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ONLINE SYSTEM FOR MONITORING WATER QUALITY,LEAKS,CONTAMINATION AND MANAGING PIPELINE NETWORK

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Abstract :
• People now days always want something that can make their life easier. To fulfill the requirement of the people we develop the smart water monitoring system for home or office. In this the water monitoring systems such as water pollution monitoring and water pipeline leakage sensing monitoring. This system is used to avoid the huge amount of water is being wasted by uncontrolled use of home/offices. In this system we use the sensors to check the pipe leakage and water quality. Leak detection in water pipelines, we use the Soil Moisture sensor to leak detection, it will check the water quality by using the pH value, Turbidity and the temperature of the water. The values are continuously updated to cloud server and is displayed on LCD

IndexTerms -Arduino, Soil moisture sensor, Turbidity sensor, Temperature sensor,pH sensor,Nodemcu,LCD.

I.INTRODUCTION:

People now days always want something that can make their life easier. To fulfill the requirement of the people we develop the smart water monitoring system for home or office. In this the water monitoring systems such as water pollution monitoring and water pipeline leakage sensing monitoring. This system is used to avoid the huge amount of water is being wasted by uncontrolled use of home/offices. In this system we use the sensors to check the pipe leakage and water quality. Leak detection in water pipelines, we use the Soil Moisture sensor to leak detection, it will check the water quality by using the pH value, Turbidity and the temperature of the water. The values are continuously updated to cloud server and is displayed on LCD. we are using Arduino uno as microcontroller and sensors. By using arduino UNO microcontroller we can eliminate ADC module which decreases complexity. The pH sensor, temperature sensor, turbidity and water flow sensor monitors the quality of water. The ultrasonic sensor detects the level of water in the tanks and pipe. The soil moisture sensor check any leakage or not. All the values are uploaded to IOT.

II.LITERATURE REVIEW AND EXISTING SYSTEM:

2.3: Existing system:

Embedded board is the main system which controls and connects to all other modules in the existing system, this module will contain a microcontroller and microcontroller related circuit which is use to run it and interface to it. It checks the water quality using pH sensor and checks water level using ultrasonic sensor. The ADC module will get analog values from the sensor and send to microcontroller. The message will send to concern mobile number if threshold value exceeds.

Drawbacks:

- ADC module increases complexity
- Time consuming

III. PROPOSED SYSTEM:

In this proposed system we are using Arduino uno as microcontroller and sensors. By using arduino UNO microcontroller we can eliminate ADC module which decreases complexity. The pH sensor, temperature sensor, turbidity and water flow sensor monitors the quality of water. The ultrasonic sensor detects the level of water in the tanks and pipe. The soil moisture sensor check any leakage or not. All the values are uploaded to IOT.

The system is completely self-sufficient, no need for charging, the batteries at the nodes are charged using water propelled dynamo. The system is completely wireless without the hassle of wires being laid underground. The system addresses all water needs and water problems to both water supply board and end citizens. Because of the node setup and highly modular design the system has high repairability and serviceability. Highly economical and water proof design of the system makes it easy to scale to a city level.

3.1 : BLOCK DIAGRAM:

