SYSTEM FOR WATER QUALITY MONITORING AND DISTRIBUTION

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Abstract— Water plays a vital role in the creation of human being and other natural phenomena. More than 80% of the resources is surrounded by water but in that only 20% is good for consumption others are fully polluted and contaminated. Now a days water is more polluted, and even supplied in a very lesser level so to check and monitor the quality of the water we mainly using a number of sensors are used to monitor the water's quality and distribute it to the less fortunate. The quality of the water is affected by several parameters. Water is provided from difference resources like lake, pond, well, ground water, oceans etc.so these waters are not good for consumption Therefore, our goal is to assess the water's quality while keeping an eye on the flow and level of the water. It is intended to use a variety of cutting-edge devices to check various water quality system parameters.

Keywords—IoT; Water management; Water distribution, Water monitoring system.

INTRODUCTION

Water is a main resource for every single living being without water no individual can live in this world. Additionally, it is essential to our lives and there are maximum 80% of the water surrounded in this world in that only 20% is good for consumption remaining water are polluted and contaminated and also now a days both drinking and the domestic use water is not that good they are maximum polluted so here we are evaluating the water's

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purity and distributing the water to the isolated rural village [1][14]. The water we consume for drinking and the water we get it from well, underground water ocean, pond water are not that much good to consume directly so we are using a sensors like turbidity and Ph sensor, these sensors will be placed in the main tank and they will be sensing the water quality whether the water is good for drinking when it satisfies the condition like Ph level neural seven and turbidity level like less than one then the solenoid valve will on automatically using the relay and then using water pump motor the water will be send to the tank for drinking purposes then the main tank water fail to satisfy the Ph and turbidity sensor condition then the second tank valve will be opened where water is used for domestic purposes like washing ,gardening etc [2-4]. When monitoring the water if the water gets decreased in the drinking water tank then using water level sensor the decreased water level is noted the using the water pump and solenoid valve the water is passed to the first tank from main tank while distributing the water from the main tank using the water flow sensor the flow of the water is analyzed all these daily data will be disappearing in the lcd and using iot they are stored and shown in the mobile app all the Ph, turbidity, water level are displayed[3][9].

we can also implement it in our own houses, government schools, hostels etc. The water quality monitoring and distribution system using IoT is useful as water is an important element which must be preserved and used carefully to meet the demand of future needs[4].

LITERATURE SURVEY

Human survival depends on water, but in order to ensure a proper distribution of water, a number of crucial elements must be taken into account. The most crucial element to take into account among these is water leaking from pipes. In order to distribute water and stop losses, this paper describes a smart water management system that uses the microcontroller ZR16S08 as an IOT solution. The technology works by intelligently monitoring the water flow in distribution network pipes, which ensures that water leaks through pipes are prevented[5][11]. In order to create nodes for wireless sensors that will be connected to water pipes, the ZR16S08 microcontroller was used [6]. This microcontroller adheres with the criterion of cheap cost as well as low power usage. The web server receives the information the sensor nodes have gathered. With the use of On-Off Keying modulation, the sensors on each node and gateway are able to communicate[1]. The system has the advantage of accurately measuring water flow, but the drawback is that it uses a lot of energy and has a narrow frequency range [4].

Water is the important resource for the life and existence. Now a days due to person migrating from rural to urban area there is a scarcity of water[7][12]. In this paper we mainly talk about water quality monitoring using iot, they employ a variety of sensors, including flow sensors, control of water sensors, water level sensors, Ph sensors, and others, to identify and track the state of the water and level[8][10]. The sensors are all connected and interfaced by the Raspberry Pi hardware, and the data is sent to a webpage for a cloud database. The water pollution and the water scarcity is the main problem and just by implementing these sensor these problems can be prevented. In the proposed system they still more implemented more sensor to detect the quality using raspberry pi acting as a controller. The suggested system's key benefits include supplying a sufficient amount of water and keeping track on the water's quality. [7]. It is not that easy to provide water all over the city just by using simple sensor but in the future it can be implemented.

