

Intelligent Water Distribution and Rain Water Harvesting

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Abstract: Water is essential for all living organisms and economic growth, social progress, environmental integrity. Nowadays, an increase in the development of smart water cadence trials and demand operation requires advanced spatial and temporal opinions. This paper proposes a result for the water management and distribution problem. This implementation is to check water distribution for all homes or buildings correctly and generating the current bills for individual households and also blocks the leakage of water using embedded system and IOT technology. Water inflow detectors, stopcock to control the inflow of water from the tank. Flow detector create of series of electric beats through which water employed by the stoner. Inflow rate and the quantum of water contribute can be deliberated.

Keywords: IoT, water management, bill generating, leakage of water.

1. Introduction

It is a universal truth that pure water is clearly quintessential for wholesome living. Supply of pure and smooth ingesting water is a primary want for all human beings on the earth. Almost 71% of the Earth's floor is protected with the aid of water, and over 96% of water is saline in the oceans. The quantity of freshwater on the planet is confined to round 2.5% and much less than 1% of the whole amount of water is consumable [1].

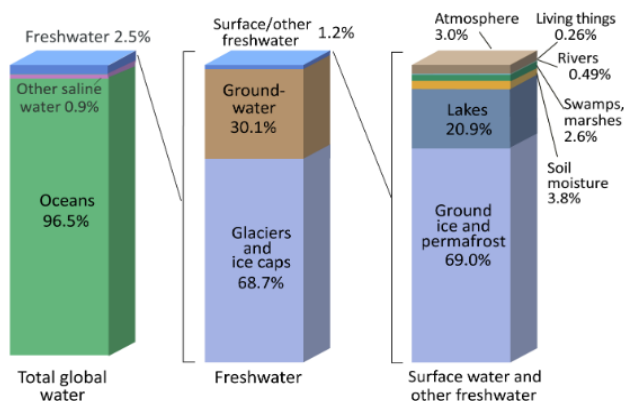


Fig. 1. Global water distribution

Environmental air pollution is the major motive to measure and to recognize the toxic, chemical and organic best

parameters of water. Most of the water our bodies are polluted with the aid of humans. In order to make sure the protected furnish of the consuming water nature wants to be monitored in actual time. The purpose is to increase a low-priced device for actual time monitoring of water great in IoT platform.

IoT is a technology that is currently booming with wide range of applications that is used for the purpose of connecting and exchanging data with other devices.

The principal architecture of IoT is based on three layers:

- Physical Layer
- Network Layer
- Application Layer

Here in this machine 4 bodily parameters: temperature, pH, conductivity and turbidity of extraordinary water samples are measured by means of 4 separate sensors geared up with Arduino Uno which is used as the core controller by 4 separate sensors geared up with Arduino Uno which is used as the core controller pH, conductivity and turbidity of special water samples are measured through 4 separate sensors geared up with Arduino Uno which is used as the core controller [2].

Nearly the 0.33 quarterly part of the earth which estimates as much as 71% part of its far blanketed with water. However, out of which handiest 0.08% sparkling water is to be had for mortal functions and for residing beings.

The most important reasserts of sparkling water to be had for residing functions and for human use is the floor water to be had because of rainfall which additionally renewal the ponds, distinctive water sources like surface water. Water shortage is the trouble confronted via way of means of the residing creatures all through the records and whose depth has elevated over the past centenary [3], [4].

It's envisioned via way of means of subsequent decade about 25% of the populace of universe will stay in eternal shortage of water. "When water availability is much less than 1,000 cubic meter consistent with man or woman consistent with day water pressure happens.

Culmination of big and growing populace and frivolously growing needs for water and choppy getting access to its far the principle reason of water shortage." Apart from agricultural functions, the predominant proportion in using to be had sparkling water is construction. Modernization and civilization delivered extra use for water mainly at atomic plant life for get

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colder and at huge constructions [6].

At this stage, it's far authoritative, for correct control and spreading of water, to preserve the water useful wealth, to be able to sooner or later cause now no longer handiest to vast development in human lifestyles and circumstance however will also advantage the distinctive control organs of the biodiversity. New techniques want to be carried out which will keep away from break through and to replenish the lacuna, which typically happens throughout the spreading of water for diverse functions withinside the water sources. The venture targets, specific, on tracking using water.

