



**M.KUMARASAMY**  
**COLLEGE OF ENGINEERING**  
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Thalavapalayam, Karur – 639 113.



# **SMART WATER LEVEL MONITORING SYSTEM**

## **A MINOR PROJECT- I REPORT**

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## **BACHELOR OF ENGINEERING**

in

## **DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

## **M.KUMARASAMY COLLEGE OF ENGINEERING**

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**M.KUMARASAMY COLLEGE OF ENGINEERING,  
KARUR**

**BONAFIDE CERTIFICATE**

Certified that this 18ECP103L-Minor Project I report . “**SMART WATER LEVEL MONITORING SYSTEM** “ is the bonafide work of “ **DEVAKI M (927622BEC030), DHARSHINI B (927622BEC037), DHARSHNA R (927622BEC040), DHARSINI DEVI R V (927622BEC042)** “ who carried out project under my supervision in the academic year ( **2023-2024 - ODD SEM** )

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This report has been submitted for the **18ECP103L – Minor Project-I** final review held at M. Kumarasamy College of Engineering, Karur on 23-12-2023 .

**PROJECT COORDINATOR**

## **INSTITUTION VISION AND MISSION**

### **Vision**

To emerge as a leader among the top institutions in the field of technical education.

### **Mission**

**M1:** Produce smart technocrats with empirical knowledge who can surmount the global challenges.

**M2:** Create a diverse, fully -engaged, learner -centric campus environment to provide quality education to the students.

**M3:** Maintain mutually beneficial partnerships with our alumni, industry and professional associations

## **DEPARTMENT VISION, MISSION, PEO, PO AND PSO**

### **Vision**

To empower the Electronics and Communication Engineering students with emerging technologies, professionalism, innovative research and social responsibility.

### **Mission**

**M1:** Attain the academic excellence through innovative teaching learning process, research areas & laboratories and Consultancy projects.

**M2:** Inculcate the students in problem solving and lifelong learning ability.

**M3:** Provide entrepreneurial skills and leadership qualities.

**M4:** Render the technical knowledge and skills of faculty members.

### **Program Educational Objectives**

- PEO1: Core Competence:** Graduates will have a successful career in academia or industry associated with Electronics and Communication Engineering
- PEO2: Professionalism:** Graduates will provide feasible solutions for the challenging problems through comprehensive research and innovation in the allied areas of Electronics and Communication Engineering.
- PEO3: Lifelong Learning:** Graduates will contribute to the social needs through lifelong learning, practicing professional ethics and leadership quality

### **Program Outcomes**

- PO 1: Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO 2: Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO 3: Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- PO 4: Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO 5: Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

**PO 6: The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**PO 7: Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO 8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**PO 9: Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO 10: Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO 11: Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO 12: Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

### **Program Specific Outcomes**

**PSO1:** Applying knowledge in various areas, like Electronics, Communications, Signal processing, VLSI, Embedded systems etc., in the design and implementation of Engineering application.

**PSO2:** Able to solve complex problems in Electronics and Communication Engineering with analytical and managerial skills either independently or in team using latest hardware and software tools to fulfil the industrial expectations.

<b>Keywords</b>	<b>Matching with POs,PSOs</b>
Monitoring , IOT , Water conservation , Ultrasonic sensor .	<b>PO2 , PO3 , PO4 , PO5 , PO7 , PO9 , PO11 PO12 , PSO1 , PSO2</b>

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## **ABSTRACT**

This project gives us a proper insight about water conservation through the application of a water level monitoring system. Industries and homes where water is used to a large extent can implement the given model to get the information about the water level in real time . An ultrasonic sensor and a NodeMCU Microcontroller are used to achieve the given results . Using the power of internet, simplification can be further achieved for users as they will be able to view the data from anywhere and thereby giving the power to monitor it from anywhere and giving them chance to achieve the water loss from houses and industries . The need for this control arises due to the fact that water loss is happening at a critical rate and if not controlled the situation will worsen further.