Water pollution and the water scarcity is the main problem faced by every individual. To just ensure every person drinking the pure water we will be checking the water quality and monitoring it and The main focus of this work is on developing and building a low-cost system for the Internet of Things (IoT) that can monitor water quality in real-time. The

system makes use of a number of sensors, which are most effectively employed to detect the chemical and physical properties of water. Some of the characteristics, such as temperature, pH, and turbidity that can be monitored. The value that is measured can be controlled by an Arduino board, and the sensor detecting data can be read by an Internet of Things device utilising a WiFi network..Water is the main resource for every living being, here we are checking where the water is in the neutral Ph level like 7 or whether it is acidic or alkaline and using turbidity we can check the quality of the water if the turbidity is higher the water is not approved for drinking it leads to several diseases like diarrhoea, cholera etc. The core controller Arduino control the sensors and send all the data through internet.[8][13]. It does not require any person and as a future scope the IoT is increasing with adding more sensors we can check additional information in the water.

Applying too much fertilizers to the crop and to the plant can spoil it completely but in the irrigation purposes it is better to apply less fertilizer than applying more fertilizers to the plants [15]. Water administration and the optimisation of the water sources are primarily required to address the water deficit since it is also a major issue for agricultural purposes. In order to create an organising system for sources of water such as pond water, the water with fertiliser, and groundwater using the Arduino and a DS3231 real-time clock, this paper is frequently used for irrigation purposes and farming. A flow management system is also added to improve the effectiveness of water use. The regulated environmental chambers are where the system is primarily used. Based on the findings, the system's structure has been functionally successful, for a crop to grow well we all need fresh water so we are implementing a system like sensing the scheduling system, flow control system, here microcontroller act as a controller. water scheduling is the main and the important method for irrigation of crops it will be mainly maintain, manage and avoid the water wastage and in the future the system can be improved through the application of more advance algorithm[2].

EXISTING& PROPOSED SYSTEM

3.1 Existing system of water quality monitoring based on sensor network

An Internet of Things-based real-time water quality tracking system was suggested. To check the water quality, an STM32 chip microcontroller and sensors including a temperature sensor, pH sensor,and turbidity sensor are used. The water's pH and turbidity must fulfil the requirements.
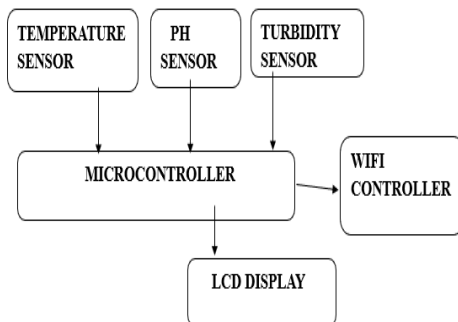

Fig3.1 Water Monitoring System

Fig 3.1 describes the water quality tracking system which is helpful to monitor the quality of water. The limitation of Water monitoring system is the consumption of time is

high and the water is monitored but not managed.

3.2 Water distribution system

Global population growth, contamination, and excessive groundwater use have all contributed to a rising problem of water scarcity. Leaks in pipelines result in the loss of 38% of all the water produced in developing nations. The technology for intelligently dispersing water was put into place. It involves various functionalities.
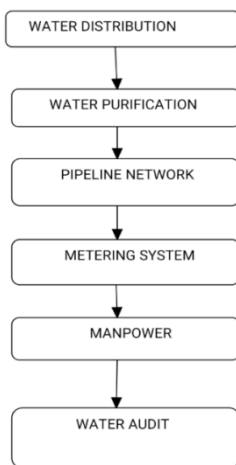

Fig: 3.2Water distribution system

Fig 3.2 describe the water distribution system in which water purification is done which is send in the pipeline network .
Some of leakage detection techniques usede are

A) Thermal imaging: Cameras for the purpose of thermal imaging will be positioned on pipelines at predetermined intervals. Monitoring the alteration in the thermal properties of the soil near the pipeline break helps to find leaks.
B.) Listening Device—Acoustic detection of leakage is used by listening devices. It makes use of a transducer to turn sound waves into electrical signals.
the limitation of water distribution system are high power supply requirement and labor cos
3.3 Proposed System of water quality monitoring and distribution

The limitation of existing system has been overcome by proposed system called water monitoring and distribution. In proposed method, the water quality is monitored using sensors. Especially people in rural areas and the under privileged people does not receive good quality of water and suffers from various waterborne diseases. This method helps in automatic filling of overhead tanks in rural areas and the main advantages is like sensors provide accurate details of the quality of water. The water from the overhead tank is automatically opened through the solenoid valve for the user consumption based on time with the help of rtc,,as in villages the distribution of water will be in any time and the water is distributed only when the sensors value satisfies the condition.

