SMART WATER FOUNTAINS

Intelligent monitoring is defined as a method which is used to monitor, control, manage and optimize the network by using different computational methods that will provide customers with relevant tools and information .

The internet of things (IoT) forms an important part of intelligent monitoring which connects people and devices using wireless sensor technology. It is a fast growing research area in the military, energy management, healthcare and many more. The concept of IoT was proposed by Kevin Ashton to demonstrate a set of interconnected devices.

IoT makes it possible to transfer information between different electronic devices embedded with new technology. The energy management is possible using energy harvesting mechanisms, which is a method of collecting energy from natural sources such as light, vibration, pressure etc. The combination of technologies such as Wireless sensor network (WSN), Radio frequency identification (RFID), Energy harvesting(EH) and Artificial Intelligence (AI) helps IoT to flourish widely. Water distribution system(WDS) is a very important research area that affects the economic growth of our country.

WDS mainly have two issues, first is the water loss due to leakage and the second is that it is prone to contamination. It is affecting the health and safety of the people. According to the report of world health organization (WHO) in 2017, around 2.1 billion people around the world lack safe drinking water. So there is a need to ensure the water quality and wastage by using Iot to reduce such issue.

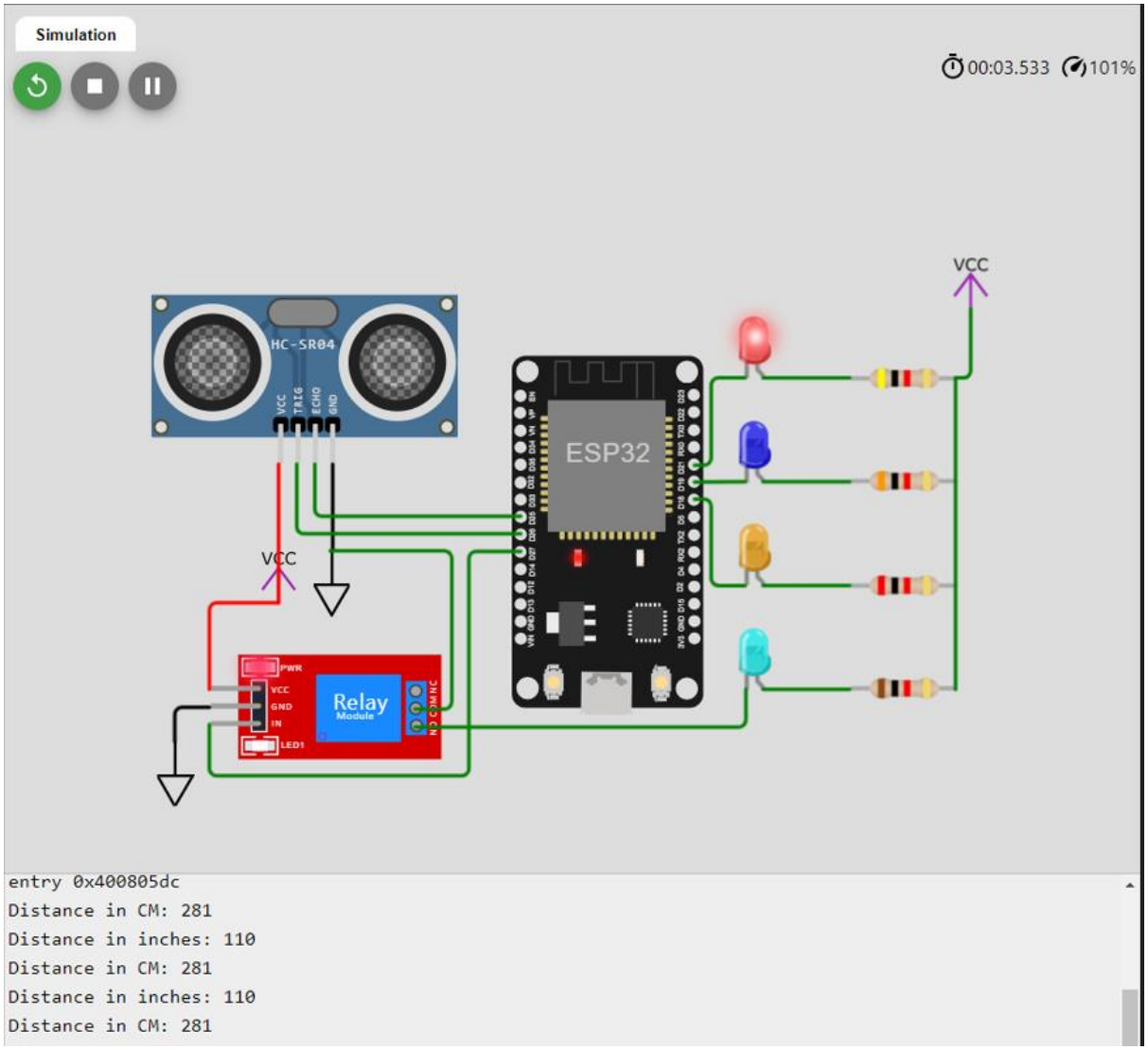
Codes:

```
#define PIN_TRIG 26
#define PIN_ECHO 25
#define LOWLED 18
#define MIDLED 19
#define HIGHLED 21
#define MOTOR 27
unsigned int level = 0;

void setup() {

  pinMode(LOWLED, OUTPUT);
  pinMode(MIDLED, OUTPUT);
  pinMode(HIGHLED, OUTPUT);
  pinMode(MOTOR, OUTPUT);
```

