

A PROJECT REPORT ON

**“INTERNET OF THINGS BASED WATER
LEVEL MONITORING SYSTEM MANAGING ”**

**SUBMITTED TO MSBTE, MUMBAI
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE AWARD**

DIPLOMA IN COMPUTER TECHNOLOGY

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(2018-2019)**

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CERTIFICATE

THIS IS TO CERTIFY THAT PROJECT ENTITLED

**“INTERNET OF THINGS BASED WATER LEVEL
MONITORING SYSTEM MANAGING”**

Submitted by

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INTERNET OF THINGS BASED WATER LEVEL
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1.List Of Publications/ Project Competitions Exhibitions

Sr.No.	Name of Competition	Place	Date
1.	A State Level Project Competition	Dr.Vithalrao Patil College of Engineering, Ahmednagar	12 Jan. 2019
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ABSTRACT

One of the major problems faced by most of the countries is the issue of water scarcity in the world and wastage during transmission has been identified as a major culprit; this is one of the motivations for this research, to deploy computing techniques in creating a barrier to wastage in order to not only provide more financial gains and help the environment as well as the water cycle which in turn ensures that we save water for our future. IOT based Water level Controlling and Management system is an innovative system which will inform the user about the level of liquid and will prevent it from overflowing. To demonstrate the system makes use of tank where the ultrasonic sensor placed over the tank to detect the liquid level and compare it with the tanks depth. The system make use of Arduino Uno ,LCD screen, Relay to switch motor and a buzzer. A 5V adapter is used for power supply in this system. The LCD screen is used to display the status of the level of liquid in the tank. The liquid level is highlighted to show the level of liquid present in the tank with the help of a web page to user. The buzzer starts ringing when the set limit of liquid is crossed. Thus system helps to prevent the wastage of water by informing about the liquid level of the tanks..

Keywords- Arduino Uno, Ultrasonic Sensor, LCD, Relay and buzzer.

Chapter 1

INTRODUCTION

Water level controller is the equipment used to control the water level in a tank. The level of the water is controlled by using a microcontroller. Main components are ATmega328 microcontroller, sensor, motor, etc. The sensor sense the presence of water and give indication to the microcontroller.

The microcontroller produces the control signals to drive the motor. If there is no water then microcontroller gives control signal to start the motor and if there is sufficient water in the field then the microcontroller give control signal to stop the motor . And also the microcontroller enables the display and displayed as THE MOTOR IS ON when the motor starts and disable the display when the motor is off. Hence the level of water in a tank can be automatically controlled. The main components used in this is ultrasonic sensor, motor, microcontroller. Level sensors the level of substances that flow, including liquids. The substance to be measured can be inside a tank or can be in the natural form for example river or lake.

The level of measurement can be either continuous or point values. Continuous level sensors measure level with a specified range and determine the exact amount of substance in a certain place, while point level sensors only indicate whether the substance is above or below the sensing point. This project used continuous level sensor that is ultrasonic sensor.

Chapter 2

REQUIREMENT ANALYSIS

2.1 Requirement Specification

As per the problem definition of the project the requirement analysis from the software and hardware has been performed. The requirements have been elaborated in the following section.

2.2 System Requirements

In this chapter of our project all the requirement needed to run the project successfully on the system are specified. The project requirements are useful for its deployment in users computing environment. Generally they are categorized as

2.2.1 Software Requirements:

1. Arduino Software
2. Eclipse

2.2.2 Hardware Requirements:

1. Arduino Uno
2. Ultrasonic Sensor
3. Liquid Crystal Display
4. Relay
5. Buzzer

6. Motor

2.3 The Software Process Model

This is the most common easy to implement and classic of all the life cycle models. It is also referred as the Classic Life Cycle Model or Linear-Sequential Life Cycle Model. This model places a lot of emphasis on document

2.3.1 Waterfall Model

This is the most common easy to implement and classic of all the life cycle models. It is also referred as the Classic Life Cycle Model or Linear-Sequential Life Cycle Model. This model places a lot of emphasis on documentation i.e. Requirement Specification and Design Document. In waterfall model each phase must be completed successfully before the immediate next phase can design.

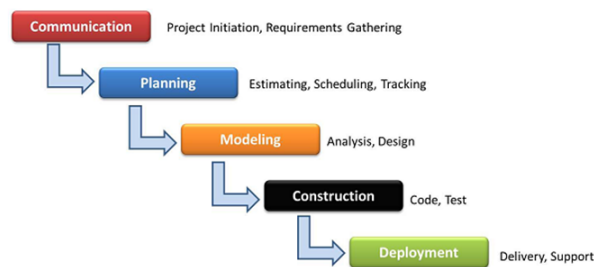


Figure 2.1: Waterfall Model

Advantages of Waterfall Model

- It allows for departmentalization and control.
- It is very simple and easy to implement.
- A schedule can be set with deadlines for each stage of development and a product can be proceed through the development process model phases one by one.
- Development moves from concept, through design, implementation, testing, installation, troubleshooting, and ends up at operation and maintenance. Each phase of development proceeds in strict order.

When to use waterfall Model

- Requirements are very well known.
- Product definition is stable.
- Technology is understood.
- New version of an existing product.
- Porting an existing product to a new platform.

Chapter 3

System Analysis

3.1 System Block Diagram/Flow Diagram

A control system may consist of a number of components. In order to show the functions performed by each component in engineering, we commonly use a diagram called the Block Diagram. A block diagram of a system is a pictorial representation of the function performed by each component and of the flow of signals. Such a diagram depicts the inter-relationships which exist between the various components. A block diagram has the advantage of indicating more realistically the signal flows of actual system. In a block diagram all system variables are linked to each other through functional blocks. The functional block or simply Block is a symbol for the mathematical operation on the input signal to the block which produce the output. The transfer functions of the components are usually entered in the corresponding blocks, which are connected by arrows to indicate the direction of flow of signals.

