An IOT Project Report

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TITLE:- IOT LUMOS

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ABSTRCT

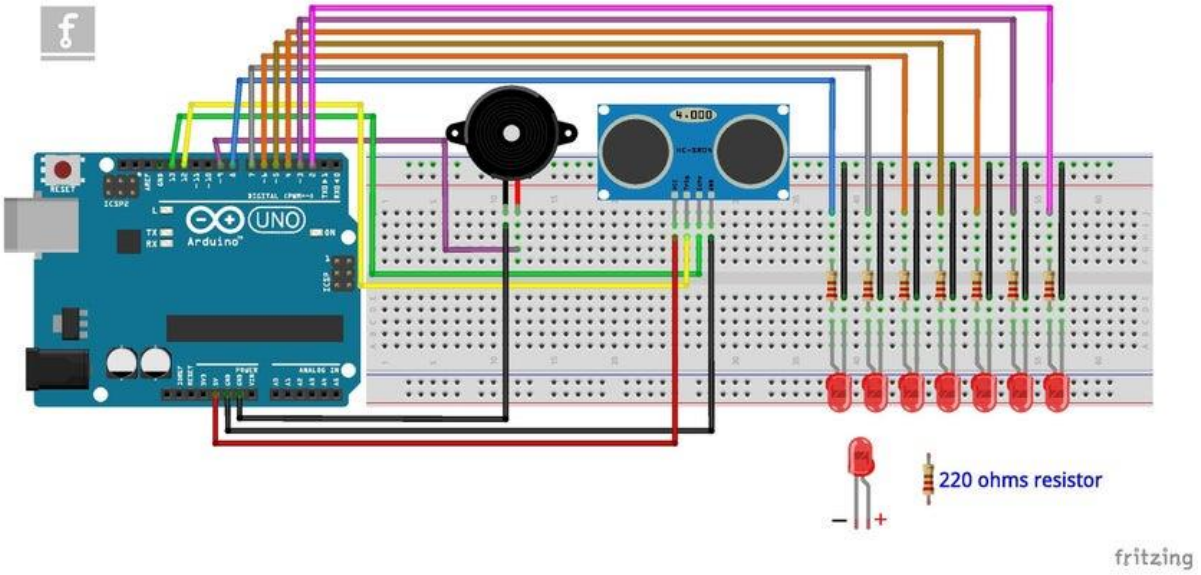
In this project, we suggest a smart street lighting system that makes use of cost- and energy-saving distance sensors. Instead of turning on the street lights continuously, the system is made to only turn them on when someone crosses the road.

The streetlights may be remotely monitored and controlled by to the system's connection to the Internet of Things (IoT). The IoT technology enables the system to deliver real-time data on each streetlight's status, including energy usage, operating status, and maintenance requirements. To improve the system's performance, remote updates and control are possible.

Reduced energy use, cost savings, and increased safety are just a few advantages of implementing this smart street lighting system. The system decreases energy waste, resulting in lower costs for municipalities, by only turning on the streetlights when someone passes by the road. The system also improves safety by making sure that the streets are well-lit when there are people around, which increases visibility for both drivers and pedestrians.

Overall, this idea offers a realistic and economical response to the problem of providing metropolitan areas with energy-efficient lighting. Municipalities aiming to increase the energy efficiency and security of their streets will find the system to be a significant asset because of its capacity to only activate lighting when necessary and its IoT connectivity.

ARCHITECTURE AND CIRCUIT DIAGRAM



Component requirements for arduino distance measurement devices.

Arduino Uno

Ultrasonic sensor Hc-sr04

7 x LEDs

Breadboard

Jumper wire

Connect Ultrasonic sensor (Hc-sr04) pins to arduino Uno pins.

1. Connnect ultrasonic sensor **Trig Pin** to arduino digital **Pin 12.**
2. Connnect ultrasonic sensor **Echo Pin** to arduino digital **Pin 13.**
3. Connnect ultrasonic sensor **VCC Pin** to arduino **5v Pin.**
4. Connnect ultrasonic sensor **GND Pin** to arduino **GND Pin.**

Connect LEDs pins to arduino uno pins.

1. Connnect **LED1(+) Pin** to arduino **Digital Pin 8**.
2. Connnect **LED2(+) Pin** to arduino **Digital Pin 7.**
3. Connnect **LED3(+) Pin** to arduino **Digital Pin 6.**
4. Connnect **LED4(+) Pin** to arduino **Digital Pin 5.**
5. Connnect **LED5(+) Pin** to arduino **Digital Pin 4.**
6. Connnect **LED6(+) Pin** to arduino **Digital Pin 3.**
7. Connnect **LED7(+) Pin** to arduino **Digital Pin 2.**
8. Connnect all **LED Negative Terminal (-)** to arduino **GND Pin.**

EXPLANATION

The Internet of Things (IoT) is a popular technology in recent years due to its ability to connect devices and machines to the internet, allowing them to communicate and exchange data. This has resulted in the creation of numerous innovative IoT-based projects, such as smart street lighting systems.
In this project, we propose an IoT-based street lighting system that detects the presence of people on the road using distance sensors. The system is designed to turn on the street lights only when someone walks by and turn them off after a predetermined amount of time, saving energy and money.

The system is made up of a network of streetlights, each of which has a distance sensor. These sensors detect the presence of objects in the surrounding area, such as people and vehicles. The distance sensor sends a signal to an arduino uno when a person approaches the streetlight. The arduino uno receives the signal and instructs the streetlight to turn on. The streetlight remains on until the person has passed, at which point it turns off automatically.
One of the main advantages of this system is that it saves energy by only turning on the streetlights when they are needed. Traditional street lighting systems keep the lights on even when no one is on the road, resulting in significant energy waste. This system significantly reduces energy consumption, resulting in cost savings for municipalities.

