing element, a Nodemcu esp8266 wifi module, and the Blynk Application. The water quality can be measured from anywhere in the world because this is an IoT (Internet of Things) project. Using the Blynk application, I will demonstrate how to evaluate the pH value of well water while also defining if the water under test is positive or negative for physical wellbeing.

6.2 Conclusions

Its primary goal of this project is to screen the water resource tests through By developing an intelligent water quality monitoring configuration applied in an IoT platform that can detect water's chemical and physical parameters, we can improve the quality and water samples. After comparing our sensor values to the standard values, we conducted an overall survey on these criteria. The functionality is the wireless communication between the system and the sensor network on a single-chip solution. This same structure for tracking reliability and practicability was achieved by checking four water parameters. The delay for measuring waterways can be changed based on the need. In this sustainability practices, time is done but also costs are relatively.

6.3 Implication for Further Study

The implications of research and projects indicate how the study results may be relevant to strategy, exercise, concept, and future research. Findings and conclusions are the inferences we draw from our total test findings that describe how the findings may be vital for policy, practice, or principle. The main part of is that any project or research that requires an idea or an update can detach the previous work.

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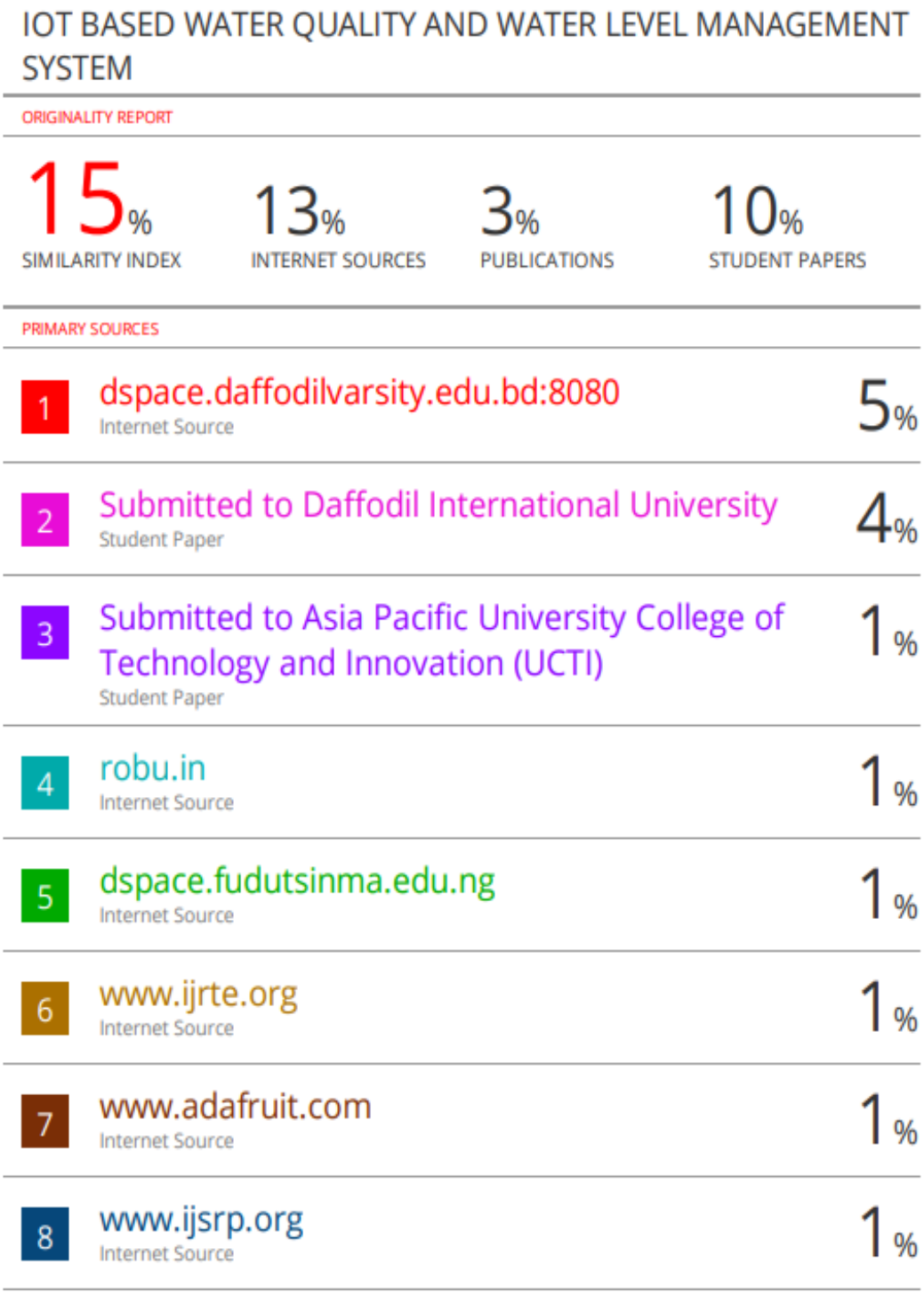
Plagiarism



IOT BASED WATER QUALITY AND WATER LEVEL MANAGEMENT SYSTEM

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