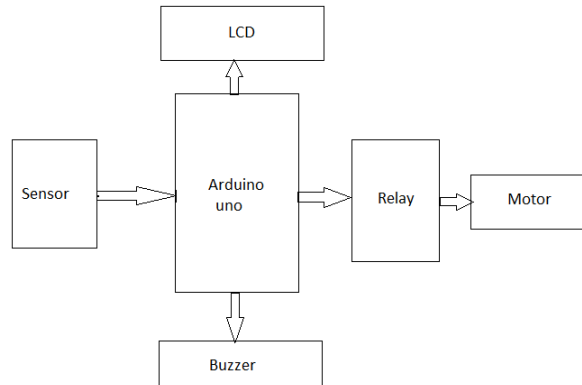


Figure 3.1: Block Diagram

3.2 Data Flow Diagram

A data flow diagram is the graphical representation of flow data through an information system. Modeling its process aspects often they are preliminary step used to create an overview of system which can be later elaborated DFDs can be also used for the visualization of data processing. A DFD shows what kind of information will be input to and output from the system where the data will come from and go the data will be stored. It does not show information about whether process will operate in sequence or parallel

3.2.1 DFD-0(Data Flow Diagram 0)

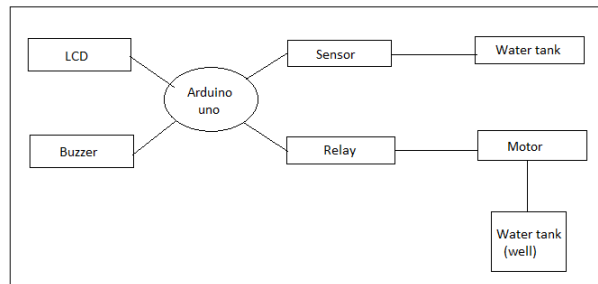


Figure 3.2: Level 0 Data Flow Diagram

3.3 UML Diagram

3.3.1 Class Diagram

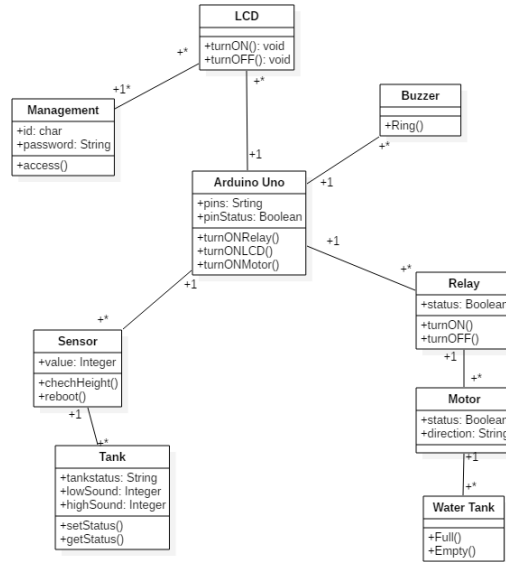


Figure 3.3: Class Diagram

3.3.2 Use Case Diagram

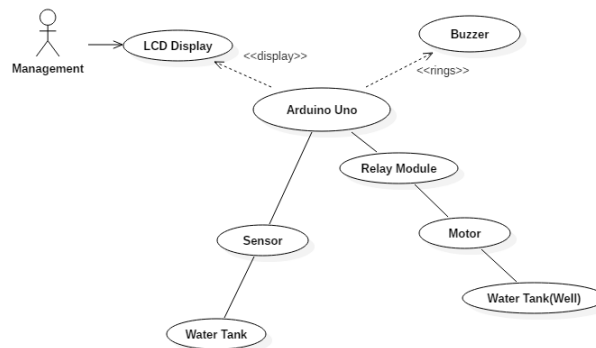


Figure 3.4: Use Case Diagram

3.3.3 Sequence Diagram

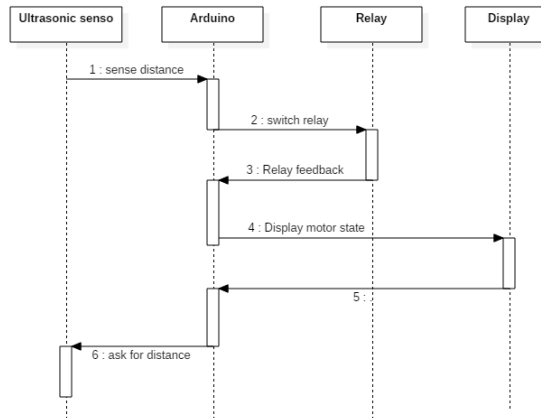


Figure 3.5: Sequence Diagram

3.3.4 Activity Diagram

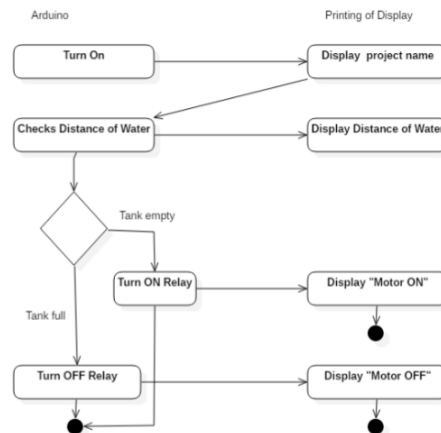


Figure 3.6: Activity Diagram

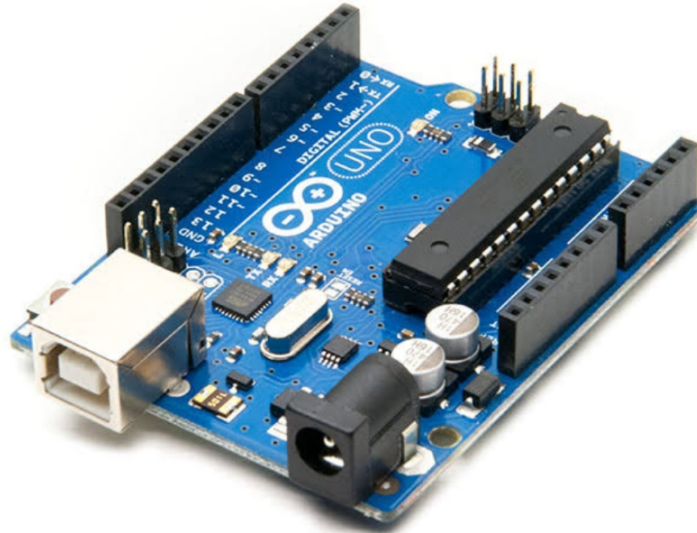
Chapter 4

IMPLEMENTATION DETAILS

4.1 Project Fundamentals

- **ARDUINO :**

Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. "Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.



Activate Windows
Go to Settings to activate Windows.

Figure 4.1: Arduino uno

• ULTRASONIC SENSOR:

Ultrasonic sensor HC-SR04 is used to measure distance in range of 2cm-400cm with accuracy of 3mm. The sensor module consists of ultrasonic transmitter, receiver and the control circuit. The Ultrasonic module works on the natural phenomenon of ECHO of sound. The pulse is send about 10us to trigger the module. After which the module automatically sends the 8 cycles of 40 KHz ultrasound signal and checks its echo. The signal after striking with an obstacle returns back and then captured by the receiver. Thus the distance of obstacle from the sensor is simply calculated by the formula given as:

$$\text{Distance} = (\text{time} \times \text{speed})/2$$



Figure 4.2: Ultrasonic Sensor

- **RELAY:**

