
Smart Parking
IoT-Based
Smart Parking
System Development
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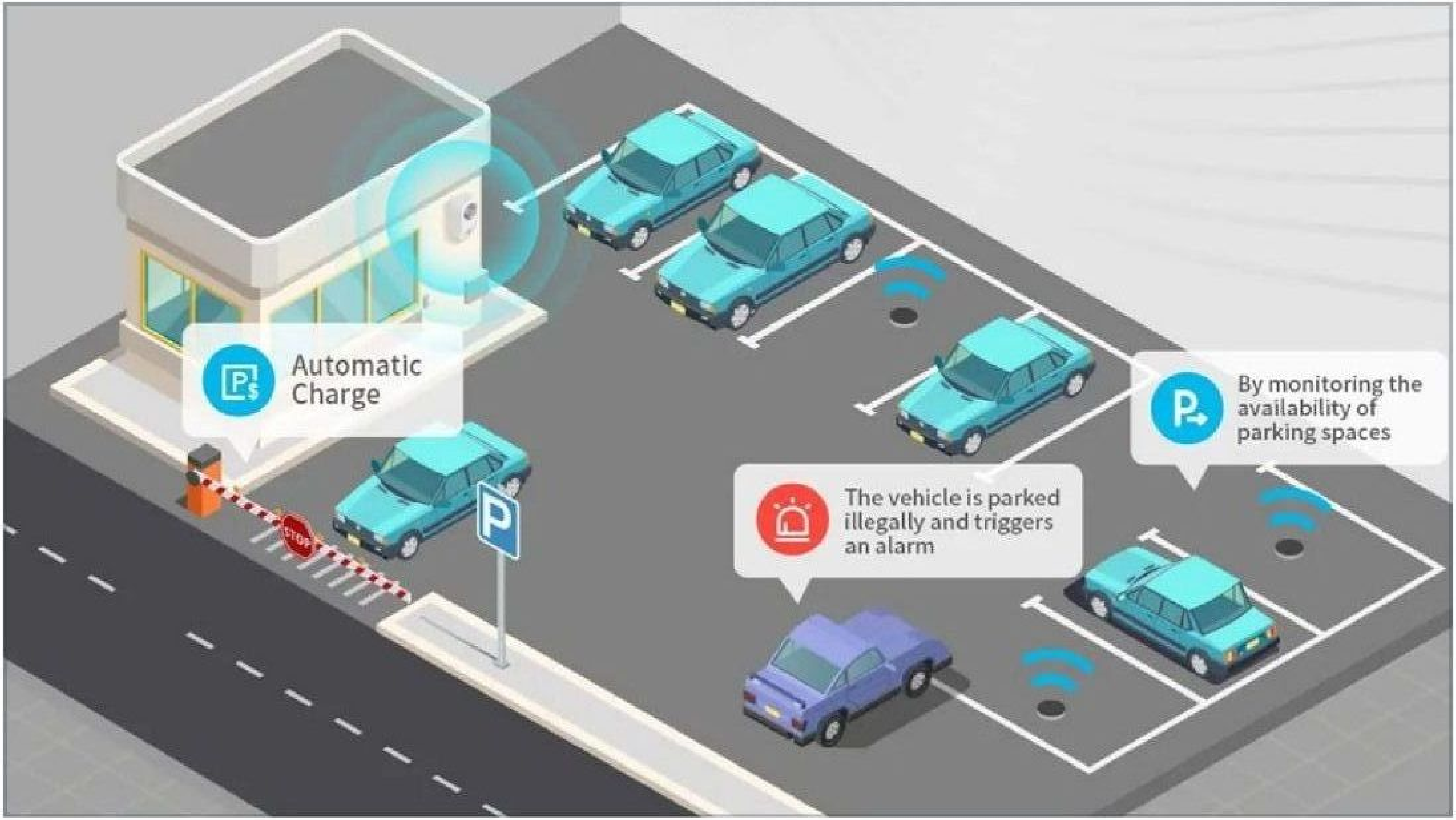
Dhanish


Automatic Charge
STOP
P
By monitoring the availability of parking spaces
The vehicle is parked illegally and triggers an alarm

Hint

Meaning of Smart Parking

How Smart Parking Works

Smart Parking Components

Ciruit Diagram

Advantages

Effective Time Management

What Is an Iot Based Parking System?

- *An IoT based smart parking system, also known as a connected parking system, is a centralized management system that allows drivers to use a smartphone app to search for and reserve a parking spot.*
- *The system's hardware features sensors that detect available parking slots and communicate this information to all drivers in the area.*

This data is updated in real-time, which means drivers never have to worry about not finding an available space.

