Project report

on

"WATER LEVEL INDICATOR BASED ON IOT"

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INDEX :

Sr. No.	Title	Page No.
	Abstract	
1.	Introduction	3
2.	Hardware description 2.1 Need of system 2.2 Components 2.3 Block Diagram 2.4 working principle 2.5 Pictorial representation	4
3.	Program	16
4.	Advantages	19
5.	Costing	20
6.	Applications	21
7.	Future Scope	21
8.	Practical photos of final project	22
9.	Conclusion	24
10.	Reference	24

1.Introduction :

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 Monitoring system is an innovative system which will inform the users about the level of liquid and will prevent it from overflowing. To demonstrate this the system makes use of containers, where the ultrasonic sensors placed over the containers to detect the liquid level and compare it with the container's depth.

2.Hardware description :

2.1) Need of the system :

As we know that IOT based water level monitoring system is an innovative system which will inform the users about the level of liquid and will prevent it from overflowing. We design the system for this following problems;

1) Over flow problems.
2) To prevent wastage of water.
3) To prevent wastage of energy.
4) Attenuation and observation.

By installing the IOT based water level indicator system in all the important municipal water tank the local government can know the level of water in real time and they can fill the tank on time and also can understand the consumption of water in the area.

2.2)Components required :

Name of the components :

1) NODE MCU ESP8266
2) Relay
3) Button
4) Ultrasonic sensor module
5) 9 volt battery
6) Software Arduino 1.8.5

Relay :

A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays. Relays are used where it is necessary to control a circuit by a separate low-power signal, or where several circuits must be controlled by one signal. The first relays were used in long distancetelegraph circuits as amplifiers: they repeated thesignal coming in from one circuit and re-transmitted it on another circuit. Relays were used extensively in telephone exchanges and early computers to perform logical operations. A type of relay that can handle the high power required to directly control an electric motor or other loads is called a contactor. Solid-state relays control power circuits with no moving parts, instead using a semiconductor device to perform switching. Relays with calibrated operating characteristics and sometimes multiple operating coils are used to protect electrical circuits from overload or faults; in modern electric power systems these functions are performed by digital instruments still called "protective relays".

Magnetic latching relays require one pulse of coil power to move their contacts in one direction, and another, redirected pulse to move them back. Repeated pulses from the same input have no effect. Magnetic latching relays are useful in applications where interrupted power should not be able to transition the

contacts. Magnetic latching relays can have either single or dual coils. On a single coil device, the relay will operate in one direction when power is applied with one polarity, and will reset when the polarity is reversed. On a dual coil device, when polarized voltage is applied to the reset coil the contacts will transition. AC controlled magnetic latch relays have single coils that employ steering diodes to differentiate between operate and reset commands.

Ultrasonic sensor module

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 sensor module works on the natural phenomenon of echo of sound. a pulse is sent for about 10us to trigger the module. after which the module automatically sends 8 cycles of 40 kHz ultrasound signal and checks its echo. the signal after striking with an obstacle returns back and is captured by the receiver.

Thus the distance of the obstacle from the sensor is simply calculated by the formula given as distance= (time x speed)/2. here we have divided the product of speed and time by 2 because the time is the total time it took to reach the obstacle and return back. thus the time to reach obstacle is just half the total time taken. The requirement for electronic signal processing circuitry can be used to make the ultrasonic sensor an intelligent device. Ultrasonic sensors can be designed to provide point level control, continuous monitoring or both. Due to the presence of a microprocessor and relatively low power consumption, there is also the capability for serial communication from to other computing devices making this a good technique for adjusting calibration and

filtering of the sensor signal, remote wireless monitoring or plant network communications.

Pin description :

VCC - +5 Volt Supply

TRIG - Trigger input of sensor

ECHO - Echo is the output of the

sensor.

GND - Ground

Button :

In electrical engineering, a switch is an electrical component that can "make" or "break" an electrical circuit, interrupting the current or diverting it from one conductor to another. [1][2] The mechanism of a switch removes or restores the conducting path in a circuit when it is operated. It may be operatedmanually, for example, a light switch or a keyboard button, may be operated by a movingobject such as a door, or may be operated by some sensing element for pressure, temperature or flow. A switch will have one or more sets of contacts, which may operate simultaneously, sequentially, or alternately.