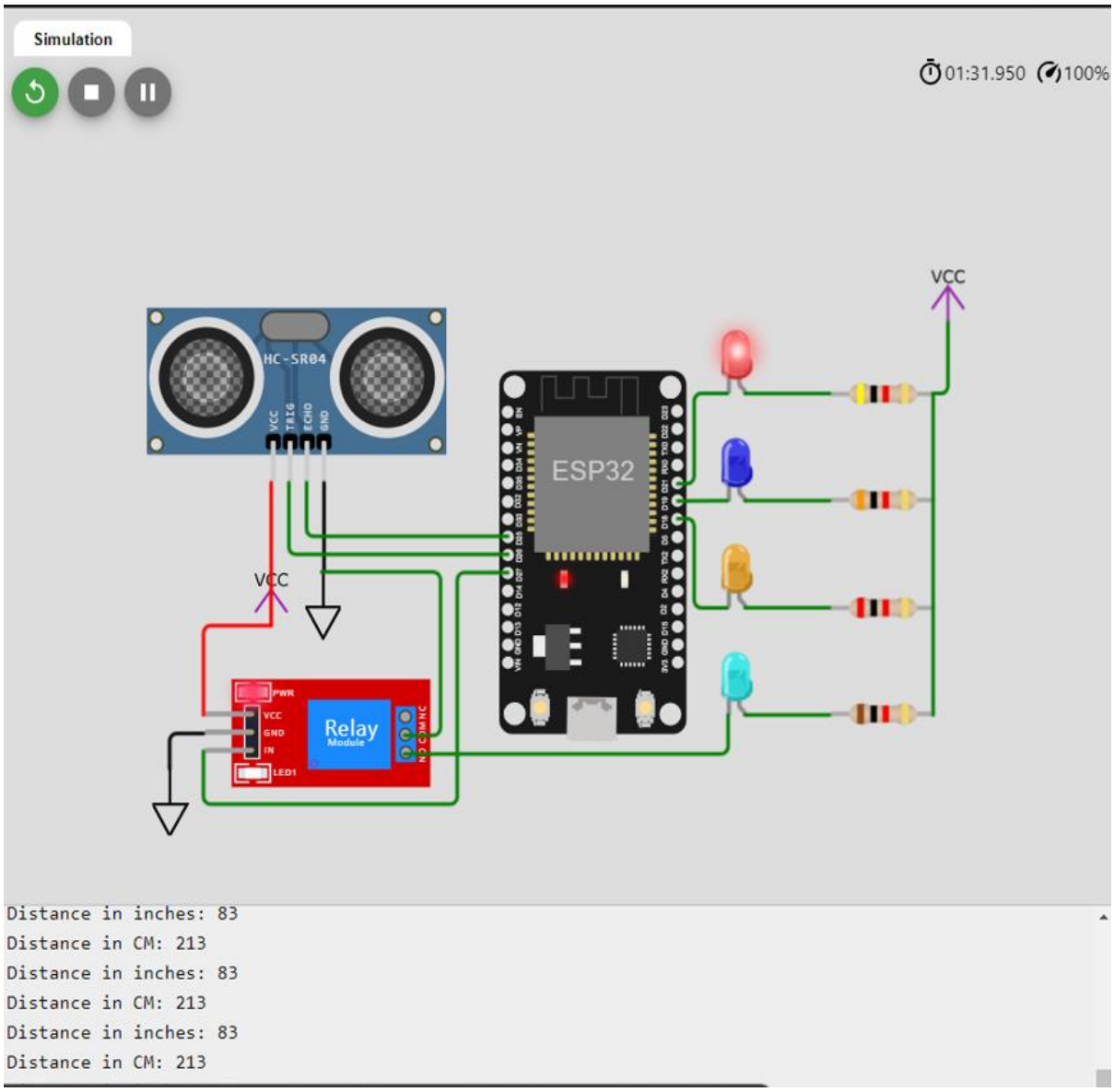
```
  digitalWrite(LOWLED, HIGH);
  digitalWrite(MIDLED, HIGH);
  digitalWrite(HIGHLED, HIGH);
  digitalWrite(MOTOR, LOW);

  Serial.begin(115200);
  pinMode(PIN_TRIG, OUTPUT);
  pinMode(PIN_ECHO, INPUT);
}

void loop() {
  // Start a new measurement:


  digitalWrite(PIN_TRIG, HIGH);
  delayMicroseconds(10);
  digitalWrite(PIN_TRIG, LOW);

  // Read the result:
  int duration = pulseIn(PIN_ECHO, HIGH);
  Serial.print("Distance in CM: ");
  Serial.println(duration / 58);
  Serial.print("Distance in inches: ");
  Serial.println(duration / 148);

  level = (duration / 10);

  if(level < 100)
  {
    digitalWrite(LOWLED, LOW);
    digitalWrite(MOTOR, HIGH);
    digitalWrite(HIGHLED, HIGH);
    digitalWrite(MIDLED, HIGH);
  }

  else if ((level > 200 ) && (level < 400))
  {
    digitalWrite(LOWLED, HIGH);
    digitalWrite(HIGHLED, HIGH);
    digitalWrite(MIDLED, LOW);
  }

  else if (level >= 400 )
  {
    digitalWrite(HIGHLED, LOW);
    digitalWrite(MIDLED, HIGH);
    digitalWrite(LOWLED, HIGH);
```

```
    digitalWrite(MOTOR, LOW);
  }
  delay(1000);
}
```

