

Sensor Based Water Quality Analysis And Water Management System

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Abstract- Quality of water is extremely vital facet in human life. Water additionally impure or could contain many varieties of impurities and it should also contain salt or acidic materials. The presence of salt causes the water to become arduous and this hardness of water causes the additional method to deteriorate. This project presents a model to live the hardness of water before causing it for additional method. In our project sensing elements like pH scale sensor, conduction sensing element, level sensing element and salinity sensors square measure wont to satisfy the human desires. The project aimed to style a system that's capable of finding the contaminants in water. The system provides higher testing and higher management of water. In terms of accuracy for decisive the specified volume of water within the instrumentality, the system was set to a fixed amount for a way long it's designed to prevent and switch the supply of water. what is more, by the utilization of the Microcontroller based mostly system, accuracy is obtained. it's a wireless device that may offer a secure, cheap and promptly offered water.

Index Terms - pH, ZigBee, Sensors, Water Management,

1. INTRODUCTION

Fresh and clean water could be a very important trade goods of would like for the well-being of human societies, maintaining and up the standard and amount of fresh has long run ecological, health and economic implications. However, surface waters area unit most prone to pollution attributable to their straightforward accessibility for disposal of waste water. Human activities have greatly degraded water quality significantly within the downstream sections of the foremost rivers as a results of additive effects from upstream development and in tiny tributaries with inadequate waste matter treatment facilities. The pollution of water resources is one in all the foremost serious environmental issues. Water quality management policy is usually related to judgments not solely by gift things, however conjointly by past records. data on water quality and pollution sources supported regular watching is of crucial importance for the implementation of property water management methods. From the watching information of water quality, it are often determined whether or not the previous policy was adequate or additional rules are required. These kinds of judgments area unit typically obtained from the

applied math analysis of water quality information. In recent years, distinguishing spatial and temporal changes in water quality has been a significant analysis focus. to look at the spatial and temporal variations of water quality, regular watching sites and programs area unit needed. withal, high value of information sampling and assortment has restricted the institution of the massive quantity of watching sites.

The seasonal Mann-Kendall's take a look at was accustomed account for the variability from temporal perspective that has been wide employed in previous studies. The parameters concerned in water quality and watching system area unit pH scale level, salinity, physical phenomenon, turbidity. Delivering water for agriculture by means that of irrigation canals is incredibly necessary for feeding the growing world population. At present, things of pollution is obtaining worse in African nation. Water could be a very important issue for all individuals of the globe, for agriculture, for breeding and conservation of nature. Its conservation, decision-marking associated with the management of mechanism for control, production of electricity energy, drink, irrigation, area unit required with a resolution sufficiently precise, real time and remotely. a way to monitor

effectively and accurately water quality on an outsized scale by completely different technics has become a worldwide topic. the standard watching of surface water primarily depends on collection samples manually, this type of methodology is low potency and laborious to use on an outsized scale.

2. Block Diagram and Description

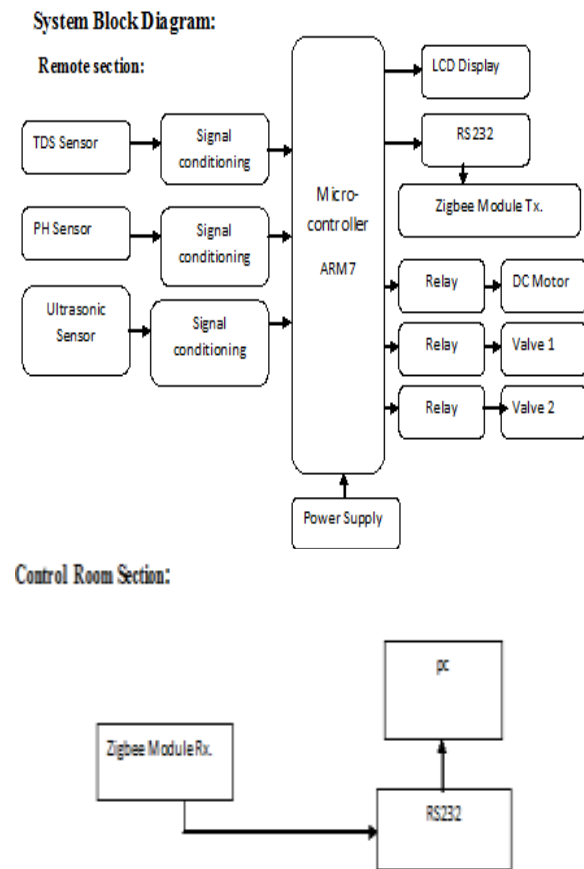


Fig.1 Block Diagram of System

2.1. ARM7

- ARM7TDMI-S Processor (LPC2148) is employed

2.2. RS-232

- RS 232 could be a serial communication cable utilized in the system. Here, the RS 232 provides the serial communication between the microcontroller and therefore the outside world like show, laptop or Mobile etc. thus it's a media accustomed communicate between microcontroller and therefore the laptop.

