Internet of Things

SMART WATER MANAGEMENT

NAAN MUTHALVAN

PHASE 4 PROJECT

SUBMITTED BY

S. ARUN

D. MAHESWARAN

L.MANOJ

S. MOHAMED RIZWAN

M. MOSIKKERAN

CONTENT

1. ABSTRACT:

This paper represents an IoT (Internet of things) based smart water quality
Monitoring (SWQM) system that aids in continuous measurement of water condition based on four physical parameters i.e., temperature, pH, electric conductivity and turbidity properties.
A serious drop in ensuring the water quality in the distribution system is a factor that affects public health. This could lead to increase in biological and non-biological contents, change in color and odor of the water. These contaminants cause a serious threat to the whole water ecosystem. The conventional methods of analyzing the water quality requires much time and labor. So, there is a need to monitor and protect the water with a real time water quality monitoring system in order to make active measurements to reduce contamination. The growth of the technology had helped in developing efficient methods to solve many serious issues in real time. Internet of things (IoT) has achieved a great focus due to its faster processing and intelligence. This paper focus on discussing the architecture, applications and need of IoT in water management system.

2. INTRODUCTION:

Smart irrigation system uses weather data or soil moisture data to determine the irrigation need of the landscape. Smart irrigation technology includes: These products maximize irrigation efficiency by reducing water waste, while maintaining plant health and quality.

3. OBJECTIVE:

- To reduce the wastage of water.
- Tailor watering schedules and run times automatically to meet specific landscape needs.
- These controllers significantly improve outdoor water use efficiencies.

4. PROBLEM STATEMENTS:

The main conclusions drawn from this study can be summarized as follows:

The lack of consensus in the definition and architecture of a smart water system and metrics of intelligent water system assessment is hindering the process of smart techniques entering the water sector.

The implemented system was very basic in nature consisting of IoT devices using Sensors for water level monitoring in a smart home. In 2017, Malche etal.

Presented an IoT based system for water level monitoring for the smart village.

The main objective of the proposed system was to monitor the real- time water Level from a distant location.

Water management is possible primarily by real-time monitoring of water level

And quality. Real-time water level monitoring can significantly reduce wastage of

Water due to overflow from tanks. The water management system can also help

Detect water leaks in a smart home by analyzing water levels during different

Hours of the day.

The main problem with the IoT is the storage system. A typical IoT device can

Accumulate thousands of data, thus a large storage systems needed. Notification on how to use push is also a topic of discussion. When to alert user based on the water status is also a problem that needs to be solved.

5. METHODOLOGY:

1) Sensor and Data Acquisition

This stage consists of the ultrasonic sensor. The ultrasonic sensor measures the distance of water level by sending out a sound wave at a frequency above the range of human hearing, converting water depth in the reservoir (distance of water surface from sensor) into electronic signals sent to the micro controller (Arduino). It must be noted however that the electronic signals from the sensors is digital signal.

2) Control

The controller used in this study is an Atmega 382 microcontroller on Arduino Uno. Its work is to coordinate all the activities of the smart water system. It then computes the appropriate control scheme meant to implement the irrigation based on the level of water in the reservoir. The controller output is sent as a digital control to the water pumps via the relays. The status of the system including the water level, the pumps activated status are displayed on a Liquid Crystal Display (LCD) connected to the micro-controller. The controller derives its power from a 9 volts DC source. In this work, algorithm was developed in the Arduino Integrated Development Environment (IDE) using the Arduino script programming language and uploaded to the microcontroller.

The algorithm enables the system to automatically start/stop pumps when the water level reaches Percentage (30%-80%)

3) Water Optimization

This stage ensures that water is adequately managed in the process of irrigation. It uses the ultrasonic sensor to measure the level of water in the reservoir and sends this to the

microcontroller. Based on this the microcontroller decides the pumps to be deployed for irrigation at a particular time. It comprises of relays, pumps that release water on the irrigation. This is a way of avoiding water wastage and maintaining continuous availability of water for irrigation purposes. The power for the relay and the pumps are derived from a 9 volts DC supply.