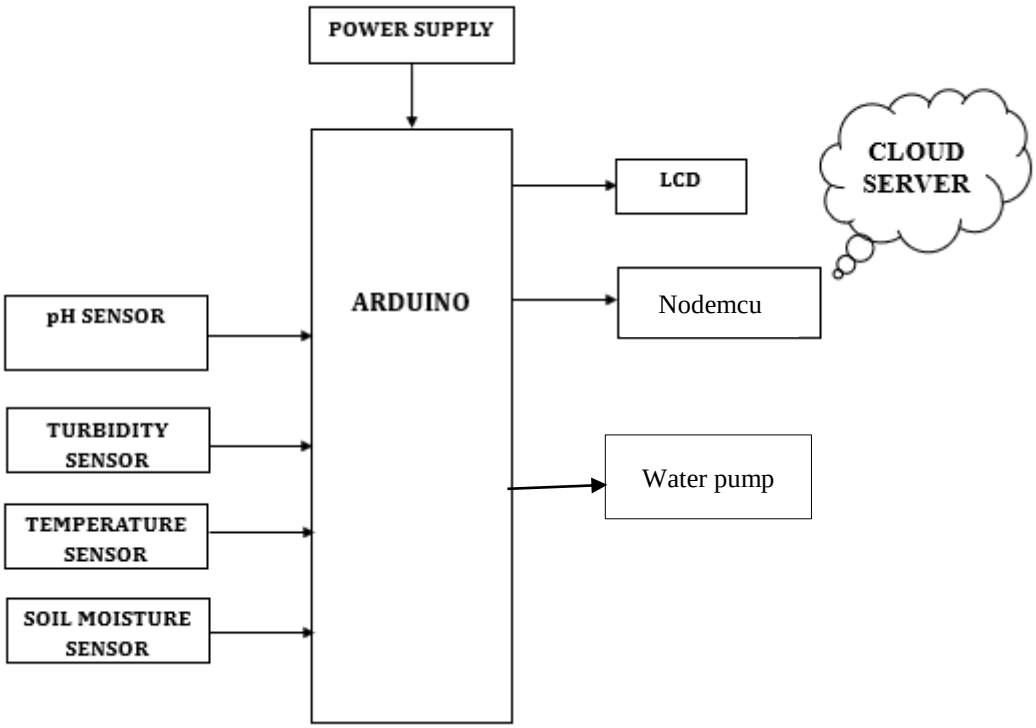

Fig 3.1: Block diagram of proposed system

3.2:ADVANTAGES:

- Low power consumption
- Water quality monitoring

3.3:APPLICATIONS:

- Drinking water distributing systems
- Lake, River, Sea water monitoring

IV.COMPONENTS DESCRIPTION:

4.1: HARDWARE COMPONENTS REQUIREMENTS:

4.1.1: ARDUINO UNO:

Arduino Uno is a very valuable addition in the electronics that consists of USB interface, 14 digital I/O pins, 6 analog pins, and Atmega328 microcontroller. It also supports serial communication using Tx and Rx pins.There are many versions of Arduino boards introduced in the market like Arduino Uno, Arduino Due, Arduino Leonardo, Arduino Mega, however, most common versions are Arduino Uno and Arduino Mega. If you are planning to create a project relating to digital electronics, embedded system, robotics, or IoT, then using Arduino Uno would be the best,easy and most economical option.

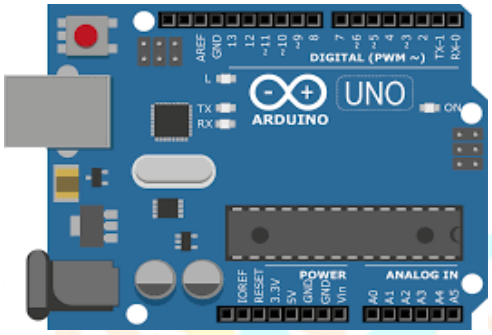

Fig 4.1.1: Arduino UNO

4.1.2:pH Sensor:

A pH sensor is one of the most essential tools that's typically used for **water measurements**. This type of sensor is able to measure the amount of alkalinity and acidity in water and other solutions.

Fig 4.1.2: pH Sensor

4.1.3:NODE MCU:

Node MCU is an open-source firmware and development kit that plays a vital role in designing your own IoT product using a few Lua script lines.Multiple GPIO pins on the board allow you to connect the board with other peripherals and are capable of generating PWM, I2C, SPI, and UART serial communications.

