

# Automated Water Billing with Detection and Control of Water Leakage Using Flow Conservation

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**Abstract:** This venture manages naturally gathering the Water utilization by a client and furthermore identifying the spillages in the water dissemination framework. Water spillage is a significant part of water misfortunes. As well as raising shopper attention to their water use, metering is likewise a significant method for distinguishing and confines water spillage. A hole identification program can be exceptionally proactive, assisting water utilities with robotizing water frameworks, recognizing trouble spots prior, giving clients instruments to screen water use, giving more exact rates and diminishing interest. The goals are to defeat the burdens of utilizing ebb and flow meter innovation and make the charging and investigating process quicker alongside diminishing the wastage of water. Message and Wi-Fi (IoT) innovation naturally gathers utilization, determinations, and gathers status information from energy meter and moving that data to a focus point data set for charging examining and investigating. This progression saves the cost of infrequent trips to each utility supplier actual area to peruse a meter. One more benefit is charging can be founded on close to regular utilisation as opposed to in the gauges view of previous or anticipated use. This ideal data in combination with investigation, can assist both utility providers and customers with bettering control to the creation and usage of water utilization.

**Keywords:** Leakage detection, IoT, Arduino IDE, Raspberry Pi.

## 1. Introduction

Water misfortune during conveyance is viewed as a significant waste. It's been a while seen that a lot of water misfortune happens near the wellspring of filtered water long before the arrival of the conveyance organization. Estimations per capita water consumption demonstrate that India is as of now water pushed; forecasts for the future show that India might have water shortage by year 2050. In this situation, spillages in the water circulation framework can colossally affect the water accessibility. Water stream preservation includes the arrangements, methodologies and exercises to oversee new water as a practical asset, to safeguard the water climate, and to meet ebb and flow and humanity's future interest. It additionally manages carefully "noticing" the reading on the energy metre. This cycle kills the conventional "paper and pen" and the mistakes related utilizing a manual perusing/recording/handling within the meter information. AMR appeared when the energy meters were switched on keen which traces all the way back to the beginning arrangement of

microcontrollers in energy meters. Programmed Meter Reading additionally makes the information recording quick and saves money on time and subsequently follows the meaning of computerization. Water is the sustainable and a plentifully accessible regular asset on the earth 70% of the Earth's surface is covered by water. Out of this, just 3% of the total water is versatile. Water is useful in many ways for home grown purposes, modern utilization, horticultural field and so forth. Populace development causes deficient and lopsided dissemination of drinking water. Earth comprises 97 percent salt water and 3% of new water altogether. Of this 3% of new water, 68.7% is of ice covers and the ice sheets. 30.1% comprises 0.3 percent of surface water, 0.9 percent of ground water, and 0.9 percent of other water. Of this 0.3%, 87% comprises water from a lake, 2% of stream a quarter of a percent for wetlands, and a quarter of a percent for water. The fast advancement of science and innovation worked on the sensors and stream meter plans to accomplish appropriate water supply through capacity tanks, pipes and so forth [7]. To work with the home grown and modern, the administration has addressed the issue of water supply and framed water sheets which screen the appropriate inventory of water all through the country. It goes about as the directing body kept the principles outlined by the public authority. Water goes about as an essential in the source enterprises; thus, there emerges a need of precise estimation of water stream. In the home-grown area, water is utilized for all family exercises. Inordinate use of water should be stayed away from and a framework is expected to screen the over utilization of water.

## 2. Literature Survey

Water emergency and contamination are two significant existing issues in present status of Bangladesh. Some customary water level marker alongside warning framework and cleansing course of action is accessible in this unique circumstance. Nonetheless, the sign and purging framework isn't completely computerized and there needs a great deal of upkeep above. In this paper, a clever model is proposed to direct a programmed sign and two-layer filtration process for home water. The computerized sign framework is important to stop the likely shortage of drinking water, wastage of water in different levels

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and sanitization framework is required for safe drinking water. Proposed framework can likewise keep up with the legitimate dispersion of water during sweltering and sticky weather conditions by detecting temperatures and dampness. At long last, this framework will create programmed bill contingent upon the specific measure of uses of water by people.

### 3. Proposed Methodology

The model for the stream preservation is to quantify inflow and outpouring of water. Water provided from water dispersion authority is put away in ground level repositories and above tanks and is additionally conveyed to rest of the buyers. This undertaking introduces stream estimation sensors at the information and afterward measure water volume in the water repositories.

