REPORT-

Project Report: WATER TURBIDITY SENSOR

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1. Introduction

The water turbidity sensor project is designed to measure the clarity of water by detecting suspended particles. The system utilizes an Arduino microcontroller, a turbidity sensor, and an I2C LCD display to provide real-time turbidity readings. This project is particularly useful for water quality monitoring in environmental, industrial, and domestic applications. The project was completed by a team of five members, each responsible for different aspects of design, coding, and testing.

2. Materials and Components

- **Arduino Uno**: The main microcontroller that processes sensor data.
- **Water Turbidity Probe**: Measures water clarity by detecting light absorption and scattering.
- **16x2 LCD Display (with I2C connection)**: Displays turbidity readings in NTU (Nephelometric Turbidity Units).
- **Jumper Wires**: Establishes connections between components.
- **Wire Strippers**: Used for preparing wire connections.
- **5V Battery Clip**: Powers the circuit.

3. System Design

- **Power Supply Setup**: A 5V battery clip provides electricity to the Arduino, turbidity sensor, and display module. Voltage regulation ensures stable operation.
- **Module Connections**:
    - The turbidity sensor is connected to the Arduino's analog input (A0) for data acquisition.
    - The I2C LCD is wired to the Arduino's SDA (A4) and SCL (A5) pins for data display.

4. Working Principle

When the sensor probe is placed in water, it emits light and measures the amount of light scattered by particles in the water. The Arduino processes this data and converts it into NTU values, which are displayed on the I2C LCD. Higher NTU values indicate higher turbidity levels, signifying reduced water clarity.

5. Code Description

Key functions of the code include:

- **Reading Sensor Data**: The analog signal from the turbidity sensor is read and converted to an NTU value using a calibration equation.
- **Displaying Data**: The NTU value is sent to the I2C LCD display for real-time monitoring.
- **Threshold Alert (Optional)**: If turbidity exceeds a predefined limit, an LED warning signal or buzzer can be triggered.

6. Outcomes

The project successfully measured water turbidity in different samples, providing accurate real-time readings. The display effectively presented NTU values, allowing for easy interpretation of water quality.

7. Benefits

- **Real-Time Monitoring**: Instant feedback on water quality.
- **Compact and Portable**: Easy to use in field conditions.
- **Cost-Effective**: Affordable solution for water quality assessment.
- **Scalability**: Can be integrated with IoT platforms for remote monitoring.

8. Future Reliability and Enhancements

Potential improvements include:

- **Improved Calibration**: Using multiple reference samples to enhance accuracy.
- **Wireless Data Transmission**: Integrating Wi-Fi or Bluetooth for remote access.
- **Cloud-Based Data Logging**: Storing turbidity data for trend analysis and long-term monitoring.
- **Waterproof Casing**: Ensuring durability for outdoor and industrial applications.

9. Testing and Troubleshooting

Various tests were conducted to validate performance:

- **Sensor Calibration**: Measured against known turbidity standards.
- **Display Accuracy**: Ensured correct NTU values were displayed.
- **Power Efficiency**: Evaluated battery performance in portable applications.

10. Conclusion

The water turbidity sensor system successfully met its objectives by providing a reliable method for water quality assessment. This

project is highly applicable for environmental monitoring, wastewater management, and aquaculture. The experience gained in sensor integration, coding, and troubleshooting was valuable for all team members.