Water Quality Monitoring And Control In IOT

Submitted in partial fulfillment of the requirements

of the degree of

Bachelor of Engineering

in

Electronics & Telecommunication

By

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2018-19

CERTIFICATE

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This is to certify that the project entitled **"Water Quality Monitoring And Control IN IOT"** is a bonafide work of **Ansari Sahil(16DET76), Khan Afzal (16DET90), Khan Kulna (16DET92), Khan Tehrim (16DET98)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of Bachelor of Engineering in Department of Electronics and Telecommunication Engineering.

Supervisor Examiner

Head of Department Director

Project Report Approval for Bachelor of Engineering

This project entitled **"Water Quality Monitoring And Control In IOT"** by **Ansari Sahil (16DET76), Khan Afzal (16DET90), Khan Kulna (16DET92), Khan Tehrim (16DET98)** is approved for the degree of **Bachelor of Engineering Electronics and Telecommunication** .

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I declare that this written submission represents my ideas in my own words and where others ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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Acknowledgments

We have taken efforts in this project. However, it would not have been possible without the kind support and help of many individuals. I would like to extend my sincere thanks to all of them.

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We would like to express my gratitude towards my parents & Staff of Anjuman-I-Islam's Kalsekar Technical Campus for their kind co-operation and encouragement which help me in completion of this project.

Finally we express our indebtedness to all who have directly or indirectly contributed to the successful completion of this project.

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ABSTRACT

Water adds fuel to our life.No life exist without water.Traditionally for testing and controlling water qualities it was send in the laboratories which was quiet time consuming.To ensure the safe supply of drinking water the quality should be monitored in real time,for that purpose new approach IOT (Internet of Things) based water quality monitoring has been proposed. The Internet of Things (IoT) has the potential to revolutionize the water industry, as more of its technology is connected to the web. In the proposed system water quality parameters are measured by different sensors such as pH, turbidity and temperature for communicating data onto a platform. The measured values from the sensors can be processed by the core controller and if the water is being detected as dirty then the particular parameters are being controlled for making the water safe for drinking purposes.

ACKNOWLEDGEMENT

We are extremely fortunate to be involved in an exciting and challenging project like **"Water Quality Monitoring And Control In IOT"** It has enriched our life, giving us an opportunity to work in field of IOT. This project increased our thinking and understanding capability and after the completion of this project, we experience the feeling of achievement and satisfaction.

We should like to express our greatest gratitude and respect to our guide **Prof.Shahin Athavani** For her excellent guidance, valuable suggestion and endless support.She has not only been wonderful guide but also a genuine person. We consider ourselves extremely lucky to be able to work under guidance of such a good personality. Also we would like to thanks our **HOD Prof. SHAIKH AFZAL** for guiding us to improve our project. Actually, he is one such genuine person for whom our words will not be enough to express.

It was impossible for us to complete our project without their help. We are also grateful to our Director **Mr. ABDUL RAZZAK HONNUTAGI** for their encouragement. We like to express our grateful thanks to our classmates, all staffs and faculty members of electronics and telecommunication engineering department who willingly rendered us their unselfish help and support Last but not least, we want to convey our heartiest thanks to our parents for their immeasurable love, support and encouragement.

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CHAPTER NO: 01

INTRODUCTION

CHAPTER NO: 01

INTRODUCTION

1.1: Project Overview

In the 21st century, there were lots of inventions, but at the same time were pollutions, global warming and so on are being formed, because of this there is no safe drinking water for the world.Nowadays, water quality monitoring in real time faces challenges because of global warming,limited water resources, growing population, etc.Hence there is need of developing better methodologies to monitor the water quality parameters in real time.

1.2: Purpose

The main purpose of using an Iot approach to monitor and control water quality is to develop a system which provides the end user a useful data used.Conventionally, the water samples are collected from different places, and then tested by the scientist at their laboratory using many techniques to determine the water quality.This was a time consuming process but now the Internet of Things (IoT) has the potential to modernize the water production, as more and more of its technology is connected to the web.So instead of monitoring and controlling the water quality using old ways, this technique is used which is way better, fast, cost friendly and easy to use.The water quality parameters pH measures the concentration of hydrogen ions. It shows the water is acidic or alkaline.Pure water has 7pH value, less than 7pH has acidic, more than 7pH has alkaline range of pH is 0-14 pH. For drinking purpose it should be 6.5-8.5pH.Turbidity measures the large number of suspended particles in water that is invisible.Higher the turbidity higher the risk of diarrheoa, collera. Lower
the turbidity then the water is clean.Temperature sensor measures how the water is, hot or cold.The traditional methods of water quality monitoring and control involves the manual collection of water samples from different locations.

