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IOT based Water Distribution and Monitoring System

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Abstract- The paper represents the initial steps in the development of a drinking water quality monitoring system. The system is to detect and locate in real time any change in water quality, quantify its importance, evaluate its consequences and determine the proper actions to be taken to limit its effects based on a wireless sensors network. First, we start with determining an location of the quality control points of the drinking water. Then, develop anomalies detection algorithm which detects the contamination and malicious acts in the drinking water distribution system. Finally, considering the environmental parameters of our system, we propose a data aggregation method in order to minimize the energy consumption of the source nodes and to reduce the network load. We investigate the design of a water level sensor device that is able to detect and control the level of water .The system firstly senses the amount of water available in the tank by the Ultra Sonic Sensor. We sense the Quality of water using PH sensor. We distribute the water to the area through automatic electronic valve i.e. Solenoid.

Keywords- Water Monitoring, distribution, authentication, IOT, customer relations and billing, water-meter, Municipal Utilities, smart cities.

I. INTRODUCTION

The combination of advanced information technologies with the cyber-physical environment creates a new of potential applications. To develop IOT system which address all water distribution and monitoring problems and reduce man power as well as consume less time.We investigate the design of a water level sensor device that is able to detect and control the level of water Ultra Sonic Sensor and Arduino Controller. We sense the Quality of water using PH sensor. We distribute the water to the area through automatic electronic wall i.e. Solenoid. Hence, it's necessary to prevent any intrusion into water distribution systems and to detect pollution as soon as possible, whether intentional or accidental. The protection of the visible assets can be realized by traditional intrusion detection. As a result, the network becomes more difficult to protect. In recent years, assistance and research programs have been developed to improve the safety and security of drinking water systems. Our project provides a new water quality monitoring system for water distribution network based on wireless sensor network (WSN).
The Motivation of this research work is to improve the Water Distribution and Monitoring work using web based application. We detect the areas where we want to distribute the water and identify the water flow level. We can identify the water available in tank and generate the bills which will help in future use. Main motivation of proposed system is to detect the quality of the water whether it is safe or not which is used in order to avoid physical diseases.

A. Problem Ingredients

Main Object is to develop IOT system which address all water distribution and monitoring problems and reduce man power as well as consume less time. And system which will able to detect the water flow as well as quality of water using Ultrasonic and PH sensor in order to avoid physical diseases. This IOT based proposed system will used to acquire water level details of a water source in real time from any location, any device connected to Internet. For various purposes for better management of water source, water level data can be used .This is very usual for monitoring and controlling water level using Arduino Controller and Solenoid Valve from remote location when it is not possible to visit location physically every time.

B. Goals and Objectives

1) Automatic work
2) We are able to find the level of Water, Speed of Water as well as bill details.
3) Ability to check Quality of water.
4) Required less time to operate.
5) We are able to turn on or off the water wall automatically.

II. LITREATURE SURVEY

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Paper name: Smart Water Distribution Management System Architecture Based on Internet of Things and Cloud Computing.
Author: Sawsan Alshattnawi Yarmouk University Computer Science Department Irbid Jordan
In this paper, The fast population growth needs to provide clean and affordable water that meet the human requirements. The water faces various problems in the future because of global climate change. An efficient and effective water management and treatment is necessary to keep water quality and availability. It contains all the theoretical requirements necessary to develop such system, especially in third world countries where the water supply is intermittent.
Paper name: Optimal Demand Response Scheduling for Water Distribution Systems
Author: Konstantinos Oikonomou, Student Member, IEEE, Masood Parvania, Member, IEEE, and Roohallah Khatami, Student Member, IEEE
In this paper , the proposed models incorporate a detailed formulation of water distribution networks and the associated hydraulic constraints, ensuring deliverability of the services topower systems. The nonlinear terms appearing in the WDS constraints are linearized to convert the proposed models to instances of mixed-integer linear programming problems. The proposed model is developed on a 15-node WDS, using the energy and ancillary service prices of the California ISO. The results reflect significant profit opportunities for the W-DSO by providing DR and frequency regulation services in the markets
Paper name: A Novel Smart Water-Meter based on IoT and Smartphone App for City Distribution Management
Author: M Suresh1*, U. Muthukumar2, Jacob Chandapillai2 1Data Acquisition Systems Laboratory, 2Centre for Water Management Fluid Control Research Institute, Palakkad, Kerala. 678 623. INDIA *e-mail: m.suresh@fcriindia.com, Member IEEE1
In this paper, A novel approach to performing automated water-meter reading for update of consumption information from field. The smart metering approach proposed differs from existing methodologies by making use of low cost IoT hardware and smartphone. This permits both Meter Reader as well as individual domestic / industrial consumers to use regular smartphones to perform meter reading and update to utility's portal / database for billing and payment. The proposed scheme reduces overheads in handling meter reading and billing for water distribution in metropolitan and large urban.
Paper name: Design and realization of water quality information management system
Author: Dongling Ma, Jian Cuil
In this paper,In this paper, we make the water quality monitoring system and distribution. We distribute the water by using flow sensor. And check by using turbity sensor and ph sensor.
Paper name: Feasibility Study on Wireless Passive SAW Sensor in IoT enabled Water Distribution System
Author: Zhaozhao Tang Faculty of Arts and Creative Technologies
In this paper, the wired and wireless response signals of the passive SAW delay line temperature and pressure sensor is compared. There is 1/5 attenuation on the response signal when wireless interrogation and response signal receiving process is applied. A wireless passive SAW delay line temperature and pressure sensor was planted in a framework simulating the environment of the water pipelines, and the response signals of the sensor node in different ambient environments are analysed and compared to the air environment.