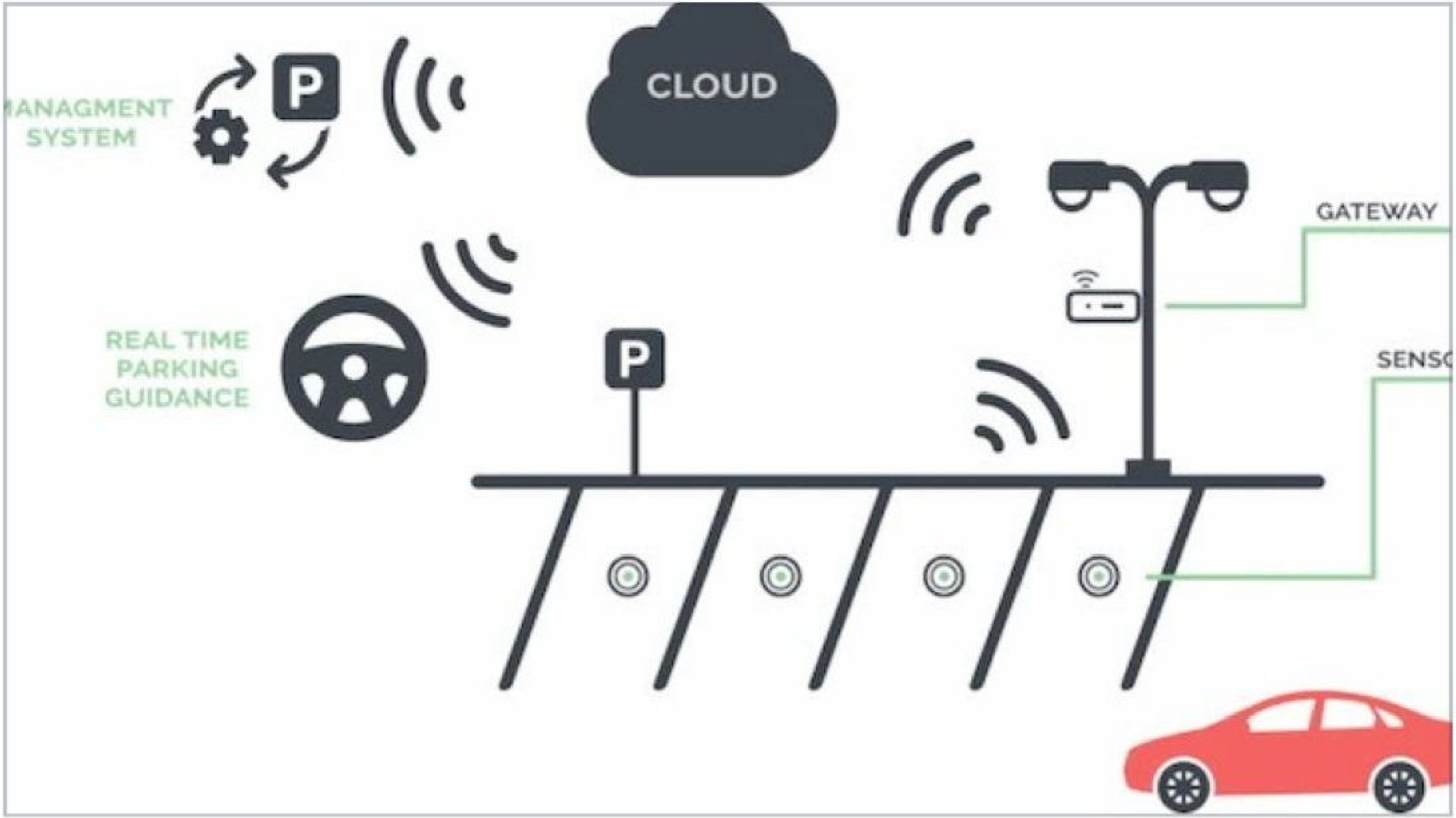
HOW DOES IT SMART PARKING WORKS ?

- Parking systems are installed on the outside of buildings or inside of buildings. When a vehicle enters the space, sensors detect its presence and calculate available parking slots. This information is then sent to the driver's phone via an app
- The smart parking system also has real-time data on occupancy rates, which can be found on the app. This data is collected from each sensor and is updated every five minutes.

What components involved in the smart parking system using IoT?

- A sensor that can detect the presence of the vehicle.
- A micro control that can help you processing the data.
- A cloud platform will restore the data.