The IOT enabled solutions provides optimized smart water management system by including IOT sensors these sensors aid in real time monitoring of water consumption or leakage. The IOT sensors that were used here are Ph sensor, Turbidity sensor, Water flow sensor, Water level sensor for monitoring and management of water and the whole process

is monitored in IoT to ascertain if supplies maintain the required degree of purity and to find out the extent of any variation that occurs and to find out organisms responsible for spreading of water borne diseases .Normally if the Ph of water is Lesser than 7 means it is referred as Acidic water and if it is greater than 7 means it is referred as alkaline and if it is accurately 7 means it is referred as neutral water and the turbidity must be less than 1 Nephelometric Turbidity Unit (NTU).The analysis of water is done in order to ascertain the quality of water whether it is subjected to physical and chemical test is done and the Physical test includes determining turbidity and chemical test includes alkanity and acidity of water.

Now a days due to the work and daily touch schedule we cannot keep up time that too in the rural remote village they faces many basic problem like they will never know the timing when they will be supplying water to them so we are using real time clock where we are introducing and fixing a constant timing and the water quality is monitored by the mobile application. If they are supplying water twice a day then the fixed timing the water quality is checked and distributed based on time. Arduino uno is a microcontroller where all the sensors are interfaced and using IoT, the sensor's sensed will be displayed in lcd are noted. In the main tank the turbidity and Ph sensor are placed to monitor the water quality and in between main tank and the drinking water tank the water flow sensor is placed to verify the flow of the water then if if fails to satisfy the level then second tank valve is opened and using solenoid valve water is let out for domestic use just by sensing and analyzing the water quality level and distributing it to the remote village we can prevent the water scarcity as well as the water pollution so that they can use the right quality of water without getting any diseases. we can also implement it in our own houses, government schools, hostels etc. The water quality monitoring and distribution system using IoT make it clear that every single individual in this world just consume right quality of water where as their will be no shortage of water in the future all the urban, rural emote places will get the water supply without any problem and using embedded c Arduino ide the codes are written to satisfy all the condition .
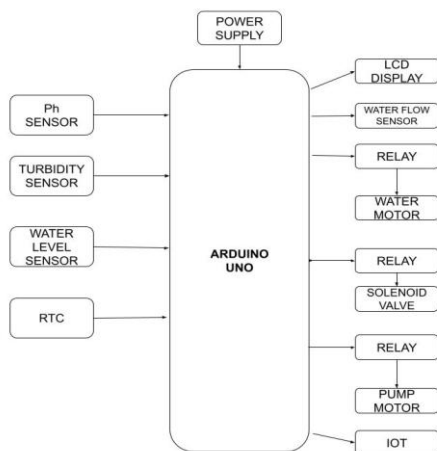

Fig. 3.3 water quality tracking and distribution system

Fig. 3.3 water quality tracking and distribution system. The water quality is monitored automated using sensors. This method helps in automatic filling of overhead tanks in rural areas and the main advantages is like sensors provide accurate details of the quality of water. The water from the overhead tank is automatically opened through the solenoid valve for the user consumption. In this proposed method, Arduino microcontroller is used

to interface with the sensors and to the uno communication devices. The Ph and Turbidity sensor is utilised to measure the water's PH level, which refers to acidity or alkalinity as well as dust particle and turbidity, respectively. The water level sensor indicates the amount of water in the tank, while the water flow sensor determines how much water is being utilised. The sensors' most recent value is displayed on the LCD.

