SENSOR BASED WATER QUALITY MONITORING AND LEAKAGE DETECTION SYSTEM

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Abstract—**Water is crucial to human life, pollution has been an increasing problem over the previous couple of years. it is a most precious not only for the civilization but also for all the living things in the planet. It serves us in 360 degrees starting from households to hydroelectric plants of our life so on. So it's very important and responsibility of everyone to manage the water in an efficient way. In this paper we propose an efficient water monitoring system based on the internet of Things. If we keep wasting water continuously it may be very dangerous problem in future. We must always start saving water from ourselves. There are various ways through which water get wasted. Leakage plays an important role in water wastage. Whenever there's leakage somewhere we couldn't catch on in initial stage but when it becomes a huge problem it causes large wastage of water. So it's better to take action immediately as soon as leakage takes place. so as to convey a solution, we proposes a system that monitors the water level, water quality and water leakage using various sensors in real time. Leakage respectively. Once the flaw is identified, it's informed to control room through the internet (Email, twitter, SMS) and also nearby people can be informed in time. By placing this method, we will be able to collect and analyze the water usage patterns of the residents and save plenty of water in small still large scale in future.**

Keywords- Water Quality, arduino, IoT, GSM Module, pH sensor, Ultrasonic sensor

I. INTRODUCTION

Water is a universal solvent which plays an important part in everyday life. The water available on earth has been estimated at 1.4 billion cubic kilometres, enough to cover the earth with a grade of about 3 km. About 95 of the Earths water is unfit for mortal consumption. About 4 is locked in the polar ice caps, and the rest 1 constitutes all fresh water begin in rivers, aqueducts and lakes which is suitable for our consumption. A study estimated that a person in India consumes an Normal of 135 litres per day. This consumption would rise by 40 by the time 2025. This signifies the need to save our fresh water coffers. The supplementary water tank was made to store water that's collected from rain water by numerous houses. Clean drinking water is a significant resource which is needed to sustain life and plays a major part in the well- being of the human beings. In the real time process, drinking water serviceability and water supply to the consumer end gates at urban area face new challenges to guard water inventories from deliberate or unintentional impurity. Contaminated drinking water serves as a transmission medium for several dangerous agents which produce adverse goods in humans and cause serious health issues. Thus, there's a need for better real time in- pipe water quality monitoring system to be stationed in the water

distribution network and at consumer sites. At present, water measures are used to calculate the quantity of water used at homes. This doesn't give an effective system of covering the water Operation. The water is wasted at each and every outlet deliberately or intentionally which adds up to huge quantity in the end. Effective operation of the water used at homes is veritably important necessary as, about 50 percentage of water supplied to the metropolis gets wasted through its incorrect operation. With growing industry advancement and world population industry advancement, environmental pollution came big concern. Systems for air and water quality monitoring are needed for exercise analysis and their impact on nature of the power plants, mining sector, canvas and gas etc. Principally, determination of water quality relies on estimation of values of some important and reflective parameters. For illustration, the water quality monitoring demands the determination of parameters like PH, dissolved oxygen, content of ammonia, conductivity, turbidity, temperature, dissolved metal ions, etc. Although there are well known and extensively used styles for dimension of these parameters with applicable Detectors, design of electronic systems for environmental monitoring isn't frequently straightforward. The engineering challenges are colourful detector bumps are generally stationed in remote places, long- term deployments require detector nodes to be robust and systems to be fluently reconfigurable, detector bumps have to be suitable to operate autonomously in the required terrain, etc. Also, similar operations bear largely dependable and accurate detectors with the reduced position of conservation, long continuance, fast response times, high perceptivity and high selectivity. With the preface of IoT in the ultramodern world, numerous problem have been answered. With the use of IoT in covering water and air quality, colourful issues similar as data collection, communication, data analysis and early warnings are worked on. Water management is only possible, if the user is sensible of the volume of water he uses and the quantity available to him. For every lives water is essential. Hardly anyone keeps in track of the level of water in the outflow tanks. Accordingly, automatic controlling involves designing a control system to serve with minimum or no human hindrance. The idea can be implicitly used to ascertain and control the level of water in overhead tanks and help the loss. In this Arduino based automatic water level indicator and regulator design, the water level is being measured by using ultrasonic detectors. The ideal of the design is to measure the position of water in the tank and notify the stoner about the water position. In this paper next we are explained about existing method, proposed method and finally the result and conclusion

