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Smart Water Quality Based on IoT

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Abstract: *Water pollution is one of the biggest fears for the green globalization. In order to insure the safe force of the drinking water the quality needs to be examiner in real time. In this paper we present a design and development of a low cost system for real time monitoring of the water quality in IOT (internet of effects). The system correspond of several detectors is used to measuring physical and chemical parameters of the water. The parameters similar as temperature, PH, turbidity, inflow detector of the water can be measured. The measured values from the detectors can be reused by the core regulator. The Arduino model can be used as a core regulator. Eventually, the detector data can be viewed on internet using WI-FI system.*

Keywords: pH Sensor, Turbidity Sensor, Temperature Sensor, Flow Sensor, Ardurino Model, WI-FI Module

I. INTRODUCTION

The Internet of Effects, else known as IoT in the simplest sense, refers to the conception of connecting physical bias, machines, software, and objects to the Internet (1). In a broader sense, it's a dynamic and global network structure, in which intelligent objects and realities are used in confluence with selectors, electronics, detectors, software and connectivity to enhance connection, collection and data exchange (2). This type of network generally has a large number of bumps that interact with the terrain and exchange data, whilst replying to events or driving conduct to ply control or change upon the physical world. By participating and acting on participated data contributed by individual corridor, an IoT system would be lesser than the sum of its corridor (3). Each network knot is considered smart and consumes little coffers similar as data processing and data storehouse power as well as energy consumption.

IoT isn't limited to public uses only but can also be used intimately. With a central integrated IoT system, the home atmosphere can be acclimated by the pressing of a button, be it temperature, air control, or ambient music. Likewise, there's the option for smart home security systems which can incorporate cameras, stir sensors, and cinches, to notify home possessors incontinently if the system suspects burglary or intrusion of property. Household IoT systems are suitable to understand the stoner's life habits and meetly evolve and acclimatize into a smart char through constant tone-perception and selfchecking (4). Having all of these features adds convenience, customization, security, and ease of use to life at home (8). Putatively, IoT minimizes mortal sweats in numerous life aspects whilst promoting effective resource application. It guarantees high speed, accurate quality data with secure processing and better customer or stoner experience (9). These indicate, amongst other advantages, the trustability and validity of data, performance, security and sequestration. Table 1 shows that IoT units are getting decreasingly popular for not just consumer use, but also business and diligence and are projected to rise at a steady rate for the coming times (10). Lakes and aqueducts are the earth's most important brackish system. According to their immediate surroundings, they're ecosystems and natural life territories and form part of the food chain from vegetative material to creatures to humankind. Rivers are complex life support systems that operate on a thin line of sustainability (11). In recent history, the sharp increase in the mortal population has redounded in a considerable increase in the need for brackish worldwide. Coupled with other factors similar as global warming and anthropogenic inputs (pollution from external and artificial wastewater discharge), it isn't unthinkable to say that the quality of water is now a major concern for experts around the world. To comprehend the trouble and investment demanded to gain fresh drinking water, it's necessary to first understand the abecedarian problems faced by brackish systems.

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II. Objective

The development of a simple prototype system fit for water quality monitoring needs to be comprised of the following factors

1. Multiple detectors to collect applicable data from the terrain.
2. A central microcontroller loaded with a computer program to read analogue data and convert them to digital affair.
3. A movable laptop with applicable software to read the digital data and present the data in an accessible format on a screen, as well as to give power to the microcontroller.

III. Methodology

3.1 Block Diagram

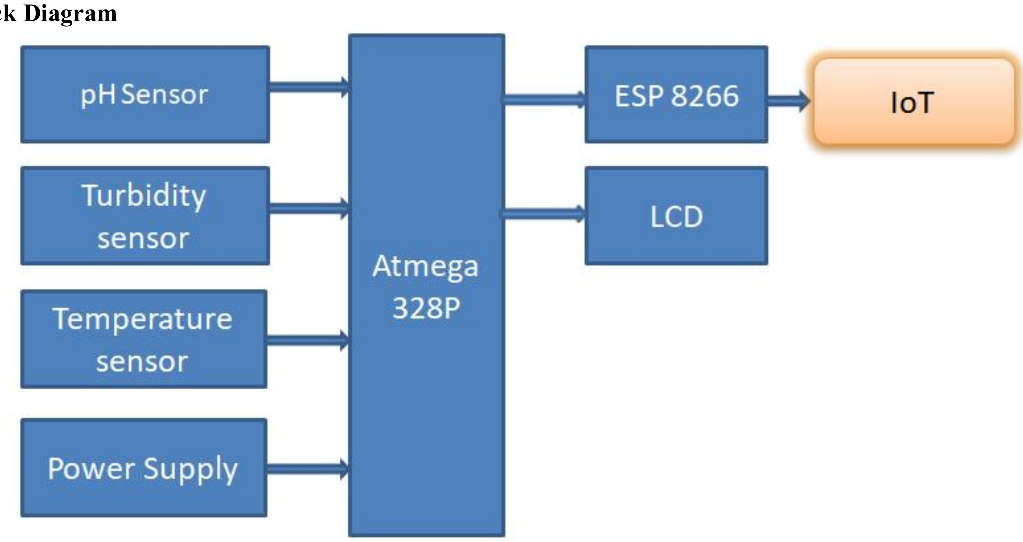

Figure 1: Block Diagram of Proposed System

3.1 Working in Detail

In this, we present the theory on real time monitoring of water quality in IoT environment. The overall block diagram of the proposed method is explained. Each and every block of the system is explained in detail. In this proposed block diagram consist of several sensors (temperature, pH, turbidity, flow) is connected to core controller. The core controller are accessing the sensor values and processing them to transfer the data through internet. Ardunio is used as a core controller. The sensor data can be viewed on the internet wi-fi system.

