"IOT BASED WATER QUALITY MONITORING SYSTEM USING SOLAR ENERGY"

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Abstract

This work presents a water quality checking framework utilizing IOT innovation and controlled by sun based board. To screen water quality over various destinations as an ongoing application, an incredible framework design comprised by site is recommended. The WI-FI module is associated utilizing IOT innovation. Plan and execution of a model utilizing one hub controlled by sunlight based cell and IOT innovation is the difficult work. Information gathered by sensors at the Water Plant side like TDS, PH, turbidity, conductivity, and temperature is sent through IOT to the Website. Information gathered from the distant webpage can be shown in visual configuration also as it very well may be broke down utilizing diverse recreation instruments at site. This epic framework has benefits like no fossil fuel byproduct, low force utilization, more adaptable to convey at far off site, etc.

Keywords: *IOT, PH Sensor, Turbidity Sensor, TDS (Total Dissolved Solid) Sensor, Conductivity Sensor, Temperature Sensor, Wi-Fi.*

I. INTRODUCTION

Water quality and the nonstop water supply is the need of consistently. Sun powered energy is the blast for such thoughts. The sun based energies can be capacity in the batteries for the nonstop electric energy's necessities.[1] The water characteristics boundaries like turbidity, TDS (Total Dissolve solids), PH are additionally need for unadulterated water supply for enterprises. The Invent of Internet advancements gives additional advantages for observing the water quality stockpile. There are numerous chances for utilizing IOT networks inside the water/wastewater businesses. Information transmission can be checked utilizing modern remote I/O gadgets and board. Water contamination is the pollution of water bodies. [2] Water contamination happens when toxins are released straightforwardly or in a roundabout way into water bodies without satisfactory treatment to eliminate hurtful mixtures. Water contamination influences plants and organic entities living in these waterways. In practically all cases the impact is harming not exclusively to singular species and populaces, yet in addition to the normal networks. Water covers more than 70% of the world's surface and is a vital asset for individuals and the climate. Water contamination influences drinking water, rivers, lakes and oceans all over the world.[3] This consequently harms human health and the natural environment. Here you can find out more about water pollution and what you can do to prevent it. The water quality monitoring system proposed is made up by an IOT environment. [4] Solar panel city from sunlight. They are typically made of silicon crystal slices called cells, glass, a polymer backing, and aluminum framing. Solar panels can vary in type, size, shape, and color. In most cases the "size" of a PV module refers to the panel's rated output wattage or electricity generating potential. [5]

II. TYPES OF SENSOR

Turbidity Sensor

Turbidity is brought about by part-icles suspended or broke down in water that disperses light causing the water to seem overcast or dinky. Particulate matter can incorporate residue, particularly earth and sediment, fine natural and inorganic matter, solvent shaded natural mixtures, green growth, and other tiny life forms.

Sensor Specification:

Operating Voltage: 5V DC
Operating Current: 40mA (MAX)
Response Time: <500ms
Insulation Resistance: 100M (Min
Output Method: Analog
Analog output: 0-4.5V
Digital Output: High/Low-level signal

TDS (Total Dissolve solid) Sensor

TDS is a condensing for Total Dissolved Solids in a fluid, remembering natural and inorganic substances for a sub-atomic, ionic, or miniature granular suspended structure. TDS is by and large communicated in parts per million (ppm) or as milligrams per liter (mg/L). TDS is straightforwardly identified with the nature of water i.e., the lower a TDS figure, the cleaner the water. For instance, invert assimilation cleaned water will have a TDS somewhere in the range of 0 and 10, while faucet water will shift somewhere in the range of 20 and 300, contingent upon where you live on the planet.