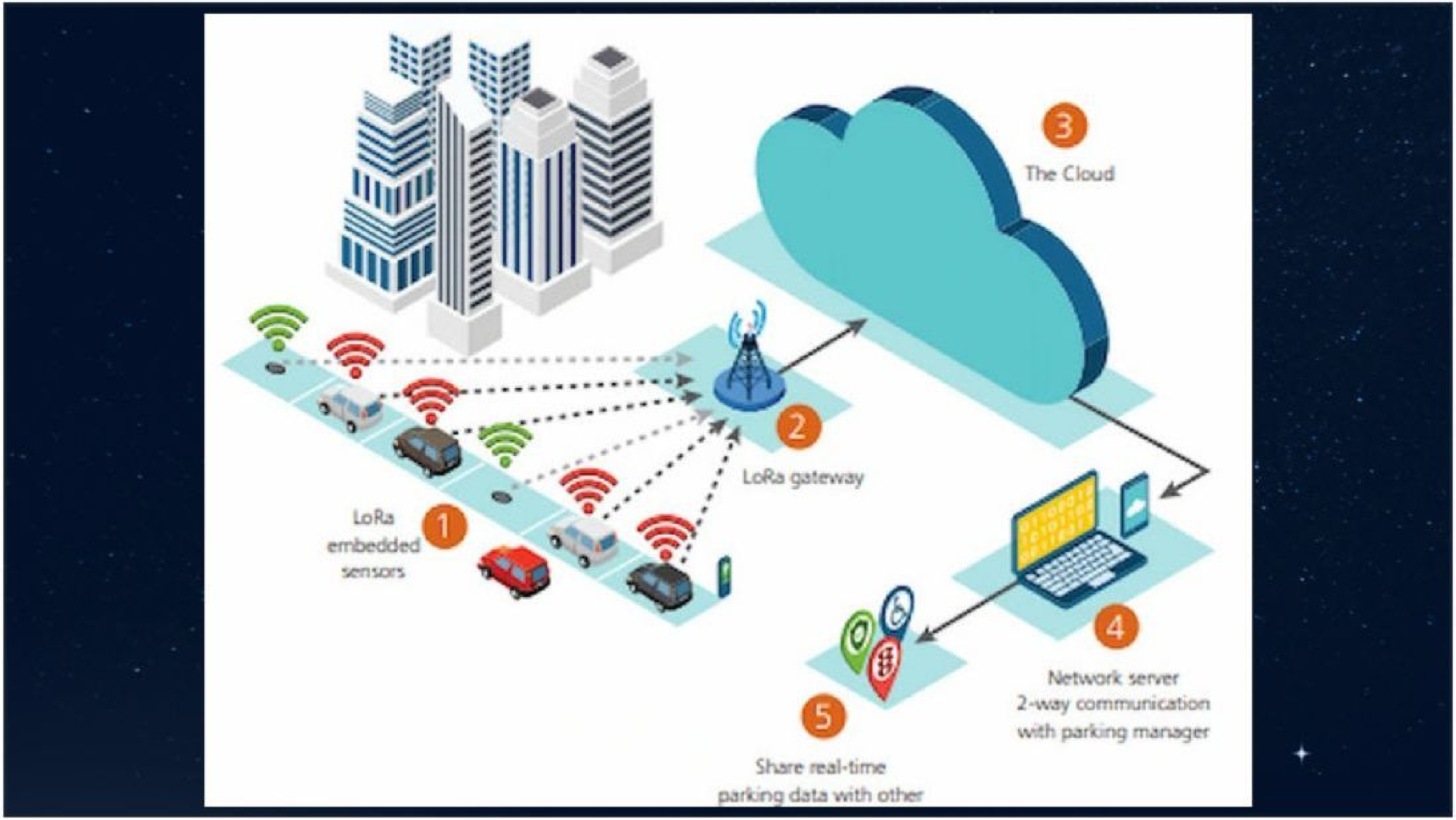
A mobile application enables you to control the smart parking process



MANAGMENT
SYSTEM
CLOUD
GATEWAY
REAL TIME
PARKING
GUIDANCE
SENSO

The Operating Principle of Smart Parking

- To detect parked cars in a specific parking lot, an IoT device can use engineering technology to identify their presence and occupancy. This enables a smart parking system to provide searching, navigation, and reservation of parking lots.