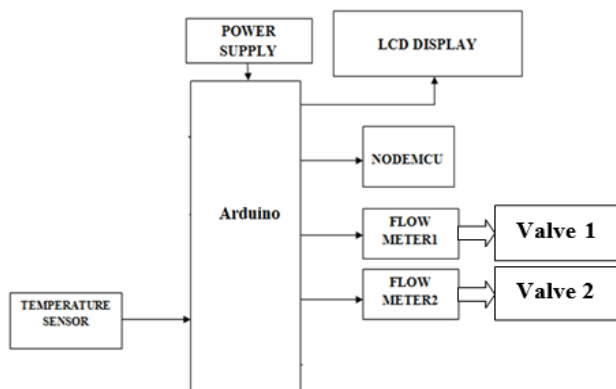


Fig. 1. System architecture

The volume of water inside the supply would give the gathered distinction among inflow and outpouring of water. Subsequently, then the surge can be determined. In the event that the volume of the water passes the boundary level, the framework will consequently stop the water supply. The water supply can begin when the spillage is redressed. Propels in water meter innovation can naturally record and report spillage inside client possessed part of the pipes by distinguishing a consistent progression of water. Programmed Reading and Management involving Mobile Agents can be critical for regions and energy dispersion organizations in order to limit the quantity of conventional visits expected by the circulation organization, subsequently diminishing the quantity of representatives utilized in playing out this customary tedious and significant expense work. Such innovation assists with saving water, yet assists the client with staying away from pointlessly high-water bills. AMR framework is partitioned into four fundamental units. These are: Reading unit, Communication unit and spillage location, Data getting and handling unit, charging unit.

### 4. Requirements

#### A. Software Requirements

- Operating System: Arduino IDE
- Language: Embedded C

#### B. Hardware Components

- Arduino Uno
- LCD Display
- Flow sensor
- Solenoid Valve
- Nodemcu
- Power supply

Here we utilize the program language Arduino IDE for execution of the task. After every one of the associations are made utilizing the necessary parts, the program is unloaded into the Arduino Uno.

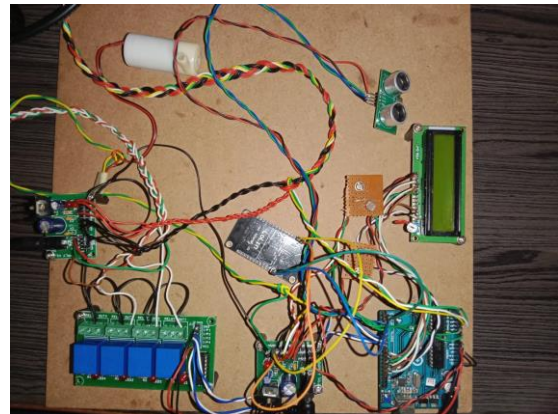


Fig. 2. Hardware setup

In equipment 12v power supply is utilized for reinforcement power. Arduino is the core of this venture and peripherals are associated with Arduino. Nodemcu is utilized to speak with the client. Temperature and conductivity sensor are utilized to really take a look at the nature of the water. Flow meters are taken on in both shipper and recipient part to really look at the progression of water and to distinguish the spillage. Solenoid valves are utilized to switch the progression of water consequently, transfers are utilized to switch the solenoid valves.

### 5. System Outcome

The fundamental idea of this venture is to convey the necessary measure of water to client with no spillage the working of this undertaking is as displayed underneath. At first at whatever point the power is on the resetting is expected to begin the machine in new mode.

The engine siphons the specific measure of water to the client and solenoid goes to off mode. At the point when additional water is expected to the client the client demands through the text. These texts are perused by the processor and begin to siphon additional water by opening solenoids. Prior to siphoning additional water, the processor demands the client to take care of additional bill. In the event that the client doesn't need additional water then the ordinary bill will be produced. Assuming that the stream meter esteem contrasts from source to recipient the spillage location cautions the shipper.

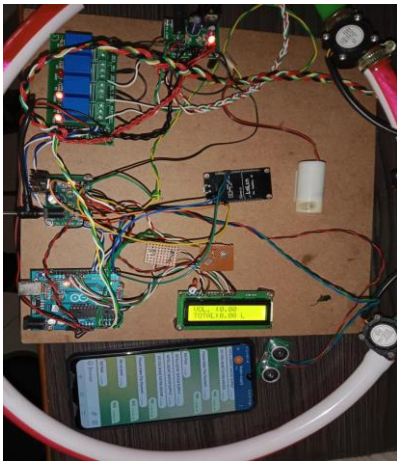


Fig. 3. Output

## 6. Conclusion

As talked about in this task, spill identification assumes an undeniably significant part in water protection. Hence, taking on water protection strategies and advancements that help water safeguarding and the board is an area of expanded need. By putting resources into such innovations and frameworks now, networks can altogether lessen utilization and facilitate the burden on our country's water supplies. The paper portrays the plan and the Smart Energy Meter's operation addresses how might a smart energy meter be utilized for Automatic Meter reading. It is the most practical execution to foster humankind in this time of innovation. Distinguishing spills aids in water conservation assets both in terms of price and energy. More water is accessible to buyers and can be charged. Water reintroduction of pollution after unified treatment is less inclined to occur in the lines. With the current upgrade in the use of creativity to work with humankind, it is a proficient and useful usage of the existing organizations. This paper likewise demonstrates the way that the client can manage the pile by

using a Smart Energy Meter. It makes it easier to take meter readings, exactness, and location of broken readings. The spillage control can be upgraded by consolidating the line's sensors interfacing every single house to recognize the spillage. Arrangements can be given to the clients to send an alarm message to the expert in the event of any flaws or harm happens to the meter or the line can be accounted for to the utility suppliers by sending an alarm message that will bring the water to a halt association with that specific house.

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