CHAPTER NO: 02

LITERATURE REVIEW

CHAPTER NO:02

LITERATURE REVIEW

- Nikhil Kedia entitled \Water Quality Monitoring for Rural Areas-A Sensor Cloud Based Economical Project."Published in 2015 1st International Conference on Next Generation Computing Technologies (NGCT-2015) Dehradun, India. This paper highlights the entire water quality monitoring methods, sensors, embedded design, and information dissipation procedure, role of government, network operator and villagers in ensuring proper information dissipation.It also explores the Sensor Cloud domain.While automatically improving the water quality is not feasible at this point,efficient use of technology and economic practices can help improve water quality and awareness among people.

- Jayti Bhatt,Jignesh Patoliya entitled \RealTime Water Quality Monitoring System".This paper describes to ensure the safe supply of drinking water the quality should be monitored in real time for that purpose new approach IOT (Internet ofThings) based water quality monitoring has been proposed.In this paper, we present the design of IOT based water quality monitoring system that monitor the quality of water in real time.This system consists some sensors which measure the water quality parametersuch as pH, turbidity, conductivity, dissolved oxygen, temperature.The measured values from the sensors are processed by microcontroller andthis processed values are transmitted remotely to the core controller that is raspberry pi using Zigbee protocol.Finally, sensors data can view on internet browser application using cloudcomputing.

- Qiao Tie-Zhu, Song Le planned Online Monitoring System of Water Quality Based on GPRS. The framework is utilized to prepare the example and send the pertinent information to the checking focus by means of the GPRS information transmission. The point of building up this framework is the remote checking of water quality parameter and makes it continuous and speedier than past framework utilized for water quality monitoring, likewise to control water quality.

- Kulkarni Amruta, TurkaneSatish created Solar Powered Water Quality Monitoring framework utilizing remote Sensor Network. In this framework the WSN innovation controlled utilizing sun oriented board. The framework comprises hub and base station in which the hub gathers that get from the distinctive remote sensor. The hub is associated with the base station through the Zigbee innovation that fueled by the sunlight based board. This framework is ease yet in the event that the sun oriented board can't be charged due to the some environment impact then the framework will quit working. From, all above specify procedure we come to realize that each unique framework comprise some impediment however it can't meet the point of ongoing, minimal effort consistent checking of water quality parameters.

CHAPTER NO:03

HARDWARE SPECIFICATION

CHAPTER NO: 03

HARDWARE SPECIFICATION

3.1 : Ph Sensor

PH is a measure of acidity or alkalinity of a solution, the pH scale ranges from 0 to 14. The pH indicates the concentration of hydrogen [H] + ions present in certain solutions. It can accurately be quantified by a sensor that measures the potential difference between two electrodes: a reference electrode (silver / silver chloride) and a glass electrode that is sensitive to hydrogen ion. This is what form the probe. We also have to use an electronic circuit to condition the signal appropriately and we can use this sensor with a micro-controller, such as Arduino.pH, commonly used for water measurements, is a measure of acidity and alkalinity,or the caustic and base present in a given solution.The value 7 represents neutrality. The numbers on the scale increase with increasing alkalinity, while the numbers on the scale decrease with increasing acidity. Each unit of change represents a tenfold change in acidity or alkalinity. The pH value is also equal to the negative logarithm of the hydrogen-ion concentration or hydrogen-ion activity. pH values for some common solutions are listed in the table to the right.Most common method of measuring pH is to use an electrochemical pH sensor.The measuring electrode detects changes in the pH value while the reference provides a stable signal for comparison. A high impedance device, known as a pH meter, is used to display the millivolt signal in pH units. Combination pH sensor technology can be used to build di erent products,

