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Arduino UNO based Water Quality Monitoring System

Anisa Pathan, Sanika Kadam, Pooja Mulik, Sahil Alisha Mulani

Department of Electrical Engineering, NMCOE, Peth, India

Department of Electrical Engineering, NMCOE, Peth, India

Department of Electrical Engineering, NMCOE, Peth, India

Assistant Professor, Department of Electrical Engineering, NMCOE, Peth, India

ABSTRACT: This paper presents the design and implementation of an Arduino UNO based Water Quality Monitoring System. It is capable of measuring essential water quality parameters such as pH, turbidity, and temperature using appropriate sensors. This low-cost, portable system provides real-time feedback through an LCD screen and offers optional data logging. The proposed system aims to support environmental monitoring by enabling easy and affordable testing of water in domestic and industrial contexts.

KEYWORDS: Water Quality, Arduino UNO, pH Sensor, Turbidity Sensor, Temperature Sensor, Real-time Monitoring, LCD Display

I. INTRODUCTION

Access to safe and clean water is a fundamental requirement for public health. Traditional water testing methods are costly and time-consuming. With advancements in microcontroller technology, automated and real-time monitoring systems are now feasible. This paper proposes an Arduino-based water quality monitoring system that continuously checks water parameters and alerts the user about unsafe conditions. It is designed for ease of use in both rural and urban settings.

II. LITERATURE SURVEY

Several researchers have proposed models for automated water quality monitoring using microcontrollers. Some studies focus on wireless systems while others emphasize cloud integration. This paper builds upon previous work by providing a simple and cost-effective prototype using basic sensors and Arduino UNO.

III. METHODOLOGY

- Study existing sensor-based monitoring systems.
- Select reliable and cost-effective sensors for pH, turbidity, and temperature.
- Interface all sensors with Arduino UNO.
- Program Arduino to process and display sensor data.
- Assemble components on a breadboard or PCB.
- (Optional) Add SD card module for data logging.

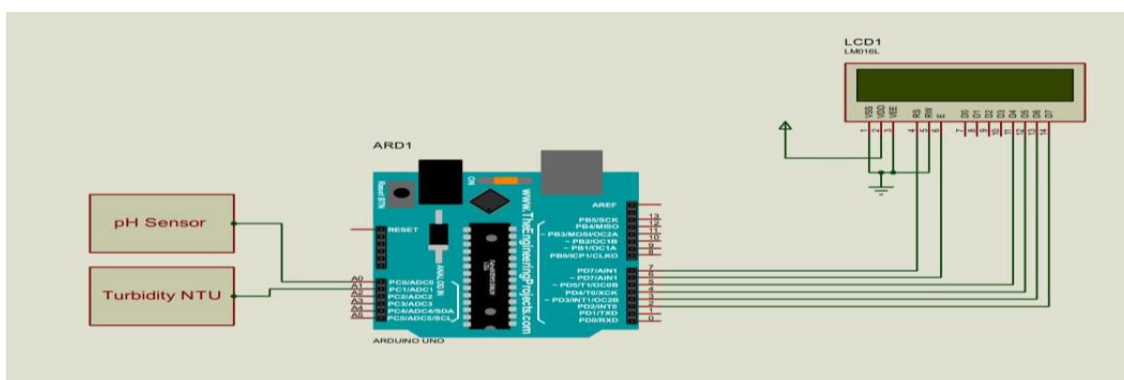
IV. COMPONENTS REQUIRED

- Arduino UNO
- pH Sensor
- Turbidity Sensor
- Temperature Sensor (DS18B20 or LM35)
- 16x2 LCD Display
- Jumper Wires

- Breadboard/PCB
- Power Supply
- SD Card Module (optional)

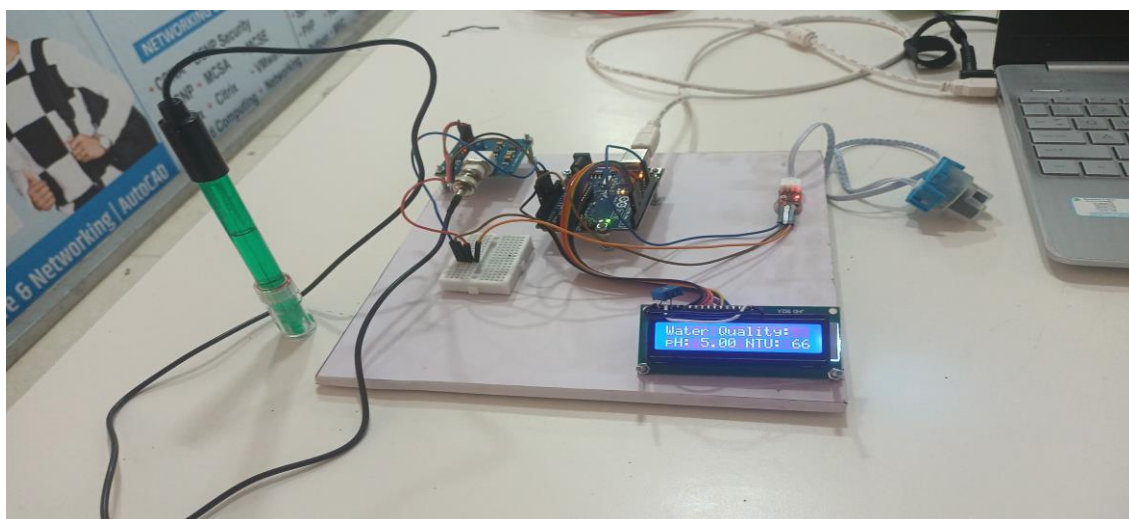
V. CIRCUIT DIAGRAM

Sensors are connected to the analog pins of Arduino UNO. The LCD is connected via I2C module or parallel pins. The circuit can be powered via USB or external battery. (Insert diagram if available)



VI. EXPERIMENTAL RESULTS

The system was tested with water samples of different quality levels. Results indicated correct readings for pH, turbidity, and temperature. Real-time values were accurately displayed on the LCD. This verified the viability of the prototype.



VII. CONCLUSION

An efficient Arduino-based water quality monitoring system was developed successfully. It offers real-time analysis and can be deployed in remote or urban locations with minimal setup. The system is scalable and can be improved with GSM/Wi-Fi modules or solar integration for remote monitoring.

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