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## **LIST OF ABBREVIATIONS**

<b>ACRONYM</b>	<b>ABBREVIATION</b>
LED	Light Emitting Diode
LCD	Liquid Crystal Display
IOT	Internet of Things

# **CHAPTER 1**

## **INTRODUCTION**

Our project is to reduce the waste of water due to overflow . Our motivation for this project is to build a circuit which can also detect the water level . It is mainly helpful in industries and hometown . Our aim is to design a system which is will be versatile , economical and simple configurable which will be able to solve water level problem and saving water from overflow . System uses NodeMCU Microcontroller and ultrasonic sensor to do work . The sensor sense a pulse of ultrasonic waves and the after hitting the water source again and again for detect the level of water . Because it may help the people to detect the level of water in the storage tank . It may help them to stress free from the level of water while tanking. This will help to detect the level of water by our phone anywhere and everywhere. This project will display the level of water by switching on this device it will be shown by the LEDs connected to the project device . Intend to design a system which can monitor the level of water from water tank . The resource of water are continuously depleting ,so we need to keep a check on our usage so that no extra water goes unutilized .

## **CHAPTER 2**

### **OBJECTIVE**

- Our motivation for this project is to build a circuit which can detect the water level. This system helps to prevent the water wastage of water by informing about the liquid level of the containers .
- It may also helpful to save the Electronics application which uses the water as major source . Because the water level may down it will cause damage for the application .
- The main aim of thus system is to monitor the water level at rural areas so that they help in detecting the wastage of water.
- The primary objective of the proposal model is to monitor the water present in the tank and sump visually when the exceed or recedes the threshold set by the user.

## CHAPTER 3

### LITERATURE REVIEW

1. Hemin Ismael Azeez, Narongrit Pimkumwong proposed Automatic water level control using LabVIEW-Kurdistan Journal of Applied Research (KJAR)-2017. Variety of controlling system are introduced in [1]-[4] to overcome the problem and to automatically pump up and control the water level in the overhead tank. In [1] a microcontroller based automatic water level control system using AT89C52 microcontroller is introduced. Authors in [2] have addressed the problem and presented a system of an automatic water level controller with SMS notification. Arduino UNO is also employed as controller system as it has an open source libraries. For the SMS circuit Motorola c261 model supports serial communication with headset plug has been employed that can support AT commands which can be used for Global System for Moblie (GSM) control system.
2. Monika, n.Siva Kumar Reddy-2016 he has proposed his to study the method to check and control water level for irrigation system. The water is a one of the most important natural resource and it is an important assert to save the water on the earth. This paper describes the autotamatic system to monitor and control water level with the help of water level sensors and wireless network system. The need of this paper is to cut water wastage occurs in cannel and sub cannel, and the WSW system reduces the human efforts.

3. Kon et.al,2009 explained the use of image sensor for measuring water level is the most recent approach.Different from other types of sensors, it can provide the surrounding information around the sensor as well as the water level so that the measured data can be confirmed.It also has an advantages that it is unaffected by weather. Commenting on his experience with the rader sensor the environment Agency”s Rikk Smith says, “We have been very pleased with this sensor because it was quick and easy to install and we have not had to touch it since it was installed over five months ago”.

4. Jaehyoung Yu Harnsoo Han,2006 explained the monitoring water level in a river or in reservoir is important in the applications related to agriculture, flood preventing and fishing industry etc. The schemes develop for measuring water level can be categorized as 4 types based on measuring features: pressure, supersonic waves, heat, image.

## **CHAPTER 4**

### **FEASIBILITY REPORT**

#### **4.1 EXISTING METHOD :**

The overall system presented in this study is subdivided into of two layers of the system architecture . The physical layers and presentation l layer .

**Physical layer :** Physical layer consist of Sensors nodes and Communication technologies . At this layer the data is controlled and transferred to the presentation layer .

**Presentation layer :** The data from the physical layer is stored and presented in the display to know the water level . It will also shown by the indication if LEDS fixed in this system.

## **4.2 PROBLEM STATEMENT :**

Need of this system is to avoid wastage of water. Sometimes people forget to off the motor when the tank is full, because of that water get wasted . To avoid wastage of water this project came into picture. By using this water level monitoring system we can monitor the level of water and consumption of water. As well as time saving benefits , water level monitoring can have a wide variety of environment benefits , such as improved visibility on potential flood situation . By utilizing water level monitoring system , it is much easier to rapidly deploy countermeasures in the event that levels becomes too low or high .

