IOSR Journal of Computer Engineering (IOSR-JCE)
e-ISSN: 2278-0661,p-ISSN: 2278-8727, Volume 22, Issue 4, Ser. III (Jul. – Aug. 2020), PP 18-22
www.iosrjournals.org

Real Time Water Quality Monitoring System using Iot

Siva Balaji Addanki[1], Vijaya G[2], Ajay Avikatla[3], Bharath Bandlamudi[4]
[1]*Department of Computer Science Engineering Velagapudi RamaKrishna Siddhartha Engineering College, Vijayawada India*
[2]*Department of Computer Science Engineering Velagapudi RamaKrishna Siddhartha Engineering College, Vijayawada India*
[3]*Department of Computer Science Engineering Velagapudi RamaKrishna Siddhartha Engineering College, Vijayawada India*
[4]*Department of Computer Science Engineering Velagapudi RamaKrishna Siddhartha Engineering College, Vijayawada India*

Abstract: *The conventional technique of measuring the quality of water is to gather the samples manually and send it laboratory for analysis, but this technique is time overwhelming and not economical. Since it's not feasible to take the water sample to the laboratory after every hour for measuring it's quality. The water quality measuring system can measure the essential qualities of water in real time. The system consists of multiple sensors to measure the standard of water, microcontroller and Cloud dashboard display to show the information about the parameters to the end users. It's a true time system which is able to endlessly measure the standard of water and can send the measured values to the Cloud when each predefined time. The system relies on microcontroller ESP8266.An individual easy to know the quality of water at any point of time at any place and at the any time without putting any money and in an easy and in an efficient manner.*

Keywords: *Microcontroller, Multiple sensors, Water Quality Measuring, Cloud Dashboard Display.*

Date of Submission: 11-08-2020 Date of Acceptance: 27-08-2020

I. Introduction

Water quality may be an advanced term to explore. The standard of water depends on such a lot of things. We've used many thought parameters in conjunction with one another to work out the water's quality. These include: turbidity, total dissolved solid and temperature. Since the standard technique of water quality measuring isn't economical thus there was a necessity to develop a system which is able to measure the standard of water in real time and also the system must be economical, correct and low price. The water quality measuring system makes use of multiple sensors, Cloud Services to display the content. Information acquisition module includes microcontroller ESP8266. Data transmission module includes wifi module in ESP8266. There are numerous sensors that measures temperature, turbidity present in the water. The measured values are then transmitted to the cloud centre via internet, it's conjointly shown on Thingspeak cloud dashboard by the microcontroller. The system has the advantage of potency, accuracy and low price.

II. Overall style of the system

2.1 System Hardware Design

As shown within the diagram the system consists of assorted water quality measuring sensors like turbidity, temperature, microcontroller ESP8266, Cloud. The water quality measuring system uses turbidity, temperature device to measure the standard of water. This device then measures the corresponding values of the water. Since the outputs of the sensors measured are digital in nature and microcontroller will handle solely digital signals thus there's no necessity of a tool that converts analog signals into digital signals. The system doesn't make use of ADC for this purpose. These digital signals are then given to the microcontroller ESP8266. System uses wifi module for communication. wifi module makes use of internet connection from mobile in the form of hot spot for communication. Microcontroller sends the measured values to the cloud centre via the internet. Since it's a true time system thus microcontroller can send the measured values to the cloud centre after the particular time as per the program. With the information to the cloud centre the microcontroller conjointly displays the values of the measured quantities on the dashboard of the cloud. It's a true time system thus it doesn't need any man machine interaction for activity the standard of water.