Fig.2 TDS (Total Dissolve solid) Sensor

Sensor Specification:

Input Voltage: 3.3 ~ 5.5V
Output Voltage: 0 ~ 2.3V
Working Current: 3 ~ 6mA
TDS Measurement Range: 0 ~ 1000ppm
TDS Measurement Accuracy: ± 10% FS (25 ℃)
TDS probe with Number of Needle: 2

PH Sensor

A PH Sensor is one of the most essential tools that are typically used for water measurements. This type of sensor is able to measure the amount of alkalinity and acidity in water and other solution. To calculate the PH of an aqueous solution you need to know the concentration of hydronium ion .It is measured on a Scale of 0 to 14 PH.

Fig.3 PH Sensor

Sensor Specification:

Module Power: 5.00V
Module Size: 43mm×32mm
Measuring Range: 0-14PH
Measuring Temperature: 0-60 ℃
Accuracy: ± 0.1pH (25 ℃)
Response Time: ≤ 1min
pH Sensor with BNC Connector

Conductivity Sensor

Conductivity Sensor measures the ability of a section to Conduct on Electric current. It is the presence of ions a solution that allow the solutions to be conductive. Two Conductivity rods will be used as conductivity probe for measuring of conductivity of water.

Temperature Sensor

A temperature sensor is an electronic device that measures the temperature of its environmental and converts the I/p data into electronic data to record monitor [6]. The basic principle of working of the temperature sensor is the voltage across the diode terminal. If the voltage increase the temperature also rises followed by a voltage drop between the transmitter terminal of base and emitter [7].

III. BLOCK DIAGRAM

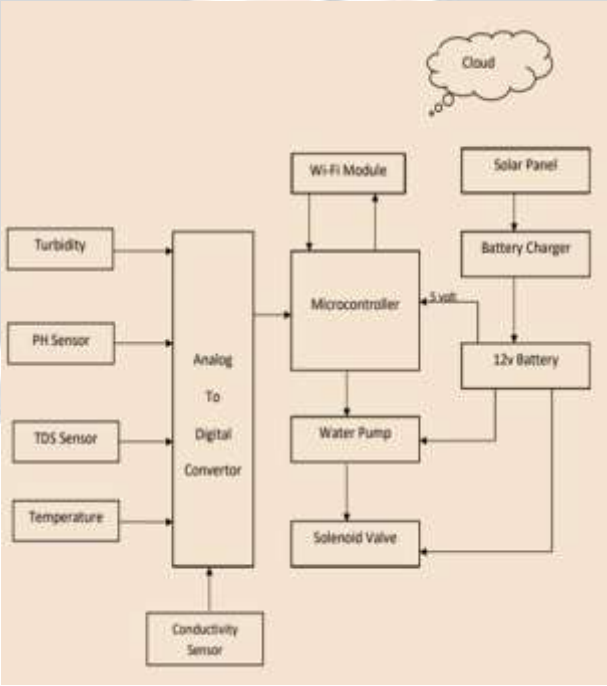

Fig.4 IOT Based Water Quality Monitoring System

Description:

Water pH value is calculated and will be displayed on LCD (Liquid Crystal Display).The same values will be send to website of concern department for monitoring. If the values of parameters differ from the normal values of water parameters, then the supply of water will be interrupted. The Solar Panel will be the main source for charging the system. The Battery will be charged with the help of Solar Charger.

Advantage:

The system will be fully automatic with enhanced sensors.
The Supply of Water will be automatically cut of when the water is not pure.
The Alarm System to alert the concern peoples

Application:

It is applicable for water purification plants in large as well Small Scale Industry.
Can be applied to home or office or education institutes
The higher turbidity and imbalanced of pH in water supply used for drinking, agriculture and industry use is a serious issue.
At such place quality control can be done by monitoring and necessary action for quality improvement.

IV. CONCLUSION

The System will detect the quality of water and accordingly display the status of quality of water. If the quality of water is good then The Microcontroller ATMEGA328P will be interface with turbidity sensor, TDS sensor, etc. The values of water quality parameters the water supply will be allowed automatically otherwise it will stop the flow of water and will give the alert to the concern department. The Monitoring of water quality will be done through website also. The Solar Power will be used for entire working the system.

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