In conclusion, the IoT-based street lighting system with distance sensors is an innovative and effective solution for providing energy-efficient lighting in urban areas. The system's ability to activate streetlights only when necessary, as well as its IoT connectivity, make it a valuable asset for municipalities looking to improve the energy efficiency and safety of their streets.

Code

```
const int trig = 12;
const int echo = 13;

const int LED1 = 8;
const int LED2 = 7;
const int LED3 = 6;
const int LED4 = 5;
const int LED5 = 4;
const int LED6 = 3;
const int LED7 = 2;

int duration = 0;
int distance = 0;

void setup()
{
  pinMode(trig , OUTPUT);
  pinMode(echo , INPUT);

  pinMode(LED1 , OUTPUT);
  pinMode(LED2 , OUTPUT);
  pinMode(LED3 , OUTPUT);
  pinMode(LED4 , OUTPUT);
  pinMode(LED5 , OUTPUT);
  pinMode(LED6 , OUTPUT);
  pinMode(LED7 , OUTPUT);

  Serial.begin(9600);
}

void loop()
{
  digitalWrite(trig , HIGH);
  delayMicroseconds(1000);
  digitalWrite(trig , LOW);

  duration = pulseIn(echo , HIGH);
  distance = (duration/2) / 28.5 ;
  Serial.println(distance);

  if ( distance <= 5 )
  {
    digitalWrite(LED1, HIGH);
    digitalWrite(LED2, LOW);
    digitalWrite(LED3, LOW);
    digitalWrite(LED4, LOW);
    digitalWrite(LED5, LOW);
```

```
  digitalWrite(LED6, LOW);
  digitalWrite(LED7, LOW);
}
else if ( distance <= 10 )
{
  digitalWrite(LED1, LOW);
  digitalWrite(LED2, HIGH);
  digitalWrite(LED3, LOW);
  digitalWrite(LED4, LOW);
  digitalWrite(LED5, LOW);
  digitalWrite(LED6, LOW);
  digitalWrite(LED7, LOW);
}
else if ( distance <= 15 )
{
  digitalWrite(LED1, LOW);
  digitalWrite(LED2, LOW);
  digitalWrite(LED3, HIGH);
  digitalWrite(LED4, LOW);
  digitalWrite(LED5, LOW);
  digitalWrite(LED6, LOW);
  digitalWrite(LED7, LOW);
}
 else if ( distance <= 20 )
{
  digitalWrite(LED1, LOW);
  digitalWrite(LED2, LOW);
  digitalWrite(LED3, LOW);
  digitalWrite(LED4, HIGH);
  digitalWrite(LED5, LOW);
  digitalWrite(LED6, LOW);
  digitalWrite(LED7, LOW);
}
else if ( distance <= 25 )
{
  digitalWrite(LED1, LOW);
  digitalWrite(LED2, LOW);
  digitalWrite(LED3, LOW);
  digitalWrite(LED4, LOW);
  digitalWrite(LED5, HIGH);
  digitalWrite(LED6, LOW);
  digitalWrite(LED7, LOW);
}
else if ( distance <= 30 )
{
  digitalWrite(LED1, LOW);
  digitalWrite(LED2, LOW);
  digitalWrite(LED3, LOW);
```

```
    digitalWrite(LED4, LOW);
    digitalWrite(LED5, LOW);
    digitalWrite(LED6, HIGH);
    digitalWrite(LED7, LOW);
  }
  else if ( distance <= 35 )
  {
    digitalWrite(LED1, LOW);
    digitalWrite(LED2, LOW);
    digitalWrite(LED3, LOW);
    digitalWrite(LED4, LOW);
    digitalWrite(LED5, LOW);
    digitalWrite(LED6, LOW);
    digitalWrite(LED7, HIGH);
  }
  else if ( distance > 35 )
  {
    digitalWrite(LED1, LOW);
    digitalWrite(LED2, LOW);
    digitalWrite(LED3, LOW);
    digitalWrite(LED4, LOW);
    digitalWrite(LED5, LOW);
    digitalWrite(LED6, LOW);
    digitalWrite(LED7, LOW);
  }
}
```

SOCIAL APPLICATION EXPOSURE

The Internet of Things project for street lights that uses distance sensors has a large social application exposure. It addresses a number of social and environmental issues concerning energy consumption, safety, and sustainability.

To begin, the project intends to reduce energy consumption and promote energy efficiency by only turning on street lights when necessary. This reduces overall energy consumption, which not only saves money but also helps to reduce carbon emissions. This is a critical first step in promoting sustainability and combating climate change.

Second, the project addresses concerns about safety on poorly lit streets. It ensures that the streets are only well-lit when people are present, improving visibility for pedestrians and drivers and potentially reducing accidents and improving road safety.

Third, the project has the potential to benefit the community by lowering the costs associated with street lighting. Reduced energy consumption can result in cost savings for municipalities, which can be directed towards other essential services or community infrastructure projects.

Furthermore, the Internet of Things technology used in this project allows for remote monitoring and control of the street lights, allowing for real-time data on the status of each street light, including energy usage, operational status, and maintenance requirements. This can assist municipalities in optimising their street lighting systems and ensuring timely maintenance, thereby improving the system's overall efficiency and effectiveness.

Finally, the IoT project for street lights that uses distance sensors has a large social application exposure. It addresses a number of social and environmental issues concerning energy consumption, safety, and sustainability. It has the potential to improve people's lives in the community by providing energy-efficient, safe, and sustainable street lighting.

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