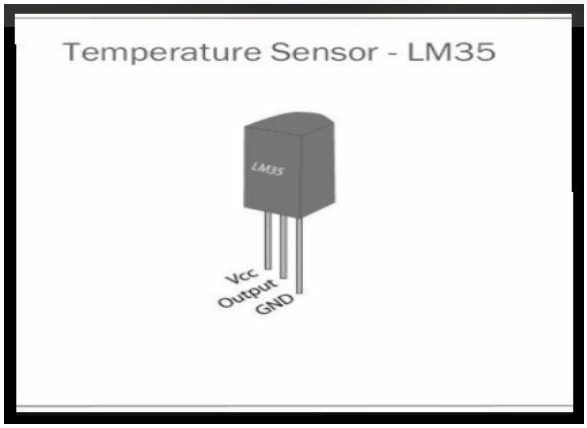
including laboratory pH sensors and industrial or process pH sensors.sensor: The pH of a solution is the measure of the acidity or alkalinity of that solution. The pH scale is a logarithmic scale whose range is from 0 - 14 with a neutral point being 7. Values above 7 indicate a basic or alkaline solution and values below 7 would indicate an acidic solution. It operates on 5V power supply and it is easy to interface with arduino.The normal range of pH is 6 to 8.5.Here are some examples of everyday substances and their pH:

Substance	pH approximate
Lemon juice	2,4 – 2,6
Cola drink	2,5
Vinegar	2,5 – 2,9
Orange or apple juice	3,5
Beer	4,5
Coffee	5,0
Tea	5,5
Milk	6,5
Water	7,0
Saliva	6,5 – 7,4
Blood	7,38 – 7,42
Seawater	8,0
Soap	9,0 a 10,0
Bleach	13

3.2 : Turbidity Sensor

Turbidity is a measure of the cloudiness of water.Turbidity has indicated the degree at which the water loses its transparency. Is considered as a good measure of the quality of water.Turbidity blocks out the light needed by submerged aquatic vegetation.It also can raise surface water temperatures above normal because suspendedpar-ticles near the surface facilitate the absorption of heat from sunlight.Turbidity is the quantitative measure of suspended particles in a fluid. It can be soil in water or chocolate cakes in your favourite milk shake. While chocolate is something we so want in our drinks, soil particles are totally undesired. Turbidity Sensor along with a micro controller unit takes care of turbidity measurements. Crafted with plastic andsome metal - alloy traces, turbidity sensor uses light to convey data concerning turbidity in water. The turbidity sensor appears like an Android bot. Two horn like structure, a top to bottom m ono material body. A black colour cap is placed at the bottom of the sensor. Thick alloyed contact legs provide ways for connectors tohold to the sensor. A white plastic slab protects the legs from da mage. The plastic used to make outer structure can survive high temperature variations as well as mechanical corrosions. Scales are found on the transparent can which enable easy gripping.

3.3: Temperature Sensor



Temperature sensor is a device, to measure the temperature through an electrical signal it requires a thermocouple or RTD (Resistance Temperature Detectors). The thermocouple is prepared by two dissimilar metals which generate the electrical voltage indirectly proportional to change the temperature. The RTD is a *VARIABLE RESISTENCE* , it will change the electrical resistance indirectly proportional to changes in the temperature in a precise, and nearly linear manner.

Here comes its working:The measurement of the temperature sensor is about the hotness or coolness of an object. The working base of the sensors is the voltage that read across the diode. If the voltage increases, then the temperature rises and there is a voltage drop between the transistor terminals of base & emitter, they are recorded by the sensors. If the difference in voltage is amplified, the analogue signal is generated by the device and it is directly proportional to the temperature.

3.4: DC Servo Motor

3.4.1: Operating Principle: Servo Motors are used where there is a need for accurate shaft movement or position. These are not proposed for high speed applications. These are proposed for low speed, medium torque and accurate position application. These motors are used in robotic arm machines, flight controls and control systems. Servo motors are available at different shapes and sizes. A servo motor will have mainly there wires, one is for positive voltage another is for ground and last one is for position setting. The RED wire is connected to power, Black wire is connected to ground and YELLOW wire is connected to signal.A servo motor is a combination of DC motor, position control system, gears. The position of the shaft of the DC motor is adjusted by the control electronics in the servo, based on the duty ratio of the PWM signal the SIGNAL pin.Simply speaking the control electronics adjust shaft position by controlling DC motor. This data regarding position of shaft is sent through the SIGNAL pin. The position data to the control should be sent in the form of PWM signal through the Signal pin of servo motor.The frequency of PWM (Pulse Width Modulated) signal can vary based on type of servo motor. The important thing here is the DUTY RATIO of the PWM signal. Based on this DUTY RATION the control electronics adjust the shaft.

Brush wear promoted by power supply ripples: Brush wear may be mechanical wear due to brush and commutator abrasion or electrical wear due to sparking between the brush and commutator.

