Waste Water Management System using IoT

[1]R.P.Shanthi Rani*, [2]R.Reeja Igneshia Malar, [3]Dr.M.Vadivukarassi
[1,2]Assistant Professor, [3]Associate Professor
[1]Department of CSE Artificial Intelligence and Machine Learning
[2]Department of CSE Cyber Security,
[3]Department of CSE [1,2]CMR Engineering College, Secunderabad, Telangana, India
[3]St. Martin's Engineering College, Secunderabad, Telangana, India.
*Corresponding Author E-mail: shanthivigil@gmail.com

Abstract— Water is a critical resource for agriculture and has not been well managed in India. The urban wastewater has been monitored by using the smart solution for testing the quality of water by using an array of sensors and thus the measured value is displayed in LCD. the foremost aim of this project includes the estimation of water quality parameters like PH, Turbidity, Temperature, BOD, TDS that helps to identify the deviations in parameters and provides an alert message when there's an abnormal level, i,e. the value exceeds the predefined threshold or the standard value set within the Arduino Uno Controller.

Indexed Terms-- Arduino uno, sensors, LCD

I. INTRODUCTION

Now a day's the water gets easily polluted by various factors like industries and analyzing such polluted water is the biggest deal for the planet to tackle. The monitoring of such polluted water should be made continuously. The troubles of surface water bodies are predominantly because of organic nutrients. Over 90% of the board plants surveyed demonstrated that agribusinesses, a gigantic worry within the bowl, which include diffuse or factor source pollutants with the help of organic be counted, nutrients, pesticides and hydro-morphological influences Using a cluster of sensors to watch the parameters gives the hydrogen of ions concentration in a very solution and it's helpful to spot the acidity or alkalinity of a solution.

II. RELATED WORK

Thilina N Balasooriya, Pranav Mantri, and Piyumika Suriyampola focused on IOT-based smart watering systems for improving the efficiency of agricultural irrigation. By monitoring the soil moisture of crops and also the PH level of the irrigation water, not only can water be conserved, but healthier plants can even be cultivated. This research proposes an IoT-based smart watering that addresses both of those concerns by using PH and soil microcontrollers. The IBSWS prototype demonstrates that the employment of sensors and Wi-Fi-enabled microcontrollers over a cloud environment are often accustomed implement such a system and properly managing crop irrigation.[1]

Fei Yuan, Yifan Huang, Xin Chen proposed, a Biological Sensor System Using Computer Vision for Water Quality Monitoring. pollution has seriously threatened our life, so a good water quality monitoring mechanism is the most significant part of water quality management. Most studies use biological monitoring methods to watch water pollutants, like pesticides, heavy metals, and organic pollutants. However, there are still many difficulties at this time. Few methods consider the influence of illumination and complicated background within the monitoring environment, and therefore the characteristics parameters extracted within the systems are single. additionally, the results of using shallow neural networks for water quality classification are often not ideal. so as to resolve the above problems, we design a water quality monitoring system combined with the pc image processing technology and use computer vision to investigate the fish behaviour in real-time for monitoring the existence or not of pollution. For the illumination problem, we use the no-reference quality assessment algorithm supported by natural scene statistics for contrast distortion images to judge the video and configure the lighting conditions of the monitoring environment. White balance pre - processing is additionally perf ormed to produce an excellent basis for moving target detection. Besides, we use background modeling to eliminate the influence of complex background on the moving target detection and therefore the foreground is

extracted using the saliency detection algorithm. to comprehensively analyze the influence of water quality on the fish behaviour from the extracted foreground targets, multi-dimensional feature parameters are wont to quantify the indications, including movement velocity, rotation angle, spatial variance, and body color which characterize the behaviour changes of the fish. Finally, the classification model supported by the long memory neural network is employed to classify the feature parameters data of the fish behaviour in several water quality environments.[2]

Manish Kumar Jha, Rajini Kumari Sah, M. as proposed a smart water monitoring system for real-time water quality and usage monitoring. This paper consists of two parts: smart water quantity meter and smart water quality meter. the target of designing SMQM is to make sure conservation by monitoring the quantity of water consumed by a household, notifying the identical to the buyer and also the authority.[3]

III. PROPOSED SYSTEM

- The waste water is treated and monitored by using the array of sensors that are collected to Arduino uno board and measured value is displayed in LCD.
- we have developed a coffee cost system for real time monitoring of the water quality in IOT environment.
- In this design Arduino uno is employed as a core component. the planning system applies a specialized IOT module for accessing sensor data from core component to the cloud.

