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Water Distribution & Monitoring using IoT

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Abstract: - This system represents the initial steps in the development of a water distribution and quality monitoring system. This system is based on a wireless sensors network to detect and locate in real time any change in water quality, quantify its importance, evaluate its consequences and determine the most appropriate actions to be taken to limit its effects. First, we start with determining of the quality control points of the water. Then, we move on to the development of a water level for future prediction in the water distribution system. Finally, taking into account the environmental parameters of our system, we propose a water distribution system based on the IOT concept we use different sensors to manage the water.

Keywords: Water management, Flow sensor, Ultrasonic Sensor, Wifi-Module, Notification, Ph Sensor.

I. INTRODUCTION

Water is one of the most important basic needs for all living beings, but unfortunately, a huge amount of water is being wasted because of uncontrolled use and exploitation of water resource. Kerala averages rainfall of 3,000 mm a year. The general impression was that among all the states in India, Kerala had ample drinking water, but it's not the case. There are 1,164 problem villages without the adequate supply of drinking water. Even though Kerala has 44 rivers spanning its lush green landscape. Together, they contribute an annual discharge of 72, 00 million cubic meters of water which is unused to the Arabian Sea. One of the main reasons for the shortage is poor management of water. Overflowing water tanks in residence, schools, colleges, Municipal overhead tanks, Hospitals etc. can contribute to the massive amount of water wastage. If we can control this we can save large amounts of water. Conventional water tanks can neither monitor nor control the water level in the tank. As of now, the water level has to be manually checked and refilled according to the requirements. So in this paper, we solve all the above mention problems with automatic water level detection and refilling of water storage system with the help of Internet of Things (IoT).

A. PROBLEM STATEMENT:

To develop IOT system which address all water distribution and monitoring problems and reduce man power as well as consume less time.

II. LITERATURE SURVEY

[1] Monitoring system as a tool for risk evslution in water distribution system Alicja Balut, Andrzej Urbaniak 2018.

In this paper, we monitor the quality of water and get the result on IOT. And we distribute the water by connecting the flow sensor.

[2] Real-time clustering for priority evaluation in a water distribution system Alexandru Predescu, C˘at˘alin Negru, Mariana Mocanu, Ciprian Lupu 2018.

Nowadays with the development of smart infrastructure for water resource management, there is an increased need for efficient operation and management of water distribution infrastructures. In this paper, we propose a system for real-time clustering system priority evaluation in a water distribution system.

[3] Optimal Demand Response Scheduling for Water Distribution Systems Konstantinos Oikonomou, Roohallah Khatami , 2018.

As energy intensive infrastructures, water distribution systems (WDSs) are promising candidates for providing demand response (DR) and frequency regulation services in power systems operation. However, models that tap the full flexibility of WDSs to provide the services while respecting the operational constraints of water networks are remained scarce.

[4] Smart Water Distribution Management System Architecture Based on Internet of Things and Cloud Computing Sawsan Alshattnawi, Irbid Jordan, 2017.

The fast population growth needs to provide clean and affordable water that meet the human requirements. The

water faces a problem in the future because of global climate change. An efficient water management and treatment is necessary to keep water quality and availability.

[5] Feasibility Study on Wireless Passive SAW Sensor in IoT enabled Water Distribution System Zhaozhao Tang, Wenyan Wu, Jinliang Gao, Po Yang 2017.

Internet of Things (IoT) technology has recently been widely utilized into a variety of industrial applications. Wireless Passive Surface Acoustic Wave (SAW) sensors have attracted great attention in numerous IoT enabled applications. The sensor nodes are not directly supplied by the power supply as it absorbs the energy from the interrogating Radio Frequency (RF) pulses to excite the SAW.

III. PROPOSED SYSTEM

To perform all the decided tasks the above system design is formulated by utilizing components such as flow sensors, ultrasonic sensors, ph sensor, microcontroller and analog to digital converters. Water flow in each home unit is measured and intimated to the main distribution unit. On evaluating these measured values the home unit which over consumes water can be easily identified and alert is produced on over consumption. Also water supply to that particular home unit is stopped. Automated supply ensures that human operation is not mandatory.
But it is needed to switch on the water distribution unit. These tasks are meant to supply water to all areas properly. Also quality of supplied water is very much important so to ensure that, quality must be check.