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Ambient conditions: The service life of a DC motor is dependant upon its rec-tifying action. Care must be taken to ensure good commutation, as dust, oil, gas, water, etc. Water, etc, on the commutator surface results in poor rectification and increases brush wear.

Changing the brush position: The brushes are generally fixed in position such that rotational speed and current characteristics are maintained equivalent in both clockwise and counter-clockwise directions. These are basically determined based on the position of the magnetic poles. Rotating the motor after not carefully relo-cating parts such as the brush holder (for fixing the brushes) or rear cover results in misalignment of the brushes and magnets. This will produce change in the above characteristics in the rotational direction or cause poor rectification, leading normal brush wear. Therefore, changing of the brush positioning is to be avoided.

Installed orientation: Motors are generally designed for use with a horizontal output shaft. Special consideration must be given to components including bearings and grease washers when intended for an upward- or downward-facing output shaft. Please contact us for details. Further, avoid installing a motor in a manner in which grease from the gear head would tend to enter the motor (e.g., with an upward-facing output shaft).

Noise generation: Electrical noise is generated as a result of sparks from commutation between the brushes and commutator. Please contact us for assistance with lowering noise.

Load variation: Even with torque below the rated load, a motor will more damage than might be imagined if there is frequent load variation. Exercise caution with operating conditions and load restrictions.

Insulation resistance: The insulation resistance of a brush motor will naturally continue to decrease as its running time increases. The figures for resistance given in the catalog are for a new motor.

Service life : Service life depends greatly on operating conditions and environment.

3.5: ESP8266 WiFi Module

Introduction

ESP8266 is Wi-Fi enabled system on chip (SoC) module developed by Espressif system. It is mostly used for development of IoT (Internet of Things) embedded applications.

ESP8266-01 WiFi Module

ESP8266 comes with capabilities of

- 2.4 GHz Wi-Fi (802.11 b/g/n, supporting WPA/WPA2),
- general-purpose input/output (16 GPIO),
- Inter-Integrated Circuit (I^2C) serial communication protocol,
- analog-to-digital conversion (10-bit ADC)
- Serial Peripheral Interface (SPI) serial communication protocol,
- I^2S (Inter-IC Sound) interfaces with DMA(Direct Memory Access) (sharing pins with GPIO),
- UART (on dedicated pins, plus a transmit-only UART can be enabled on GPIO2), and
- pulse-width modulation (PWM).

It employs a 32-bit RISC CPU based on the Tensilica Xtensa L106 running at 80 MHz (or overclocked to 160 MHz). It has a 64 KB boot ROM, 64 KB instruction RAM and 96 KB data RAM. External flash memory can be accessed through SPI.

ESP8266 module is low cost standalone wireless transceiver that can be used for end-point IoT developments.

To communicate with the ESP8266 module, microcontroller needs to use set of AT commands. Microcontroller communicates with ESP8266-01 module using UART having specified Baud rate.

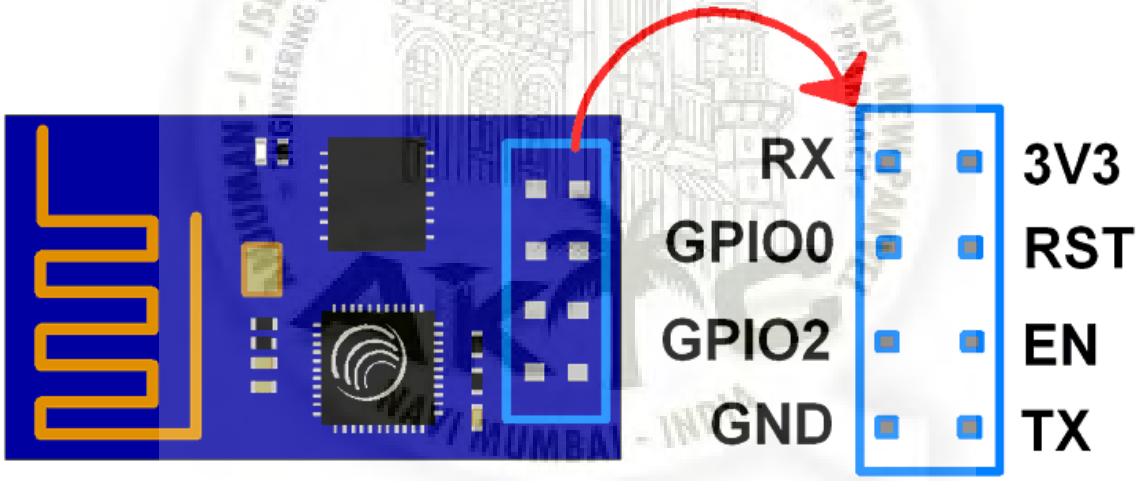
There are many third-party manufacturers that produce different modules based on this chip. So, the module comes with different pin availability options like,