Relay is an electromagnetic device which is used to isolate two circuits electrically and connect them magnetically. They are very useful devices and allow one circuit to switch another one while they are completely separate. A relay switch can be divided into two parts: input and output. The input section has a coil which generates magnetic field when a small voltage from an electronic circuit is applied to it. This voltage is called the operating voltage. Commonly used relays are available in different configuration of operating voltages like 6V, 9V, 12V, 24V etc.

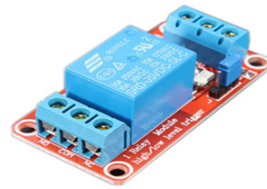


Figure 4.3: Relay

- **Liquid Crystal Display:**

This is required to display the status and other information. It is a combination of two status of matter, the solid and the liquid. LCD uses a liquid crystal to produce a visible image. Liquid Crystal Displays are super-thin technology display screen. LCD is composed with several layers which include two polarized panel filters and electrodes. LCD (Liquid Crystal Display) screen is a electronic display module and find a wide range of application. A 16x LCD display a very basic module and is very commonly used in various devices and circuits. A 16xLCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the Command instruction given to the LCD. A command is an instruction given to LCD to do a predefined task.



Attivata Windows

Figure 4.4: Liquid Crystal Display

- **Buzzer:**

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm device, timers and confirmation of user input such as mouse click or keystroke. It is operated on 12 volt dc supply. Buzzer is connected to relay which is sensing device. When relay is given signal to buzzer , it will make noise.



Figure 4.5: Buzzer

4.2 Flowchart:

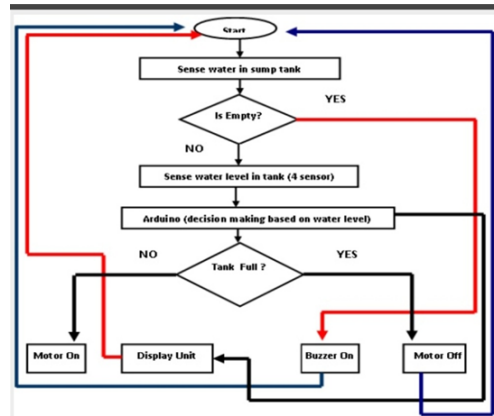


Figure 4.6: Flowchart

4.3 Coding:

4.3.1 Hardware Coding:

```

#include <LiquidCrystal.h>
#define trigPin 9
#define echoPin 10

int relay = 7; //-----buzzer1-----
long microSecond, cmDistance;
const int rs = 12, en = 11, d4 = 5, d5 = 4, d6 = 3, d7 = 2;
LiquidCrystal lcd(rs, en, d4, d5, d6, d7);
const int buzzerPin = 8;
const int min1 = 15;
const int max1 = 40;
long duration;
int piezoPin=8;
int distance;

void setup()