SOFTWARE
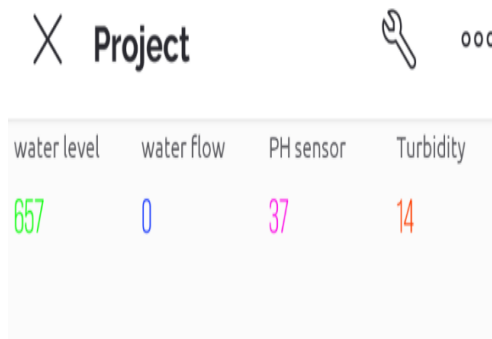

Fig.4.1 Blynk IoT

Fig.4.1 displays sensor vslues in the mobile appBlynk. Arduino Integrated development environment and Embedded C are utilized for implementation. Node MCU is an open source IoT platform. Node MCUusesUART protocol for serial communication. By means of this protocol the sensor values are communicated with help of IoT.Thus the water quality is monitored and displayed in Blynk IoT app where the sensed values are communicated with this app by means of node MCU.The Ph, turbidity, water level and the waterflow will be displayed which is helpful for monitoring the water quality.

Fig 4.2, The Flow chart explains the complete project like after giving power supply the water from the main tank is distributed to the village tank before supplying the water the Ph and Turbidity is sensed. If the water satisfy the condition it is send for drinking purpose or else it is send for other purpose like agriculture and domestic use so use the flowchart above we can prove such conditions.

The flow diagram depicts that the if the waterlevel is less it is sensed by water level sensor and water is pumped from underground and the water quality is monitored using sensors and if the condition is satisfied the solenoid valve is opened on the basis of time.

Water is the main factor so in the rural villages water supply and also water quality is very bad so we are taken a measure to sense the water quality and distribution to the everyone in the particular fixed time.Thus water is monitored and distributed.
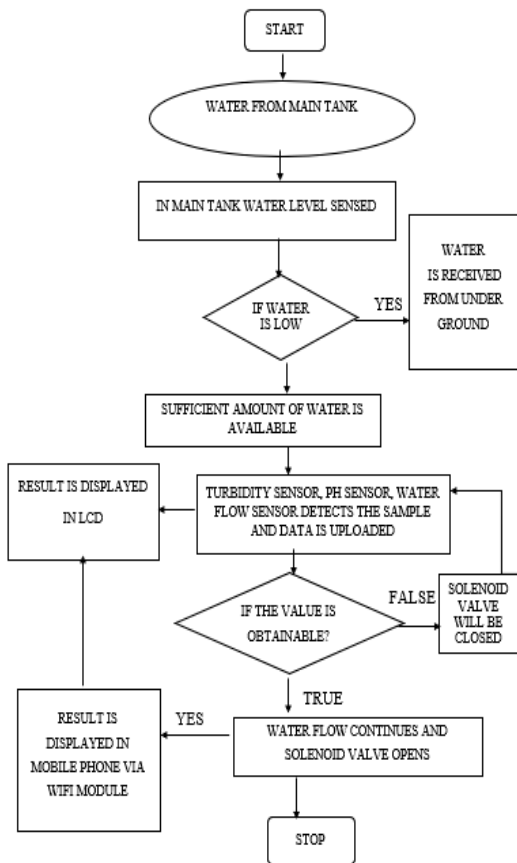
V.Result and discussion

Fig.4.2 Execution of water quality monitoring and distribution system

Fig.4.3 Overall setup

Fig. 4.3 shows overall setup where monitoring of turbidity, Ph and water flow and water level using IoT sensors have the distinct benefit that the system is affordable, can monitor water quality automatically, and doesn't need workers. Thus with the help of proposed system water quality is analysed. In distribution systems, it is important to determine when and where water quality changes in the system. Thus water is distributed on the basis of

water quality and on time basis it is distributed to the user with the help of Rtc.

VI. Conclusion

Fresh water is a scarce and restricted resource on Earth, and as a result of pathogenic agents and chemical contaminants, the water is becoming more and more contaminated every day. For the health of our bodies, we must regularly consume water. Everyone and everything needs water to survive, not just humans. Our bodies depend on water for seventy per cent of their weight, thus it is crucial to our health that we drink plenty of it. Monitoring offers the unbiased data required to make intelligent choices about the management of water quality now and in the years to come. We utilise water-quality tracking to identify new, persistent, and developing issues, to assess if drinking water requirements are being met, and to safeguard additional positive uses of freshwater. Therefore, the people and environment gain from maintaining and promoting high water quality.

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