- ESP-01 comes with 8 pins (2 GPIO pins) – PCB trace antenna. (shown in above figure)
- ESP-02 comes with 8 pins, (3 GPIO pins) – U-FL antenna connector.
- ESP-03 comes with 14 pins, (7 GPIO pins) – Ceramic antenna.
- ESP-04 comes with 14 pins, (7 GPIO pins) – No ant.

etc.

For example, below figure shows ESP-01 module pins

ESP8266-01 Module Pin Description



ESP8266-01 Module Pins

3V3: - 3.3 V Power Pin.

GND: - Ground Pin.

RST: - Active Low Reset Pin.

EN: - Active High Enable Pin.

TX: - Serial Transmit Pin of UART.

RX: - Serial Receive Pin of UART.

GPIO0 & GPIO2: - General Purpose I/O Pins. These pins decide what mode (boot or normal) the module starts up in. It also decides whether the TX/RX pins are used for Programming the module or for serial I/O purpose.

To program the module using UART, Connect GPIO0 to ground and GPIO2 to VCC or leave it open. To use UART for normal Serial I/O leave both the pins open (neither VCC nor Ground).

CHAPTER NO:04

THEORITICAL DETAILS

CHAPTER NO:04

THEORITICAL DETAILS

4.1 Internet of Things (IoT)

The Internet of things (IoT) is the network of physical devices, vehicles, home appliances and other items embedded with electronics, software, sensors, actuators, and connectivity which enables these objects to connect and exchange data. Each thing is uniquely identifiable through its embedded computing system but is able to inter-operate within the existing Internet infrastructure.The IoT allows objects to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention. When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, virtual power plants, smart homes, intelligent transportation and smart cities."Things", in the IoT sense, can refer to a wide variety of devices such as heart monitoring implants, biochip transponders on farm animals, cameras streaming live feeds of wild animals in coastal waters, automobiles with built-in sensors, DNA analysis devices for environmental/food/pathogen monitoring, or field operation devices that assist firefighters in search and rescue operations. Legal scholars suggest regarding "things" as an "inextricable mixture of hardware, software, data and service".These devices collect useful data with the help of various existing technologies and then autonomously flow the data between other devices.The term "the Internet of things" was coined by Kevin Ashton of Procter Gamble, later MIT's Auto-ID Center, in 1999.

4.2 IoT Working

A complete IoT system integrates four distinct components: sensors/devices, connectivity, data processing, and a user interface.

Sensors/Devices

• First, sensors or devices collect data from their environment. This could be as simple as a temperature reading or as complex as a full video feed.

• Here uses a sensors/devices,a because multiple sensors can be bundled together or sensors can be part of a device that does more than just sense things. For example, phonemis a device that has multiple sensors (camera, accelerometer, GPS, etc), but phone is not just a sensor.

• However, whether itˆaTMs a standalone sensor or a full device, in this first step data is being collected from the environment by something.

Connectivity

• Next, that data is sent to the cloud, but it needs a way to get there.

• The sensors/devices can be connected to the cloud through a variety of methods including: cellular, satellite, WiFi, Bluetooth, low-power wide-area networks (LPWAN), orconnecting directly to the internet via ethernet.

• Each option has tradeoffs between power consumption, range and bandwidth. Choosingwhich connectivity option is best comes down to the specific IoT application, but theyall accomplish the same task: getting data to the cloud.

Data Processing

• Once the data gets to the cloud, software performs some kind of processing on it.

• This could be very simple, such as checking that the temperature reading is within anacceptable range. Or it could also be very complex, such as using computer vision on video to identify objects (such as intruders in house).

User Interface

• Next, the information is made useful to the end-user in some way. This could be via alert to the user (email, text, notification, etc). For example, a text alert when the temperature is too high in the company^aTMs cold storage.

• Also, a user might have an interface that allows them to proactively check in on thesystem. For example, a user might want to check the video feeds in their house via a phone app or a web browser.

