Water Quality Monitoring And Domestic Usage Management System

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Abstract

Water resources are getting scarce and unreliable as time progresses. It is essential to identify the quality of water. This project includes necessary hardware and software tools that provide a reliable mode of measurement of water quality and usage with a user- friendly mobile application interface. The hardware model is designed with the ESP-8266 NodeMCU as the microcontroller unit. This module is capable of connecting to a network and transmission of data over the internet. A temperature sensor is utilized to screen the temperature of the water.DS18B20 is the temperature sensor that is being used because of the reliable library files available. A pH sensor is used to measure the pH of the water in the motor. The pH sensor has been explicitly worked to gauge the pH of the fluid. The flow sensor is utilized to decide the measure of water moved from engine through the sensor.The software tools include the Arduino IDE for programming the ESP8266 NodeMCU. Google Firebase is used as the cloud service to transmit and store the sensor data. Firebase is known for its speed and security and hence, it has been chosen over other cloud services. A mobile application on android operating systems has been developed to view the output from anywhere over the internet. The app is linked to the firebase cloud service and retrieves data at very high speeds. Various data like the amount of water used, water level in the tank, pH of water and temperature of water is measured, transmitted to the cloud and retrieved on to the mobile app for continuous monitoring. The app enables the user to monitor the sensor values from any place at any time. The app alerts users when they usage limit exceeds. The users can also know the amount of water used in exact litres. Current systems prove to be very costly and bulkier. This system is a simple combination of hardware which can be neatly packed as a product. The novelty lies in the reduced power consumption of the system and a secure user interface to display the data in the form of a mobile app.

Keywords:

1. Introduction

Water assumes a significant part in carrying on with life and working of social designs. With the changing environments and development in populace, it has presented likely dangers towards water assets manageability. By utilizing water checking framework, we can keep away from water wastage, power utilization and can save the water assets for our future. Tank Water Level Monitoring, is utilized to lessen the wastage of water and close degree of water in the tank.Water level checking and controlling assumes a significant part at distant spots like multistoried structures, overhead tanks and tanks where there are number of tanks water level is to be checked and controlled. This additionally diminishes human labor needed for physically turning ON the engine in the event of void tank and killing the engine if there should arise an occurrence of water flood from the tank. It replaces the customary technique for utilizing tank ball and force saving likewise done on the grounds that we will keep the engine on at whatever point required. In the current work has 4 unique degrees of water of 4 distinct tanks are ceaselessly observed by client getting to the worker site page. The primary point of this venture is to create and organization of ease, compact and dependable water quality checking framework. The initial step of the examination is to build up an application for checking PH and Temperature. By knowing the PH of the water with which we can decide if the water is debased or not and Temperature gives both substance and natural qualities of water. The framework we have proposed is a water quality and utilization checking framework in the Arduino stage that actions the pH, temperature and presence of suspended things in the tanks utilizing sensors. These pieces of information can be seen by the individual utilizing the application created and the move can be made by the individual or the administration in cleaning the debased water to diminish certain wellbeing related issues and sicknesses.

2. Literature survey:

In this section, the prevailing works of numerous researchers area unit studied and the key takeaways area unit summarized. Several valid points and assumptions will be taken as inspiration from these studies.In 2015, amit joshi in his work introduced a water quality watching framework utilizing remote finder organization (WSN) innovation and supercharged by sun based board. To screen water quality over totally various locales as a timeframe application, an incredible framework configuration established by disseminated identifier hubs and a base station is generally suggested. The hubs and base station territory unit associated with WSN innovation like Zigbee. plan and execution of a picture model utilizing one hub powerful by sunlight based cell and WSN innovation is that the difficult work. Data gathered by various sensors at the hub side like hydrogen particle focus, turbidity, conduction, saltiness and temperature is dispatched through WSN to the base station. This epic framework has benefits like no fossil fuel byproduct, low force utilization, extra adaptable to convey at far off site so on. The framework configuration depends on sensor hubs and a base station.

3. Existing system:

In existing framework, four sensors are utilized. The four sensors are Ph sensor, heat sensor, stream sensor, level sensor.
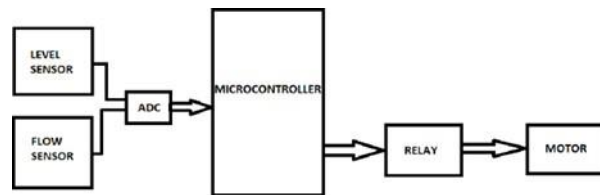
Here, the datas are collected are then sent to the micro controller. The datas are sent to a/d converter and are converted to digital form.In existing system, the user cannot see the how much is the quality of water and how much water was used.