As tracking will assist similarly for commanding and dispensing the water useful resource frivolously according to the vicinity and accessible of useful assets as consistent with zone.

Whenever the residents wanted to go for vacation, they can switch ON the HOLIDAY Mode before going out. When this mode is activated, there will be no supply of water to that house. When water will have imposed accordance to utilization and after sure restrict the utilization exceed, humans will begin the usage of water cautiously and will likely no longer over make the most water.

2. Literature Survey

Design and Implementation of Intelligent Controller of Low Voltage Solenoid Valve Based on ZigBee.

In order to lessen the hard work value and decrease the water use of cultivation and enhance the usage of water wealth, a smart check of low-tension solenoid valve primarily established totally on ZigBee is outline on this paper. The smart controller will acquire the sun electricity as a supply of electricity and screen the command statistics of the tracking middle of the machine in actual time. It may even acquire the records of flow to manage the making productive electromagnetic valve on the identical period in order to understand the cause of correct fertilization, suitable soaking, lowering water loss, without an escort operation and automated manage of sprinkling machine.

Water Management System Using IoT.

This paper provides an IoT tool which allows to manipulate and plan using water. This gadget may be effortlessly established and justify the lengthy run. The Laser sensor is located at the container, which constantly video display units the water stage in actual time. These facts could be up to date withinside the consumer can examine the quantity of Aqua. As maintained to the extent of water withinside the reservoir, the engine operable is routinely manage. When the water stage falls beneath the edge stage the engine could be once more grew to become on routinely.

IoT Based Water Management System for Smart City.

In the time of beyond decade, water requires to extended uncertain in India. Progressively call for of water deliver has emerge as a prime assignment for the universe. Wasteful consumption of water, weather adjustments and civilization have in addition exhaust the convenient resource. Decision and control of the useful resource have to receive utmost importance. In this paper, we gift an IoT layout for water tracking and influence proceed towards which helps internet,

primarily based totally statistics series on actual time bases. The machine addresses new demanding situations with inside the water sector -glide price estimation and the want for a look at of the delivery of water which will diminish water wastage and inspire its conservation. We additionally degree the first-rate of water allotted to each family via way of means of deploying pH and conductivity sensors.

3. Proposed System

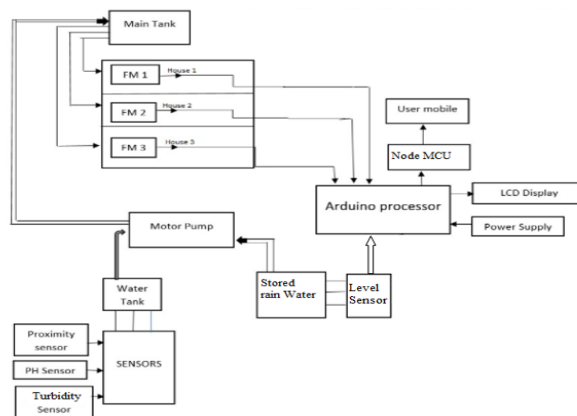


Fig. 2. Block diagram of proposed system

The proposed system display units the fine of water essentially consists of flow meter, microcontroller, PH sensor, Level sensor, Turbidity sensor, and Proximity Sensor. Hall effect-based drift meter is to estimate the float charge of the water. Arduino uno will act as a microcontroller-based devices. The flow meter estimates the drift charge of the water. It consists of several sensors i.e., pH, turbidity, flow sensor, DHT-11 which is used to check humidity, temperature with an ESP 8266 Wi-Fi module and power supply module is connected to core controller. Arduino Uno acts as core controller because it includes the entirely wanted to guide the microcontroller. Arduino Uno used for having access to the sensor values from respective sensor and processing them to switch the statistics via internet.