III.EXITING SYSTEM

Using Existing System, Manual work is increasing over time where workers has to go to respective area where he need to supply water and then turn on or off the particular wall which results in time consuming process.
Extra Manual Work, Consume More Time, We are not able to find the level of water, speed of water as well as cannot generate the bill, Can't identify the quality of water**.**

IV.SURVEY OF PROPOSED SYSTEM

The propose system will design to control and monitor the water in tank which reduce Manual work by automatically turning water walls on or off which reduce time. Propose system will identify the level of water, flow of water as well as bill details, check quality of water. The IOT system which address all water distribution and monitoring problems and reduce man power as well as consume less time.
Naïve Bayes algorithm is a classification technique based on Bayes Theorem with an assumption of independence among predictors. Naive Bayes theorem gives us a way of calculating posterior probability P(c|x) from P(c), P(x) and P(x|c).

$$P(C|X) = \frac{P(X|C)\,P(C)}{P(X)}$$

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Look at the equation below:
P(C|X) is the posterior probability of class (c, target) of the given predictor (x, attributes).
P(C) is the prior probability of class for the given equation.
P(X|C) is the likelihood which is the probability of predictor given equation.
P(X) is the prior probability of predictor of given class.

A. Advantages Of Proposed System
We perform a proposed system provides authentication
Required less time
Time effective process.
Water distribution will require less man power

V. SYSTEM ARCHITECTURE

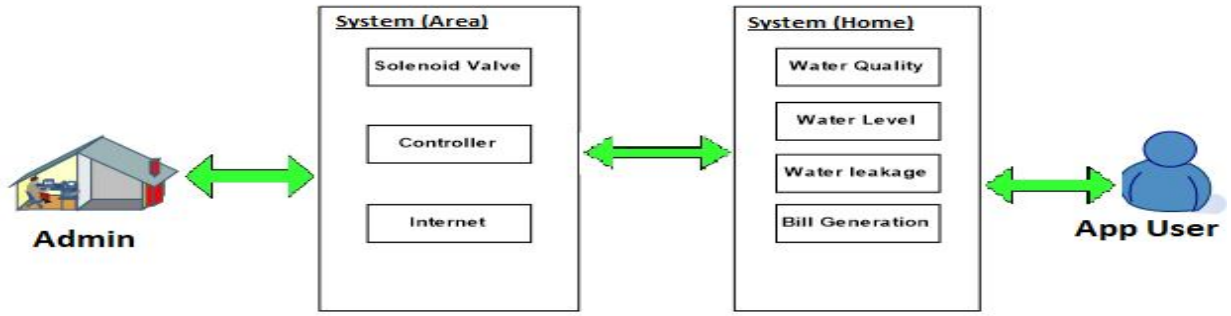


Fig: System Architecture

The Above Fig. Shows the architecture of the System .In which it tells how will be system flow and water quality, water level, generate the bill and how the water will be provided from the authorized user.

A. Module (Admin)
1) Registration
2) Login
3) Web based system
4) Data Base server
5) Can distribute the water as per area wise.

B. Module (Water distribution)
1) Water distribution process can be done by admin only.
2) Admin can turn on or off the water distribution as per area.

C. Module (Water Monitoring)
1) In this module water quality can be monitor through various sensors like PH sensor.
2) Water level can be monitor via ultrasonic sensor.