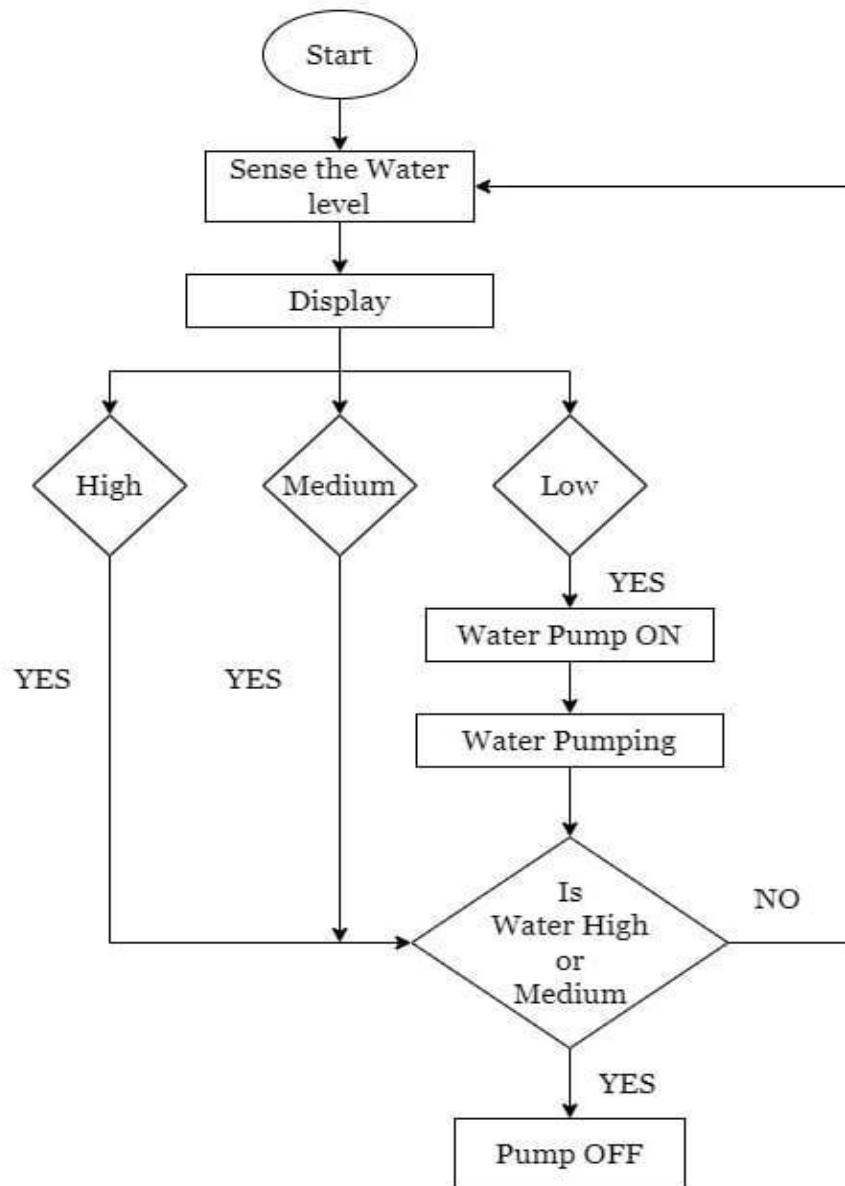
## **4.3 PROPOSED METHOD :**

In this proposed application architecture of the system , the physical layer consist of the physical environment such as water source and ultrasonic waves to sense the water level in the water tank with required network connectivity . The sensor water is uploaded to carries at the presentation layer of the architecture which is the second layer . The proposed system consist of water level sensor and digital logic processor unit . Those proposed system eliminates manually controlling of water requirement in home and agriculture field .



## CHAPTER 5

### BLOCK DIAGRAM :



## CHAPTER 6

### COMPONENTS

#### RESISTOR :

Resistor a passive component used to control current in a circuit . It's resistance is given by the ratio of voltage Applied across it's terminals to the current passing through it . It is used to resistance the flow of current. The part of current energy dissipated in the form of heat in resistor , thus decrease the total current .



220 OHM RESISTOR

#### ULTRASONIC SENSOR :

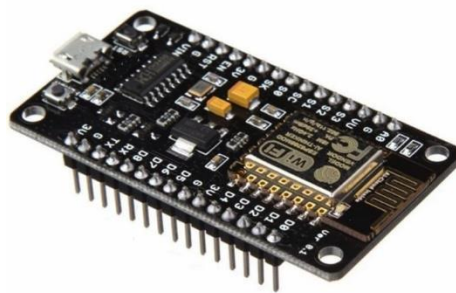
Ultrasonic sensor a transducer to send and receive ultrasonic waves that can relay back information about the denser in the instrument used to measure the distance to an object by using ultrasonic sonic sound waves . Ultrasonic sensor objects proximity . The basic principle of measuring the propagation time of sound between send and receive.