II. LITERATURE SURVEY

[1]. This paper dictates what can be done to resolve those issues by involving the Internet of effects (IoT) and the damages caused by water. Keeping the quality of water in check is today's ultimate aim. Thereby, to guarantee safe drinking water supply, the quality of water should be observed regularly. The use of IoT based result, concentrated substantially on water quality monitoring has thus been suggested. In order to support the issue, an IoT- based water quality checking network has been introduced that continuously experimenters and evaluates the quality of water and tries to distinguish whether it's over to the mark for general use. This paper includes the use of specific detectors that calculates the various parameters of the quality of water which includes conductivity and dissolved oxygen (DO), turbidity, pH, and temperature. The values from the detectors have been measured and calculated using the microcontrollers. Also these Reused remote values have been transmitted to the raspberry pi, the central regulator which uses the ZigBee protocol. finally, all the data from the detectors are also accessible via cloud computing through any browser, on request

[2].Most of the people in domestic areas face the problem of running out of water and overflow of water in water tanks due to redundant force of water. It becomes delicate for users to judge the position of water in water tanks. When the pump is turned ON, users won't realize that the water tank is filled, which may affect in overflow. Water position index and regulator system is used to sort out the issues associated with water tank. It's also possible to check the position of the water using detector so that whenever the water goes below, pump gets turned ON automatically. Also when there's overflow of water in water tank it uses detector to detect the water position so that if the water position goes over, the pump gets turned off automatically. This system prevents destruction of water

[3]. Online Checking System for Drinking Quality of drink slot machine aimed to 1) Study and design checking system for drinking quality of drinking water dealing machine and 2) Develop drinking water dealing machines to own the quality and safety in drinking. The system will be checking with 5 parameters similar as Turbidity, Conductivity, Total Dissolved Solids (TDS), pH and temperature of the water. The system was designed within the robotization system by a regulator included GSM module 3G Shields (UC20-G) in transferring data for creating a database in Real- time. The system is noticed about water quality in real- time on the mobile, website, station on Google chart and Time of conservation in changing the water sludge. This exploration, showed that the system can inform the water quality information at the stations with installation of the drinkable machine and it can send

alerting Communication to transportable and website in real- time to the responsible persons or affiliated person, the detectors utilized in this exploration are effective in work and have the accurate in dimension of potable quality.

[4]. Water is essential to human life. It's most precious not only for the human race but also for all the living effects in the earth. It serves us in 360 degrees starting from homes to hydroelectric shops of our life and so on. So it's actually important and responsibility of everyone to manage the water in an effective way. In this paper we propose an effective water monitoring system grounded on the Internet of Effects. If we keep wasting water continuously it can be actually dangerous problem in future. We should start saving water from ourselves. There are colorful ways through which water get wasted. Leakage plays a vital part in water destruction. Whenever there's leakage nearly we couldn't get it in original stage but when it becomes a huge problem it causes large destruction of water. So it's better to take action incontinently as soon as leakage takes place. In order to give a result, we put forward a system that monitors the water position, water quality and water leakage using colorful detectors. The ultrasonic detector and flow detector senses the water position and the water leakage independently. Once the excrescence is linked, it's informed to control room through the internet (Dispatch, twitter, SMS) and also near people can be informed in time. By placing this system, we will be suitable to collect and analyze the water operation patterns of the resides and save a lot of water in small as well large scale in future. As per our reference there are no projects with combination of water quality and water leakage finding, As technical side. For water leakage no sensors are used to find the leakage it has been identified by manual for water quality checking also GE filtration method is used so for which implemented in RO system Maintenance cost and manual interpret in required

III. METHODS

A model of the water distribution networks using wireless sensor networks is depicted as in the Fig.1. At each point of water supply in the distribution pipeline to the household, the sensor nodes in the water distribution network will be placed to active mode for sensing. The sensing unit efficiently transmits real time data to the central processing unit for further analysis regarding water quality. All the sensed water quality parameter data are analyzed using fuzzy logic and are transmitted wirelessly to the notification unit in the administrator's office. The algorithm for detecting the contamination and decision making are performed in the

processing unit. Finally, the notification node receives information about the contamination occurrence and alerts the consumers. The designed water quality monitoring system is promising as it detects contamination even at low concentrations.

