Ahsanullah University of Science & Technology
Department of Computer Science & Engineering
Semester Spring 22

CSE 3118

Microprocessors and Microcontrollers Lab

Project Proposal

Project Name: Automation on Water Pump and Water Quality Monitoring System

Submitted To

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Objective:

Water is among the essential natural resources for the survival of life. Humans require water to meet their fundamental needs daily. Water is necessary for various uses in our households in addition to drinking. However, water management is a common struggle that most of us are bored of. It's a pain to chase down municipal water, fill our tanks every time the supply comes on, and track whether the tank is full. And also it is good practice to monitor its quality to ensure it is fit for human consumption.

In this 21st period untidy or polluted water is taken for the drinking requirements that is nonetheless there is no assortment or purifying in numerous evolving countries. People are been exaggerated by several diseases through this polluted water like cholera, typhoid, dysentery, polio, meningitis and guinea worm disease. Unclean water for washing can cause skin and infectious eye disease such as Trachoma.

The good thing is now you can depend on an automated device to take better care of all those chores without needing your participation. These water level controllers and automatic water pumps and water quality monitoring system are champions at what they do, and they do much more than take the weight off your shoulders. It's not just about reducing your tasks; effective pump water management is also pertinent for conserving water.

This project is an 'Automation on Water Pump and Water Quality Monitoring System' where the pump automatically switches ON/Off by sensing different water levels and monitoring the water quality. The fundamental objective of this project is to reduce the wastage of water and drinking pure water.

Social Values:

The automation of water pumps and water quality monitoring systems can have a number of positive social values, including:

1. Improved access to clean water: With an automated water pump and water quality monitoring system, communities can have access to clean and safe drinking water. This can have a positive impact on the health and well-being of community members, particularly those who previously had limited access to clean water.

2. Increased efficiency and productivity: Automation can increase the efficiency of water pump and monitoring systems, which can lead to increased productivity and reduced labor costs. This can be especially beneficial for communities with limited resources and manpower.

3. Enhanced reliability and safety: Automated water pump and monitoring systems can operate continuously and provide real-time data on water quality, ensuring that the water supply is reliable and safe for consumption.

4. Environmental sustainability: Automation can help reduce water waste by optimizing water usage and minimizing leakage. This can help communities conserve water resources and protect the environment. water supply. This is especially useful when energy conservation is a top priority in today's world.

5. Economic benefits: Automated water pump and monitoring systems can stimulate economic growth by providing a reliable and consistent water supply for agriculture, industry, and other economic activities. This can help create jobs and improve the overall economic well-being of a community.

Overall, the social values of automation on water pump and water quality monitoring systems can improve the quality of life for individuals and communities, while also promoting environmental sustainability and economic growth.

Required Components:

The following parts and tools are required for building this project.

- ARDUINO UNO R3
- 16X2 SERIAL LCD MODULE DISPLAY WITH I2C MODULE
- ULTRASONIC SONAR SENSOR HC- SR04
- 5V BUZZER
- 5V RELAY BOARD MODULE

- 5V DC MINI WATER PUMP MICRO SUBMERSIBLE MOTOR PUMP
- LIQUID SUSPENDED PARTICLES TURBIDITY SENSOR DETECTION MODULE KIT
- JUMPER WIRE
- BREADBOARD
- 9V BATTERY
- 9V BATTERY CONNECTOR
- TUBE

Working Procedure:

The essential components that react to the input are

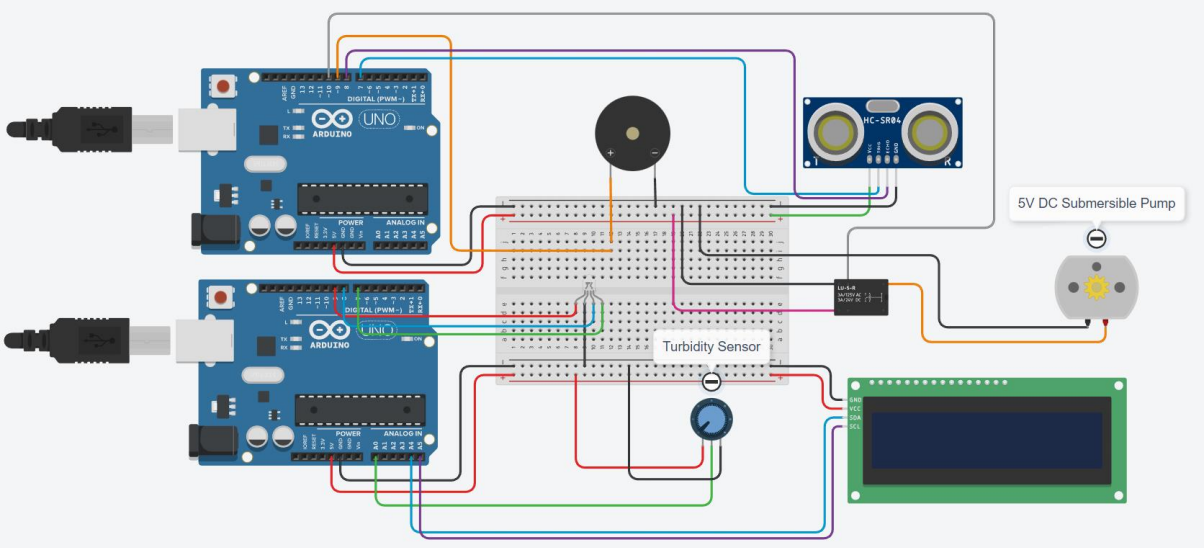
- 16X2 SERIAL LCD MODULE DISPLAY WITH I2C MODULE
- 5V BUZZER
- 5V DC MINI WATER PUMP MICRO SUBMERSIBLE MOTOR PUMP
- 5V RELAY BOARD MODULE