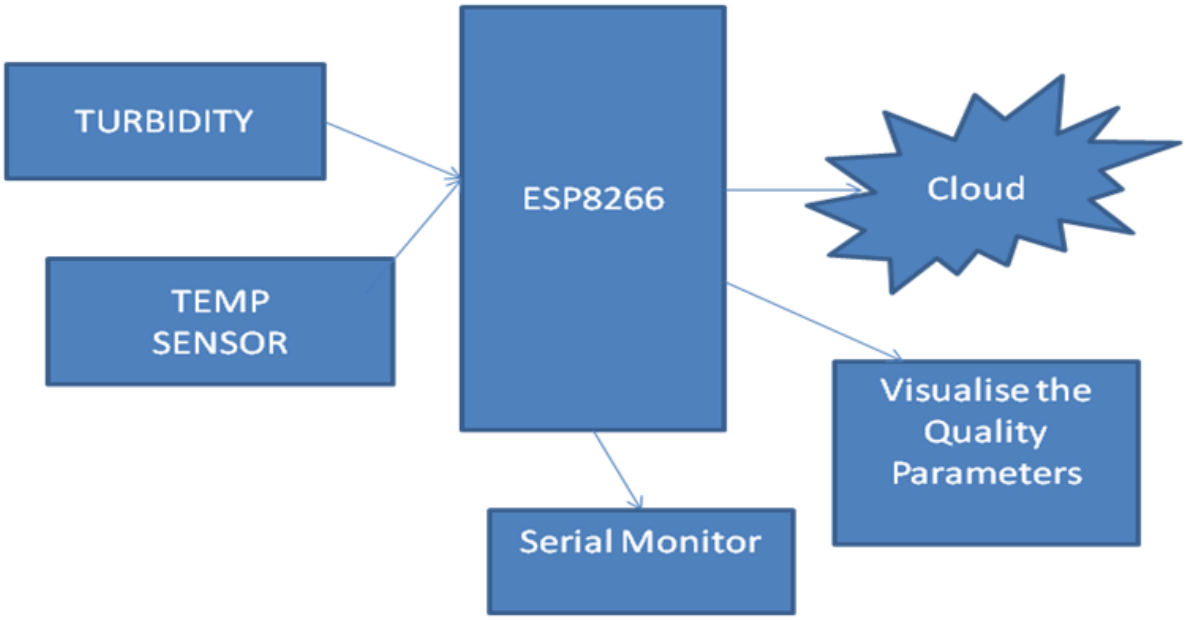


Fig. 1. Block Diagram of the Proposed System

2.1. Water Quality Measuring Sensors

The system uses sensors to measure 2 qualities of water particularly Turbidity and temperature.

- Turbidity is the measure of water clarity. In alternative words it shows to what extent the water is obvious. These particles decrease the passage of light through the water. Turbidity sensor measures the murkiness by measuring the quantity of light scattered at ninety degree. Turbidity sensor makes use of LDR and LED.
- Temperature has a vital influence on water. The system uses DS18B20 water proof Temperature sensor to measure the temperature of water

2.2. Microcontroller ESP8266

The **ESP8266** is a low-cost wi-fi microchip, with a full TCP/IP stack and microcontroller capability, produced by Espressif Systems in Shanghai, China.

Microcontroller has following features:

- Processor: L106 32-bit RISC microprocessor core based on the Tensilica Xtensa Diamond Standard 106Micro running at 80 MHz
- Memory: 32 KiB instruction RAM
- Memory: 32 KiB instruction cache RAM
- Memory: 80 KiB user-data RAM
- Memory: 16 KiB ETS system-data RAM
- External QSPI flash: up to 16 MiB is supported (512 KiB to 4 MiB typically included)
- IEEE 802.11 b/g/n Wi-Fi
- Integrated TR switch, balun, LNA, power amplifier and matching network.
- WEP or WPA/WPA2 authentication, or open networks.
- 16 GPIO PINS
- SPI
- I^2C (software implementation)
- UART on dedicated pins, plus a transmit-only UART can be enabled on GPIO2
- 10-bit ADC (successive approximation ADC)

III. Communication Module

With the popularity of Wifi IoT devices, there is an increasing demand for low-cost and easy-to-use WiFi modules. ESP8266 is a new player in this field: it's tiny (25mm x 15mm), with simple pin connections (standard 2×4 pin headers), using serial TX/RX to send and receive Ethernet buffers, and similarly, using serial commands to query and change configurations of the WiFi module. This is quite convenient as it only requires two wires (TX/RX) to communicate between a micro-controller and WiFi, but more importantly, it offloads WiFi-related tasks to the module, allowing the microcontroller code to be very light-weighted.

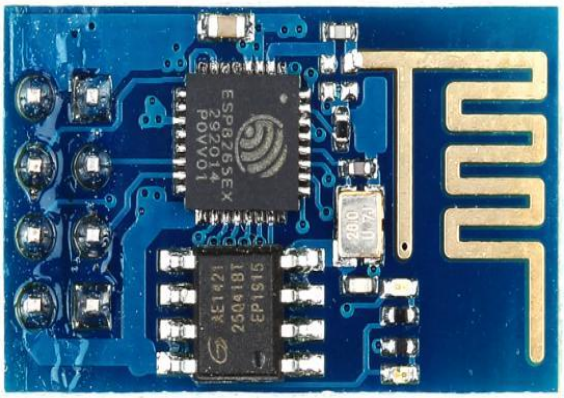


Fig. 2. ESP8266 Serial WiFI Module (ESP-01)

ESP8266 ESP-01 Serial WIFI Transceiver Module is a cheap and easy way to connect any small microcontroller platform, like Arduino, wirelessly to Internet. ESP8266 has powerful on-board processing and storage capabilities that allow it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development up-front and minimal loading during runtime. Its high degree of on-chip integration allows for minimal external circuitry, and the entire solution, including front-end module, is designed to occupy minimal PCB area. ESP-01 WIFI Transceiver Module is addressable over SPI and UART, making this an exceptionally easy choice for anyone wanting to build an Internet of Things thing. You can use AT commands to connect to WiFi networks and open TCP connections without need to have TCP/IP stack running in your own microcontroller: You can simply connect any microcontroller to this module and start pushing data up to the Internet.

