Real Time Implementation of Water Leakage Monitoring Using IOT

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Abstract- India's water requirements have increased dramatically over the last ten years to an unprecedented level. The need for water supply is always growing, and many nations throughout the world have had a difficult time meeting this need. Wasteful consumption, climate changes, and urbanization have further reduced the resource. Water conservation and management must be given top priority because it is one of the main necessities for human life. Utilizing Internet of Things (IoT) technology, water leakage, water delivery scheduling, and SMS notification can all be efficiently monitored. Notably, this technology may also give end-users and other professionals real-time input via a website or a smartphone. Because large cities sometimes have leaky distribution pipelines, clean water, a scarce resource for human existence, is wasted. Water distribution authorities encounter challenges in identifying the source of leaks in their pipes, which is a major issue globally. Leakage is a problem that can be caused by a number of things, including ageing or ongoing development in metropolitan areas like Dar es Salaam, which makes it difficult for the distribution authorities to determine the reason and take appropriate measures. Thus, the goal of this research was to create an Internet of Things-based water leak detecting system. Two sensors were incorporated into the prototype to measure the water's sound rate at the source and destination places. According to the outcome, leakage can be identified by comparing the volume of water generated at the start point with the other end. Increasing the emphasis on distance calculation could yield intriguing results that support further study of IoT monitoring systems.

Keywords: ESP8266, ISM, PH sensor, Level Sensor, Arduino Microcontroller

INTRODUCTION

On a hot day, consider how beneficial it would be to be able to turn on the air conditioning system ten minutes before you arrive home. How about a security system that can detect smoke and notify you to attempted burglaries? These fantasies produce the never-ending concept of water level monitoring. Of course, the advanced Water Level Monitoring systems keep track of water use. Nowadays, technology has permeated every aspect of people's life. Numerous elements of everyday life have been and continue to be influenced by technology, including improved social contact, simple transportation, the freedom to enjoy entertainment and media, and medical advancement. Many individuals now rely heavily on technology as a result of the development of several technologies like mobile phones and laptops.to interact with their pals and to save data like music, videos, papers, and images. With the capacity to search for information, save their own information in the cloud, and provide them with improved ways of managing information, the internet has evolved into a ubiquitous interface that many devices utilize. Since their inception, mobile phones and the internet have seen a sharp rise in the number of users, becoming one of the primary ways of communication. The internet is now accessible to users without the need of a computer thanks to cellphones, which provide the same functionality but in a different way. With the advent of cutting-edge Smartphones are increasingly sophisticated hardware and software gadgets that play a significant role in people's everyday lives. How the Smartphone can connect to and communicate with other devices is a crucial component. Water Level Monitoring is a sector that has lately gained prominence, and cellphones may be used in it as information or functionality hubs.

LITERATURE REVIEW

[1] Zulhani Rasin and Mohd Abdullah -Sewer blockages are a major contributor to both sewer floods and pollution. If water providers are unable to offer a workable solution to prevent floods, they risk paying significant fines and incurring huge operating expenses. As a result, it is frequently necessary to detect sewer conditions in order to choose the best course of action to solve this serious issue. In this study, a unique low-cost wireless sensor system is presented that can identify bottlenecks before they happen and send event data to a central control centre. The suggested WSN's actual deployment in an urban setting will be shown. Additionally, this technology's difficulties in a field testing and the data collected on the sensor and communication dependability will be addressed

[2] Misiunas, D., Lambert, *M*-The identification and localization of abrupt bursts in water distribution networks are addressed using a method that combines hydraulic transient computing with continuous pressure monitoring. The method is intended for medium-sized and large bursts caused by an unexpected failure of a pipe wall or other network physical component and accompanied by a transient pressure wave that spreads across the network. The location of a burst is determined using the burst-induced transient wave arrival timings and magnitudes observed at two or more sites. The modified cumulative sum (CUSUM) change detection test is used to find the wave arrival timings and magnitudes. Results from a real-world network's validation

demonstrate the viability of the suggested burst detection and a method of locating that will be used to water distribution systems.

[3] Daadoo, M., Tarapiah, *S*-This study analyses the performance of the switch architecture and each of its component parts. Future services that will require greater network capacity and faster data rates are expanding due to the expansion of the internet. As a result, fibre-optic networks with transmission rates greater than 40 Gb/s are being used as the basis environment for new network and system ideas. As a result, it's necessary to build entirely optical networks and the associated hardware. A switchboard is one of the fundamental components of such a network. Layered switch topologies with high design freedom, much smaller switches, and good expandability are what we suggest and analyses. The challenge of handling the competing calls is resolved in the paper's new switchboard construction method. The use of multilayered matrix is the fundamental tenet of the suggested switchboard design. Utilizing distributed feedback lasers, LiNbO3 switches, low-speed photodiodes, and arrayed waveguide gratings, these components are the workhorses of modern optical communications systems. It is scalable, high-speed, straightforward, useful, and inexpensive. We conducted extensive research and discovered that six layers is the ideal amount of layers needed to produce positive outcomes. Using the suggested architecture has the effect of increasing operational efficiency and decreasing delay time.