• However,TMs not always a one-way street. Depending on the IoT application, the

user may also be able to perform an action and affect the system. For example, the user might remotely adjust the temperature in the cold storage via an app on their phone.

• And some actions are performed automatically. Rather than waiting for to adjust the temperature, the system could do it automatically via predefined rules. And rather than just alert of an intruder, the IoT system could also automatically notify relevant authorities.

CHAPTER NO: 05

SOFTWARE SPECIFICATIONS

CHAPTER NO: 05

SOFTWARE SPECIFICATIONS

5.1: Arduino IDE

The Arduino IDE is incredibly minimalistic, yet it provides a near-complete environment for most Arduino-based projects. The top menu bar has the standard options, including “File” (new, load save, etc.), “Edit” (font, copy, paste, etc.), “Sketch” (for compiling and programming), “Tools” (useful options for testing projects), and “Help”. The middle section of the IDE is a simple text editor that where you can enter the program code. The bottom section of the IDE is dedicated to an output window that is used to see the status of the compilation, how much memory has been used, any errors that were found in the program, and various other useful messages.

The Arduino IDE in its default state

Projects made using the Arduino are called sketches, and such sketches are usually written in a cut-down version of C++ (a number of C++ features are not included). Because programming a microcontroller is somewhat different from programming a computer, there are a number of device-specific libraries (e.g., changing pin modes, output data on pins, reading analog values, and timers). This sometimes confuses users who think Arduino is programmed in an “Arduino language.” However, the Arduino is, in fact, programmed in C++. It just uses unique libraries for the device.

The 6 Buttons

While more advanced projects will take advantage of the built-in tools in the IDE, most projects will rely on the six buttons found below the menu bar.

The button bar

1. The **check mark** is used to verify your code. Click this once you have written your code.
2. The **arrow** uploads your code to the Arduino to run.
3. The **dotted paper** will create a new file.
4. The **upward arrow** is used to open an existing Arduino project.
5. The **downward arrow** is used to save the current file.
6. The far right button is a **serial monitor**, which is useful for sending data from the Arduino to the PC for debugging purposes.

5.2: Program Code

```
#define BLYNK_PRINT Serial
#include <ESP8266_Lib.h>
#include <BlynkSimpleShieldEsp8266.h>

char auth[] = "716dff67d0c4493a8f3ad1267063db84";

char ssid[] = "mac";
char pass[] = "12345678";

#include <SoftwareSerial.h>
SoftwareSerial EspSerial(2, 3); // RX, TX

#define ESP8266_BAUD 9600
ESP8266 wifi(&EspSerial);

   float temp;
   int tempPin = 0; //analog pin 1

   int fanpin =7;

   int check=0;

   SimpleTimer timer;
void setup()
{
  pinMode(fanpin,OUTPUT);
   digitalWrite(fanpin,HIGH);
```

```
 Serial.begin(9600);
 delay(10);

 EspSerial.begin(ESP8266_BAUD);
 delay(10);
 Blynk.begin(auth, wifi, ssid, pass);
  timer.setInterval(1000L, sendUptime);
}

 void sendUptime()
   {
    Blynk.virtualWrite(10, temp);
   }


void loop()
{
 Blynk.run();
 timer.run();

      temp = analogRead(tempPin);
      temp = temp * 0.48828125;


        if(temp > 50 )
        {

        digitalWrite(fanpin,LOW);

        if(check==0)
        {
          Blynk.notify("alert");

        }
        check=1;

       }
       else
       {
         digitalWrite(fanpin,HIGH);
         check=0;
       }
```

```
 TUR = analogRead(TURPIN);
     TUR = map(TUR, 500, 890 , 0, 100);
      Serial.print("TURBIDITY=");
   Serial.print(TUR);
   Serial.println("%");
     if(TUR < 90 )
       {
        digitalWrite(PUMPPIN,LOW);
         myservo.write(180);
       }
       else
       {
         digitalWrite(PUMPPIN,HIGH);

       }

       if(digitalRead(ldrPin)==HIGH)
       {
         digitalWrite(ELECPIN,LOW);



       }
       else
       {
         digitalWrite(ELECPIN,HIGH);

       }

for(int i=0;i<10;i++)
 {
  buf[i]=analogRead(analogInPin);
  delay(10);
 }
 for(int i=0;i<9;i++)
 {
  for(int j=i+1;j<10;j++)
  {
   if(buf[i]>buf[j])
   {
    temp=buf[i];
    buf[i]=buf[j];
    buf[j]=temp;
   }
  }
 }
 avgValue=0;
 //Serial.println(phValue);
 for(int i=2;i<8;i++)
```

```
avgValue+=buf[i];
Serial.println(avgValue);
float pHVol=(float)avgValue*5.0/1024/6;
float phValue = -5.70 * pHVol + 21.34;
Serial.print("sensor = ");
Serial.println(phValue);


delay(20);

}
```

