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Implementation of Smart Way Water Monitoring System over in Municipalities

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***Abstract*—Nowadays water is the most preferred source of water for irrigation, industry and drinking domestic purposes in the country. There are more than 30 million tube-wells owned in private to withdrawal of water. It is proposed to develop an app which can help stakeholders to indicate how much water can be withdrawn safely from aquifers in their area as well as suggesting feasible recharge measures. The scope of this project is integrate modern technologies with monitoring facilities. This project focused on two major problems which are water level and water quality. By using this system, the user can easily identify the level of the water consumption and the quality content of the water. These things are done by using remote sensing and internet of things. In water level, the water level of the container will be fetched by using a sensor and those data were integrated with a web, android and iOS application which helps them to monitor the water consumption. It reduces the problems in over consumption of water and it aware the usage to the user. The water section provides the solution by obtaining three parameters given by of pH, TDS and fluoride content. By using the data of these parameters will helps user to identify purity level of the water. These data were also fetched and updated to the particular application in which each municipalities provided with and by use of those data further steps proceeded.**

***Index Terms*— IOT, android, iOS, sensors.**

I. INTRODUCTION

Nowadays water is the most preferred source of water for irrigation, industry and drinking / domestic purposes in the country. There are more than 30 million tube-wells owned in private to withdrawal of water. Over withdrawal of water from aquifers due to drying of abstraction structures and cause of vulnerability to contamination of geogenic and anthropogenic. It is proposed to develop an app which can help stakeholders to indicate how much water can be withdrawn safely from aquifers in their area as well as suggesting feasible recharge measures. The scope of this project is integrate modern technologies with monitoring facilities. This project focused on two major problems which are water level and water quality. By this system, the user can easily identify the level of the water consumption and the quality content of the water. In water level, the water level of the container will be fetched by using a sensor and those data were integrated with a web, android and iOS application which helps them to monitor the water consumption. It reduces the problems in over consumption of water and it aware the usage to the user. The water parameter it provide with the solution by obtaining three parameters given by of pH, TDS and fluoride content. Using these data will helps user to identify purity level of water. These data are fetched and updated to particular application where each municipalities provided with and by those data further steps will be proceeded.

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II. HARDWARE REQUIREMENTS

A. Arduino

An Arduino board is a microcontroller based embedded kit. The first Arduino technology was developed in the year 2005 by David Cuartielles and Massimo Banzi. The designers thought to provide easy and low cost board for students, hobbyists and professionals to build devices. The best examples of Arduino for beginners and hobbyists includes motor detectors, thermostat and simple robots. Arduino technology is used in many operating devices like communication or controlling. a typical example of the Arduino board is Arduino Uno. It includes an ATmega328 microcontroller and it has 14 digital pins and 6 analog pins and some pulse modulation pins.

B. Ultra Sonic Sensor

The ultrasonic sensors measure distance by using ultrasonic waves. The sensor head emits an ultrasonic wave and receives the wave reflected back from the target. Ultrasonic Sensors measure the distance to the target by measuring the time between the emission and reception. An optical sensor has a transmitter and receiver, whereas an ultrasonic sensor uses a single ultrasonic element for both emission and reception. In a reflective model ultrasonic sensor, a single oscillator emits and receives ultrasonic waves alternately.

C. Sensor Board

A sensor board senses, measures and reports the qualities like pH, TDS and Fluoride content in the water. It helps to measure each qualities with individual sensor boards. Inspite of using real pH, TDS and fluoride sensors it helps to acts like an exact sensor and fetch data as like real sensors. These sensors were available in markets in lower price and it helps to meet the customer requirements. The sensor board is given in fig1.

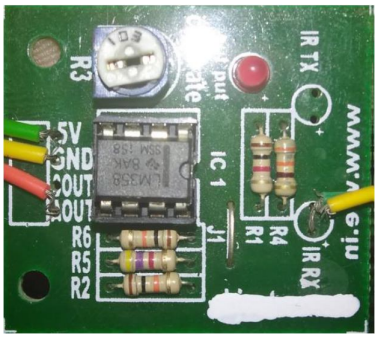

Fig 1. Sensor Board

D. TTL Convertor

The USB to TTL converter solves the problem by providing a serial port connection between a host computer and a development board, with the correct interfaces and signal levels for each. The TTL convertor is given in fig 2.