Output:



Output:


Simulation
01:31.950
100%
VCC
HC-SR04
VCC TRIG ECHO GND
ESP32
VCC
PWR
VCC
GND
IN
LED1
Relay
Module
NC COM NO
Distance in inches: 83
Distance in CM: 213
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Distance in inches: 83
Distance in CM: 213

COMMERCIALLY AVAILABLE WATER QUALITY SENSORS AND THE MEASURING PARAMETER

Sensor	Water quality parameter	Source
Spectro::lyser	Turbidity, temperature, pressure, colour, dissolved ions, UV254	Broeke(2005)[9]
SmartCoast	pH, dissolved oxygen(DO), conductivity, temperature, turbidity, phosphate, water level	O'Flyrm et al., 2007[10]
Kapta 3000 AC4	Chlorine, temperature, pressure, conductivity	Mcdougle et al., 2012[11]
Smart water(Libelium)	pH, dissolved oxygen(DO), conductivity, temperature, oxidation-reduction potential(ORP), turbidit y, dissolved ions	Libelium(2014)[12]
Lab-on-chip	Any specific bio-chemical	Tsopela et al., 2016[13]
I::scan	Colour, turbidity, UV254	S::can(2017)[8]

Harvesting technique	Advantages	Disadvantages
Piezo-electric	High efficiency, easy to design, No need of external voltage source	Small leakage of charge due to polarization
Electromagnetic	Reliable, No need of external voltage source	Size bigger compared to other methods, low voltage load
Thermoelectric	Lightweight, Reliable	Difficult to design due to maintain optimal thermal conduction coefficient, low power generated

Result:

As IoT is growing every day with new technologies involved, new challenges arise. The IoT has encouraged people to connect to devices using the internet and the increase in the use of IoT devices motivated people to use smart technologies.