Switches in high-powered circuits must operate rapidly to prevent destructive arcing, and may include special features to assist in rapidly interrupting a heavy current. Multiple forms of actuators are used for operation by hand or to sense position, level, temperature or flow. Special types are used, for example, for control of machinery, to reverse electric motors, or to sense liquid level. Many specializedforms exist. A common use is control of lighting, where multiple switches may be wired into one circuit to allow convenient control of light fixtures. By

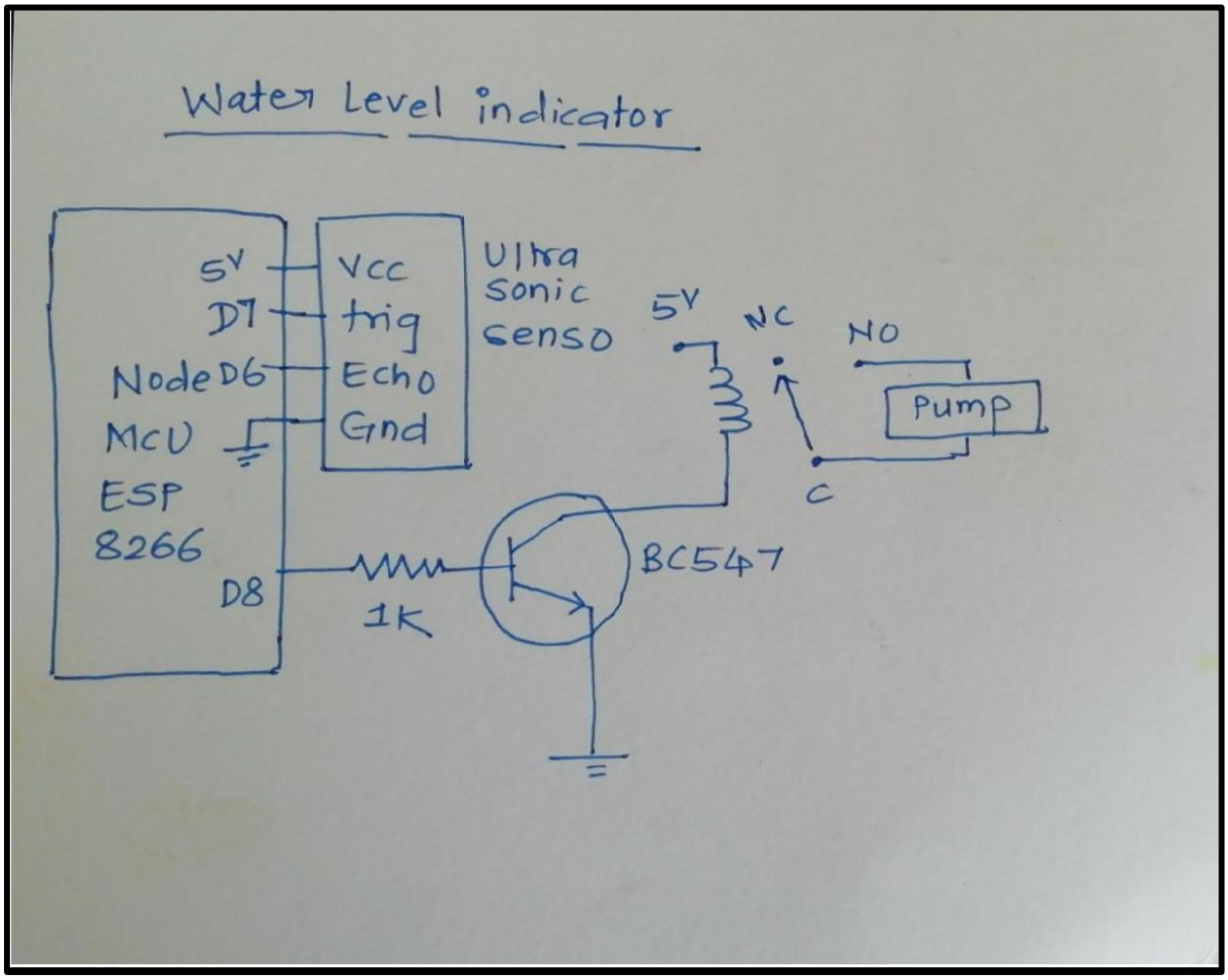
analogy with the devices that select one or more possible paths for electric currents, devices that route information in a computer network are also called "switches" - these are usually more complicated than simple electromechanical toggles or pushbutton devices, and operate without direct human interaction.