```

```
{

  Serial.begin (9600);
  pinMode(trigPin , OUTPUT);
  pinMode(echoPin , INPUT);
  pinMode(relay , OUTPUT);
  pinMode(buzzerPin , OUTPUT);
  Serial.begin(9600); // Starts the serial communication

  lcd.begin(16,2);
  lcd.setCursor (0, 0);           //sets the cursor at row 0 column 0
  lcd.print (" level monitoring");
  lcd.clear();

  lcd.begin(16, 2);
  lcd.print(" Starting Module...!!");
  delay(1000);
  lcd.clear();
  lcd.begin(16, 2);
  lcd.print(" Water Level Management");
}

void loop()
{

  digitalWrite(trigPin , LOW);
  delayMicroseconds(2);

  digitalWrite(trigPin , HIGH);
  delayMicroseconds(10);

  digitalWrite(trigPin , LOW);
  duration = pulseIn(echoPin , HIGH);
```



```
microSecond = duration;
cmDistance = microSecond/60;

// Calculating the distance
distance= duration*0.034/2;

delay(500);
Serial.println(distance);
delay(500);

if (cmDistance==max1 || cmDistance==(max1+1) || cmDistance==(max1+2))
{

    lcd.clear();
    lcd.begin(16, 2);
    lcd.clear();
    lcd.print("MOTOR ON");
    // print the number of seconds since reset:
    lcd.setCursor(0, 1);
    lcd.print(" Distance=");
    lcd.print(cmDistance);
    lcd.print("cm");
    delay(10);
    digitalWrite(relay, HIGH);
    digitalWrite(buzzerPin, HIGH);
    delay(1000);
    digitalWrite(buzzerPin, LOW);

}

else if (cmDistance>=max1)

{
```

```
lcd.clear();
lcd.begin(16, 2);
lcd.clear();
lcd.print("MOTOR ON");
// print the number of seconds since reset:
lcd.setCursor(0, 1);
lcd.print(" Distance=");
lcd.print(cmDistance);
lcd.print("cm");

digitalWrite(relay , HIGH);
delay(1000);
}

else if (cmDistance==min1 || cmDistance==(min1-1))

{

lcd.clear();
lcd.begin(16, 2);
lcd.clear();
lcd.print("MOTOR ON");
// print the number of seconds since reset:
lcd.setCursor(0, 1);
lcd.print(" Distance=");
lcd.print(cmDistance);
lcd.print("cm");
delay(10);
digitalWrite(relay , HIGH);
digitalWrite(buzzerPin , HIGH);
delay(1000);
digitalWrite(buzzerPin , LOW);
```

```
}

else if (cmDistance>=min1)
{
    lcd.setCursor(0, 1);
    lcd.print(" Distance=");
    lcd.print(cmDistance);
    lcd.print("cm");
}

else if (cmDistance==min1)

{

    lcd.clear();
    lcd.begin(16, 2);
    lcd.clear();
    lcd.print("MOTOR OFF");

    lcd.setCursor(0, 1);
    // print the number of seconds since reset:
    lcd.print("Tank Full");
    digitalWrite(relay, LOW);
    digitalWrite(buzzerPin, HIGH);
    delay(1000);
    digitalWrite(buzzerPin, LOW);
}

else if (cmDistance<=min1)
{
    lcd.clear();
    lcd.begin(16, 2);
```

```
lcd.clear();  
lcd.print("MOTOR OFF");  
  
lcd.setCursor(0, 1);  
  
// print the number of seconds since reset:  
lcd.print("Tank Full");  
digitalWrite(relay, LOW);  
delay(1000);  
  
}  
}
```

4.3.2 Software Coding

- ArduinoConnection.java:

```
package services;  
  
import java.io.BufferedReader;  
import java.io.IOException;  
import java.io.InputStream;  
import java.io.InputStreamReader;  
import java.io.OutputStream;  
import java.sql.Connection;  
import java.sql.DriverManager;  
import java.sql.PreparedStatement;  
import java.sql.SQLException;  
  
import gnu.io.CommPortIdentifier;  
import gnu.io.SerialPort;  
import gnu.io.SerialPortEvent;  
import gnu.io.SerialPortEventListener;  
import java.util.Enumeration;
```

```
import java.util.Properties;
import javax.sound.midi.MidiDevice.Info;
import connectDB.DBconnect;

public class ArduinoConnection implements SerialPortEventListener {
    SerialPort serialPort;
    /** The port we're normally going to use. */
    private static final String PORT_NAMES[] = {"/dev/tty.usbserial-A9007UX1"
    // Mac OS X"/dev/ttyUSB0", //Linux
    "COM19", // Windows
    };

    static String inputLine;
    static BufferedReader input;
    private static OutputStream output;
    private static final int TIMEOUT = 2000;
    private static final int DATA_RATE = 9600;
    Properties prop = new Properties();
    public void initialize() {

        CommPortIdentifier portId = null;
        Enumeration portEnum =CommPortIdentifier.getPortIdentifiers();

        //First, Find an instance of serial port as set in PORT_NAMES.
        while (portEnum.hasMoreElements()) {
            CommPortIdentifier currPortId = (CommPortIdentifier)
            portEnum.nextElement();
            for (String portName : PORT_NAMES) {
                if (currPortId.getName().equals(portName)) {
                    portId = currPortId;
                    break;
                }
            }
        }
    }
}
```

```
}  
}  
if (portId == null) {  
    System.out.println("Could not find COM port...");  
    return;  
}  
  
try {  
    serialPort = (SerialPort) portId.open(this.getClass().getName(),  
    TIMEOUT);  
    serialPort.setSerialPortParams(DATA_RATE, SerialPort.DATABITS_8,  
    SerialPort.STOPBITS_1, SerialPort.PARITY_NONE);  
  
    // open the streams  
    input = new BufferedReader(new InputStreamReader(serialPort.getInputStream()));  
    output = serialPort.getOutputStream();  
    //output=serialPort.getOutputStream();  
  
    serialPort.addEventListener(this);  
    serialPort.notifyOnDataAvailable(true);  
  
} catch (Exception e) {  
    System.err.println(e.toString());  
}  
}  
  
public synchronized void close() {  
    if (serialPort != null) {  
        serialPort.removeEventListener();  
        serialPort.close();  
    }  
}
```

```
}

public synchronized void serialEvent (SerialPortEvent oEvent) {
    if (oEvent.getEventType() == SerialPortEvent.DATA_AVAILABLE) {

        try {

            if (input.ready())

                inputLine=input.readLine();

                System.out.println(" value = "+inputLine);

                Connection conn=DBconnect.getConnection();

                PreparedStatement ps = conn.prepareStatement("UPDATE level SET
                value=? where id=1");

                ps.setString(1,inputLine);
                ps.executeUpdate();

            }
            catch (Exception e)
            {
                System.err.println(e);
                e.printStackTrace();
            }

        }

    }

    // Ignore all the other eventTypes, but you should consider the
```