3. EXISTING SYSTEM

The most common method to detect these parameters is to collect sample an analog meter. A separate unit for turbidity measurement. This method wastes too much manpower and material resource, and has the limitations of the samples collecting, long-time analyzing, the aging of experiment equipment and other issues. After the results, the action is taken as such as cutting off the supply lines, intimating the corresponding officers etc.,

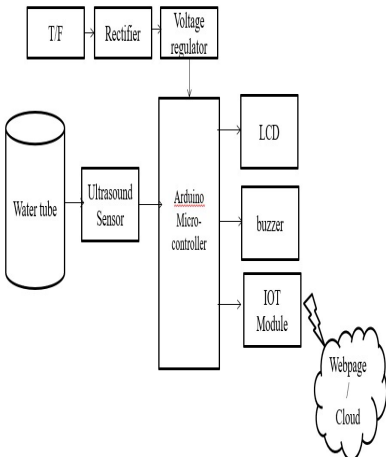
4.PROPOSED SYSTEM

Automatic monitoring of water sound and automatically alert can send to end users through SMS and monitoring using IOT

This section provides the interaction between the hardware and software for each subsystem. It involves the interaction of the Arduino board, water sound sensor, nodeMCU, and Arduino IDE. Arduino microcontroller arranged well wood material together with the breadboard; these components are programmed with Arduino IDE in a computer. Also, the water sound sensor and nodeMCU are programmed in the Arduino IDE to measure the readings of water (into liters) as well as sending data to the cloud (database server) and administrator respectively. Fig. 3 The component schematic of the water pipe leak detector is displayed normally.

- Normal mode –checks water sound level and supply the water to consumers on daily basis.
- Abnormal mode –automatically stop the water supply if Sound value is abnormal and automatically send SMS to tank cleaner and consumers.
- DELAY TIME ALERTING- If water is not present or water will not send on time, it will announce the pre alert message through consumers through SMS.
- Cleaning date is intimated and next month cleaning process date also passed through the same notifications.
- We can set certain limit for the amount of water that sound for each home.
- The water sound sensor generates a series of electric pulses, which can be used to calculate the sound rate and the amount of water being used by the user.
- The valve and relay control the supply of water from the main tank, ensuring that only the required amount of water is distributed to each home unit.
- The proposed system involves providing each home unit with a water sound sensor, water sound switch, valve, and relay, all controlled by an Arduino mega board.
- It is an innovative and practical solution to the growing problem of water scarcity and uneven distribution of drinking water.
- It not only addresses the current issues but also ensures a sustainable and more efficient use of these precious resources in the future.

4.1 BLOCK DIAGRAM



5. SYSTEM REQUIREMENTS
HARDWARE DESCRIPTION
5.1 NODE MCU

Fig 5.1 Node MCU
NodeMCU is an open-source firmware and improvement board with a Lua base specifically designed for Internet of Things applications. It remembers firmware that runs for the ESP8266 Wi-Fi SoC from Expressive Systems, and equipment which depends on the ESP-12 module.
5.2 LCD Display

Fig 5.2 LCD
LCD can show numbers, characters and designs. The microcontroller's (P0.0–P0.7) I/O port is interfaced with the showcase. Multiplexed mode is used for the presentation. The next showcase flashes on in 1/tenth of a second. Because of Vision's diligence, the show will result in a continuous display of tally.
5.3IOT SMS SERVICE (ISM)
This ISM Modem are accept any ISM network oerator SIM card and acts just like a mobile phone with its own unique phone number. It is a wireless MODEM that send and receive data through the ISM network. It required a SIM card and connectivity to the ISM network. It can also be used in GPRS mode to connect to the internet and use all the application for data logging
5.6 Power Supply
The 12V advance step down transformer is powered by an AC source. The transformer is the 12V AC which is corrected utilizing a diode connects. The yield of Diode Bridge of 12V DC is separated by capacitor.

5.7 ARDUINO UNO R3 MICROCONTROLLER

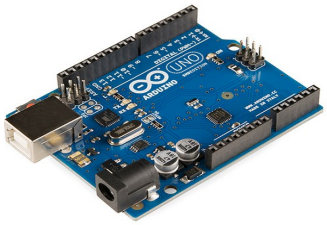


Fig 5.7 Arduino Board

A microcontroller board based on the ATmega328 IC is called the Arduino Uno R3. It has been 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It comes with everything required to support the microcontroller; all you need to do to get started is use a USB cable to connect it to a computer or an AC-to-DC adapter or battery to power it.

CONCLUSION

Water tank sensors are used in an automatic measuring and reporting system for Internet of Things (IOT)-based water tank monitoring and control because they have the distinct benefit of communication networks. The technology is low cost and manpower-free, and it can automatically monitor water use. The method is very adaptable. Other water leakage metrics can only be monitored with this system by changing the required sensors and software programmes. The procedure is simple. It provides a great deal of versatility and extension value.

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