3.2 Hardware Details

1. Arduino Uno:
2. pH Sensor
3. Turbidity Sensor
4. Temperature Sensor
5. Wi-Fi Module
6. LCD Display

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3.3 Component Specifications

Table 1: Component Specifications

SR. NO	COMPONENT	SPECIFICATION
1.	Atmega 328P	16 bit controller,32K Bytes of In-System Self-Programmable Flash program memory
2.	DHT 11 (Temperature & Humidity Sensor)	Power supply : 3 – 5.5V Current supply : 0.5 – 2.5 mA Measurement range : 0°C : 30%RH – 90%RH 25°C : 20%RH – 90%RH 50°C : 20%RH – 80%RH
3.	Pulse Sensor	operating voltage +5V/+3.3V current utilization : 4mA
4.	ECG sensor	operating voltage +2V/+3.3V current utilization : 170microAmpere
5.	SIM 808 (GSM/GPRS/GPS)	Supply voltage range 3.4 ~ 4.4V Low power consumption Operation temperature:-40°C ~85°C
6.	LCD	16x2 display, 5x7 pixel matrix
7.	Power Supply Design	IC- 7812,7805, LM 317 Potentiometer

IV. Results and Discussion

4.1 Flow Chart

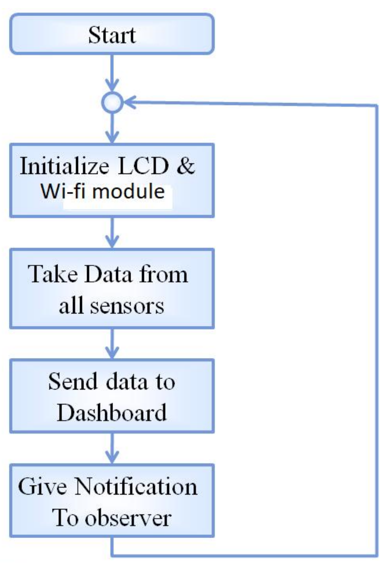

Figure 2: Flow chart

4.2 Results

We have identified a suitable implementation model that consists of different sensor devices and other modules, their functionalities are shown in figure. In this implementation model we used ATMEGA 328 with Wi-Fi module. Inbuilt ADC and Wi-Fi module connects the embedded device to internet. Sensors are connected to Arduino UNO board for monitoring, ADC will convert the corresponding sensor reading to its digital value and from that value the corresponding

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environmental parameter will be evaluated. After sensing the data from different sensor devices, which are placed in particular area of interest. The sensed data will be automatically sent to the web server, when a proper connection is established with sever device.

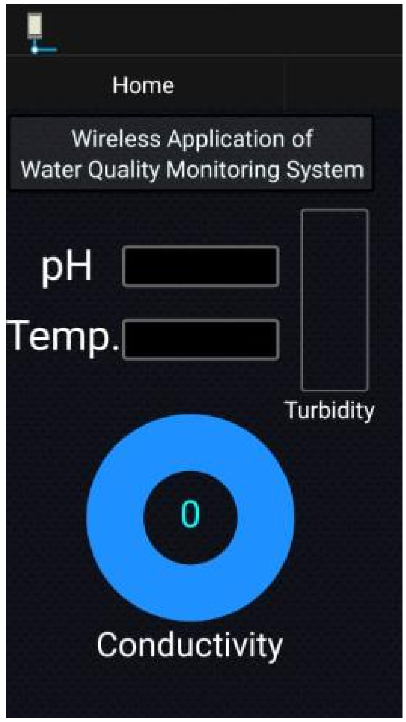

Figure 3: Mobile application

The analog data"s captured by all the four sensors are sent to the microcontroller through, Analog to Digital converter. After processing the digital information in micro controller unit where analysis done and the water quality is identified and those parameters were sent to the person who is operating with the instrument via SMS. The same will be displayed in the LCD display unit of the microcontroller. Through the Wi-Fi module, the web page is linked with the microcontroller. The central monitoring system receives the measured value. Based on the received data, the corporation authorities will take necessary action for their further decision. Through which, the water pollution and the water born disease will be controlled. Fig. indicates the displayed values of various water quality parameters. The simulation code is developed in Embedded-C software.

V. Conclusion

Monitoring of Turbidity, PH & Temperature of Water makes use of water parameters detector with unique advantage and being GSM network. The system can cover water quality automatically, and it's low in cost and doesn't bear people on duty. So the water quality testing is likely to be more provident, accessible and fast. The system has good inflexibility. Only by replacing the corresponding detectors and changing the applicable software programs, this system can be used to cover other water quality parameters. The operation is simple. The system can be expanded to cover hydrologic, air pollution, artificial and agrarian product and so on. It has wide operation and extension value. By keeping the bedded bias in the terrain for monitoring enables tone protection (i.e., smart terrain) to the terrain. To apply this need to emplace the detector bias in the terrain for collecting the data and analysis. By planting detector bias in the terrain, we can bring the terrain into real life i.e. it can interact with other objects through the network. Also the collected data and analysis results will be available to the end stoner through the Wi-Fi..

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