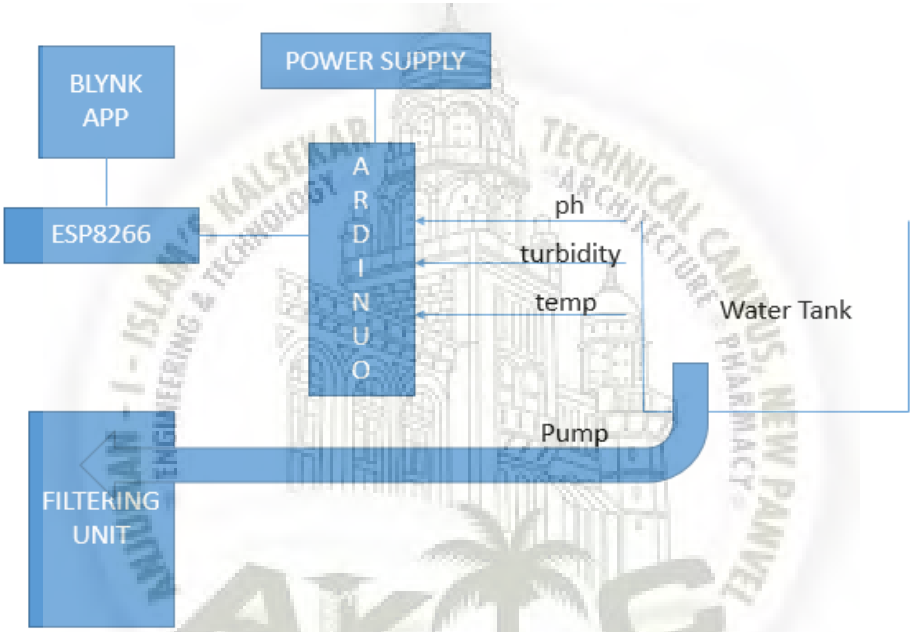
CHAPTER NO: 06

PROPOSED SYSTEM

CHAPTER NO: 06

PROPOSED SYSTEM

6.1: Block Diagram



6.2: Working

1.The water which needs to be tested is first placed in the particular tank.

2. There are various sensors placed in the tank for sensing various parameters such as ph,turbidity and temperature.

3.Sensors used here are ph sensor,turbidity sensor and temperature sensor.

4.If the water is being detected as dirty like if the particular value of turbidity exceeds which we have set as threshold value then the ESP8266 which is connected to the Arduino

will send a notification to the mobile through the blynk app that the water is being detected as dirty.

5.The dirty water is then made to pass through the filtering process.

6.The filtering part comprises of a tank which have different layers,first layer consists of large stones,second layer consists of soil particles,third layer consists of small granules,fourth layer consists of activated charcoal and the next is cotton.

7.the dirty water is then passed through this layer,this layer removes all the dirts which is present in the water.

8.If incase after passing through this process germs are still present in the water then the servo motor automatically drops a capsule of aqua pure which helps to remove the germs and bacteria present in the water and makes the water much pure that one drink it aswell.

9.If the water is not being detected dirty then the Blynk app will send the message to the mobile that the water is pure.