ULTRA SONIC SENSOR

## **NODEMCU ESP8266:**

It has one analog pin, 16 digital I/O pins along with the capability to produce like SPI, UART and I2C. NodeMCU has 128 KB RAM and 4MB of flash memory to store data and program. It is extensively employed development board in IOT application providing a versatile and cost effective approach to connect devices to the internet.



NODEMCU ESP8266

## **RELAY MODULE :**

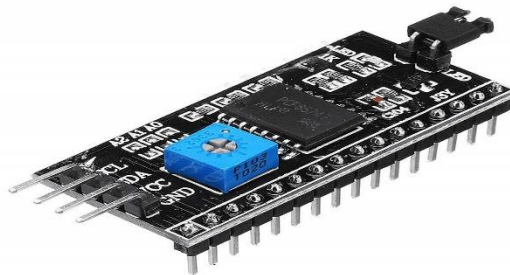
A power relay module is an electrical switch that is operated by an electromagnet. The electromagnet is activated by a separate low power signal from a microcontroller. When activated, the electromagnet pulls to either open or close an electrical circuit. The relay module function is mainly to switch electrical device and system on or off. It also serves to isolate the control circuit from the devices or system being controlled.



5V RELAY MODULE

## 12C MODULE :

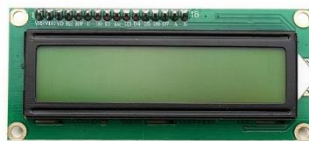
12C module has a inbuilt PCF8574 12C chip that converts 12C serial data to parallel data for the LCD display. These modules are currently supplied with a default 12C address of either  $0 \times 27$  or  $0 \times 3F$ . To determine which version which have check the black 12C adaptor board on the underside of the module.



12C MODULE

## LCD DISPLAY :

LCD(Liquid Crystal Display) is a type of flat panel display which uses liquid crystal in it's primary form of operation. LEDs have a large and varying set of use cases for consumers and businesses, as they can be commonly found in smartphones,televisions,computer monitors and instrument panels.



LCD DISPLAY

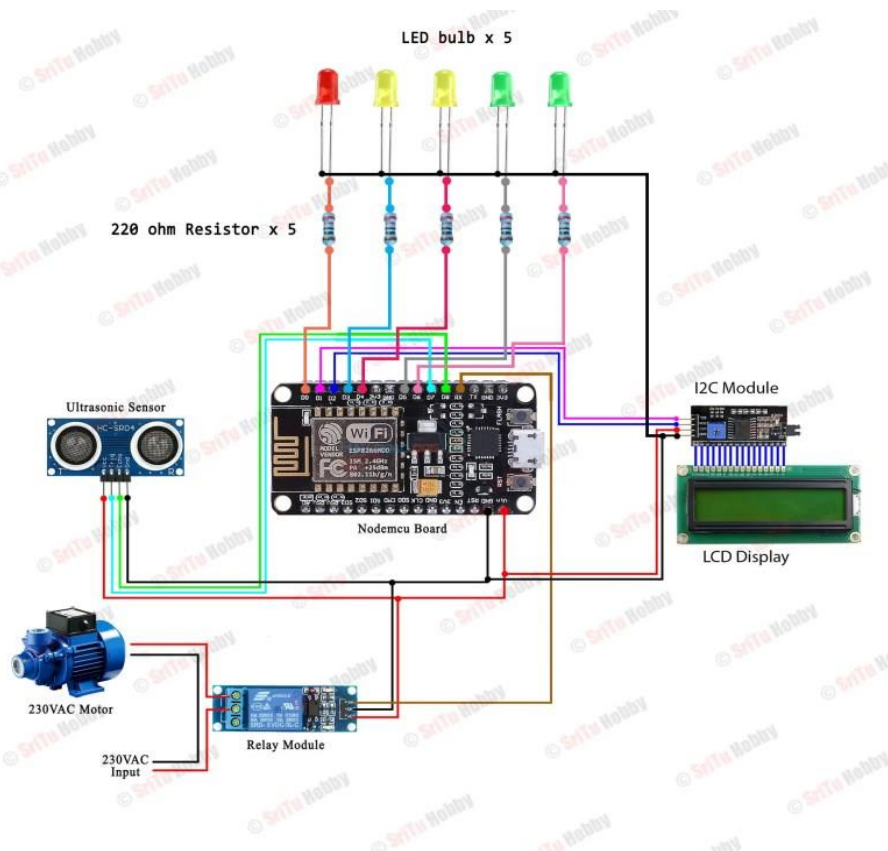
## LEDs :