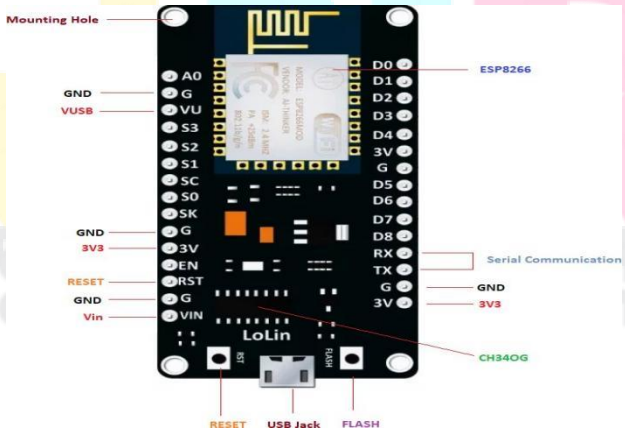

Fig4.1.3: Node M

4.1.4: LCD:

LCD(Liquid Crystal Display) is the innovation utilized in scratch pad shows and other littler PCs.Like innovation for light-producing diode(LED) and gas -plasma,LCDs permit presentations to be a lot more slender then innovation for cathode beam tube(CRT).LCDs expend considerably less power than LED shows and gas shows since they work as opposed to emanating it on the guideline of blocking light.

Fig4.1.4: LCD

4.1.5:Temperature Sensor:

The DHT11 is a commonly used Temperature and humidity sensor that comes with a dedicated NTC to measure temperature and an 8-bit microcontroller to output the values of temperature and humidity as serial data.

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Fig4.1.5: Temperature Sensor

4.1.6:Soil Moisture Sensor:

Soil moisture sensors **measure the water content in the soil and can be used to estimate the amount of stored water in the soil horizon**. Soil moisture sensors do not measure water in the soil directly. Instead, they measure changes in some other soil property that is related to water content in a predictable way.

Fig4.1.6: Soil Moisture Sensor

4.1.7:Turbidity Sensor:

Turbidity sensors **measure the amount of light that is scattered by the suspended solids in water**. As the amount of total suspended solids (TSS) in water increases, the water's turbidity level (and cloudiness or haziness) increases.

Fig4.1.7:Turbidity Sensor

4.2: SOFTWARE COMPONENT REQUIREMNTS:

4.2.1:ARDUINO IDE SOFTWARE:

The Arduino integrated development environment (IDE) is a cross platform application (for Windows, macOS, Linux) that is written in the programming language Java. It originated from the IDE for the languages Processing and Wiring. It includes a code editor with features such as text cutting and pasting, searching and replacing text, automatic indenting, brace matching, and syntax highlighting, and provides simple one-click mechanisms to compile and upload programs to an Arduino board. It also contains a message area, a text console, a toolbar with buttons for common functions and a hierarchy of operation menus. The source code for the IDE is released under the GNU General Public License, version.

4.2.2:EMBEDDED C:

EMBEDDED C Programming is the soul of the processor functioning inside each and every embedded system we come across in our daily life,such as mobile phone,washing machine and digital camera. Each processor is associated with embedded software. The first and foremost thing is the embedded software that decides functioning of the embedded system. Embedded C language is most frequently used to program the microcontroller.

V.RESULT AND DISCUSSION:

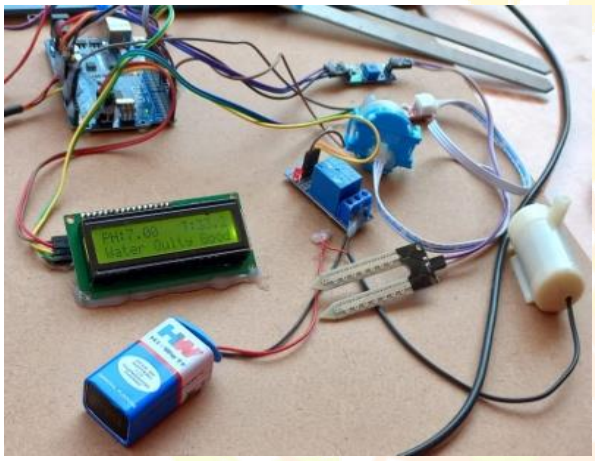

FIG 5.1: Working Model of the system display water quality qualitybad

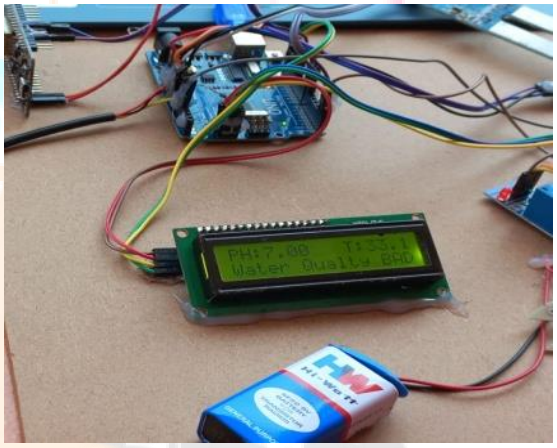

FIG 5.2:Working Model of the system display water good

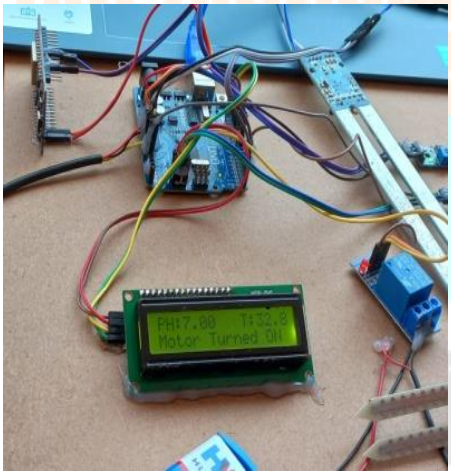

FIG 5.3:When motor turned on

FIG 5.4: When motor turned on displays on the app

FIG 5.5:Green dot represents,water quality good

FIG 5.6: Red dot represents leak detected

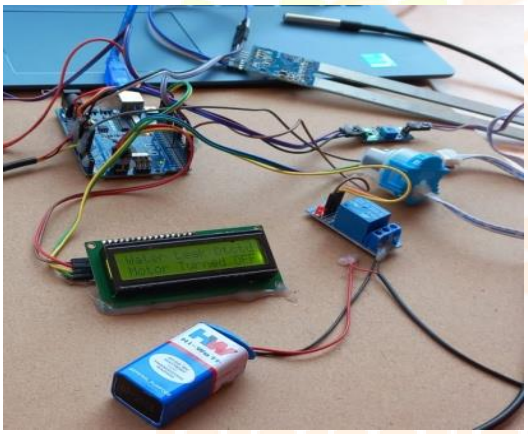

FIG 5.7:Leak detected ,when motor turned off

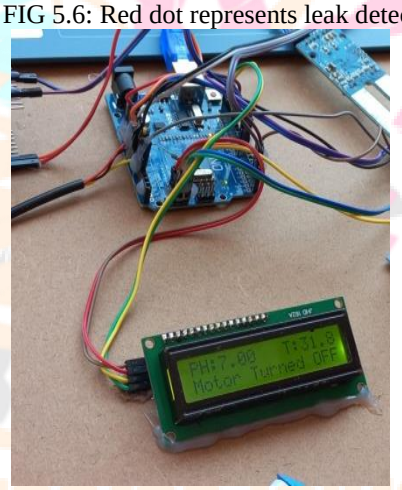

FIG 5.8:When motor turned off

VI.CONCLUSION:

With the advent of IoT and smart cities, developing technology which promotes sustainability and protects the environment is the need of the hour. If the researched system can be implemented in a developing country like India, then thousands of lives can be saved, which are lost due to contamination of water and water can be supplied to all the areas which face high stress due to limited water supply. The proposed work has a lot of scope in terms of maintain the purity of water. The overall project scope includes water quality monitoring. To address the water quality in all the industrial areas water monitoring station will be installed at locations such as residential, and industrial areas. This project also detects the leaks in pipeline and if any leak detected then it stops the supply of water which saves the water from wastage and also contamination due to leak. An app is specially designed for this project to monitor the different parameters like water turbidity, PH etc.

VII.REFERENCES

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