other ones.

```
private Object open(String inputLine, String string) {

// TODO Auto-generated method stub
return null;
}

public static void main(String[] args) throws SQLException {

    ArduinoConnection main = new ArduinoConnection();

    main.initialize();

    Thread t=new Thread() {
    public void run() {
//the following line will keep this app alive for 1000 seconds,
//waiting for events to occur and responding to them
(printing incoming messages to console).
try {Thread.sleep(1000000);} catch (InterruptedException ie) {}
}
};
t.start();
System.out.println(" Started");
}
}
```

- login.java:

```
package services;

import java.io.IOException;
import javax.servlet.ServletException;
import javax.servlet.http.HttpServlet;
```



```
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;

/**
 * Servlet implementation class Login
 */
public class Login extends HttpServlet {
    private static final long serialVersionUID = 1L;

    /**
     * Default constructor.
     */
    public Login() {
        // TODO Auto-generated constructor stub
        super();
    }

    /**
     * @see HttpServlet#doGet(HttpServletRequest request,
     HttpServletResponse response)
     */
    protected void doGet(HttpServletRequest request,
        HttpServletResponse response) throws ServletException, IOException {
        // TODO Auto-generated method stub
        response.getWriter().append("Served at:
        ").append(request.getContextPath());
    }

    /**
     * @see HttpServlet#doPost(HttpServletRequest request,
     HttpServletResponse response)
     */
    protected void doPost(HttpServletRequest request,
        HttpServletResponse response) throws ServletException, IOException {
```

```
// TODO Auto-generated method stub
doGet(request , response);

String email=request.getParameter("email");
String pass=request.getParameter("password");
if(email.equals("admin@gmail.com") && pass.equals("admin"))
{
response.sendRedirect("displayLevel.jsp");
}
else
{
request.getSession().setAttribute("msg", "Wrong User Credentials..!!");
response.sendRedirect("login.jsp");
}
}
}
```

- DBconnect.java

```
package connectDB;

import java.sql.Connection;
import java.sql.DriverManager;

public class DBconnect {
static Connection con = null;
public static Connection getConnect()
{
if(con==null)
{
try
{
Class.forName("com.mysql.jdbc.Driver");
con = DriverManager.getConnection("jdbc:mysql://localhost:3306/
```

```

water_level_db","root","");
return con;
}
catch(Exception e)
{
e.printStackTrace();
}
}
return con;
}
}

```

- displayLevel.jsp

```

<%@page import="connectDB.*"%>
<%@page import="java.sql.*"%>
<!doctype html>
<html lang="en">
<head>
<meta charset="utf-8" />
<link rel="icon" type="image/png" href="assets/img/favicon.ico">
<meta http-equiv="X-UA-Compatible" content="IE=edge,chrome=1"/>

<title>Water Level</title>

<meta content='width=device-width, initial-scale=1.0,
maximum-scale=1.0, user-scalable=0' name='viewport' />
<meta name="viewport" content="width=device-width" />
<!-- Bootstrap core CSS -->
<link href="assets/css/bootstrap.min.css" rel="stylesheet" />

<!-- Animation library for notifications -->
<link href="assets/css/animate.min.css" rel="stylesheet"/>

```

```

<!-- Light Bootstrap Table core CSS -->
<link href="assets/css/light-bootstrap-dashboard.css" rel="stylesheet"/>

<!-- Fonts and icons -->
<link href="http://maxcdn.bootstrapcdn.com/font-awesome/4.2.0/css/
font-awesome.min.css" rel="stylesheet">
<link href='http://fonts.googleapis.com/css?family=Roboto:400,700,300'
rel='stylesheet' type='text/css'>
<link href="assets/css/pe-icon-7-stroke.css" rel="stylesheet" />
</head>
<body>

<div class="wrapper">
<div class="sidebar" data-color="purple"
data-image="assets/img/sidebar-5.jpg">
<div class="sidebar-wrapper">
<div class="logo">
<a href="http://www.creative-tim.com" class="simple-text">
Water Level
</a>
</div>
<ul class="nav">
<li class="active">
<a href="displayLevel.jsp">
<i class="pe-7s-graph"></i>
<p>Water Level</p>
</a>
</li>
</ul>

</div>
</div>
<div class="main-panel">

```

```

<nav class="navbar navbar-default navbar-fixed">
<div class="container-fluid">
<div class="navbar-header">
<button type="button" class="navbar-toggle"
data-toggle="collapse">
<span class="sr-only">Toggle navigation</span>
<span class="icon-bar"></span>
<span class="icon-bar"></span>
<span class="icon-bar"></span>
</button>
<a class="navbar-brand" href="#">Admin Home</a>
</div>
<div class="collapse navbar-collapse">
<ul class="nav navbar-nav navbar-left">
<li>
<a href="#" class="dropdown-toggle" data-toggle="dropdown">
<i class="fa fa-dashboard"></i>
</a>
</li>
</ul>

<ul class="nav navbar-nav navbar-right">
<li>
<a href="login.jsp">
Logout
</a>
</li>
</ul>
</div>
</div>
</nav>

<div class="content">