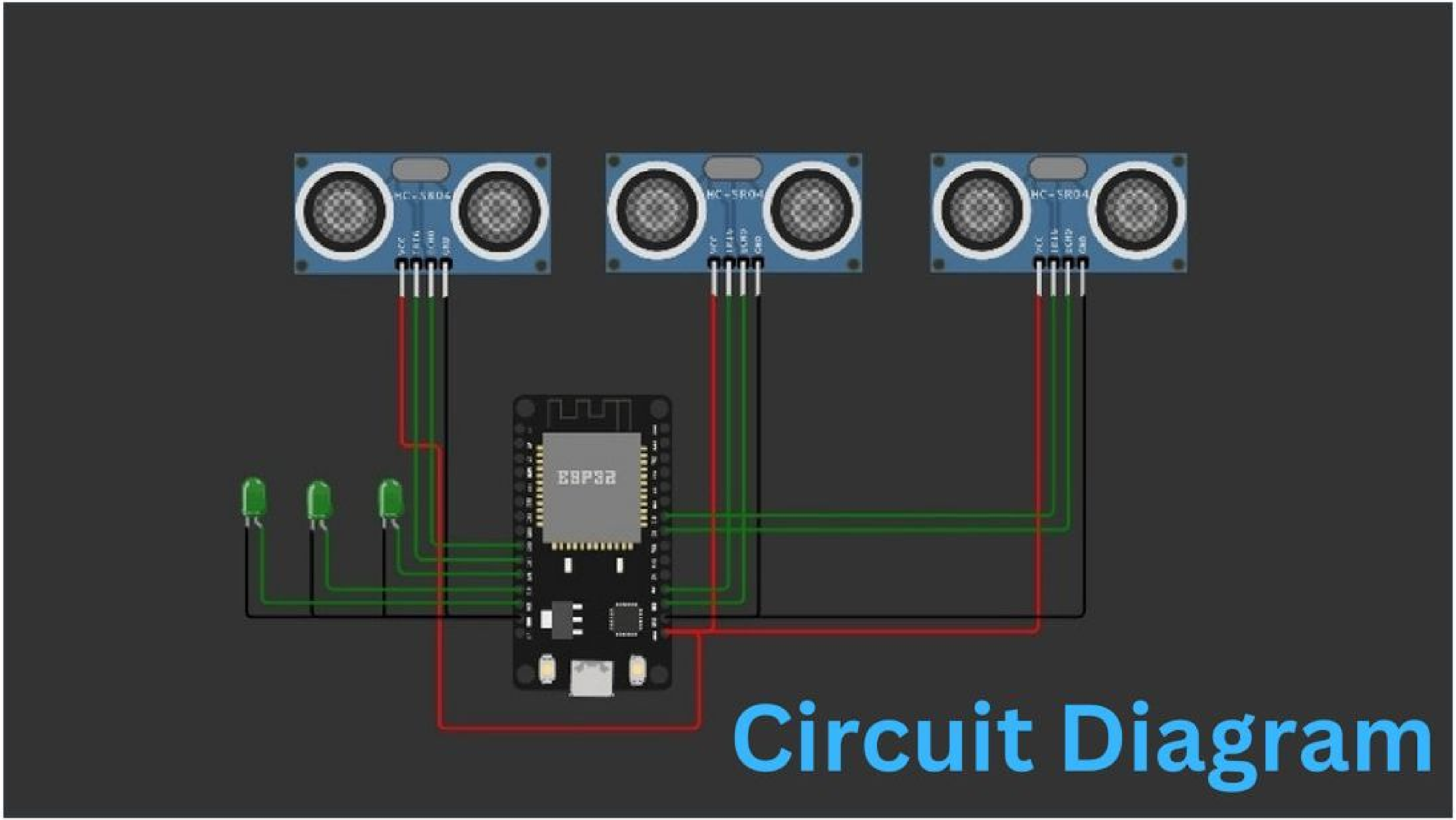

3
The Cloud
2
LoRa gateway
LoRa
embedded
sensors
1
4
Network server
2-way communication
with parking manager
5
Share real-time
parking data with other

Parking spaces have occupancy sensors that detect the presence, absence, arrival, and departure of vehicles, powered by batteries.

An occupation sensor detects vehicle activity and sends a short message package via an embedded LoRa receiver to any wireless network gateway within its range.

LoRaWAN enables two-way communication, enabling parking lot administrators to request data from sensors.

PIN's parking cloud service shares real-time parking data with other smart city services for municipal and district governments. It uses information from various city infrastructure to provide unique applications, including remote parking enforcement.


HC-SR04
HC-SR04
HC-SR04
Circuit Diagram

Advantages of IoT-based Smart Parking Systems

Optimizing Parking Space

Provide electric vehicle charging stations.

Locate Emergency Vehicle Zones.