IV. SYSTEM ARCHITECTURE & COMPONENTS

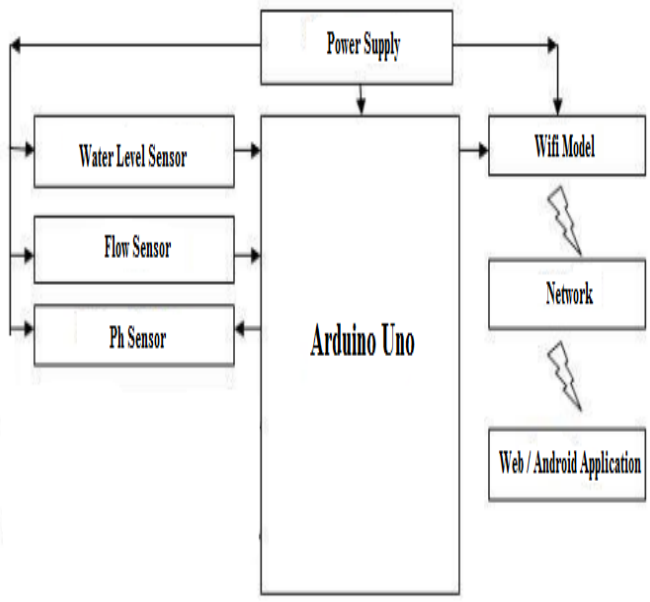

Figure – 1: System Architecture

A. HARDWARE DESCRIPTION:

1) INTERNET OF THINGS:

The internet of thing is the network of physical device, vehicles and other items embedded with electronics, software, sensors, actuators, and network connectivity which enable this objects to collect an exchange data.
The IoT allows object to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, an resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention.
IoT is expected to offer advance connectivity of devices, system and services that goes beyond machine –to- machine communication and covers a verity of protocols, domains and application.

2) LEVEL SENSOR:

Level sensors are specially- designed sensors which can establish the level of water present in a tank/ reservoir. This established water level can then be communicated to the central severs which are deployed for the purpose of effective water conservation as well as management.
This information is passed on to the central servers on a regular basis and also indicates the level of water is present in the reservoirs and tank.
Ultrasonic ranging module HC-SR04 provides 2cm-400cm non-contact measurement function, the ranging accuracy can reach to 3mm.If the level sensor are 4 pins echo, trigger, ground, Vin. The sensor can measure the level of water.

3) FLOW SENSOR:

Effective water management involves supplying water according to real requirement and thus measuring water is varying essential step in water management system.
Flow sensor typically output a series of pulses proportional to the instantaneous flow rate which means that to interrupt them it necessary to implement a simple frequency component. Since this project use a water flow sensor containing hall –effect sensor that outputs a pulse rate proportional to flow rate. In this project flow sensor is used to measure flow of water.

4) WI-FI MODULE:

The ESP8266 Wi-Fi module is a self SOC with integrated TCP/IP protocols that can give any microcontroller access to your Wi-Fi network.
The ESP8266 is capable of hosting an application or offloading all Wi-Fi networking function from another application processor. Each ESP8266 module come-programmed with an AT command set Firmware. The ESP8266 module is an extremely cost effective.
There is almost limitless fountain of information available for the ESP8266, all of which has been provided by amazing community support.

5) PH SENSOR:

pH Sensor - pH is an important parameter to be measured and controlled. The pH of a solution indicates how acidic or basic (alkaline) it is. The ORP Sensor requires a compatible interface and software to collect data. For many system applications these sensors provide an indication of water quality conditions.