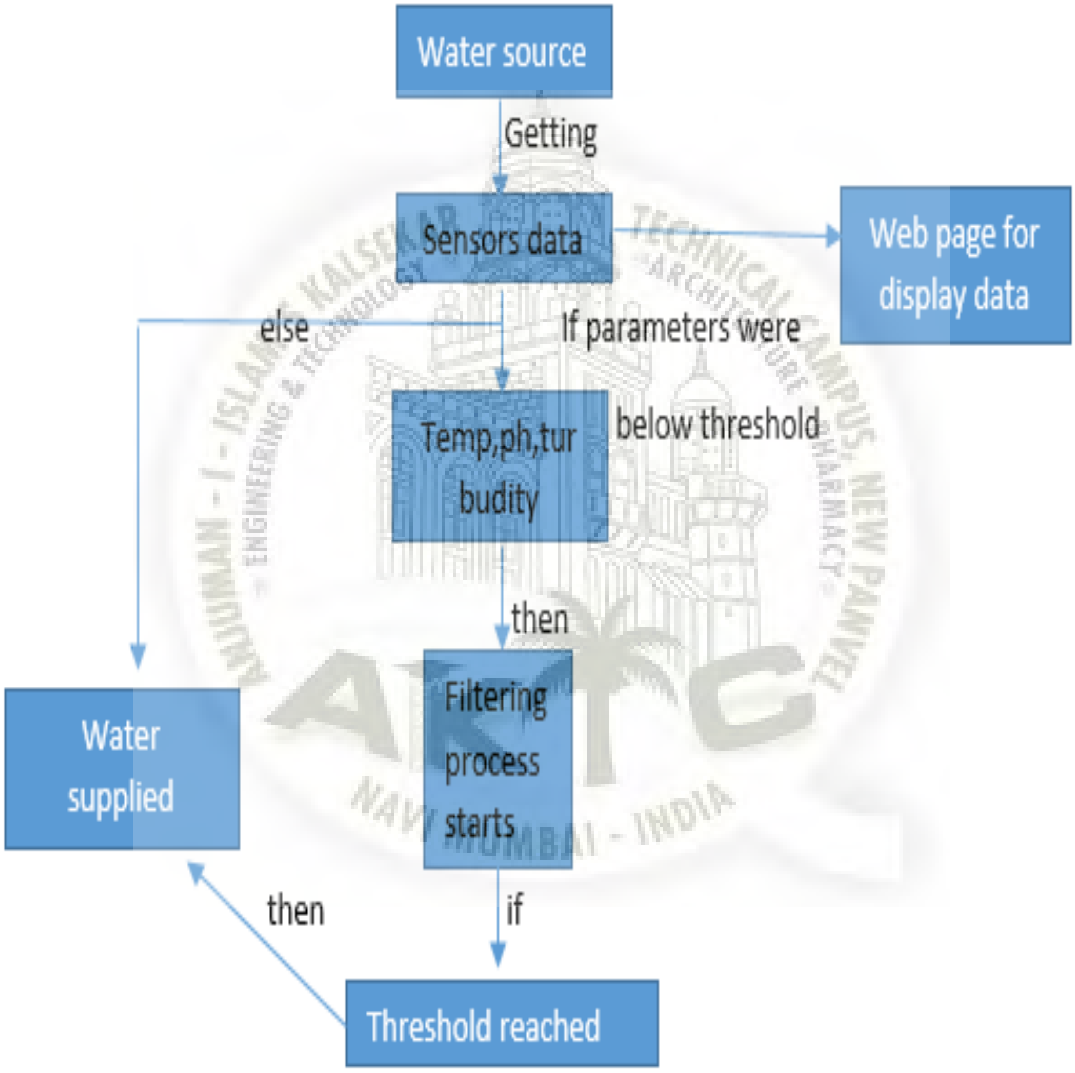
10.Else it will purify the water through filtering process.

CHAPTER NO: 07

FLOWCHART

CHAPTER NO: 07

FLOWCHART



CHAPTER NO: 08

BENEFITS AND LIMITATIONS

CHAPTER NO: 08

Benefits And Limitations

8.1: Benefits

- We can monitor the quality of water in real time environment & data analysis of water quality is possible.
- No need of man power.
- It is safe for consumption and also in doing household chores.
- More appropriate and reliable.
- Cost effective

8.2: Limitations

- If the sensor fails to work then the appropriate data will not be displayed.
- Precise programming needed.

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CHAPTER NO:09

APPLICATIONS

CHAPTER NO:09

Applications

9.1: Applications

- Can be used for Aquarium maintenance.
- Can be used in Building Society for safe water supply.
- Can be implemented in Rural areas for providing safe water.

CHAPTER NO: 10

CONCLUSION

CHAPTER NO: 10

CONCLUSION

The low cost, real time,efficient water quality monitoring and control system has been implemented and tested. Through this system the official can keep track of the level of pollutants in the parameter occurring in the water and send immediate message to the user's phone. This help in preventing diseases caused by the polluted water. Quick actions can be taken to curb level of pollutions in the water. This proposed solution gives better results when compared to the earlier existing systems such as it monitors as well as control the parameters of water.

CHAPTER NO:11

Bibliography

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