LED means “Light Emitting Diode”.An LED is an electronic device that emits when an electrical current is passed through it.LEDs are commonly used for indicator lights (such as power on/off) on electronic devices.



LEDs

## CIRCUIT DIAGRAM



## **CHAPTER 7**

### **REPORT AND DISCUSSION**

The water level monitoring system consist of resistor , five different colours of leds connected with five Resistor , Ultrasonic sensor , NODEMCU, Relay module , Lcd display , Jumping wires , 12C module . These instrument are used to operate the system The operation of this project is very simple and easy to understood . We have taken this project to make easy to know the level of water in the tank from far away location also using our mobile phones . The working process is explained below as follow. As we use the ultra sonic sensor to detect the level of water . It will be happened by when the system is active the ultrasonic sensor transmitts the sound signal from the water . The sensor emit an ultrasonic wave and receives the wave reflected back from the target . It's Employment developers board in IOT application which approaches to connect devices to the internet. It features in this project is to provides the level of water measured by the ultrasonic sensor to the app devolved in phone which is uploaded . The another way as we set relay module to get output in the lcd display .

## **CHAPTER 8**

### **CONCLUSION**

The project enables us to observe the level of waterfront a distant location and helps us to track it and protect it from overflowing and thereby enabling the user to ensure that no extra water gets used and there is no excess loss of water. We know that the major place where water gets wasted is industries and homes. So using proposed system will help to minimize the water loss to a large extent. If the user knows about the water level in real-time he/she has the power to maintain the water loss to an extent by maintaining the water at a sustainable height. i.e., between 30-70% of the original tank to ensure no overflowing.

## **CHAPTER 9**

### **REFERENCE**

1. P.Dietz,W.Yerazunis,D.Leigh,Very Low-Cost sensing and the communication using Bidirectional LEDs,UbiComp 2011:Proceeding vol.2864,pp.175-191,2003.
- 2.M.Javanmard,K.A.Abbas and F.Arvin, “A Microcontroller Based Monitoring the System for Batch TeaDryer”,CCSE journal of Agricultural Science, Vol.1,NO.2,December 2012
3. Microcontroller Based Automated Water Level Sensing and Controlling: Design and Implementation Issue Proceedings of the World Congress on Engineering and Computer Science, pp 220-225.
- 4.S.M.Khaled Reza, Shah Ahsanuzzaman MD.Tariq, and S.M.Mohin Reza, “Microcontroller Based Automated Water Level Sensing and Controlling:Design and Implementation Issue” Proceeding of the World Congress on Engineering and Computer Science, vol 1,2014.
5. M.Javanmard, K.A.Abbas, and F.Arvin, “A Microcontroller-Based Monitoring System for Batch Tea Dryer” CCSE Journal of Agricultural Science, vol.1,no.2,2013.
6. Osama Mahfooz,Mujtaba Memon, and Asim Iftikhar, “Project Review on Water Level Sensing Using PLC” Journal of Agricultural Science, vol.2,no.2,pp.160-170,2012. Jagdeesh Boopathi, “555 Timer Based Water Level Controller,” Electronics Tutorials by Jagansindia Inc.,23 June2013.



7. Jagdeesh Boopathi, “555 Timer Based Water Level Controller,” Electronics Tutorials by Jagansindia Inc.,23 June2013.
8. <https://ece.jagansindia.in/2013/06/555-timer – based water-level-controller>.
9. S.Jatmiko, A B.Mutiara, Indriati-Prototype of water level detection system with wireless Journal of Theoretical and Applied Information Technology vol.37 pp 52-59,2012.
10. Distance Measurement Using HC-SR04 via NodeMCU
11. Automatic Water Level Indicator and Pump Controller using Arduino from
12. Hicks,F.,Tyler G.;Edwards,T.W.Pump application Engineering –McGraw-Hill Book Company ,New York .