The most familiar form of switch is a manually operated electromechanical device with one or more sets of electrical contacts, which are connected to external circuits. Each set of contacts can be in one of two states: either "closed" meaning the contacts are touching and electricity can flow between them, or "open", meaning the contacts are separated and the switch is non-conducting. The mechanism actuating the transition between these two states (open or closed) are usually (there are other types of actions) either an "alternate action" (flip the switch for continuous "on" or "off") or "momentary" (push for "on" and release for "off") type. A switch may be directly manipulated by a human as a control signal to a system, such as a computer keyboard button, or to control power flow in a circuit, such as a light switch.

Automatically operated switches can be used to control the motions of machines, for example, to indicate that a garage door has reached its full open position or that a machine tool is in a position to accept another work piece. Switches may be operated by process variables such as pressure, temperature, flow, current, voltage, and force, acting as sensors in a process and used to automatically control a system. For example, a thermostat is a

temperature- operated switch used to control a heating process.

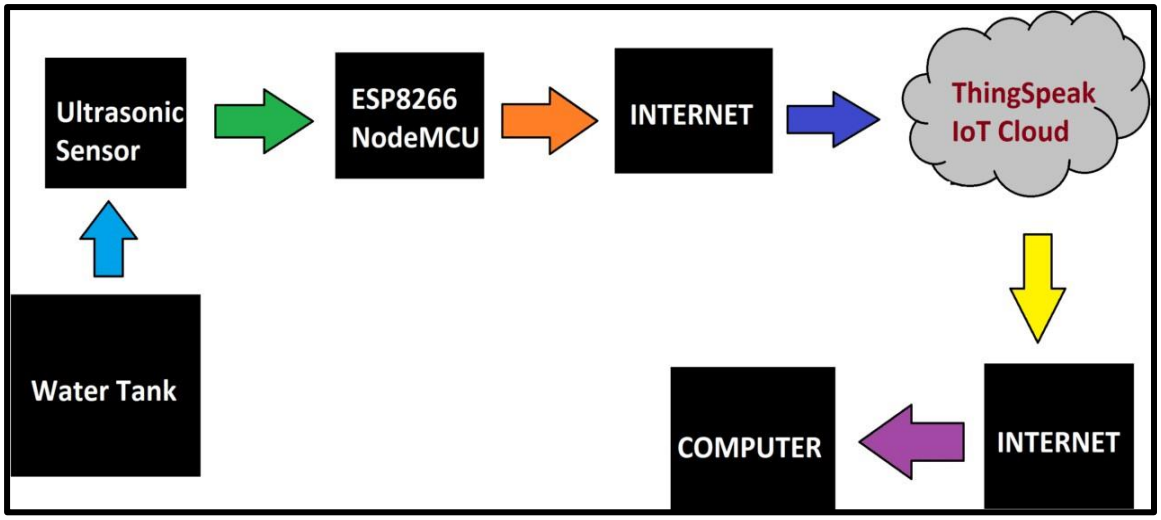
2.3 Block diagram :