```

```

<div class="container-fluid">
<div class="row">
<div class="col-md-12">
<div class="card">
<div class="header">
<h4 class="title">Approve News</h4>
<p class="category"></p>
</div>
<div class="content table-responsive table-full-width">
<table class="table table-hover table-striped">
<thead>

<th>Sensor Value</th>
<th>Level</th>

</thead>
<%
out.println("<tbody>");

try
{
Connection con=DBconnect.getConnection();
PreparedStatement ps = con.prepareStatement("select * from level");
ResultSet rs = ps.executeQuery();
while(rs.next())
{
out.print("<tr>");
out.print("<td>");
out.print(rs.getString("value"));
out.print("<td>");
int value=Integer.parseInt(rs.getString("value"));
// out.print(value);
if(value>=40)

```

```

{
out.print("Tank is empty");
}else if (value<=39 && value>15){
out.print("Tank is Half Empty");
}
else if (value<=15) {
out.print("Tank is Full");

}
}
} catch (Exception e) {
e.printStackTrace();
}
out.println("</tbody>");
%>
</table>
</div>
</div>
</div>
</div>
</div>
</div>
</div>
<footer class="footer">
<div class="container-fluid">
<nav class="pull-left">
</nav>
<p class="copyright pull-right">
&copy; <script>document.write(new Date().getFullYear())</script>
<a href="http://www.creative-tim.com">Water Level</a>
</p>
</div>
</footer>
</div>

```

</div>

</body>

<!-- Core JS Files -->

<script src="assets/js/jquery-1.10.2.js"
type="text/javascript"></script>

<script src="assets/js/bootstrap.min.js"
type="text/javascript"></script>

<!-- Checkbox, Radio & Switch Plugins -->

<script src="assets/js/bootstrap-checkbox-radio-switch.js"></script>

<!-- Charts Plugin -->

<script src="assets/js/chartist.min.js"></script>

<!-- Notifications Plugin -->

<script src="assets/js/bootstrap-notify.js"></script>

<!-- Google Maps Plugin -->

<script type="text/javascript"
src="https://maps.googleapis.com/maps/api/js?sensor=false"></script>

<!--Light Bootstrap Table Core javascript and methods for Demo
purpose-->

<script src="assets/js/light-bootstrap-dashboard.js"></script>

<!-- Light Bootstrap Table DEMO methods, don't include it in your
project! -->

<script src="assets/js/demo.js"></script>

</html>

- login.jsp

```
<!doctype html>
<html lang="en">
<head>
<meta charset="utf-8" />
<link rel="icon" type="image/png" href="assets/img/favicon.ico">
<meta http-equiv="X-UA-Compatible" content="IE=edge,chrome=1" />

<title>Water Level Detector</title>

<meta content='width=device-width, initial-scale=1.0,
maximum-scale=1.0, user-scalable=0' name='viewport' />
<meta name="viewport" content="width=device-width" />

<!-- Bootstrap core CSS -->
<link href="assets/css/bootstrap.min.css" rel="stylesheet" />

<!-- Animation library for notifications -->
<link href="assets/css/animate.min.css" rel="stylesheet"/>

<!-- Light Bootstrap Table core CSS -->
<link href="assets/css/light-bootstrap-dashboard.css" rel="stylesheet"/>

<!-- Fonts and icons -->
<link href="http://maxcdn.bootstrapcdn.com/font-awesome/4.2.0/css
font-awesome.min.css" rel="stylesheet">
<link href='http://fonts.googleapis.com/css?family=Roboto:400,700\300'
rel='stylesheet' type='text/css'>
<link href="assets/css/pe-icon-7-stroke.css" rel="stylesheet" />

</head>
<script>
```

```

function access(){
<% Object s = request.getSession().getAttribute("msg");
if(s!=null){ %>
alert('<%=s.toString()%>');
<% request.getSession().setAttribute("msg",null);
}      %>
}
</script>
<body onload="access()" >

<div class="wrapper">
<div class="sidebar" data-color="purple"
data-image="assets/img/sidebar-5.jpg">
<div class="sidebar-wrapper">
<div class="logo">
<a href="http://www.creative-tim.com" class="simple-text">
Water Level Detector
</a>
</div>
</div>
</div>
<div class="main-panel">
<nav class="navbar navbar-default navbar-fixed">
<div class="container-fluid">
<div class="navbar-header">
<button type="button" class="navbar-toggle" data-toggle="collapse">
<span class="sr-only">Toggle navigation</span>
<span class="icon-bar"></span>
<span class="icon-bar"></span>
<span class="icon-bar"></span>
</button>
<a class="navbar-brand" href="#">Login</a>
</div>

```

```

<div class="collapse navbar-collapse">
<ul class="nav navbar-nav navbar-left">
<li>
<a href="#" class="dropdown-toggle" data-toggle="dropdown">
<i class="fa fa-dashboard"></i>
</a>
</li>
</ul>
</div>
</div>
</nav>

```

```

<div class="content">
<div class="container-fluid">
<div class="row" >
<div class="col-md-8">
<div class="card" style="width:50%;" >
<div class="header">
<h4 class="title">Login Here</h4>
</div>
<div class="content">
<form action="Login" method="post" >
<div class="row" ></div>