V. RESULTS

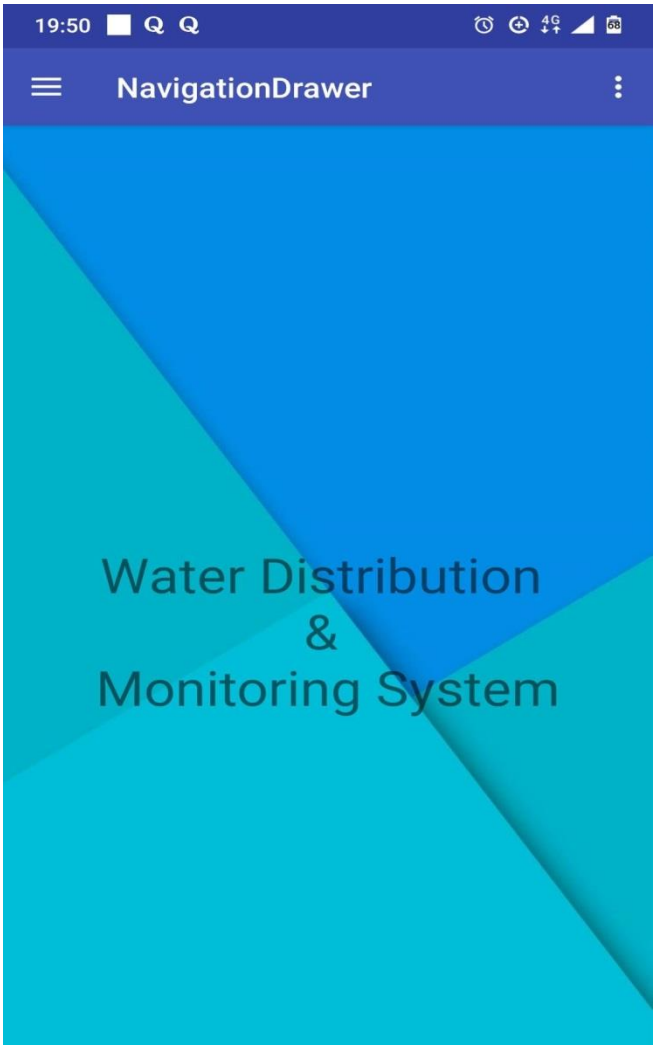

Figure – 2: Home Window

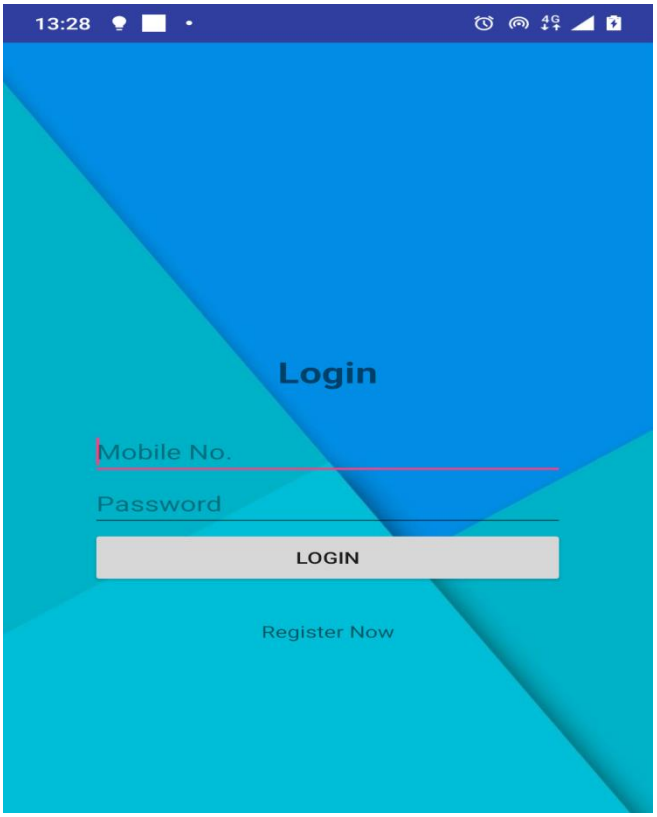

Figure – 3: Login Window

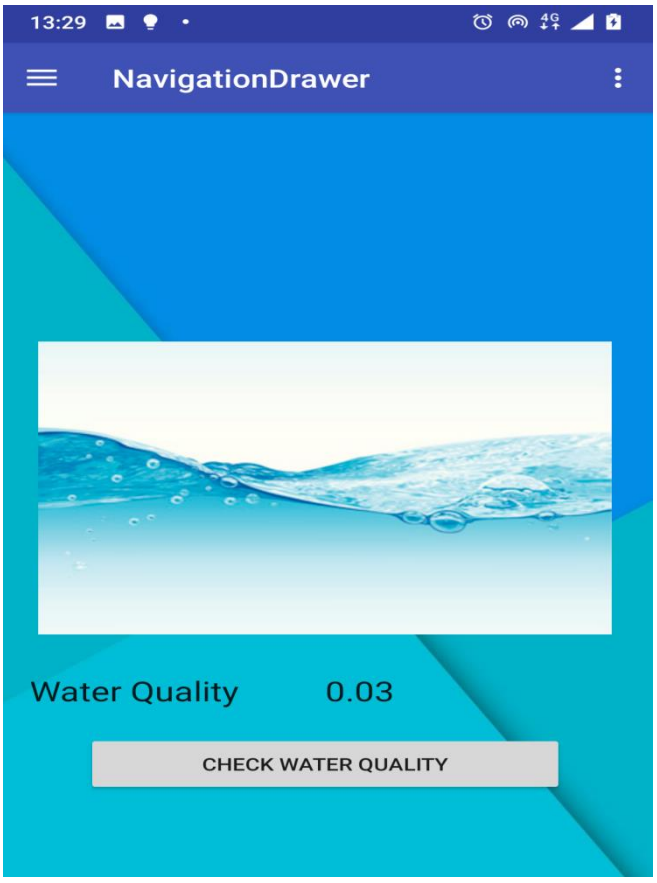

Figure – 4: Output Window - 1

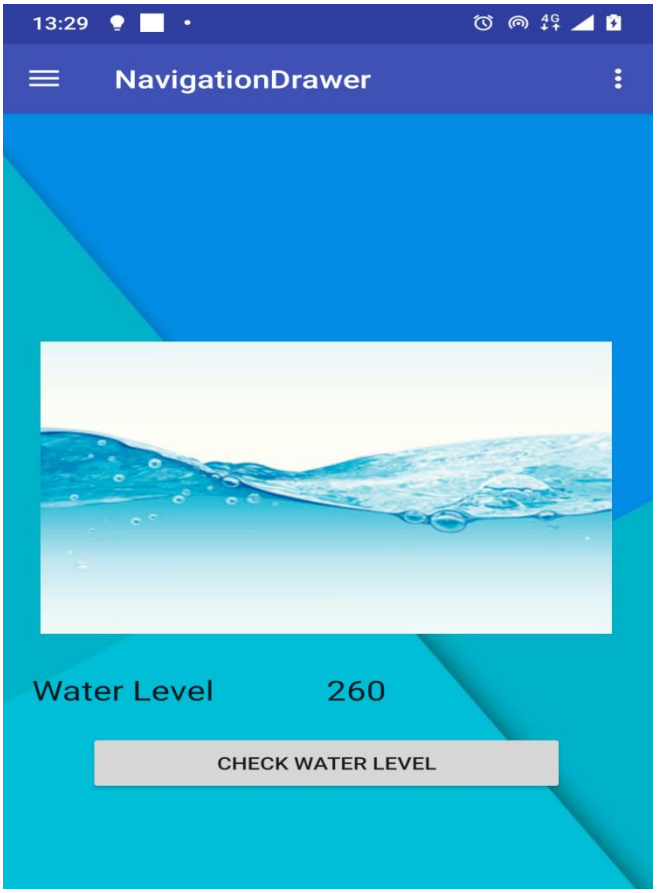

Figure – 5: Output Window - 2

VI. CONCLUSION

Enormous growth of developing world has led to huge need of water. Automated water distribution and performance monitoring system focuses on various entities such as proper supply, over consumption alert and water quality assurance. Those factors can be effectively monitored by employing ultrasonic sensor, flow sensors and pH sensors along with communication support provided by ardiuno controller.

VII. ACKNOWLEDGEMENT

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VIII. REFERENCES

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