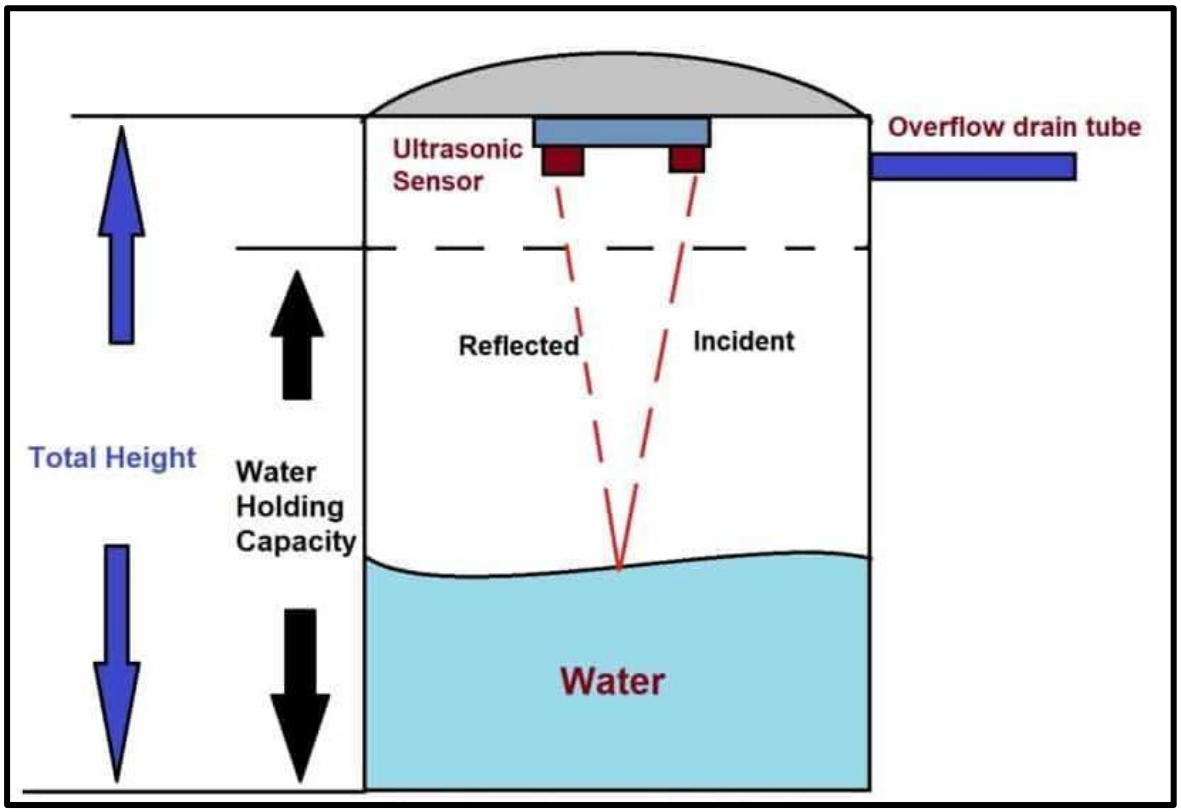


2.4 Working Principle :

- Working of this project is very simple we have used Ultrasonic sensor module which sends the sound waves in the water tank and detects reflection of sound waves that is ECHO.
- First of all, we need to trigger the ultrasonic sensor module to transmit signal by using and then wait to receive ECHO. Arduino reads the time between triggering and received ECHO.
- We know that speed of sound is around 340 m/s. so we can calculate distance by using given formula: Distance= (travel time/2) * speed of sound Where speed of sound is approximately 340m per second. By using this methods, we get distance from sensor to water surface.
- After it we need to calculate water level. Now we need to calculate the total length of water tank. As we know the length of water tank then we can calculate the water level by subtracting resulting distance coming from ultrasonic from total length of tank. And we will get the water level distance. Now we can convert this water level in to the percent of water, and can display it on LCD.

2.5 Pictorial representation :





Sr. No.	Conditions of water level	Motor Status
1	Water level below minimum level	ON
2	Water level equal to or greater than maximum level	OFF
3	Water level in between minimum and maximum levels	Status can be controlled by the user

3.Program(Source code):

* Procedure of Project -
* 1. This project will monitor the water level indicator in tank
* 2. if the water level is full relay will be low and motor will be off even if
* you try to push it On it won't start.
* 3. if water level is half empty half full. you can switch on off motor from blynk app as
* per your requirement.
* 4. if water level of tank is empty then relay will trip automatically and motor will start.