IV. OBJECTIVES

- Monitoring the water quality using sensors.
- Based on the sensor value decide the water is suitable for agriculture or not.
- Update Sensor value to IOT.
- Intimation message sent to authentication Person

V. HARDWARE AND SOFTWARE REQUIREMENTS

- Hardware Requirements:

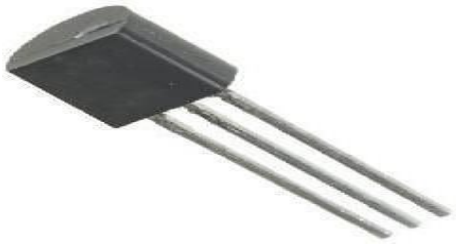
1. Arduino UNO

Arduino is an open-source hardware and software company, project, and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices and interactive objects which will sense and control objects within the physical and digital world.

2. Ph Sensor

A pH sensor may be a scientific device that's accustomed measure the cation activity in water. pH sensor determines pH by measuring the voltage level or the difference of the solution during which it's immersed. pH value of solutions ranges from 1 to 14. A pH sensor got two electrodes, which are measuring electrode and reference electrode. The reference electrode won't be changed because it always provides a tough and fast voltage when the pH meter is dipped into the solutions. The measuring electrode provides voltag e and sensitivity to the cation. If the temperature changes, then the differential voltage of the electrode also changes. Therefore we would like a temperature sensor.

Temperature Sensor



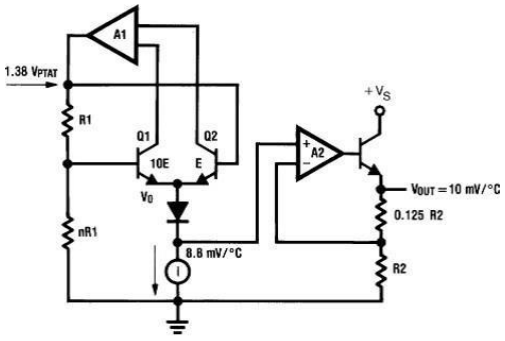
The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The

LM35 doesn't require any external calibration or trimming to provide typical accuracies.

FEATURES

- Calibrated directly at ° Celsius (Centigrade)
- Linear + 10.0 mV/°C scale factor
- 0.5°C accuracy guarantee able (at +25°C)
- Rated for full −55° to +150°C range
- Suitable for remote applications
- Low cost due to wafer-level trimming
- Less than 60µA current drain
- Operates from 4 to 30 volts
- Low self-heating, 0.08°C in still air
- Low impedance output, 0.1 W for 1 mA load.

CIRCUIT DIAGRAM



Circuit diagram of temperature sensor

3. Turbidity sensor

Turbidity could be a measure of the cloudiness of water. Turbidity has indicated the degree at which the water loses its transparency. it's considered as a decent measure of the standard of water. The turbidity sensor is that the measurement of water transparency. it's accustomed measure total suspend solids (TSS) in water by sending the sunshine beam into the water body. Turbidity is measured in Nephelometric Turbidity Units, which is thought as NTU. Turbidity values from the turbidity sensor is higher or lower.

Gas sensor

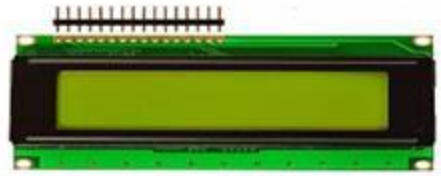
Gas sensor is one which comes in handy in applications where we've got to detect the variation within the concentration of toxic gases to keep up the system safe and avoid/caution any unexpected threats.