Special permit for loading and unloading, taxis, and more.

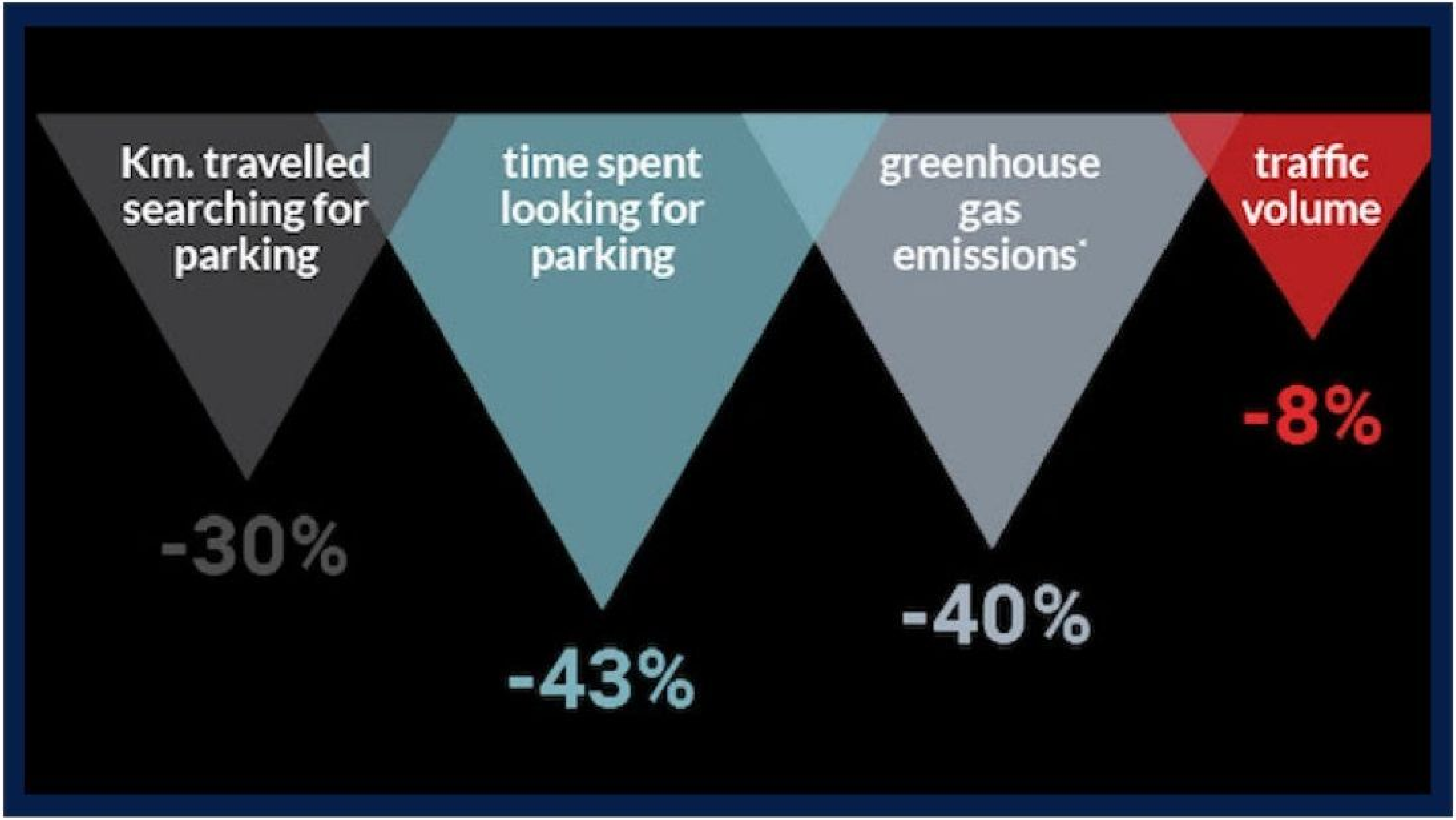
Smart Parking solution can reduce

Traffic volume: -8%

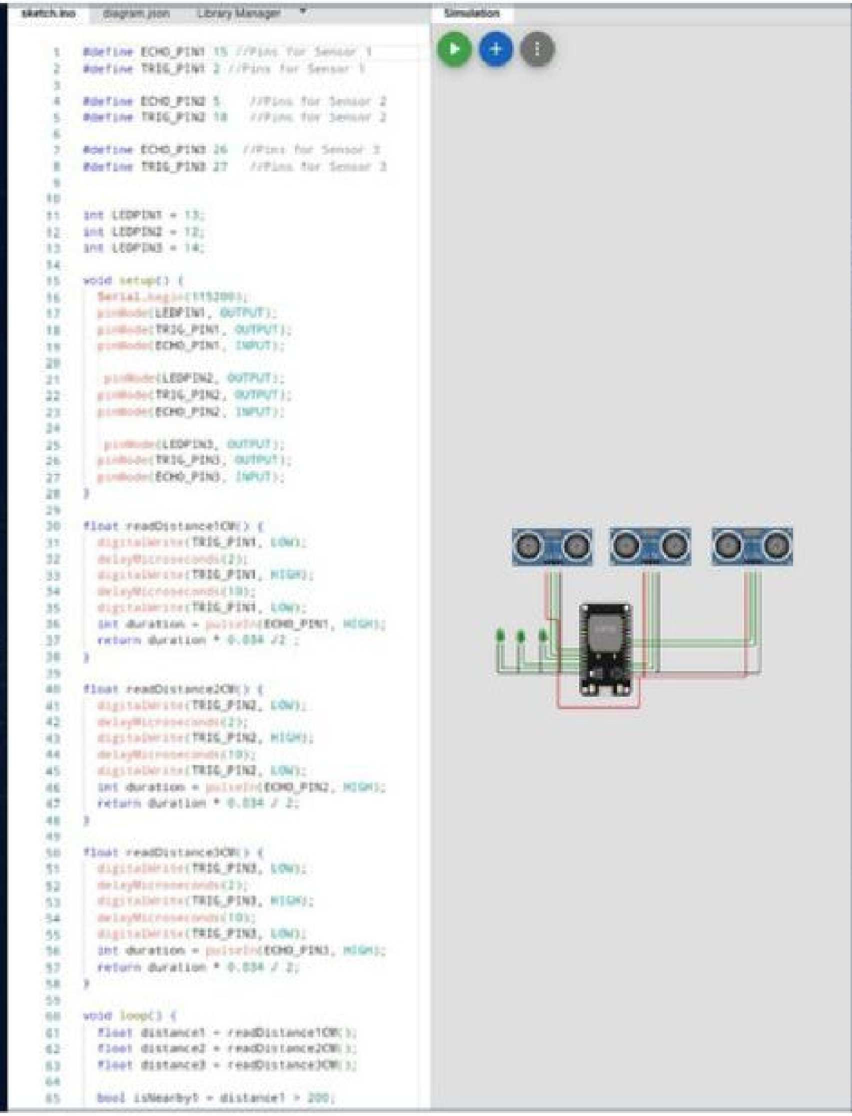
Gas Emission:-40%

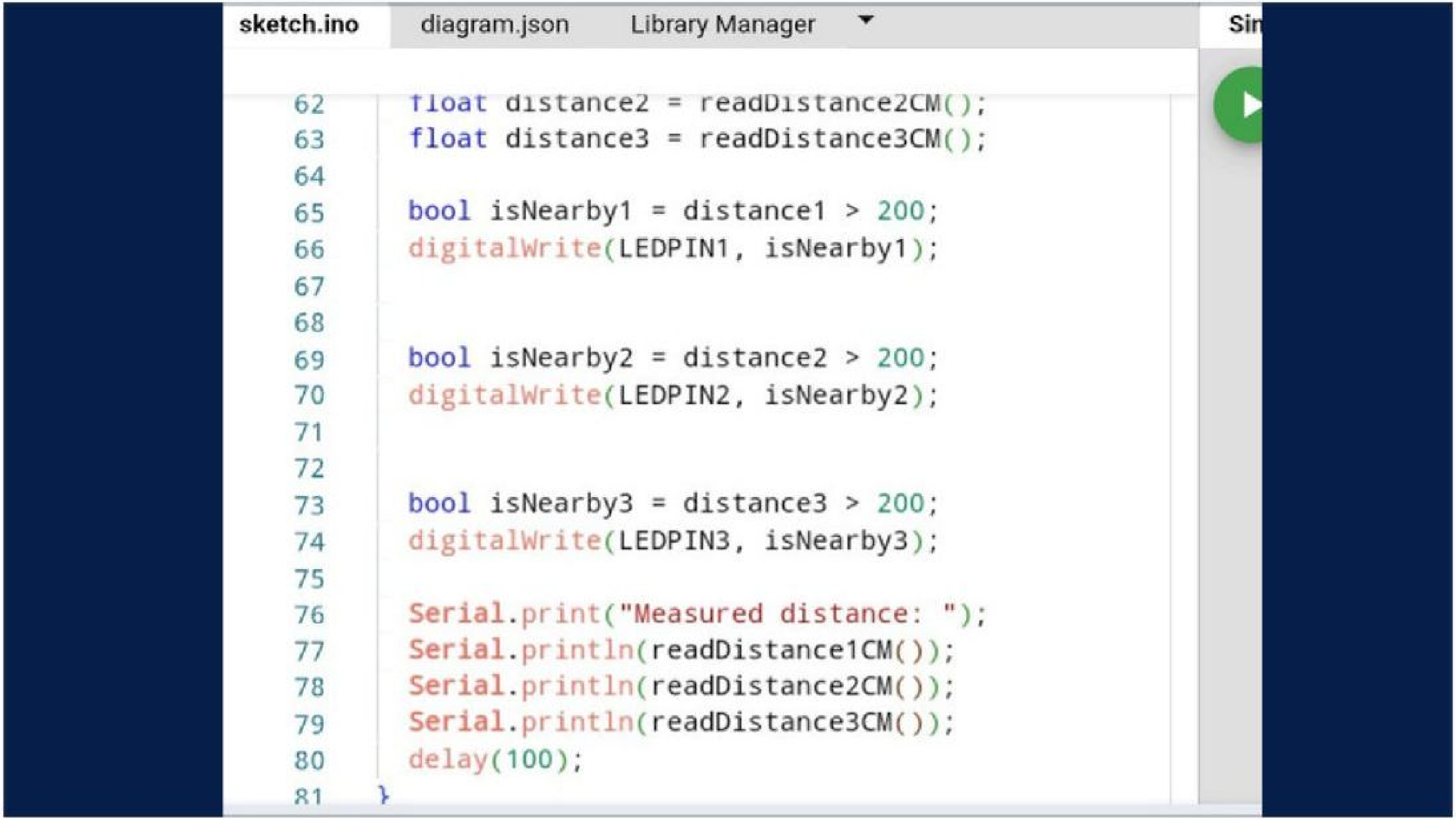
Km Travelled:-30%

Time speed:-43%


Km. travelled searching for parking
-30%
time spent looking for parking
-43%
greenhouse gas emissions*
-40%
traffic volume
-8%

Code for Smart Parking






```
  float distance2 = readDistance2CM();
  float distance3 = readDistance3CM();

  bool isNearby1 = distance1 > 200;
  digitalWrite(LEDPIN1, isNearby1);


  bool isNearby2 = distance2 > 200;
  digitalWrite(LEDPIN2, isNearby2);


  bool isNearby3 = distance3 > 200;
  digitalWrite(LEDPIN3, isNearby3);

  Serial.print("Measured distance: ");
  Serial.println(readDistance1CM());
  Serial.println(readDistance2CM());