Fig 2. TTL Converter

D. Internet Board

Internet Board enables designers to rapidly prototype cellular connected IoT devices utilizing AT&T's LTE-M network. It helps to connect over on a particular server and helps to integrate sensors output data by using cloud

computing. The internet board is configured by using TTL convertor and connected with arduino to transfer data to the server. The internet board is given in the fig3.

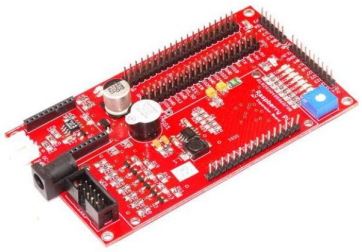

Fig 3. Internet Board

III. Software Requirements

The software requirements document is the specification of the system. It should include both a definition and a specification of requirements. It is a set of what the system should do rather than how it should do it. The software requirements provide a basis for creating the software requirements specification. It is useful in estimating cost, planning team activities, performing tasks and tracking the teams and tracking the team's progress throughout the development activity.

A. IOT Cloud Server

The IOT cloud server is a free server which helps to connect our sensor inputs and makes it integrate with a website designed by using HyperTerminal.When developing the IOThardware and software, one does not need to worry about setting up any servers or configuring networks or deploying databases as it is possible to use standard Virtual Private Servers (VPS). A VPS runs with its own operating system; it allows its customers to have superuser-level access so that they can install software that runs on the OS. As these are software-defined, it can be easily created and configured. Most IoT cloud server providers like Amazon or Microsoft Azure, provide a web-based user interface to manage the server. The panel offers easy access to services such as the installation of the OS, etc. This process helps speed up the development process while also enabling users to cut down on development costs drastically.

B.GoNative.io

The technology behind GoNative is built to take any existing web application and seamlessly convert it into native apps for Android and iOS.The modern web is powerful, so instead of "going native" by starting from scratch and maintaining separate code bases across web, Android and iOS, GoNative leverages your existing web application to serve and layout page content while seamlessly integrating native features to achieve a native user experience that feels the way native should. GoNative works with any existing live website, no changes required. Updates to your site cascade automatically to your apps. Other wrappers, including those built on PhoneGap/Cordova, instead use a static snapshot of your site, require AJAX for all network requests, and require re-submission to the app-store for most updates. GoNative apps integrate a wide range of native features to look & feel just like traditionally developed native apps. With GoNative, iOS feels like iOS, and Android feels like Android. Other solutions look & feel much more like a standard web browser, and try to mimic native controls with purely web technologies. With GoNative, you can generate a publish-ready app in minutes, directly from our website. You may also download the source to extend your app in any way. Many developers use GoNative as a hybrid-app boilerplate.

IV. Project Description

The major scope of this project is to overcome the problems facing in water usage. This project helps the municipalities in terms of monitoring the water tank by fetching its water quantity and quality etc. It also helps the municipalities to identify the content based on the water quality. All these solutions are integrated into a mobile application which works in both IOS and android. This project belongs to two major domains such as Internet of Things and remote sensing. IoT is for monitoring the area water tank to regulate water consumption and to monitor the water chemical qualities.

A. Problem Definition

In existing method, normally over in every municipalities the resource person has to regulate the water tank by climbing over on the top to see the water level and they make cleaning process which takes almost of 2 to 3 months. Focussing on ground resource, our tamilnadu has monitor and update the data's only by following a lab test. In our product we overcome these problems by obtain the water level and water qualities and made them to send to the municipality person's mobile app which indicates the water level and also about the quality content.

B. Detection of water level

Water level detection is done by using ultrasonic sensor integrate with cloud sensor in which it is limited up to a certain level. If the consumption crosses the level it allocates by intimate it in red colour.

C. Detection of pH

The sensor board continuously monitor the pH level of water and it displays in a column of web pages. If the pH content of water increases or decreases will be indicated in terms of different colours. If it reach towards acidic state it intimate in terms of red, or else if it decreases towards the base will intimate in terms of blue.

