



WATER TURBIDITY SYSTEM

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PROJECT OVERVIEW :

In the past few decades many water resources has been polluted by industrial wastes, sewage and also due to lack of maintenance, but their colour remains as pure water. People from various places in and across the globe without having knowledge on the harmful effects of these polluted water resources use this water for their drinking and household purposes which results in some kinds of diseases especially in rural areas over urban areas .To avoid these problems the water turbulence system can be used which clearly indicates the clearness of water and helps us to get a clear idea whether the water resources is eligible to use or not. It will also be helpful for various scientific and agricultural purposes.

INTRODUCTION :

Water turbidity refers to the cloudiness or haziness of water caused by the presence of suspended particles, such as sediment, algae, organic matter, or microorganisms. It is a critical parameter for assessing water quality in various applications, including drinking water supply, wastewater treatment, environmental monitoring, and industrial processes. High turbidity levels can reduce water clarity, affect aquatic ecosystems, and indicate potential contamination.

A **Water Turbidity System** is a specialized solution designed to measure and monitor the turbidity of water. The system employs advanced sensors and technologies to provide real-time data on water clarity, enabling users to take timely action to ensure water quality. These systems are essential for maintaining compliance with environmental and health standards, optimizing water treatment processes, and protecting ecosystems.

DEVICE REQUIREMENTS :

- Turbidity Sensor Module
- Arduino
- 16*2 I2C LCD
- Common cathode
- RGB LED
- Breadboard

Miscellaneous and Tools :

- 5V or 9V battery
- Jumper Cables
- Arduino IDE - Arduino based programming

Arduino Technical Specification:

- Developer : Arduino
- Manufacturer : Many
- Type : Single-board microcontroller[1]
- Retail availability :
- <https://store.arduino.cc/usa/>
- Operating system : None
- CPU : Microchip AVR (8-bit)
- Memory : SRAM
- Storage : Flash, EEPROM

Turbidity sensor

The water turbidity sensor is used to measure the quality of water in Nephelometric Turbidity Unit (NTU) units. It is connected with with Arduino Micro board (microcontroller) and the other end is immersed in water to find the clearness of the Water. The turbidity sensor is very accurate and effective and takes a complete reading of the pureness and cleanliness from the water sample taken for testing and displays the Turbidity Unit in the 16*2 I2C LCD display.

Overview of Turbidity Sensor

The turbidity sensor module comes with three parts: a waterproof lead, a driver circuit, and a connecting wire. The testing probe is made up of both the transmitter and the receiver. This type of module uses an infrared diode as a light source and an infrared receiver as a detector, but the basic idea is the same. The driver part (seen below) is made up of an op-amp and other parts that amplify the detected light signal. The actual sensor can be connected to this module using a JST XH connector, which has three pins: VCC, ground, and output. The output of this module is an analogue value that varies based on the intensity of the light.

BACKGROUND STUDY :

EXISTING SYSTEM :

- The main drawback of the water turbulence system is that it is very large physical instruments which is hard to carry and it is very costly for the setup of instruments and maintenance.
- It is even impossible for a common man to set it up for his usage of testing the quality of water for agricultural purposes or any other specified purposes.
- Even though the existing system is accurate it is not much efficient than our proposed model because of the lack of portability and also requires very high maintenance.

PROPOSED SYSTEM :

- The proposed system helps us to check the turbulence of water without the installation of weighted physical machines and can be carried anywhere to check the turbulence in Nephelometric Turbidity Unit.
- It is easily portable and costefficient and it is affordable for common people as well to use it in the field of agriculture or for finding the purity of water for various other purposes.

SOFTWARE AND WORKING CONNECTION :

The turbidity sensor's analogue output is connected to the Arduino's A0 pin, and its I2C LCD is connected to the Arduino's I2C pins, which are SCL to A5 and SDA to A4. Next, digital pins D2, D3, and D4 were linked to the RGB LED. Attach the sensor's VCC to the Arduino at 5 volts, and then connect ground to ground.

The sensor's output pin is connected to Arduino's analogue 0. Next, connect the Arduino's 5v and ground to the LCD module's VCC and ground. Next, the Arduino's I2C pins are connected to SDA to A4 and SCL to A5. Lastly, attach the RGB LED's ground to the Arduino's ground, then connect the red to D5, the blue to D4, and the green to D3.

TESTING METHODS :

The different types of testing are :

- Usability Testing
- Compatibility Testing
- Reliability and Scalability Testing
- Data Integrity Testing
- Security Testing
- Performance Testing

USABILITY TESTING

The devices that people utilise come in a wide variety of shapes and sizes. Additionally, each user has a different impression. In IoT testing, it is crucial to verify the system's usability.

COMPATIBILITY TESTING

Numerous gadgets can be linked together using an IOT system. The hardware and software configurations of these devices vary. As a result, the number of conceivable combinations is enormous. Therefore, it is crucial to verify the IOT system's interoperability.

RELIABILITY AND SCALABILITY TESTING

When creating an IOT test environment that uses virtualisation techniques and technologies to simulate sensors, reliability and scalability are crucial.

DATA INTEGRITY TESTING

It's important to check the Data integrity in IOT testing as it involves large amount of data and its application.

SECURITY TESTING

Many users are accessing vast amounts of data in the IOT environment. As a result, it is crucial to verify users through authentication and include data privacy rules in security testing.

PERFORMANCE TESTING

A strategic approach to creating and carrying out an IOT testing plan requires performance testing.

CONCLUSION :

The water turbulence should be taken care of by us in order to leave a healthy and a safety environment for our next generations. We can measure the turbidity of water and can intimate government with water turbulence records and can take early precautions to save pure water and it will also be helpful for farmers, researchers to check the turbulence of water to improve their work with profits and can be used to study about their places with our proposed water turbidity system .