*/

```
#include <Wire.h>
#define BLYNK_PRINT Serial
#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>
char auth[] = "J1AdSZ7qObKXFAEwLO4SlK4QJ4I8dzya";//Enter your Auth token
char ssid[] = "HUAWEI-AD47";//Enter your WIFI name
char pass[] = "MCA_project_water";//Enter your WIFI password

BlynkTimer timer;
bool pinValue = 0;

#define trig D3
#define echo D4
#define relay D5

void setup() {
```

```
  pinMode(trig, OUTPUT);
  pinMode(echo, INPUT);
  pinMode(relay, OUTPUT);
  Wire.begin(D2, D1);
  Serial.begin(115200);
  Serial.print("Connecting to ");
  Serial.println(ssid);
  WiFi.begin(ssid, pass);
  while (WiFi.status() != WL_CONNECTED) {
  delay(500);
  Serial.print(".");
}
  Serial.println("");
  Serial.println("WiFi connected");
  Blynk.begin(auth, ssid, pass);
  timer.setInterval(10L, Wlevel);
  digitalWrite(relay, HIGH);
}
BLYNK_WRITE(V0) {
  pinValue = param.asInt();
}
void loop() {
  Blynk.run();
  timer.run();
}
void Wlevel() {
  if (pinValue == 1) {
    digitalWrite(relay, HIGH);
    Serial.print("Motor is ON ");
  } else if (pinValue == 0) {
```

```
    digitalWrite(relay, LOW);
    Serial.print("Motor is OFF");
  }
  digitalWrite(trig, LOW);
  delayMicroseconds(4);
  digitalWrite(trig, HIGH);
  delayMicroseconds(10);
  digitalWrite(trig, LOW);
  long t = pulseIn(echo, HIGH);
  long cm = t * 0.034 / 2;
  Blynk.virtualWrite(V1, cm);
  Serial.println(cm);
}
```

4.Advantages :

1.Power Saver.

2.Money Saver.

3.Easy installation

4.The automatic water level controller ensures no overflows or dry running of pump there by saves electricity and water.

5.Avoid seepage of roofs and walls due to overflowing tanks.

6.fully automatic, save man power.

5.Cost of the project :

Name if the component	Quantity Required	cost
Node MCU ESP8266	1	360
Ultrasonic sensor	1	160
Relay	1	50
Motor	1	125
9 volt battery	1	20
Connectors	4	20
		Total:- 735rs

6.Applications :

1.It is use to measure underground storage of water.

2.It is use to predict the arrivals of floods.

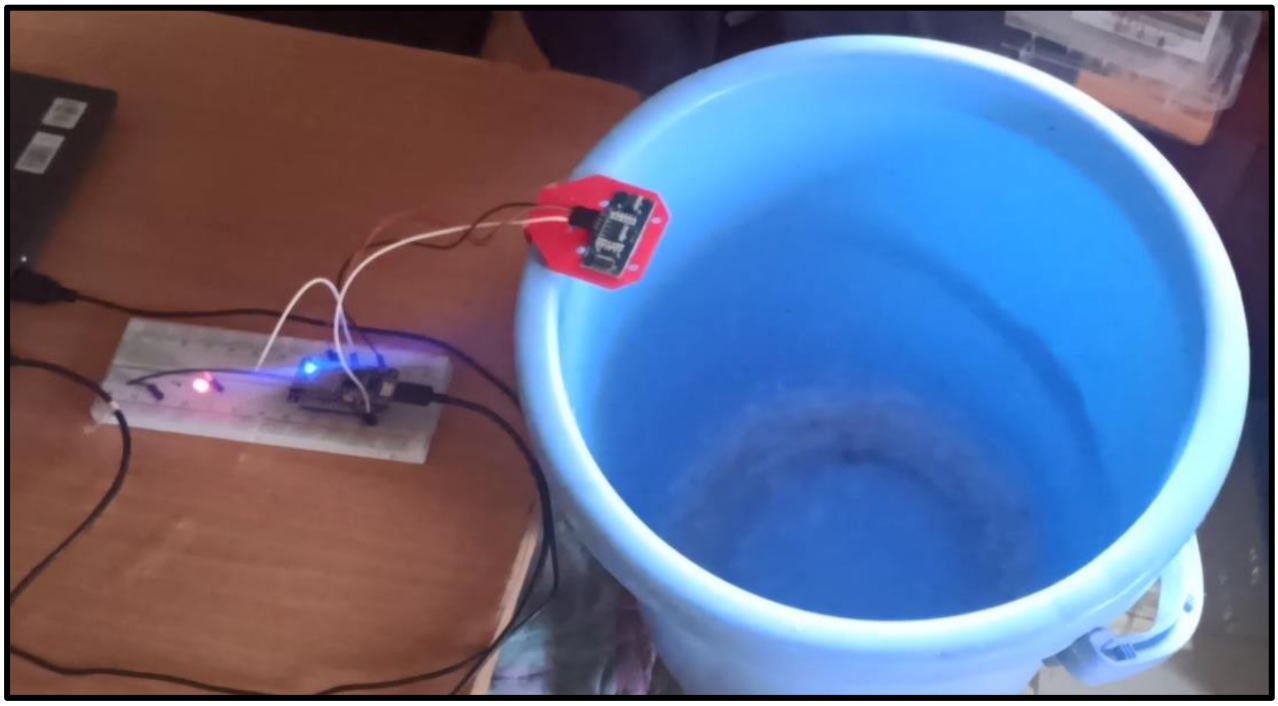
3.It Is use in hostels, factory, home apartments etc.