D. Detection of TDS

The sensor board continuously monitors the TDS level of a water and it updates then indicated with the given certain levels.

- Excellent, less than 300 mg/litre;
- Good, between 300 and 600 mg/litre;
- Fair, between 600 and 900 mg/litre;
- Poor, between 900 and 1200 mg/litre;
- Unacceptable, greater than 1200 mg/litre

E. Detection of Fluoride

The sensor board continuously monitor the fluoride level of water and it displays in a column of web pages. If the fluoride content of water increases or decreases will be indicated in terms of different colours. If it reach towards high state it intimate in terms of red, or else if it decreases towards the low will intimate in terms of blue.

V. System Architecture Diagram

A system architecture is the conceptual model that defines the structure, behavior and more views of a system. An architecture description is a formal description and representation of a system, organized in a way that support reasoning about the structure of the system. The proposed model is given as fig4.

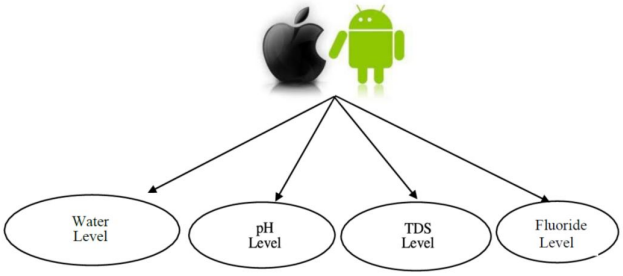

Fig 4. Proposed Model

A. Module 1:

Module 1 is based monitoring and regulating this module four various sensors are connected with the Arduino board which are ultrasonic sensor, pH sensor, TDS sensor, fluoride sensor. These sensors are continuously upload the value in cloud storage if these values are exceeding then it will provide alert interms of colors. The module 1 block diagram is shown in fig5.

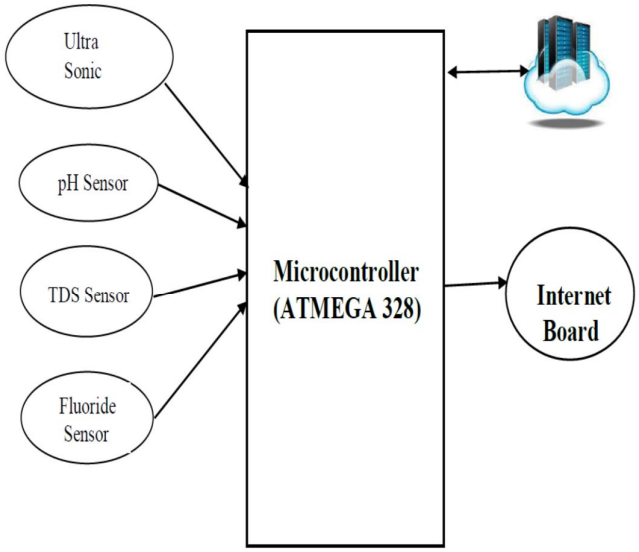

Fig 5.Module1 Block Diagram

B. Module 2

Module 2 is based on software integration. In this module the user can able to view the obtained data in terms of value and also it provides with an graphical representation in which it helps to view results in terms of graph by comparing with an previously obtained values over on server. It also provides an SMS facility The block diagram is shown in fig6.

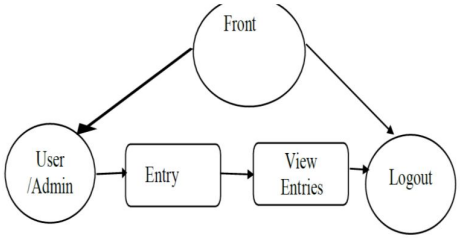

Fig 6. Module2 Block Diagram

VI. Conclusion

The existing methods of which it is implemented by the government of tamilnadu in which it requires an data set of about 32 parameters from water. But what's our motto is to one which implemented in municipalities, it collects and regulate the data over on a water surface, in which it helps and monitor their water surface according to their usages. It provides a key solution to those areas to reduce their water circumstances in every seasons.

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