A gas sensor could be a device that detects the presence or concentration of gases within the atmosphere. supported the concentration of the gas the sensor produces a corresponding electric potential by changing the resistance of the fabric inside the sensor, which may be measured as output voltage. supported this voltage value the kind and concentration of the gas are often estimated.

Specifications of MQ-3 Gas Sensor

- Power requirements: 5 VDC @ ~165 mA (heater on) / ~60 mA (heater off)
- Current Consumption: 150mA
- DO output: TTL digital 0 and 1 (0.1 and 5V)
- AO output: 0.1- 0.3 V (relative to pollution), the maximum concentration of a voltage of about 4V
- Detecting Concentration: 0.05-10mg/L Alcohol
- Interface: 1 TTL compatible input (HSW), 1 TTL compatible output (ALR)
- Heater consumption: less than 750mW
- Operating temperature: 14 to 122 °F (-10 to 50°C)
- Load resistance: 200kΩ
- Sensitivity S: Rs(in air)/Rs(0.4mg/L Alcohol)≥5
- Sensing Resistance Rs: 2KΩ-20KΩ(in 0.4mg/l alcohol)
- Dimensions: 32 x 22 x 16 mm

4. LCD

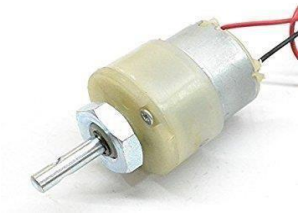


(Liquid Crystal Display) is a type of flat panel display which uses liquid crystals in its primary form of operation.

5. Power Supply

A power supply may be a hardware component that supplies power to a device. It receives power from a wall plug and converts this from AC (alternating current) to DC (direct current), which is what the pc requires.

6. DC Motor



The motor is the electro-mechanical machine that converts the current into energy. the devices which produce rotational force are understood because of the motor.

Features

- Can be used to run Two DC motors with the same IC.
- Speed and Direction control are possible
- Motor voltage Vcc2 (Vs): 4.5V to 36V
- Maximum Peak motor current: 1.2A
- Maximum Continuous Motor Current: 600mA
- Supply Voltage to Vcc1(VSS): 4.5V to 7V
- Transition time: 300ns (at 5Vand 24V)
- Automatic Thermal shutdown is available
- Available in 16-pin DIP, TSSOP, and SOIC packages

7. RELAY

The relay operates both electrically and mechanically. It consists of electromagnetic and sets of contacts that operate on the switching.

8. Nodemcu

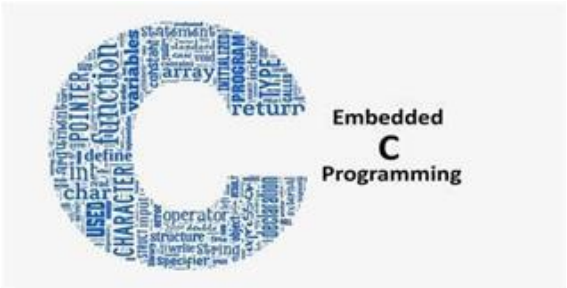
Nodemcu is an open-source IoT platform. The Node uses Lua scripting language to program. But don't be concerned. Your familiar Arduino IDE can also be accustomed to Program Nodemcu. Nodemcu runs an ESP8266 WiFi SoC from Espressif Systems. Nodemcu contains an in-built WiFi module. which means you'll easily connect it to WiFi with a few lines of code.

- SOFTWARE REQUIREMENTS

1. Arduino IDE

The Arduino integrated development environment (IDE) (figure 4.4.1) is a cross-platform application for Windows, macOS, and Linux that's written within the artificial language Java. it's accustomed write and uploading programs to Arduino compatible boards, but also, with the assistance of 3rd party cores, other vendor development boards. The Arduino IDE supports the languages C and C++ using special rules of code structuring. it's a politician Arduino software, making code compilation too easy that even a typical person with no prior technical knowledge can get their feet wet with the training process. most code, also referred to as a sketch, created on the IDE platform will ultimately generate a Hex File which is then transferred and uploaded within the controller on the board. most code also called a sketch, created on the IDE platform will ultimately ge nerate a Hex File which is then transferred and uploaded within the controller on the board.

