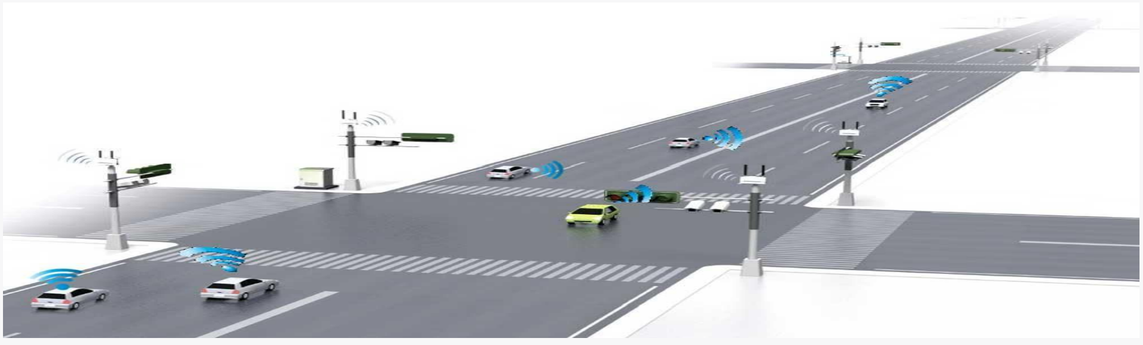
TRAFFIC MANAGEMENT SYSTEM USING IOT



Project: Traffic management system

INTRODUCTION:

A traffic management system implemented with IoT (Internet of Things) harnesses interconnected devices and sensors to oversee, assess, and enhance traffic flow and safety on roadways and highways. IoT technologies facilitate real-time data gathering, analysis, and intelligent decision-making to improve traffic efficiency, reduce congestion, enhance safety, and mitigate environmental impact. This comprehensive system integrates various elements, such as sensors, communication devices, data processing systems, and control mechanisms, to establish an intelligent and efficient traffic ecosystem.

The primary goal is to empower commuters with valuable information for route selection while mitigating traffic congestion. The project encompasses goal definition, the design of an IoT traffic monitoring system, the development of a traffic information platform, and their integration using IoT technology and the Python programming language.

Key Components:

Radio signal detector

Radio waves transmitter

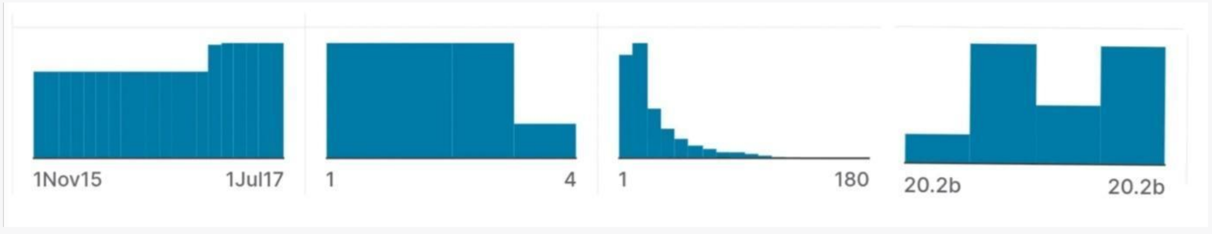
Ultrasonic sensor/Hall Effect sensor

Raspberry Pi

Python programming

Light Emitting Diode

Given dataset:



DateTime	Junction	Vehicles
01-11-2015 00:00	1	15
01-11-2015 01:00	1	13
01-11-2015 02:00	1	10
01-11-2015 03:00	1	7
01-11-2015 04:00	1	9
01-11-2015 05:00	1	6
01-11-2015 06:00	1	9
01-11-2015 07:00	1	8
01-11-2015 08:00	1	11
01-11-2015 09:00	1	12
01-11-2015 10:00	1	15
01-11-2015 11:00	1	17
01-11-2015 12:00	1	16
01-11-2015 13:00	1	15
01-11-2015 14:00	1	16
01-11-2015 15:00	1	12