- The pH sensor is used to measure the presence of acidity or alkalinity of any answer in logarithmic scale. It can have readings ranging from 1-14 the place 1 suggest the most acidic liquid and 14 indicates the most primary liquid. 7 is for impartial materials that are neither acidic nor basic.
- Turbidity sensor is used to notice the presence of suspended particles by way of the usage of light. The final result of turbidity is a discount in water clearness, disagreeable reduction the rate of photosynthesis, will extension the water temperature.
- The water go with the flow sensor generates a sequence of electric powered that are used to notice the water flow. It measures the extend of water flow between the pipe in a given time, these facts will be dispatched to cloud for storage and evaluation purposes.
- A Wi-Fi module is related to the Arduino uno which assist to switch the statistics over internet. The

received records will be directed to cloud by using ability of the Wi-Fi module and sensor statics can be seen on the ESP8266 Wi-Fi module.

- For drinking water pH should be in range of 6.6-8.5, turbidity should be 1-5, temperature should be 50-72 degree.
- Relay circuit acts as a swap which is managed by means of electrical power, equal as an ON/OFF button. The want of this relay is to self-operating this energy to change electrical circuits on and off the valve. Using TTL good judgment the relay circuit is made. Arduino does not aid 12V grant and the relay is used to provide strength to the digital valve.
- LCD display has also additionally the output correspondingly.

4. Methodology

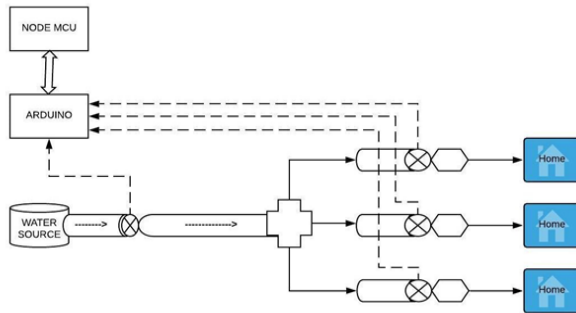


Fig. 3. Water distribution Method

Reducing the guy energy usage in water distribution.

1. Water is one of the crucial Source in our day after day life.
2. Here the solenoid valves are used to waft the water.
3. The solenoid valves are used to manipulate the waft of water.

To keep away from robbery and leakage of water.

1. The go with the drift meters is used to hit upon the water leakage and robbery.
2. The quantity of water that's flown from the inlet and the quantity of water that's flowing from the opening if each are equal then there may be no leakage in any other case if any variations then there may be leakage has been occurred.

Smart Metering.

1. Flow meter is used to degree the how a whole lot quantity of water has been used.
2. Here the water is made to float on one side, in order that rotor will begin to rotate primarily based totally on that Hall impact sensor will take the pulses that's generated through rotor and it offers as an enter to the controller primarily based totally on that meter gets the readings.
3. Furthermore, the water invoice has been generated for every consumer.

Water Quality Measurement.

1. Checking PH sensor and turbidity Level.

2. The waft meters can be constantly monitored via way of means of the controller. Once the quota of every domestic is finished earlier than turning off the final valve, supply valve is grew to become off.
3. If 90% of the quota has been used then it will deliver an alert message after 100% the valve can be grew to become off.

5. Implementation

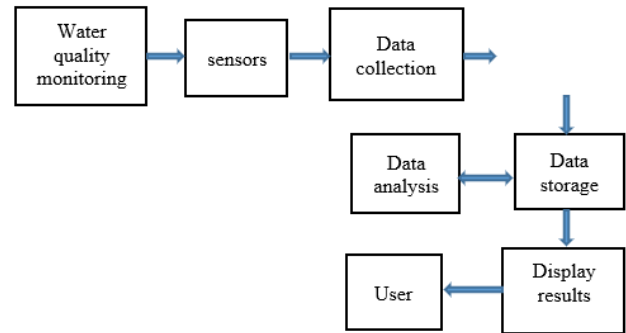


Fig. 4. Flow chart

The signal entered by these detectors are applied to Arduino board which is the managing and calculating part of the system. The computing stage involves differentiate the tasted values from detector with the determined threshold value. However, also a communication is transferred to permissible person with the help of conveying. If tasted value doesn't match with the threshold value. Communication phases involves WIFI modem.