  Serial.println(readDistance3CM());
  delay(100);
}
```

sketch.ino diagram.json Library Manager

Simul


```json
{
  "version": 1,
  "author": "Surya K",
  "editor": "wokwi",
  "parts": [
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      "left": -245.43,
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    },
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      "id": "led2",
      "top": 217.94,
      "left": -202.14,
      "attrs": { "color": "green" }
    },
    {
      "type": "wokwi-led",
      "id": "led3",
      "top": 216.99,
      "left": -154.69,
      "attrs": { "color": "green" }
    }
  ],
  "connections": [
    [ "esp:TX0", "$serialMonitor:RX", "", [] ],
    [ "esp:RX0", "$serialMonitor:TX", "", [] ],
    [ "ultrasonic1:VCC", "esp:3V3", "red", [ "v0" ] ],
    [ "ultrasonic1:GND", "esp:GND.1", "black", [ "v0" ] ],
    [ "ultrasonic2:VCC", "esp:3V3", "red", [ "v0" ] ],
    [
      "ultrasonic3:VCC",
      "esp:3V3",
      "red",
      [ "v97.89", "h25.31", "v186.97", "h171.78", "v-63.59" ]
    ],
    [ "ultrasonic3:GND", "esp:GND.2", "black", [ "v0" ] ],
    [ "led1:C", "esp:GND.2", "black", [ "v0" ] ],
    [ "led2:C", "esp:GND.2", "black", [ "v0" ] ],
    [ "led3:C", "esp:GND.2", "black", [ "v0" ] ],
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    [ "led2:A", "esp:D12", "green", [ "v0" ] ],
    [ "led3:A", "esp:D14", "green", [ "v0" ] ],
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    [ "ultrasonic3:ECHO", "esp:D26", "green", [ "v0" ] ],
    [ "ultrasonic2:GND", "esp:GND.1", "black", [ "v0" ] ],
    [ "ultrasonic2:ECHO", "esp:D15", "green", [ "v0" ] ],
    [ "ultrasonic2:TRIG", "esp:D2", "green", [ "v0" ] ],
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  ],
  "dependencies": {}
}
```