Fig1. Water Distribution Networks Using Wireless Sensor networks

IV. SYSTEM ARCHITECTURE

The control system is designed in such a way that it automatically monitors and control's the water levels, water quality and leakage detection in tanks, dams, pipe, home etc. We are using the Arduino Uno to control the management and leakage detection in any type of objectives The measured sensor details will be send to control room and are display on mobile app, laptop. The condition about this system is updated to the web server using IOT through Blinkapp.
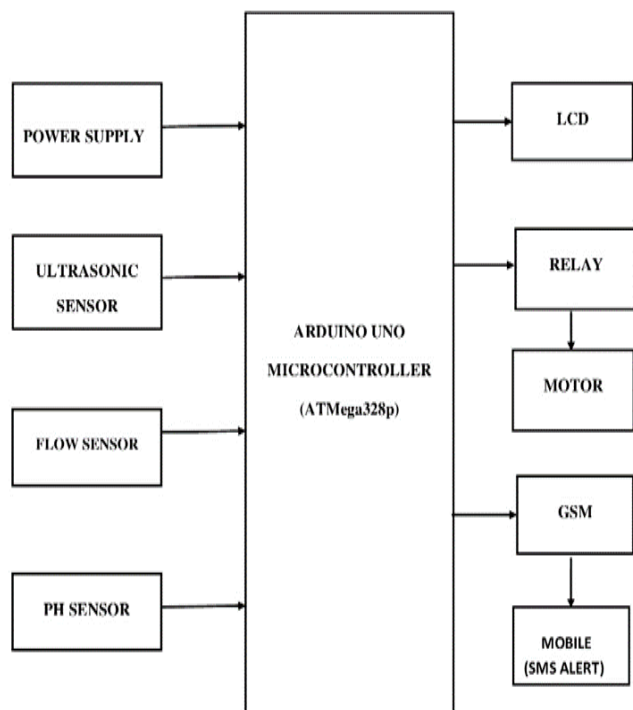
suitable to insure the safety and quality of a product and the processes that do within a wastewater or manufacturing factory. In utmost cases, the standard pH scale is represented by a value that can range from 0-14. When a pH value of seven, this is considered to be neutral. Substances with a pH value above seven represent advanced quantities of alkalinity whereas substances with a pH value that's lower than seven are believed to be more acidic. The difference between an alkaline substance and an acidic substance is veritably important. The human body has a standard pH position of 7.4, which is essential for the body to run effectively. However, it'll look to return to the neutral state, if the composition of the body every becomes too acidic or overmuch alkaline. In this product we this pH detector to detect the pH value of water.

Fig 2.pHsensor

C.Ultrasonic sensor

It is basically a distance sensor and is employed for detecting the distance. it's two ultrasonic transmitters namely the receiver and also the feedback circuit. The transmitter emits a high frequency ultrasonic undulation which bounces far from any solid object and receiver receives it as an echo. The echo is then processed by the feedback circuit to calculate the time and also the difference between the transmitter and receiver signal. This time can subsequently be used to measure the measure the distance between the sensor and also the reflecting object. it's an ultrasonic frequency of 40 KHz and accuracy is nearest to 0.3m.
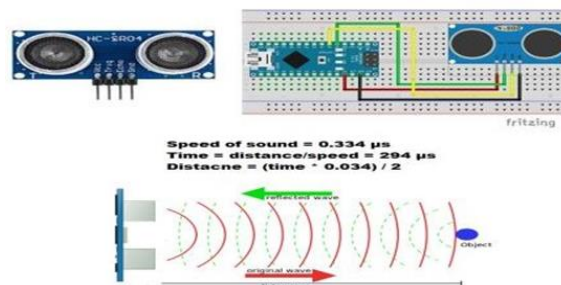

Fig 3.Ultrasonic sensor

D. Flow sensor

Flow sensor to detect leakage in a pipe is used for flow measurement. Precise measurement of the flow is an important step in qualitative and economic terms. The panel sits next to the

Fig.2 The block diagram of water quality monitoring and leakage system

A. Arduino Uno

In this system we are using Arduino UNO has the micro-controller .it is the most a part of the system. It's 14 digital I/O pins out of which 6 provide PWR output. it's an open-source and provides prototype platform. It also contains a 16MHX quartz oscillator attached thereto. additionally to the above features, it also has an USB connection, an influence jack, anS ICSP, header and button. It's everything to support a micro-controller. It can simply be connected to a computer using an USB cable or power it with an AC or a DC adapter or electric battery.