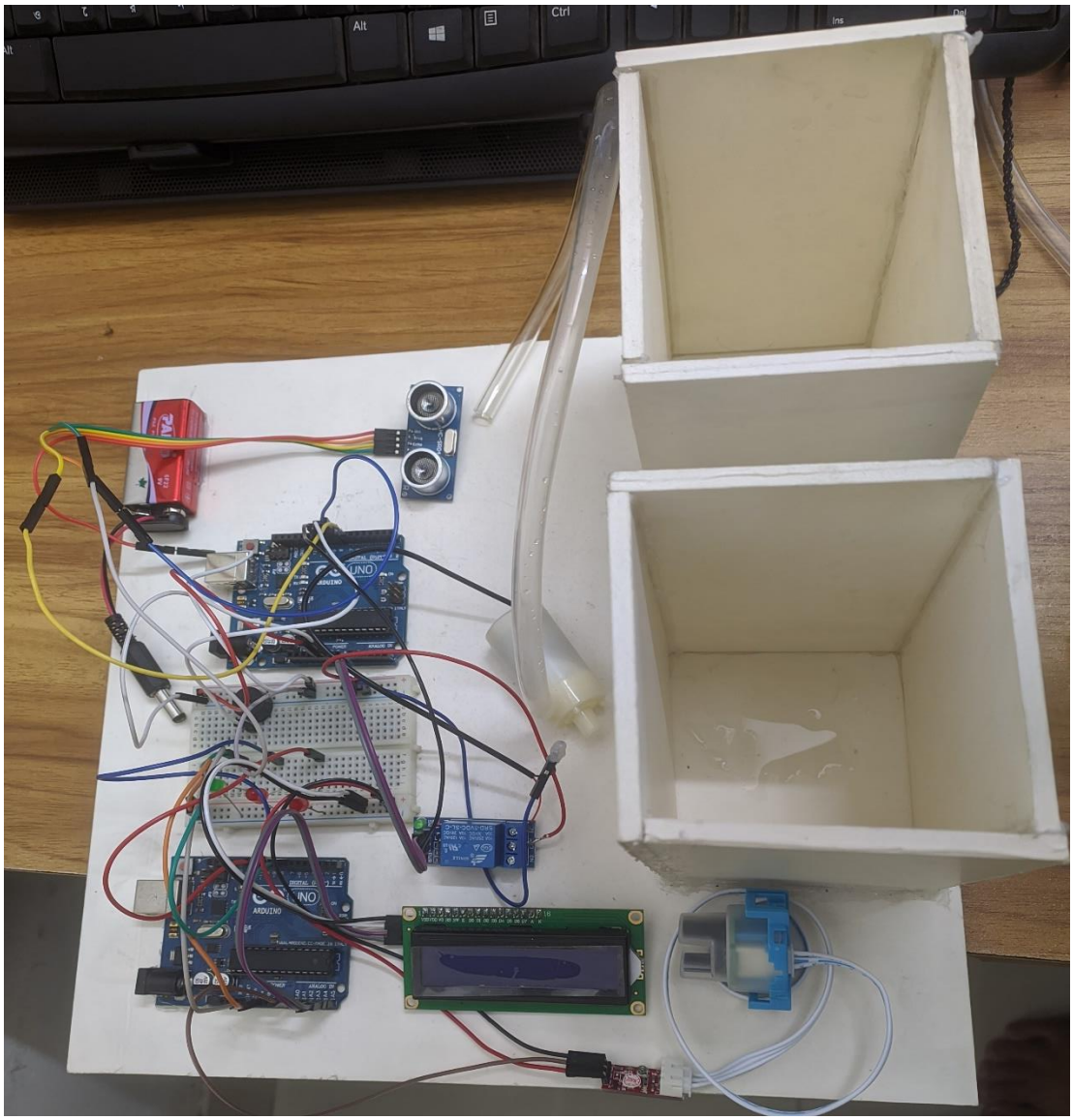
The components that take stimuli from the environment are