- In our project the RS 232 serves the perform to transfer the emended notice (or data) from laptop to the microcontroller, for the additional operation of the system. The computer code provides the notice writing and piece of writing facility. Additionally we are able to copy identical content as received through mobile within the piece of writing window and decision it as a notice. thus the laptop computer code provides the writing, piece of writing and information choices to the user.

2.3. RELAY

- It is on/off switch that uses 12V offer. it's use to create the door on or off. Here we have a tendency to use 12v single modification over relay. A relay is Associate in Nursing electrically operated switch. a straightforward magnetic force relay consists of a coil of wire wrapped around a soft iron core, Associate in Nursing iron yoke that provides an occasional reluctance path for magnetic flux, a movable iron coil, and one or a lot of sets of contacts (there ar 2 within the relay pictured). The coil is hinged to the yoke and automatically coupled to at least one or a lot of sets of moving contacts. it's control in situ by a spring in order that once the relay is de-energized there's Associate in Nursing air gap within the magnetic circuit. During this condition, one among the 2 sets of contacts within the relay pictured is closed, and therefore the different set is open. different relays might have a lot of or fewer sets of contacts reckoning on their perform. The relay within the image additionally encompasses a wire connecting the coil to the yoke. This ensures continuity of the circuit between the moving contacts on the coil, and therefore the circuit track on the computer circuit board (PCB) via the yoke, that is soldered to the PCB.

- When an electrical current is skilled the coil it generates a field of force that activates the coil and therefore the sequent movement of the movable contact either makes or breaks (depending upon

construction) a reference to a hard and fast contact. If the set of contacts was closed once the relay was de-energized, then the movement opens the contacts and breaks the association, and contrariwise if the contacts were open. Once the present to the coil is shifted, the coil is came back by a force, around [fr1] as sturdy because the attractive force, to its relaxed position. typically this force is provided by a spring, however gravity is additionally used usually in industrial motor starters. Most relays a factory-made to control quickly. during a low-tension application this reduces noise; during a high voltage or current application it reduces arcing.

- When the coil is energized with DC, a diode is usually placed across the coil to dissipate the energy from the collapsing field of force at deactivation, which might otherwise generate a voltage spike dangerous to semiconductor circuit elements. Some automotive relays embrace a diode within the relay case. or else, a contact protection network consisting of a electrical device and electrical device nonparallel (snubber circuit) might absorb the surge. If the coil is meant to be energized with electrical energy (AC), alittle copper "shading ring" may be crimped to the tip of the magnet, making alittle out-of-phase current that will increase the minimum pull on the coil throughout the AC cycle.

2.3.pH Sensor

Range: zero to fourteen hydrogen ion concentration

Body: Glass

Type: Combination

Sensor Output: +/-59.4mV/pH modification at 25C

Temperature: 0~100C

In chemistry, hydrogen ion concentration could be a live of the activity of the (solvated) cation. p[H], that measures the cation concentration is closely associated with, and is usually written as, Ph. Pure water encompasses a hydrogen ion concentration terribly near seven at 25°C. Solutions with a hydrogen ion concentration but seven aforementioned to be acidic and solutions with a hydrogen ion concentration bigger than seven basic or alkalic.

2.4.TDS Sensor

TDS is that the total dissolved solid it's used to testing the what quantity quantity of impurity gift in water apart from pure water.TDS concentration is that the total of cations and anions within the water.

2.5.Ultrasonic sensor

Ultrasonic sensing element area unit primarily accustomed measure the distances between the obstacle / object and therefore the sensing element. it is used for measure the water level and on off the water motor .It carries with it a inaudible transmitter and a receiver. The transmitter transmit the signal in one direction. This transmitted signal is then mirrored back by the obstacle and received by the receiver It carries with it a inaudible transmitter and a receiverHC-SR04 module has four pins: VCC – 5V, +ive of the ability offer TRIG – Trigger Pin ECHO – Echo Pin GND – ive of the ability offer

2.6.Zigbee Transreceiver

A wireless technology like Zigbee works on normal IEEE 802.15.4 protocol & operates on unlicensed bands worldwide at the frequencies a pair of.400-2.484GHz, 902- 928MHz and 868.0-868.6MHz. Low cost, low power (3.3V), Associate in Nursing up to 65000 nodes with an AES coding normal for communication square measure the most blessings of Zigbee.