01-11-2015 16:00	1	12
01-11-2015 17:00	1	16
01-11-2015 18:00	1	17
01-11-2015 19:00	1	20
01-11-2015 20:00	1	17
01-11-2015 21:00	1	19
01-11-2015 22:00	1	20
01-11-2015 23:00	1	15
02-11-2015 00:00	1	14

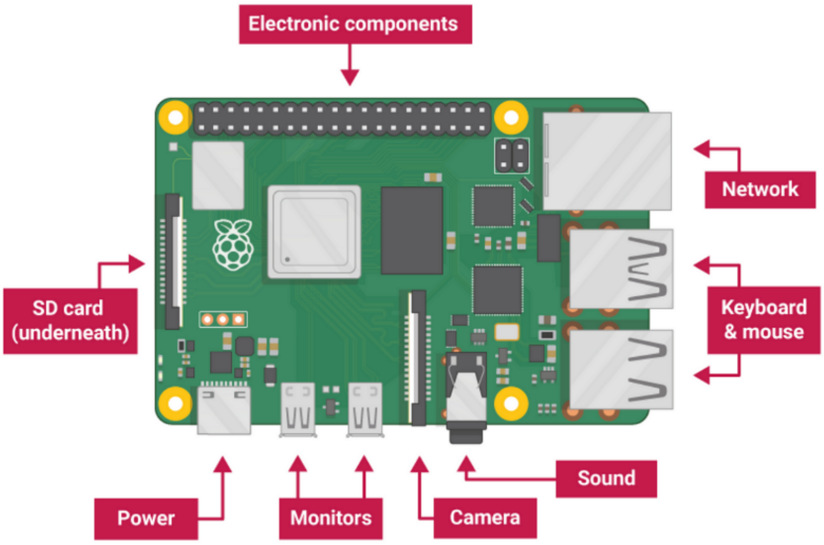
Dataset link: https://www.kaggle.com/datasets/fedesoriano/traffic-prediction-dataset

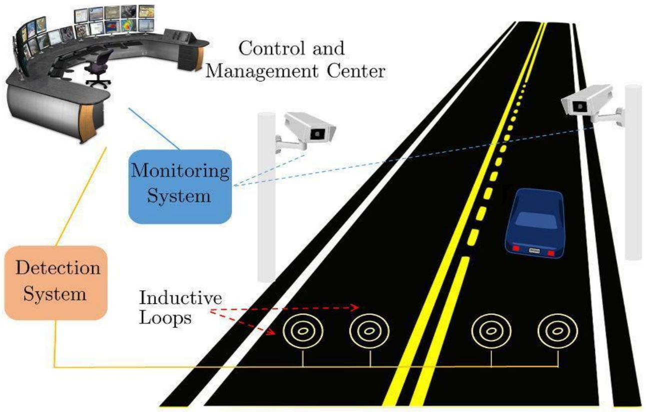
Program:

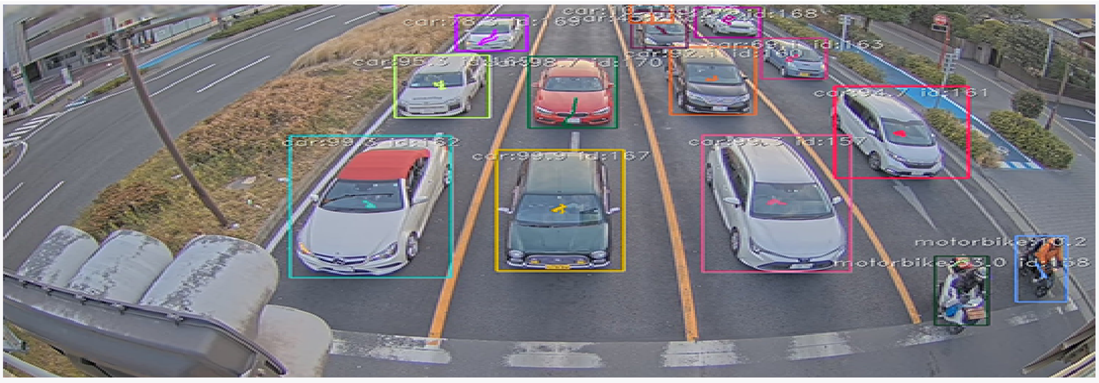
```
import RPi.GPIO as GPIO

from time import sleep


# Define GPIO pin numbers

hallpin1 = 8

hallpin2 = 10

hallpin3 = 12

hallpin11 = 22

hallpin12 = 24

hallpin13 = 26

hallpin21 = 38

hallpin22 = 40

hallpin23 = 37

hallpin31 = 31

hallpin32 = 29
```

```
hallpin33 = 23
LED1 = 16
LED2 = 18
LED11 = 32
LED12 = 36
LED21 = 35
LED22 = 33
LED31 = 21
LED32 = 19

# Set up GPIO
GPIO.setwarnings(False)
GPIO.setmode(GPIO.BOARD)
GPIO.setup(LED1, GPIO.OUT, initial=GPIO.LOW)
GPIO.setup(LED2, GPIO.OUT, initial=GPIO.LOW)
# Define Hall Effect sensor input
GPIO.setup(hallpin1, GPIO.IN)
GPIO.setup(hallpin2, GPIO.IN)
GPIO.setup(hallpin3, GPIO.IN)
# Define LED outputs
GPIO.setup(LED11, GPIO.OUT, initial=GPIO.LOW)
GPIO.setup(LED12, GPIO.OUT, initial=GPIO.LOW)
GPIO.setup(hallpin11, GPIO.IN)
GPIO.setup(hallpin12, GPIO.IN)
GPIO.setup(hallpin13, GPIO.IN)
GPIO.setup(LED21, GPIO.OUT, initial=GPIO.LOW)

GPIO.setup(LED22, GPIO.OUT, initial=GPIO.LOW)

GPIO.setup(hallpin21, GPIO.IN)

GPIO.setup(hallpin22, GPIO.IN)

GPIO.setup(hallpin23, GPIO.IN)

GPIO.setup(LED31, GPIO.OUT, initial=GPIO.LOW)

GPIO.setup(LED32, GPIO.OUT, initial=GPIO.LOW)

GPIO.setup(hallpin31, GPIO.IN)

GPIO.setup(hallpin32, GPIO.IN)

GPIO.setup(hallpin33, GPIO.IN)


while True:

    print("----------------------------")


    if GPIO.input(hallpin1) == True:

        a1 = 1

        print("magnet 1 detected")

    if GPIO.input(hallpin1) == False:

        a1 = 0

        print("magnet 1 not detected")


    # Repeat similar logic for other sensors (2, 3, 11, 12, 13, 21, 22, 23, 31, 32, 33)

    print("--------------------------------")
```

```
# Implement logic for controlling LEDs based on sensor inputs
sum1 = a1 + a2 + a3
sum2 = b1 + b2 + b3
sum3 = c1 + c2 + c3
sum4 = d1 + d2 + d3

print(sum1)
print(sum2)
print(sum3)
print(sum4)

f1 = 0
f2 = 0
f3 = 0
f4 = 0

# Implement further logic for LED control based on sum values
sleep(2)
```







CONCLUSION:

In conclusion, the smart traffic management system has demonstrated its effectiveness in significantly reducing passenger waiting and travel times, while also ensuring unimpeded movement for emergency vehicles. The implementation of this intelligent traffic management system in key areas holds the potential to curtail pollution rates. This proposed traffic management system is well-suited and dependable, making it a feasible solution for deployment in metropolitan cities.