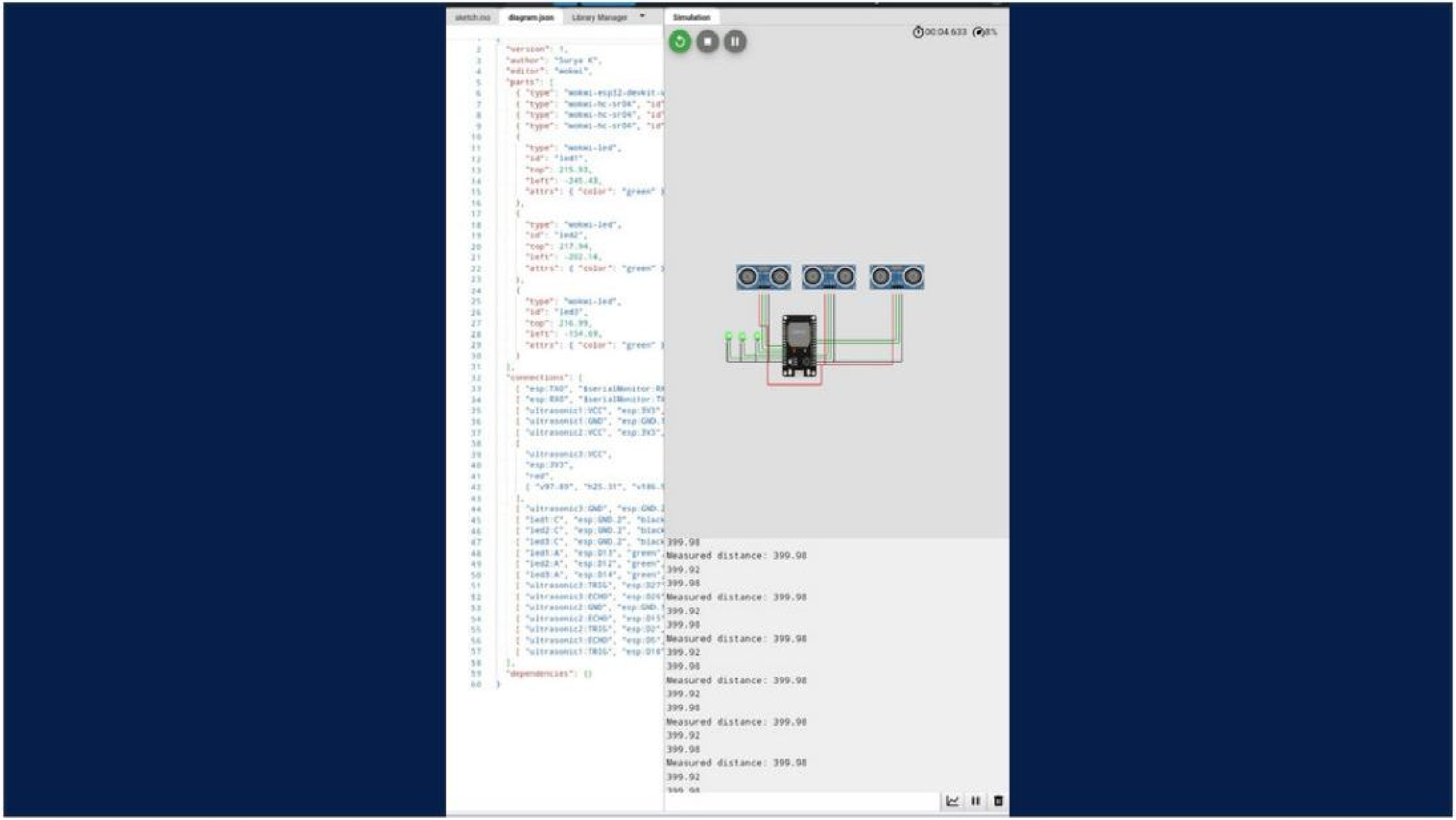
Simulation
399.98
Measured distance: 399.98
399.92
399.98
Measured distance: 399.98
399.92
399.98
Measured distance: 399.98
399.92
399.98
Measured distance: 399.98
399.92
399.98
Measured distance: 399.98
399.92
399.98
Measured distance: 399.98
399.92

Thank You