IV. System Software

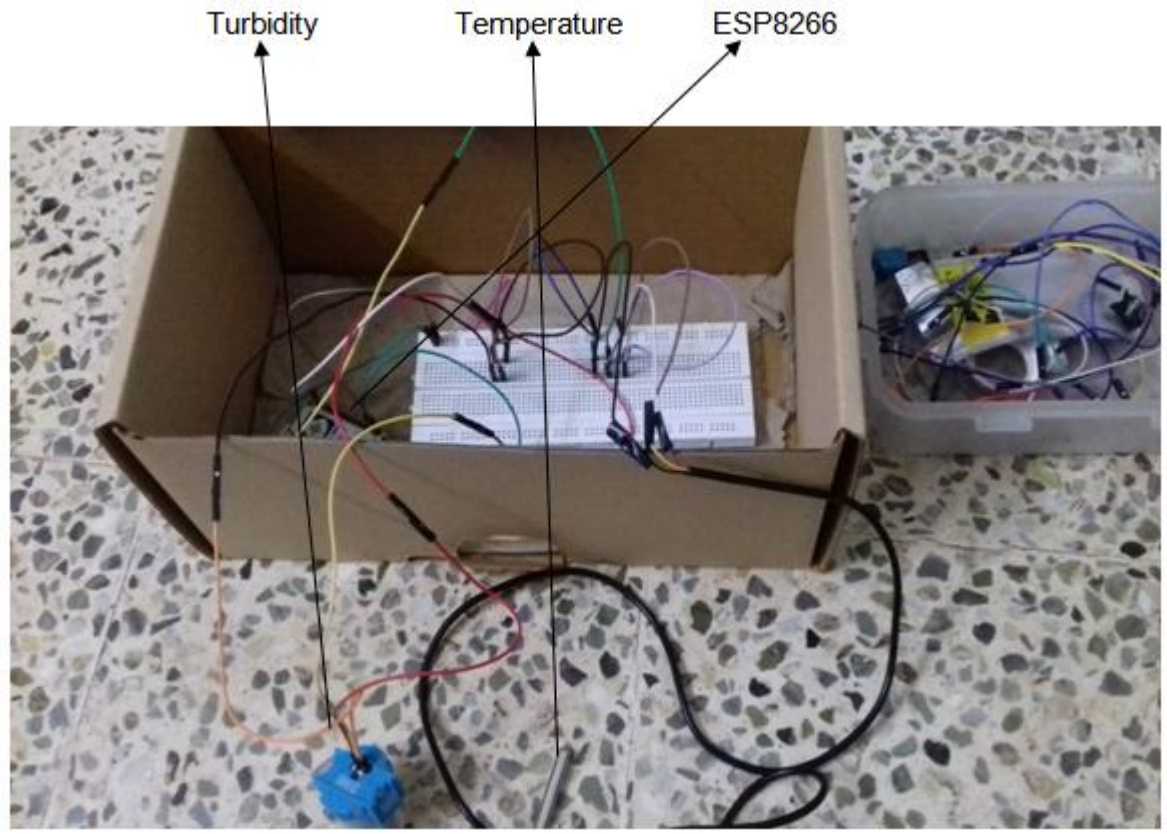
Microcontroller accepts the values measured by numerous sensors send these values to the cloud centre. This is all carried out with the help of coding. The code is written in Embedded C and for simulation we tend to use Arduino Software.