```

```

<div class="row" alignment-content:center;">
<div class="col-md-12">
<div class="form-group">
<label>Email ID</label>
<input style="width=50px;" type="text" class="form-control"
placeholder="Email ID" name="email">
</div>
</div>
<div class="col-md-12" >

```

```
<div class="form-group">
<label>Password</label>
<input type="password" class="form-control" name="password"
placeholder="Password" >
</div>
</div>
</div>

<button type="submit" class="btn btn-info btn-fill
pull-right">Login</button>
<div class="clearfix"></div>
</form>
</div>
</div>
</div>

</div>
</div>
</div>
<footer class="footer">
<div class="container-fluid">
<nav class="pull-left">

</nav>
<p class="copyright pull-right">
&copy; <script>document.write(new Date().getFullYear())</script>
<a href="http://www.creative-tim.com">City Feed</a>
</p>
</div>
</footer>
</div>
</div>
```

```
</body>
```

```
<!-- Core JS Files -->
```

```
<script src="assets/js/jquery-1.10.2.js" type="text/javascript">  
</script>
```

```
<script src="assets/js/bootstrap.min.js" type="text/javascript">  
</script>
```

```
<!-- Checkbox, Radio & Switch Plugins -->
```

```
<script src="assets/js/bootstrap-checkbox-radio-switch.js">  
</script>
```

```
<!-- Charts Plugin -->
```

```
<script src="assets/js/chartist.min.js"></script>
```

```
<!-- Notifications Plugin -->
```

```
<script src="assets/js/bootstrap-notify.js"></script>
```

```
<!-- Google Maps Plugin -->
```

```
<script type="text/javascript"  
src="https://maps.googleapis.com/maps/api/js?sensor=false"></script>
```

```
<!-- Light Bootstrap Table Core javascript and methods for Demo  
purpose -->
```

```
<script src="assets/js/light-bootstrap-dashboard.js"></script>
```

```
<!-- Light Bootstrap Table DEMO methods, don't include it in your  
project! -->
```

```
<script src="assets/js/demo.js"></script>  
</html>
```