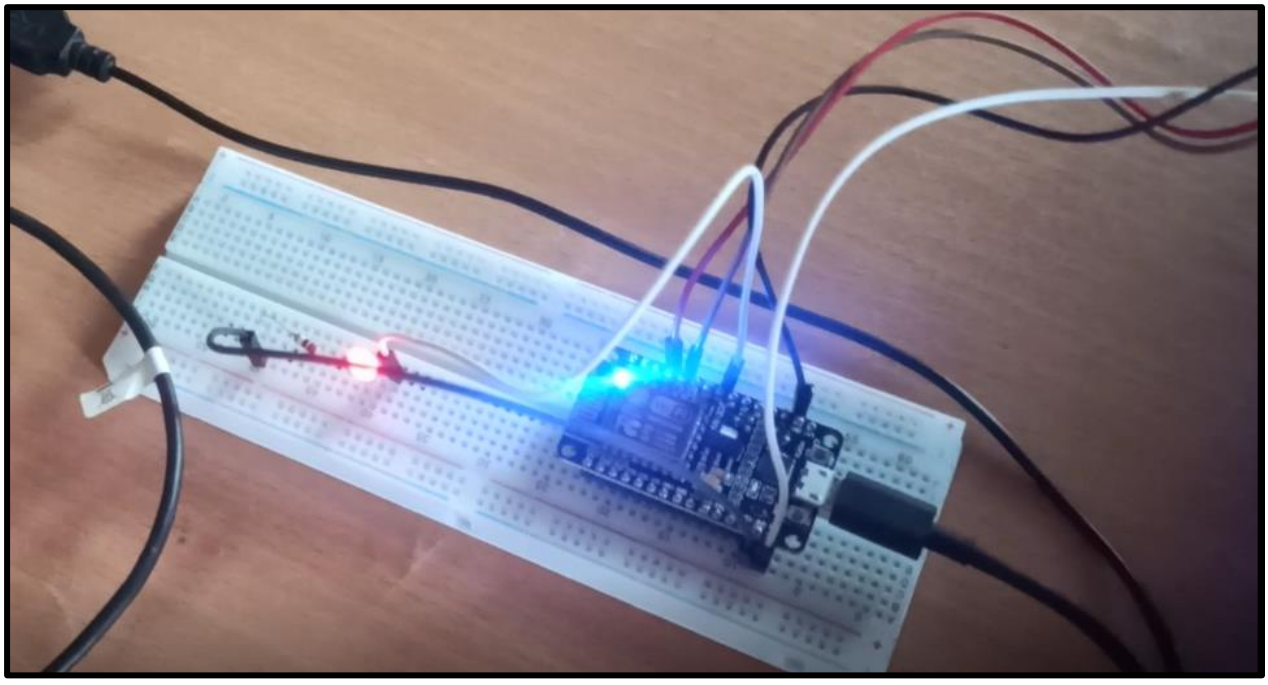
4.Fuel level indicator in vehicles.

7.Future scope :

- The IOT based water kevel indicator for hotels, homes apartments, commercial complexes, drainage, etc.,
- It can be fixed for single phase motor, single phase submersibles,three phase motors. and open well, bore well and sump. Many models available in different ranges.
- Increase in the need of production requires proper supply of water in field this system can provide help to the farmers.

8.Practical photos of final project :





9.Conclusion :

Thus we conductthatthis technologywill definitely to help for people. Save the man power.it is the water level indicator pump control circuit that indicates the different in a particular tank.

A connection runs to underground tank to check the availability of water in tank before operating the pump and the pump operates when there is a water in the under-ground tank with the help of the Blynk app.

10.References :

- http://www.circuitsgallary.com/2012/05/automatic-water-level-controller.html
- http://www.streampowers.blogspot.in/2014/07/intelligent-water-pump-controller-with.html
- http://www.elecircuit.com/simple-automatic-water-level-controller-circuit/

THANK YOU !