- *pH sensor:* The pH sensor is used to measure the presence of acidity or alkalinity of any answer in logarithmic scale. It can have readings ranging from 1-14 the place 1 suggest the most acidic liquid and 14 indicates the most primary liquid. 7 is for impartial materials that are neither acidic nor basic.
- *Temperature sensor:* The unculturable sports inversion of water may also growth that is the element figuring out the clarity. The temperature sensor measures the inversion of water.
- *Turbidity sensor:* Turbidity sensors degree the quantity of mild this is scattered via way of means of the suspended solids in water.
- *Flow sensor:* It tests the salinity of water. This parameter impacts aquatic life.

6. Result

We are showing the performing tasted the above sensors and role detector value. It constantly senses the values of sensors and the performing values are shows in the LCD, cellular in real-time. If the received price is the threshold cost commentary will be displayed as 'ACIDIC'. If the obtained cost is decrease than the threshold fee commentary will be displayed as 'BASIC'.

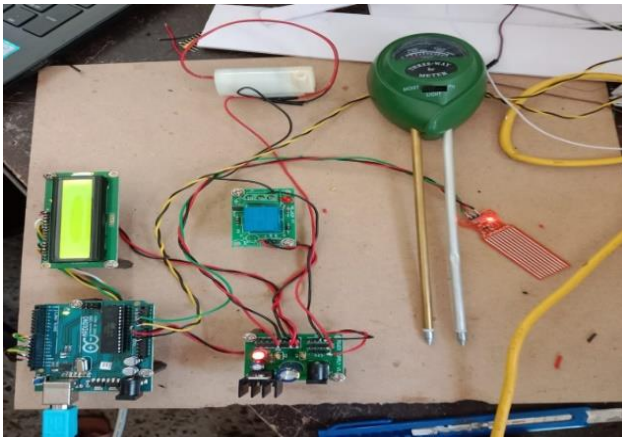


Fig. 5. Hardware setup of the project



Fig. 6. Displaying the water level



Fig. 7. Displaying the volume 1 meter



Fig. 8. Displaying the volume 2 meter

Table 1
House 1-meter values

pH value	5
Vol 1	0.00
Turbidity	1.94

Table 2
House 2-meter values

pH value	4
Vol 2	4L
Turbidity	2.22



Fig. 9. Displaying the values in Telegram App

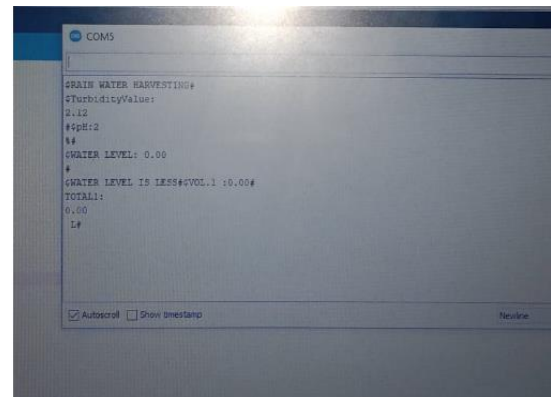


Fig. 10. Displaying the values in serial monitor

7. Conclusion

In the proposed system, the water supply management is implemented to minimize the wastage by optimizing the water usage. The holiday mode proposed can save the users money and water which is being wasted. The Smart billing system has also been included. The advanced system having Arduino Uno and Node MCU target boards are connived with several detectors successfully.

A web-grounded operation is used to monitor the parameters similar as pH value, the turbidity of the water, position of water in the tank, temperature and moisture of the girding atmosphere through the webserver. The collected data from the all the

detectors are used for analysis purpose for better result of water problems. The data is transferred to the web server via Wi-Fi module ESP8266.

8. Future Enhancement

The functionality of water pleasant monitoring machine can be more suitable to reap extra advantageous reliable results. The wide variety of parameters to be sensed can be multiplied via the addition of a couple of detectors. The gadget can be farther upgraded the use of wi-fi detectors networks. The gadget can be elevated to cowl hydrologic, air pollution, synthetic and agrarian product and so on. It has extensive operation and extension price. Detecting the more parameters for most secure purpose. Increase the parameters by addition of multiple sensors. By interfacing relay, we control the supply of water.

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