D. Module (User)
1) Registration
2) Login
3) Mobile Application
4) Can monitor water tank which is available in house.
5)

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VI. CONCLUSION AND FUTURE WORK

The proposed system eliminates manual monitoring and controlling water for home, agriculture, or industrial users. The system achieves proper water management and enhances productivity and automation.The proposed IOT based water level monitoring system will be helpful to collect, analyze and predict the water level details, water usage and other information of particular water source at particular location in real-time remotely.

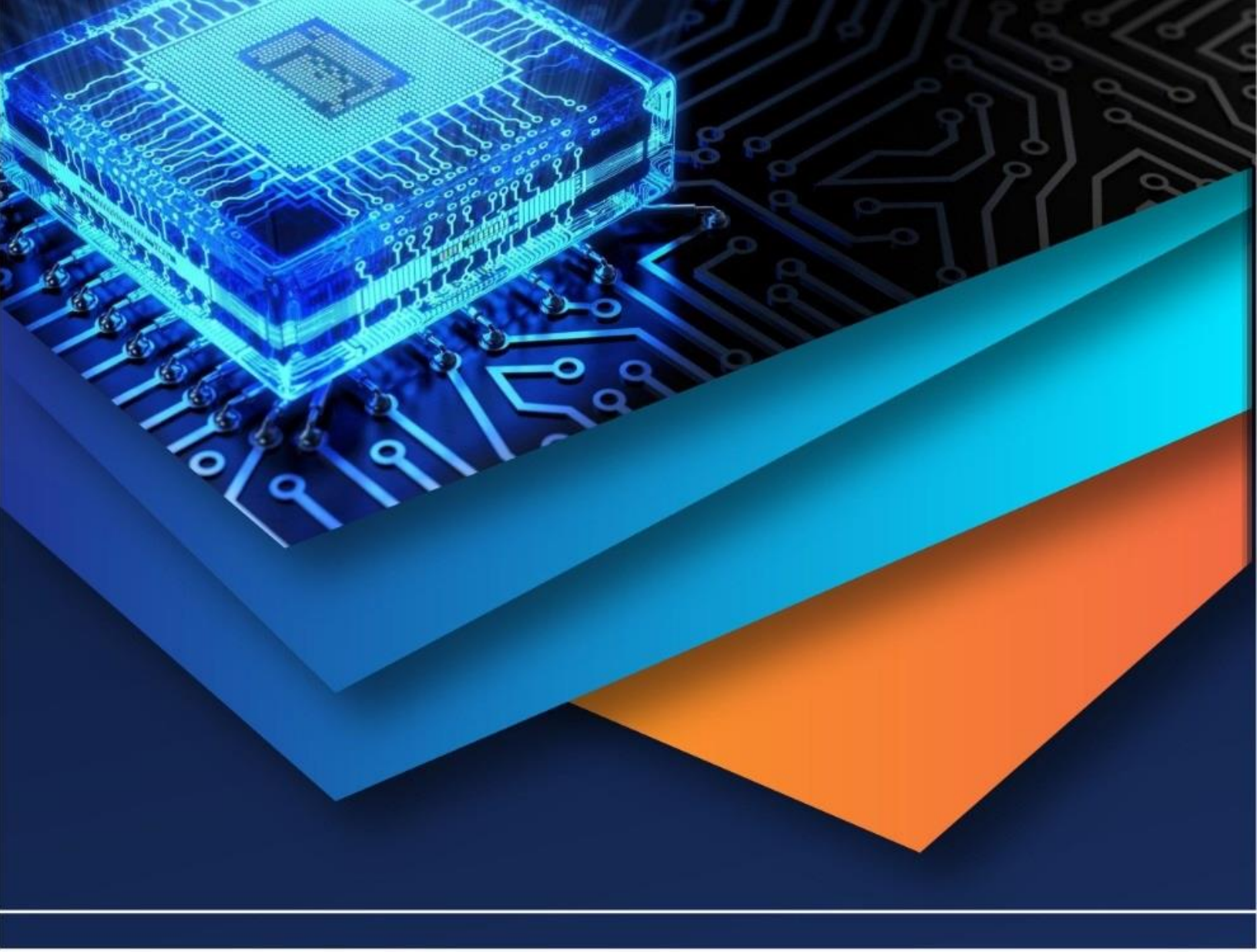
This project focuses on developing an automated system for WATER. It saves time and effort, especially if it is huge number of person. The proposed system eliminates manual monitoring and controlling water for home, agriculture, or industrial users. The system achieves proper water management and enhances productivity and automation.

Future Scope: To control and monitor the water in tank which reduce Manual work by automatically turning water walls on or off which reduce time. Identify the level of water, flow of water as well as bill details, check quality of water.

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