2. EMBEDDED C



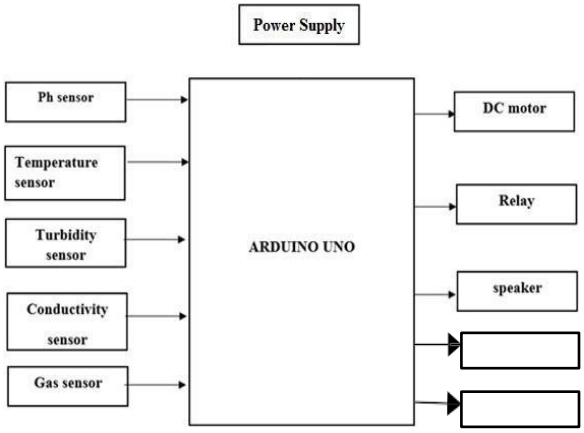
Embedded C is an extension to C artificial language that has support for developing efficient programs for embedded devices. it isn't a component of the C language. C is the foremost generally used language for embedded processors/controllers. Assembly is additionally used but mainly to implement those portions of the code where very high timing accuracy, code size efficiency, etc. are prime requirements. Arduino IDE (Integrated Development Environment) is fully developed into functionality crammed with libraries, as long as programming the Arduino UNO in Embedded C language is possible because Arduino IDE can compile both Arduino code a dditionally as AVR standard code.

3. Telegram Bots

Bots are third-party applications that run inside Telegram.

Users can interact with bots by sending them messages, commands, and inline requests. You control your bots using HTTPS requests to our Bot API.

VI. SYSTEM DESIGN



A controller, those noteworthy and only the IoT empower water following framework. it's significantly discovered that the bulk of the IoT builds addresses utilization. A controller with outside Wi -Fi and also the vitality productive what's more additionally realize convoluted meandering. within the ESP8266, are going to be one chip microcontroller inside constructed Wi -Fi module, which could an opportunity to be identified with those closest Wi -Fi warm spots to network connectivity. The sensor is immediately interfaced with the controller of the uncovered domesticated water acceptable. Those sensor parameters would be accustomed to discovering those water levels and can measure by method for setting the sensor under dissimilar results about water. Those measure for parameters encompasses a chance to be seen. Eventually, pursuing employment in LCD (Liquid Crystal Display). The majority of the information from the sensor sent to the cloud for the employment of controller is the sting are prepared inside the cloud-dependent upon the prerequisites equipped those side for WHO (World Health Organization).

Messages are going to be sent from a cloud of the client portable if the worth exceeds the brink. A caution message is shipped to the user yet on the govt. using an IoT. Likewise, provides remedial measures to stay up the amount of the measurement parameters with move forward those nature from claiming water. This might be utilized by both the water top quality monitoring government in addition to users within the smart water great tracking devices, the clever

water sensor interface devices that integrated facts storage, records processing the water measurement.

VII. CONCLUSION

Monitoring of Turbidity, PH & Temperature of Water makes use of water detection sensor with a unique advantage and existing GSM network. The system can monitor water quality automatically, and it's low in cost and doesn't require people on duty. that the water quality testing is perhaps visiting be more economical, convenient, and fast. The system has good flexibility. Only by replacing the corresponding sensors and changing the relevant software programs, this system is accustomed monitor other water quali ty parameters. The operation is straightforward. The system is often expanded to watch hydrologic, pollution, industrial and agricultural production so on. its widespread application and extension value. By keeping the embedded devices within the environment for monitoring enables self -protection (i.e., smart environment) to the environment. To implement this must deploy the sensor devices within the environment for collecting the data and analysis. By deploying sensor devices within the environment, we are going to bring the environment into reality i.e. it can interact with other objects through the network. Then the collected data and analysis results are visiting be available to the tip user through the Wi - Fi.

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