B.pHsensor

A pH detector is one of the most essential tools that's generally used for water measures. This type of detector is suitable to measure the quantum of alkalinity and acidity in water and other results. When used rightly, pH detectors are

water line and includes a panel to calculate the volume of water that has passed through. An integrated Hall-Effect magnet sensor generates an electric pulse with every turn.

quality testing is likely to be more economical, convenient and fast. As each and every variation of water level is informed to the cloud through the internet and nearby people can be informed in time. Thus saving lots of lives avoiding unpleasant scenarios
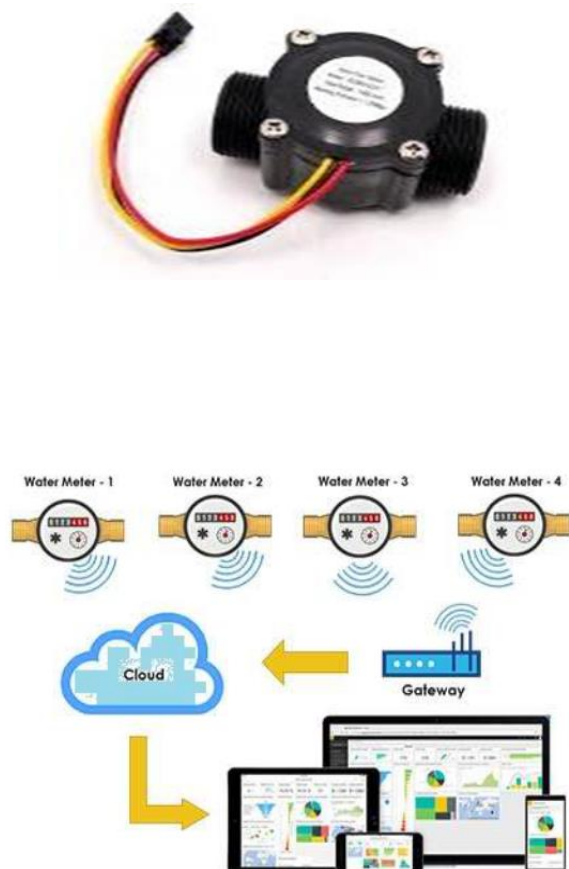
## WORKING MODEL

Fig 4.Flow Sensor

E. GSM

A GSM modem may also be a normal GSM cell phone for connecting to serial port / USB port on your device using the appropriate cable and software driver. All phones supporting the 'Extended AT command range' are used to send / receive SMS messages

F. IMPLEMENTATION AND RESULT

The system can monitor water quality automatically, and it is low in cost and does not require people on duty. This system is used to avoid the huge amount of water is being wasted by uncontrolled use of home/offices etc. The water
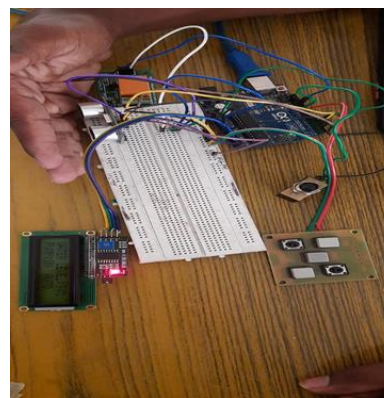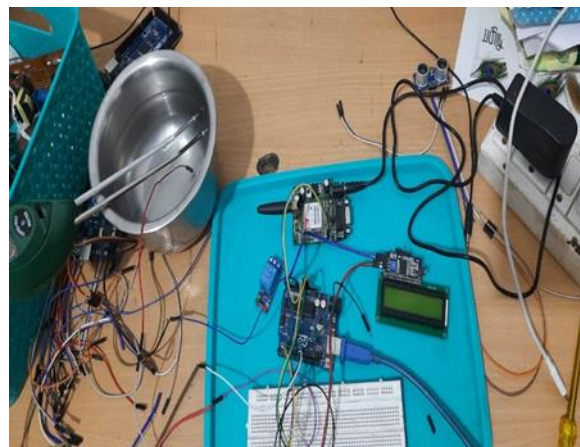
V. CONCLUSION

In this proposed work, the look and deployment of the important time water quality monitoring system for drinkable using wireless sensor network has been presented. The developed system has been field tested at school hostel region, for monitoring of water quality parameters. it's an occasional cost, lightweight system and has low power consumption. Moreover, the system is in a position to log bulk data and transfer to remote locations. The contamination detection algorithm and also the fuzzy rules help to spot the contamination within the pipeline and classify water supported the contamination. This deployment provides rich data to the water consumers/public, authorities in municipal office. The sms alert and mobile app ensures the security of beverage. Our future plan is to analyze the performance of designed system against other sorts of contaminants like nitrates, lead etc.

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