- ULTRASONIC SONAR SENSOR HC- SR04
- LIQUID SUSPENDENT PARTICLES TURBIDITY SENSOR DETECTION MODULE KIT

Our system will perform the following action

- Place the ultrasonic sensor on top of the tank. The ultrasonic sensor calculates the distance.
- According to the code, if the distance is less than or equal to 5cm, it turns off the pump.
- If the distance exceeds 80cm, the relay turns on the pump.
- The turbidity sensor is placed on top of the water surface. It calculates the water turbidity by measuring the amount of light that is scattered by material in the water.
- If the water turbidity < 20, the lcd display will show “Turbidity: *, It’s Clear”.
- If the water turbidity > 20 & turbidity < 50, the lcd display will show “Turbidity: *, It’s Cloudy”.
- If the water turbidity > 50, the lcd display will show “Turbidity: *, It’s Dirty”.


HC-SR04
5V DC Submersible Pump
Turbidity Sensor



Estimated Budget:

Previous estimation that you gave in project proposal vs. final expenditure

Equipment	Quantity	Budget (Previous)	Budget (Final)
ARDUINO UNO R3	02 (Previously was 1)	1300	2000
16X2 SERIAL LCD MODULE DISPLAY WITH I2C MODULE	01	450	390
ULTRASONIC SONAR SENSOR HC- SR04	01	150	100
5V BUZZER	01	50	20
5V RELAY BOARD MODULE	01	140	80
5V DC MINI WATER PUMP MICRO SUBMERSIBLE MOTOR PUMP	01	250	160
LIQUID SUSPENDED PARTICLES TURBIDITY SENSOR DETECTION MODULE KIT	01		900
JUMPER WIRE	As Required	80	80
BREADBOARD	01	150	80
9V BATTERY	01	350	300
9V BATTERY CONNECTOR	01	50	30
TUBE	As Required	50	20
Total		**3020**	**4160**

Contribution of Team Members:

Shamim Rahim Refat (100%): Full Project

Challenges of the project:

There are several challenges that may arise in the project of automation on water pump and water quality monitoring system. Some of the common challenges include:

1. **Technical difficulties:** Implementing an automated system using turbidity sensors requires technical expertise and may require specialized equipment and software. This can present challenges in installation, calibration, and maintenance.

2. **Cost considerations:** The cost of purchasing and installing an automated system can be high, especially for smaller communities or organizations with limited budgets. Additionally, the ongoing maintenance costs of the system may also be a factor.

3. **Power supply:** The automated system requires a reliable power supply to operate continuously. This can be a challenge in areas with limited or unreliable access to electricity.

4. **Calibration and accuracy:** Turbidity sensors require regular calibration to ensure accurate readings. Failure to calibrate the sensors can lead to inaccurate data and potentially compromise the quality of the water treatment process.

Conclusion:

In conclusion, automation on water pump and water quality monitoring system has the potential to significantly improve the efficiency and accuracy of the water treatment process. By continuously monitoring water quality in real-time, the automated system can detect changes in turbidity levels that may indicate the presence of contaminants in the water, allowing for early detection and response to potential health hazards. Additionally, the automated system can adjust the water treatment process to optimize the removal of suspended particles and

improve the quality of the water, while reducing the need for manual monitoring and maintenance.

However, the implementation of an automated system can present several challenges, such as technical difficulties, cost considerations, power supply, calibration and accuracy etc. Addressing these challenges is critical to the success of the project and ensuring that the automated system is effective in improving the quality and efficiency of the water treatment process.

Overall, automation on water pump and water quality monitoring system is a promising solution for improving the quality of the water supply, protecting public health, and promoting environmental sustainability. It is important to carefully plan and manage the implementation process to ensure that the benefits of the automated system are realized while minimizing any potential drawbacks.

References:

1. https://www.google.com/ [Last Accessed: February 23, 2023]
2. https://www.wikipedia.org/ [Last Accessed: February 23, 2023]
3. https://www.slideshare.net/shivkapil/water-level-automatic-pump-controller [Last Accessed: February 22, 2023]
4. https://www.slideshare.net/shashwatdevchaudhry/water-pump-automation-system [Last Accessed: February 22, 2023]
5. https://www.electroniclinic.com/turbidity-sensor-with-arduino-for-water-quality-monitoring-turbidity-meter/ [Last Accessed: February 22, 2023]