Proposed system:

The proposed framework comprises of three significant stages. Sense stage, Compute and control and Communication stage.
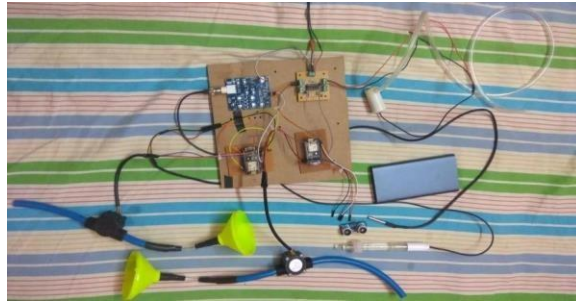
The Sense stage comprises of four sensors. Specifically Ph sensor,heat sensor, stream sensor, level sensor. The facts from these sensors are shipped off the Arduino board which is the control and processing part of the framework. The registering stage contrasts the detected facts from sensors and the predefined edge esteems. Whenever detected information doesn't coordinate with the limit esteem, at that point a message is shipped off the worry individual with the assistance of correspondence stage. In light of the messages got the concerned individual can start important move to be made.After the facts are gathered, it is put away in the data set and it very well may be gotten to whenever. The reports are shipped off the worry individual through application developed which shows the Ph level, temperature level, level of the water and demonstrates what amount is utilized.

4. Block diagram:

The block diagram describing the proposed system and its Interconnection along with the stages involved is as described below.
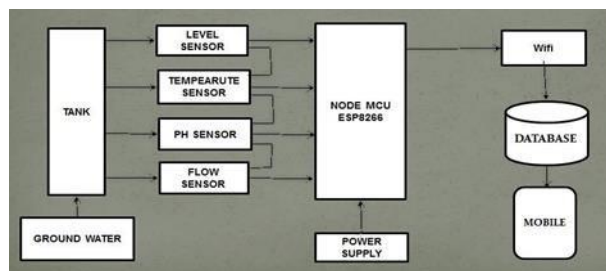
5. Methodology:

Node MCU (ESP8266):

Node MCU is an open-source firmware that assists with building IoT items. The microcontroller utilized here is ESP 8266 in light of the fact that it has an inbuilt Wi- Fi module that can associate with any switch as it is being modified. In this way, it is associated with the Internet consistently. It has a bunch of registers that work as a general reason RAM.

TEMPERATURE SENSOR:

In this task Ds 18b20 is utilized as the temperature sensor. It is a humble modernized temperature senor which has a one wire interface.The focus handiness of the DS18B20 is its direct-to- cutting edge temperature sensor.

PH SENSOR:

pH Sensor is the main boundary of water. It demonstrates the acidic or essential nature of the arrangement. The pH scale is a logarithmic scale whose reach is from 0-14 with an impartial worth being 7. Qualities over 7 show an essential arrangement and qualities under 7 demonstrates an acidic arrangement. Most of amphibian life inclines toward a pH level of 6.5 – 8.9

FLOW SENSOR:

At the point when water courses through the rotor, rotor rolls. Its speed changes with various pace of stream. Water stream sensor has only three wires and it will in general be successfully interfaced between any

icrocontroller and Arduino board.

]LEVEL SENSOR:

HC-SR04 is most generally used sensor for choosing distance of an article. Transmitter, recipient and control circuit are three bits of HC- SR04.. The HC-SR04 ultrasonic sensor uses SONAR to choose the distance of a thing particularly like the bats do.

MOTOR DRIVER:

L293D is an ordinary Motor driver or Motor Driver IC which licenses DC motor to drive on either bearing.The L293D IC gets signals from the CPU and sends the overall sign to the motors. .It has two voltage pins.

SUBMERSIBLE PUMP:It is a low

cost, little size Submersible Pump Motor which can work from a2.5 ~ 6V force supply.It can take up to 120 liters per hour with very low current consumption of 220mA.

WI-FI MODULE:

The ESP8266 module type ESP-12F is utilized as a Wi-Fi Module. ESP8266 is a 3V WiFi module mainstream for its Internet of Things applications. The ESP8266 is set up to do either facilitating an application or offloading all Wi-Fi putting together limits from another application processor.
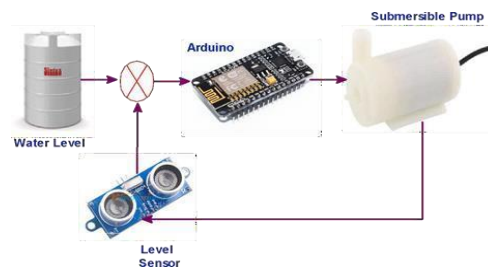
6. Conclusion:

The framework is amazingly versatile and economical. This proposed framework estimates various boundaries relating to the water like Ph, temperature and sends them to the checking focus.The framework has great adaptability. The framework is dependable and simple to keep up and it tends to be stretched out to quantify different boundaries of water like conductivity in future work. By successfully utilizing the proposed framework, one can save time and cost additionally be decreased.

7. Result:

The Water quality checking and domestic usage monitoring system is effectively carried out. Subsequently by executing this undertaking the water quality is estimated and utilization of water can be seen.

The labor force is diminished because of just single individual sitting at worker region will screen and control every one of the tank just in the event that it is required.

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