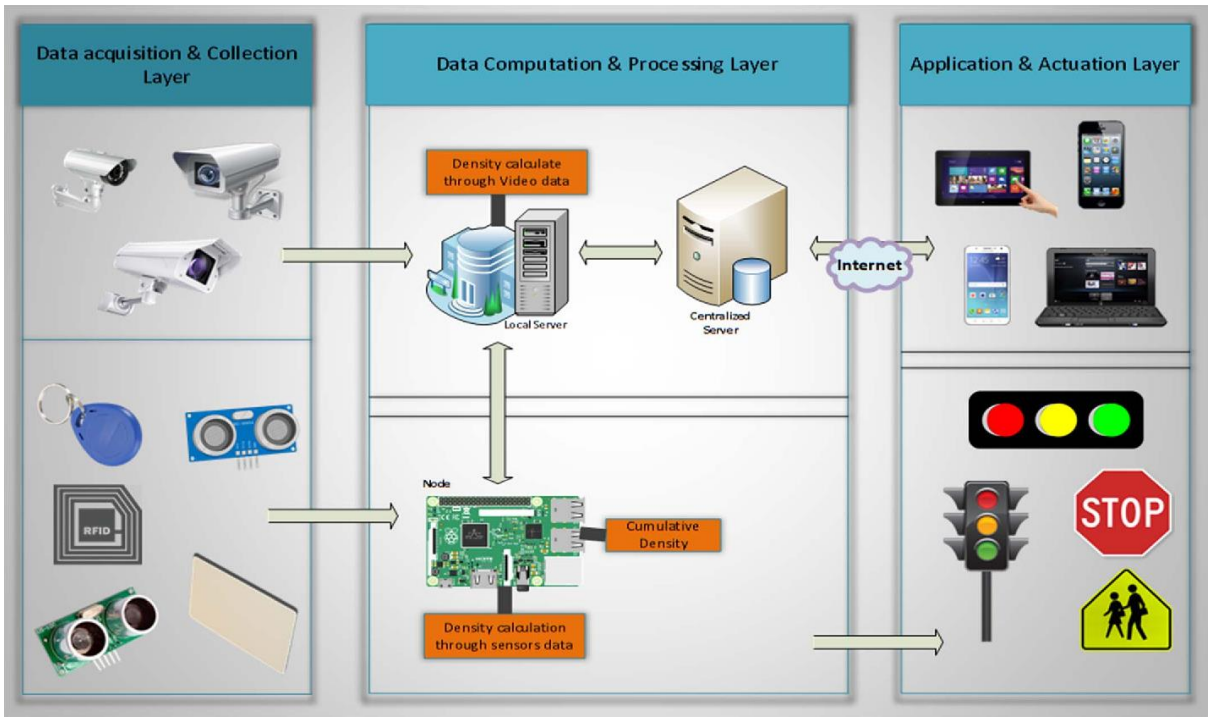
TRAFFIC MANAGEMENT SYSTEM USING IOT

TEAM MEMBER

821721106013 : A.CHANDRIKA

Phase-4 submission document Project

Title: Designing an IoT Traffic Management System can be quite complex and involves multiple subtopics, including hardware, software, and networking components



1.Traffic Sensing and Data Collection:

Subtopic: Using sensors to collect traffic data.

Code Example (Python with Raspberry Pi and Ultrasonic Sensor):

CODE:

```
import RPi.GPIO as GPIO
import time
GPIO.setmode(GPIO.BCM)
TRIG = 23
ECHO = 24
GPIO.setup(TRIG, GPIO.OUT)
GPIO.setup(ECHO, GPIO.IN)
GPIO.output(TRIG, False)
print("Waiting for sensor to settle")
time.sleep(2)
GPIO.output(TRIG, True)
time.sleep(0.00001)
GPIO.output(TRIG, False)
while GPIO.input(ECHO) == 0:
   pulse_start = time.time()
while GPIO.input(ECHO) == 1:
   pulse_end = time.time()
pulse_duration = pulse_end - pulse_start
distance = pulse_duration * 17150
print(f"Distance: {distance} cm")
GPIO.cleanup()
```

2.Data Processing and Analysis:

Subtopic: Analyzing traffic data to make decisions.

Code Example (Python with Pandas and NumPy)

CODE:

```
import pandas as pd
import numpy as np
```

```
# Load data from sensors into a DataFrame
traffic_data = pd.read_csv('traffic_data.csv')
# Analyze data
average_speed = np.mean(traffic_data['speed'])
traffic_density = len(traffic_data) / total_area
if average_speed < 40 and traffic_density > 0.7:
    # Implement traffic control measures
    control_traffic_lights()
# Define control functions
def control_traffic_lights():
    # Code to control traffic lights
    pass
```

3:Communication and Connectivity:

Subtopic: Setting up IoT communication between devices.

Code Example (MQTT with Python):

CODE:

```
import paho.mqtt.client as mqtt
def on_connect(client, userdata, flags, rc):
    print(f"Connected with Code: {rc}")
    client.subscribe("traffic_control")
def on_message(client, userdata, msg):
    # Process incoming messages
    message = msg.payload.decode()
    if message == "stop_traffic":
        control_traffic_lights("red")
client = mqtt.Client()
client.on_connect = on_connect
```

```
client.on_message = on_message
client.connect("broker.example.com", 1883, 60)
client.loop_forever()
```

4:Traffic Control:

Subtopic: Implementing traffic control measures.

Code Example (Python):

CODE:

```
def control_traffic_lights(status):
    if status == "red":
        # Code to turn on red traffic lights
        pass
    elif status == "green":
        # Code to turn on green traffic lights
        pass
```

5:User Interface (Web/Mobile App):

Subtopic: Creating a user interface for monitoring and control.

Code Example (HTML/CSS/JavaScript):

CODE:

```
<!DOCTYPE html>
<html>
<head>
    <title>Traffic Management System</title>
</head>
<body>
```

```
    <h1>Traffic Control Dashboard</h1>
    <button id="stopTrafficButton" onclick="stopTraffic()">Stop Traffic</button>
    <script>
        function stopTraffic() {
            // Code to send MQTT message to stop traffic
        }
    </script>
</body>
</html>
```