V. Conclusion

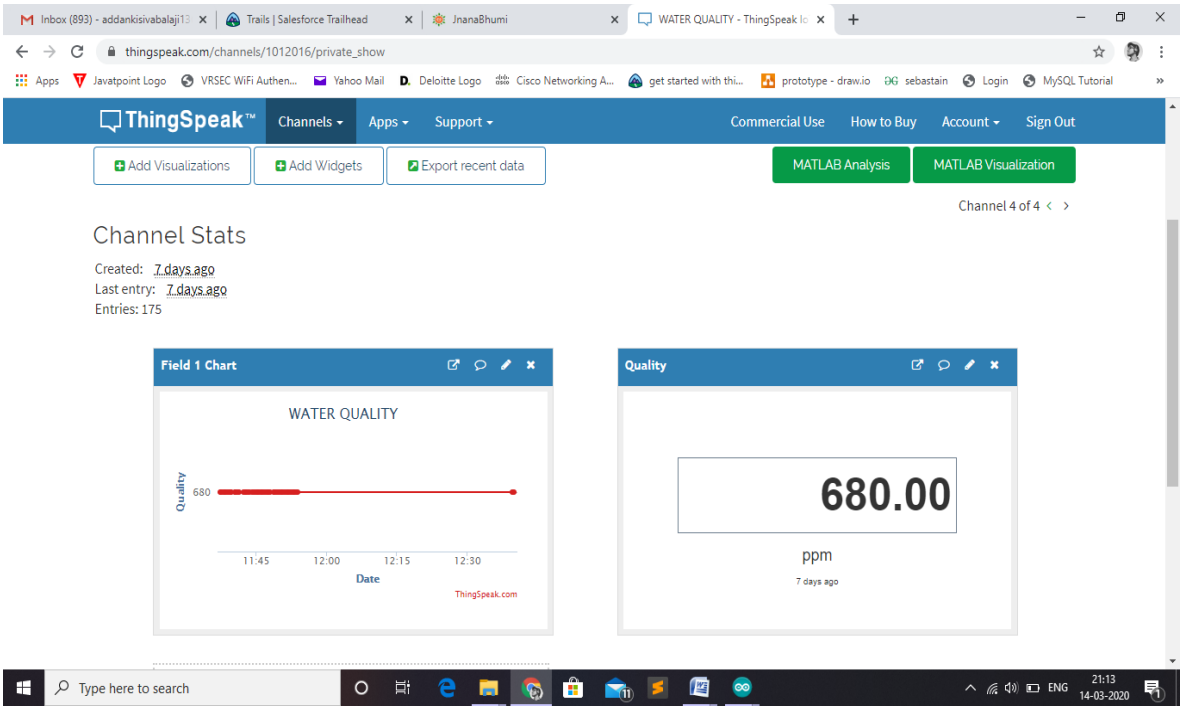
Real time system for water quality Monitoring System using Iot is associate economical system that uses numerous water detection device and Cloud. The system is incredibly versatile and economical. It's real time system that measures numerous parameters present within the water with the assistance of device and send them to the cloud centre automatically. It doesn't need individuals on duty. Its versatile system as a result of simply by replacement the sensors and by creating some changes within the computer code the system will be created to measure completely different parameters of water. The system is reliable and easy and it will be extended to measure water pollution so on. It's essential application for water quality measurement in automation era.

VI. Results

6.1 Proposed System



6.2 Measured values on Cloud Dashboard (Thingspeak Cloud)



References

[1]. Mo Deqing, Zhao Ying, Chen Shangsong, "Automatic Measurement and Reporting System of Water Quality Based on GSM," 2012 International Conference on Intelligent System Design and Engineering Application.

[2]. https://en.wikipedia.org/wiki/ESP8266#:~:text=The%20ESP8266%20is%20a%20low,Espressif%20Systems%20in%20Shanghai%2C%20China.&text=This%20small%20module%20allows%20microcontrollers,connections%20using%20Hayes%2Dstyle%20commands.

[3]. Dong He,Li-Xin Zhang," The Water Quality Monitoring System Based on WSN," 1Institute of Mechanical and electronic information, China University of Geosciences (WuHan), WuHan,China, 978-1-4577-1415-3/12/$26.00 ©2012 IEEE

[4]. Nazleeni Samiha Haron, Mohd Khuzaimi B Mahamad, Izzatdin Abdul Aziz, Mazlina Mehat," A System Architecture for Water Quality Monitoring System Using Wired Sensors," Computer and Information Science Department, 978-1-4244-2328-6/08/$25.00

[5]. © 2008 IEEE

[6]. Xiwu He," Design of Automatic Control system for Waterworks based on PLC," 978-1-4577-0536-6/11/$26.00 ©2011 IEEE

[7]. Dr. Seema Verma, "Wireless Sensor Network application for water quality monitoring in India," 2012 National Conference on Computing and Communication Systems (NCCCS).

[8]. https://www.rhydolabz.com/wiki/?p=10872#:~:text=ESP8266%20ESP%2D01%20Serial%20WIFI,like%20Arduino%2C%20wirelessly%20to%20Internet.&text=ESP%2D01%20WIFI%20Transceiver%20Module,an%20Internet%20of%20Things%20thing.

Siva Balaji Addanki, et. al. "Real Time Water Quality Monitoring System using Iot." *IOSR Journal of Computer Engineering (IOSR-JCE)*, 22(4), 2020, pp. 18-22.