4) SMS System

By Using NodeMCU or GSM Module to Share the Information about the Status of water level present in the field or water tank in percentage and pump Status either pump is ON or pump is OFF to the respective person who is taking responsibility to the system and the pump and also Owner of the field and house

6. COMPONENTS

Arduino

Ultrasonic Sensor

LCD Display (16x2)

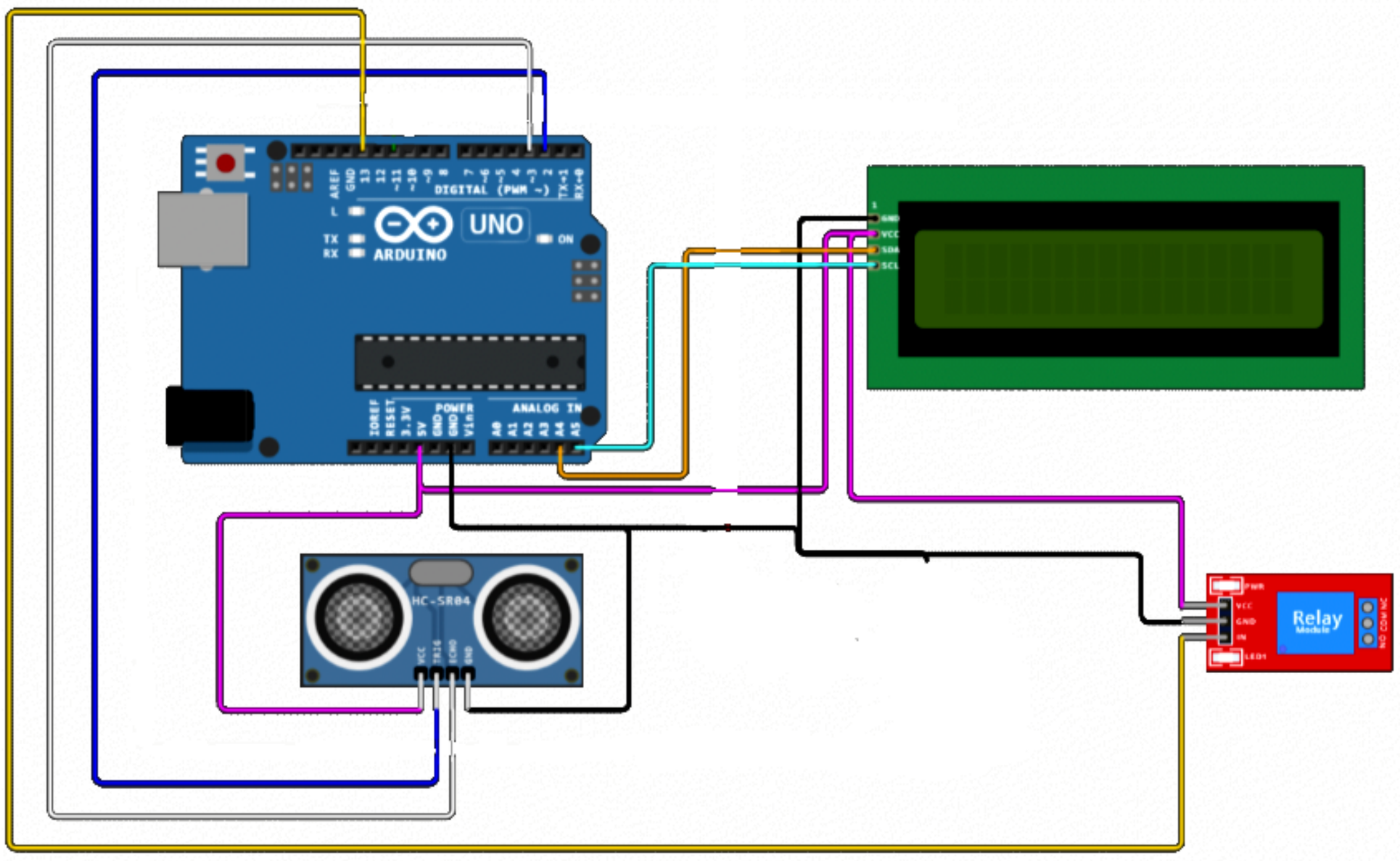
I2C Module

Relay

9V Battery

DC Motor

7. BLOCK DIAGRAM:



Block diagram of smart irrigation system

8. EXPECTED OUTCOME:

- Save water, time, and money. Studies show that up to 50% of water usage for landscape irrigation can be saved with cloud-based Smart Irrigation systems.
- This will be very useful for reducing wastage of water.
- Automatic function is used human to reduce our time to turning ON and OFF motor everyday

9. BUDGET

Sl. No	Particulars	Justification	Quantity	Price (INR)
1.	Arduino microcontroller	Master controller	1	650
2.	Ultrasonic Sensor	Measures the distance by ultrasonic sound waves	1	170
3.	LCD 16x2	Used to display the water level and pump status	1	200
4.	I2C Module	Parallel to serial converter	1	110
5.	Relay	To either open or close an electrical circuit	1	70
6.	9v Battery	Power source for motor	1	40
			Total (Rs)	**1240**
Rupees One thousand two hundred and forty only				