- Specifications of TARANG F 20:
- Supply voltage vcc-3.3 v to 3.6 v
- Transmit current- 120mA
- Operating frequency- philosophical system a pair of.4 GHZ
- Outdoor RF line of Sight Range- up to 5km with acceptable high gain antennas and elevation
- Serial interface knowledge rate-1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200.
- Transmit Power output- 19dbm typical.

3. ALGORITHM

Step 1-start

Step 2 - Initialize alphanumeric display.

Step 3 - Initialize I/O port and ADC

Step 4 - Read hydrogen , Conductivity, level of water

- Step 5- Display the hydrogen ion concentration worth
- Step 6 - Read level of tank
- Step 7- Is level of tank isn't adequate
- Step 8 - activate pump
- Step 9 - Is level of tank is adequate
- Step 10 - shut down pump
- Step 11 - Read standing through zigbee for laptop
- Step 12 -Valve 1 is open
- Step 13 - Take 15min time
- Step 14 - Valve a pair of is open
- Step 15 - Take 15min
- Step 16 - Go to step no four

4. FLOWCHART:

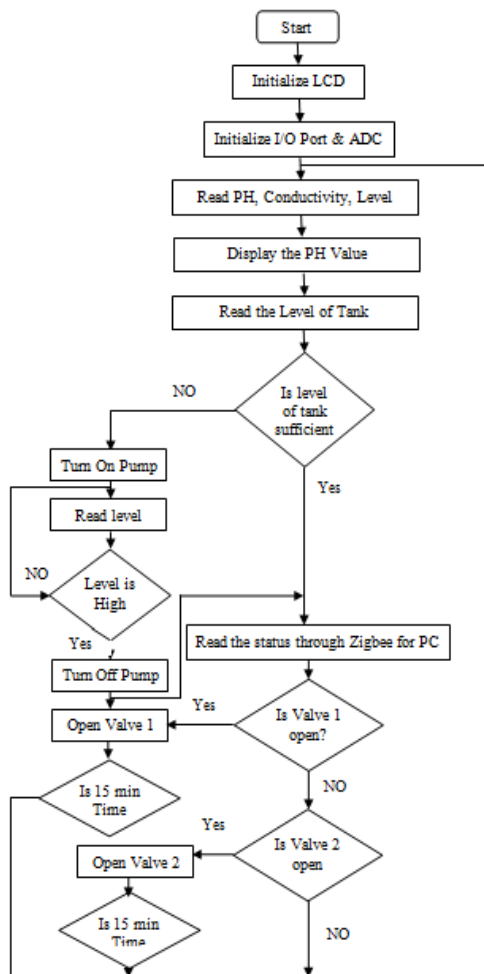


Fig.2 Flowchart of System

5. APPLICATION

1. Used for industrial purpose:

In some manufactory pure water is needed for several processes with correct quantity of hydrogen ion concentration and alternative contents. Therefore this method is beneficial for such industrial applications.

2. Utilized in house-hold purpose:

By checking water, we discover the impurities in it. therefore per the values of hydrogen ion concentration, TDS, etc. we will decide whether or not the water is employed for drinking purpose or not. therefore one will take call to filter the water or there's no would like of filtration

6. CONCLUSION

This project work is extremely vital to create the system to review the standard parameters of water to see the standard of water. water samples at various temperatures. This water quality testing and water management system model is extremely useful for the society and industries within the numerous applications of water like drinking, laundry and cleanup etc. This system is capable for locating the impurities in water like hydrogen ion concentration level, TDS or one will add several sensors like cloudiness, salinity, conduction etc. under numerous conditions of atmosphere Overall, the implementation of Zigbee based mostly WSN for water quality testing and water management system giving a less power consumption with long battery life is bestowed.

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International Journal of Research in Advent Technology (IJRAT) Special Issue

E-ISSN: 2321-9637

***Sharadchandra Pawar college of Engineering, Dumbarwadi, Pune 410504,
Organizes***

National Conference “MOMENTUM-17”, 14th& 15th February 2017

Available online at www.ijrat.org

International Forum of the 2013 ASEE Annual Meeting, Atlanta, Georgia, June 22, 2013.

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