4.4 Snapshot



4.4.1 LoginForm

1.Input Page

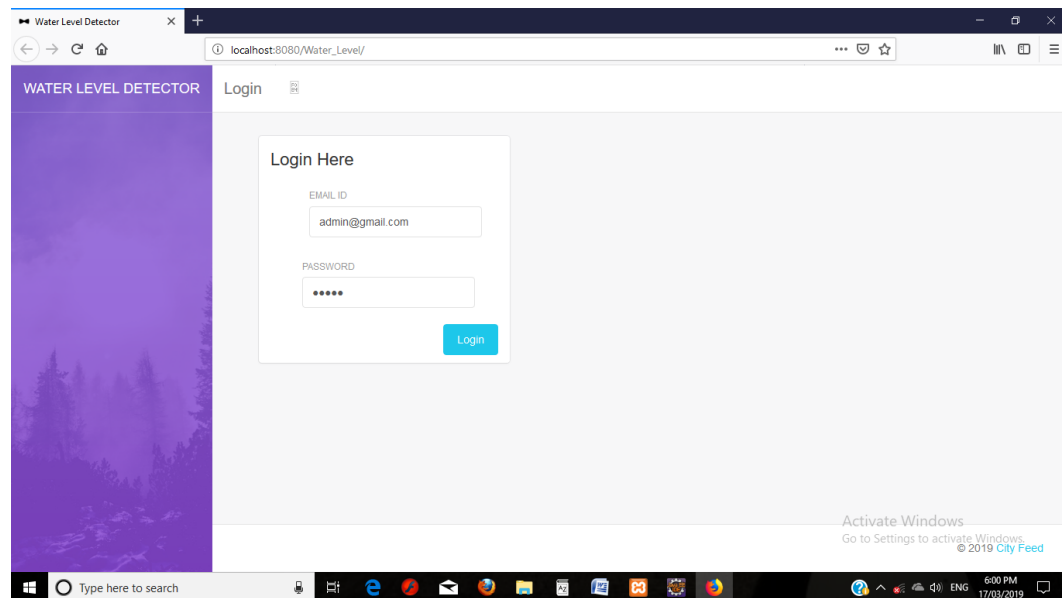


Figure 4.7: User screen while input

2.Output Page

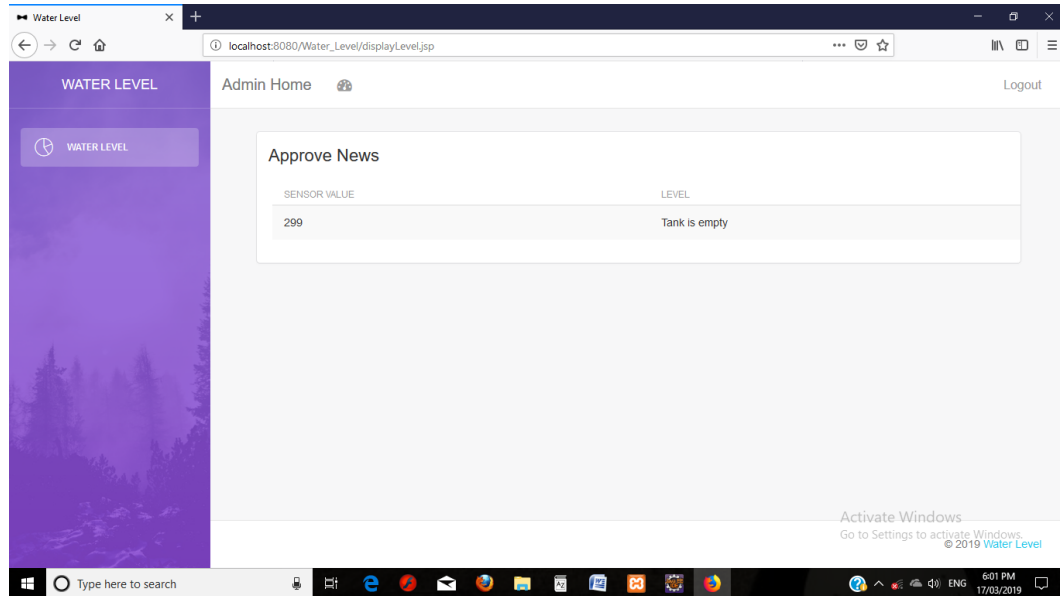


Figure 4.8: User screen while output

Chapter 5

TESTING , RESULT AND ANALYSIS

5.1 Testing and Result

5.1.1 Software Testing:

Software testing is the process of validating and verifying that a software program or application or product, meets the business and technical requirements that guided its design and development.

5.1.2 Hardware Testing

Automated hardware testing validates or verifies a products performance before it leaves the factory, using special automated test hardware the product being tested is generally called UUT (Unit Under Test), or sometimes DUT (Device Under Test).

5.2 Testing

Testing is an internal part of any system. The various objectives of testing are:

1. To uncover the errors in function logic or implementation for the software.
2. To verify that software needs the specific requirement.
3. To verify that software has been implemented according to the predefined standard.

The primary purpose of testing is to uncover systems limitations and measure its full capabilities. A list of various planned tests and a brief explanation follows below.

5.2.1 Unit Testing

In this each module is tested individually. Criteria selected for identifying unit test module is that identity modules that has core functionality implementation. Module could be and individual function or procedure.

5.2.2 Integration Testing

Integration testing individuals modules and tested as a group. Integration testing takes as its input modules that have been unit tested, groups then in larger aggregates, applies tests define in an integration test plan to those aggregations, and delivers as its output the integrated system ready for testing. The purpose of integration testing to verify functional, performance and reliability requirements.

5.2.3 Validation Testing

The process of evaluating software during or at the end of the development process is to determine whether its satisfied requirement or not.

5.3 Test Cases

TC ID	Objectives	Steps	Expected O/P	Observed O/P	Result
1.	To place the obstacle in front of Ultrasonic sensor and get the Analog output	1.An object as obstacle for Ultrasonic sensor	It should give analog output at Vout in presence of any obstacle	It give output High at Vout in presence of any obstacle	Pass
2.	To analyze data by arduino and get output at relay High if tank is empty	1.An object as obstacle for Ultrasonic sensor	It should get output high at relay	It gives output high at relay	Pass
3.	To analyze data by arduino and get output at relay Low if tank is full	1.Decrease the distance of the obstacle from the front of Ultrasonic sensor	It should get output Low at relay	It give output Low at relay	Pass
4.	To get data from arduino and display on LCD	1.Connect the LCD to Arduino	LCD Should display the Input string	LCD displays the Input string	Pass
5.	To test authentic login name entry i.e. content of name field	1.Enter Name entry with alphabets only 2.Enter Name entry with alphabets and number combination.	It should prompt message Name looks great	It should prompt message Name looks great	Pass

6.	To test password field	1.Enter password as combination of the alphabets and special symbols.	It should prompt message Password is perfect	It prompt message Password is perfect	Pass
7.	Signing in the application	1.Click on Login button	Login screen disappear and successful login to application is done	Login screen disappear and successful login to application is done	Pass
8.	Testing the COM port	1.Connect the Arduino with USB Cable to the Computer system	The COM port should Detect Arduino	The COM port Detected Arduino	Pass

Table 5.1: Test Cases

Chapter 6

ADVANTAGES FUTURE SCOPE

6.1 Advantages

- Fully Automatic because of using this project we does not need a man power.
- Save water, energy, electricity
- Low maintenance
- Easily indicated when water level is full in tank with beep sound
- Easy to control
- Low cost
- Flexible

6.2 Application

- It will automate the water leveling and controlling.
- It can be used in homes.
- It can also be used in industries, hotels, office.
- It will greatly avoid water wastage.

6.3 Future Scope

- This project will be useful at schools, colleges, home, banks, big buildings, etc. with some modifications.

- Controls the motor automatically
- Reduces the burden on man
- It can used in any industry concerned with fluids.

Chapter 7

CONCLUSION

This system is very beneficial in rural as well as urban areas. It helps in the efficient utilization of available water sources. If used on large scale, it can provide a major contribution in the conservation of water for us and the future generations. In present days, there are, many parts on earth which face scarcity of water, calamities like draught etc. Energy production is laborious and cannot be misused. The water tank overflows as the high concern in the present era. People also need to wait to stop doing their other activities until the tank is full. Hence, here is an idea which senses and indicates the water level so that the pump can be switched off on appropriate time and save water, electricity and time as well.

REFERENCE

- [1] Thinagaran , 1Md Nasir Sulaiman, 2Leong,C.Y, Internet of Things[IoT] Enabled Water Monitoring System ,2015 IEEE 4th Global Conference on Consumer Electronics[GCCE]
- [2] Perumal, T.; Sulaiman, M.N; Mustapha, N.; Shahi, A.;Thinaharan, R, Proactive architecture for Internet of Things [IoTs] management in smart homes, Consumer Electronics[GCCE], 2014 IEEE 3rd Global Conference on, pp.16, 17, 7-10 Oct 2014.
- [3] <https://www.tutorialspoint.com>
- [4] <https://www.arduino.cc>
- [5] <http://w3school.com>

- <http://w3school.com>