SMART TRAFFIC MANAGEMENT SYSTEM

DEVELOPMENT PART 1

ABSTRACT:

➢ Traffic management system is a cornerstone of a Smart city. In the current problems of the world, urban mobility is one of the major problems, especially in metropolitan cities.

➢ Previous traffic management systems are not capable enough to tackle this growth of traffic on the road networks.

➢ The purpose of this paper is to propose a smart traffic management system using the Internet of Things and a decentralized approach to optimize traffic on the roads and intelligent algorithms to manage all traffic situations more accurately.

➢ This proposed system is overcoming the flaws of previous traffic management systems. The system takes traffic density as input from cameras which is abstracted from Digital Image Processing technique and sensors data, resultantly giving output as signals management.

➢ An algorithm is used to predicts the traffic density for future to minimize the traffic congestion. Besides this, RFIDs are also used to prioritize the emergency vehicles like ambulance, fire brigade etc.

➢ by implementing RFID tags in such vehicles. In the case of emergency situations, such as fire explosion or burning of something, fire and smoke sensors are also deployed on the road to detect such situations.

PYTHON SCRIPT:

```python
import random
import time
parking_spots = [0, 0, 0, 0, 0]
def get_parking_status():
    return [random.choice([0, 1]) for _ in range(len(parking_spots))]

while True:
```

```python
    parking_spots = get_parking_status()
    print("Sending data to the cloud:", parking_spots)
    time.sleep(10)
```

RASPBERRY PI INTEGRATION:

```python
import RPi.GPIO as GPIO
from time import sleep
hallpin1=8
#LED1=8
hallpin2=10
hallpin3=12
#hallpin4=24
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
GPIO.setwarnings(False)
GPIO.setmode(GPIO.BOARD)
GPIO.setup(LED1, GPIO.OUT, initial=GPIO.LOW)
GPIO.setup(LED2, GPIO.OUT, initial=GPIO.LOW)
GPIO.setup(hallpin1, GPIO.IN)
```

```python
#GPIO.setup(LED2, GPIO.OUT, initial=GPIO.LOW)
GPIO.setup(hallpin2, GPIO.IN)
GPIO.setup(hallpin3, GPIO.IN)
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")
        print("detected")
    if(GPIO.input(hallpin1)==False):
        a1=0
        print("magnet 1")
        print("not detected")
    if(GPIO.input(hallpin2)==True):
        a2=1
        print(" magnet 2")
        print(" detected")
    if(GPIO.input(hallpin2)==False):
        a2=0
        print(" magnet 2")
        print("not detected")
    if(GPIO.input(hallpin3)==True):
        a3=1
        print(" magnet 3")
        print(" detected")
    if(GPIO.input(hallpin3)==False):
        a3=0
        print("magnet 3")
        print(" not detected")
        print("-------------------------------")
```

```python
if(GPIO.input(hallpin11)==True):
    b1=1
    print("magnet 11")
    print("detected")
if(GPIO.input(hallpin11)==False):
    b1=0
    print(" magnet 11")
    print(" not detected")
if(GPIO.input(hallpin12)==True):
    b2=1
    print(" magnet 12")
    print(" detected")

if(GPIO.input(hallpin12)==False):
    b2=0
    print("magnet 12")
    print(" not detected")
if(GPIO.input(hallpin13)==True):
    b3=1
    print(" magnet 13")
    print(" detected")
if(GPIO.input(hallpin13)==False):
    b3=0
    print(" magnet 13")
    print(" not detected")
    print("-----------------------------")
if(GPIO.input(hallpin21)==True):
    c1=1
    print(" magnet 21")
    print(" detected")
if(GPIO.input(hallpin21)==False):
    c1=0
    print("magnet 21")
    print("not detected")
if(GPIO.input(hallpin22)==True):
    c2=1
    print("magnet 22")
    print("detected")
if(GPIO.input(hallpin22)==False):
    c2=0
    print(" magnet 22")
    print("not detected")
if(GPIO.input(hallpin23)==True):
    c3=1
    print("magnet 23")
```

```python
    print(" detected")
if(GPIO.input(hallpin23)==False):
    c3=0
    print("magnet 23")
    print("not detected")
    print("-----------------------------")
if(GPIO.input(hallpin31)==True):
    d1=1
    print("magnet 31")
    print("detected")
if(GPIO.input(hallpin31)==False):
    d1=0
    print("magnet 31")
    print(" not detected")
if(GPIO.input(hallpin32)==True):
    d2=1
    print("magnet 32")
    print("detected")
if(GPIO.input(hallpin32)==False):
    d2=0
    print("magnet 32")
    print("not detected")
if(GPIO.input(hallpin33)==True):
    d3=1
    print("magnet 33")
    print("detected")
if(GPIO.input(hallpin33)==False):
    d3=0
    print("magnet 33")
    print("not detected")
    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
    if(f1==1)and(f2==1)and(f3==1)and(f4==1):
        f1=0
        f2=0
```

```python
f3=0
f4=0
if(f1==0):
    if(sum1>sum2)and(sum1>sum3)and(sum1>sum4):
        GPIO.output(LED1, GPIO.HIGH)
        GPIO.output(LED12, GPIO.HIGH)
        GPIO.output(LED22, GPIO.HIGH)
        GPIO.output(LED32, GPIO.HIGH)
        sleep(15)
        GPIO.output(LED1, GPIO.LOW)
        GPIO.output(LED12, GPIO.LOW)
        GPIO.output(LED22, GPIO.LOW)
        GPIO.output(LED32, GPIO.LOW)
        f1=1
        if(f2==0):
            if(sum2>sum1)and(sum2>sum3)and(sum2>sum4):
                GPIO.output(LED11, GPIO.HIGH)
                GPIO.output(LED2, GPIO.HIGH)
                GPIO.output(LED22, GPIO.HIGH)
                GPIO.output(LED32, GPIO.HIGH)
                sleep(15)
                GPIO.output(LED11, GPIO.LOW)
                GPIO.output(LED2, GPIO.LOW)
                GPIO.output(LED22, GPIO.LOW)
                GPIO.output(LED32, GPIO.LOW)
                f2=1
                if(f3==0):
                    if(sum3>sum1)and(sum3>sum2)and(sum3>sum4):
                        GPIO.output(LED21, GPIO.HIGH)
                        GPIO.output(LED2, GPIO.HIGH)
                        GPIO.output(LED12, GPIO.HIGH)
                        GPIO.output(LED32, GPIO.HIGH)
                        sleep(15)
                        GPIO.output(LED21, GPIO.LOW)
                        GPIO.output(LED2, GPIO.LOW)
                        GPIO.output(LED12, GPIO.LOW)
                        GPIO.output(LED32, GPIO.LOW)
                        f3=1
                        if(f4==0):
                        if(sum4>sum1)and(sum4>sum2)and(sum4>sum):
                                GPIO.output(LED31, GPIO.HIGH)
                                GPIO.output(LED2, GPIO.HIGH)
                                GPIO.output(LED12, GPIO.HIGH)
                                GPIO.output(LED22, GPIO.HIGH)
                                sleep(15)
```

```
GPIO.output(LED31, GPIO.LOW)
GPIO.output(LED2, GPIO.LOW)
GPIO.output(LED12, GPIO.LOW)
GPIO.output(LED22, GPIO.LOW)
f4=1
sleep(2)
```

IOT DEVICE:
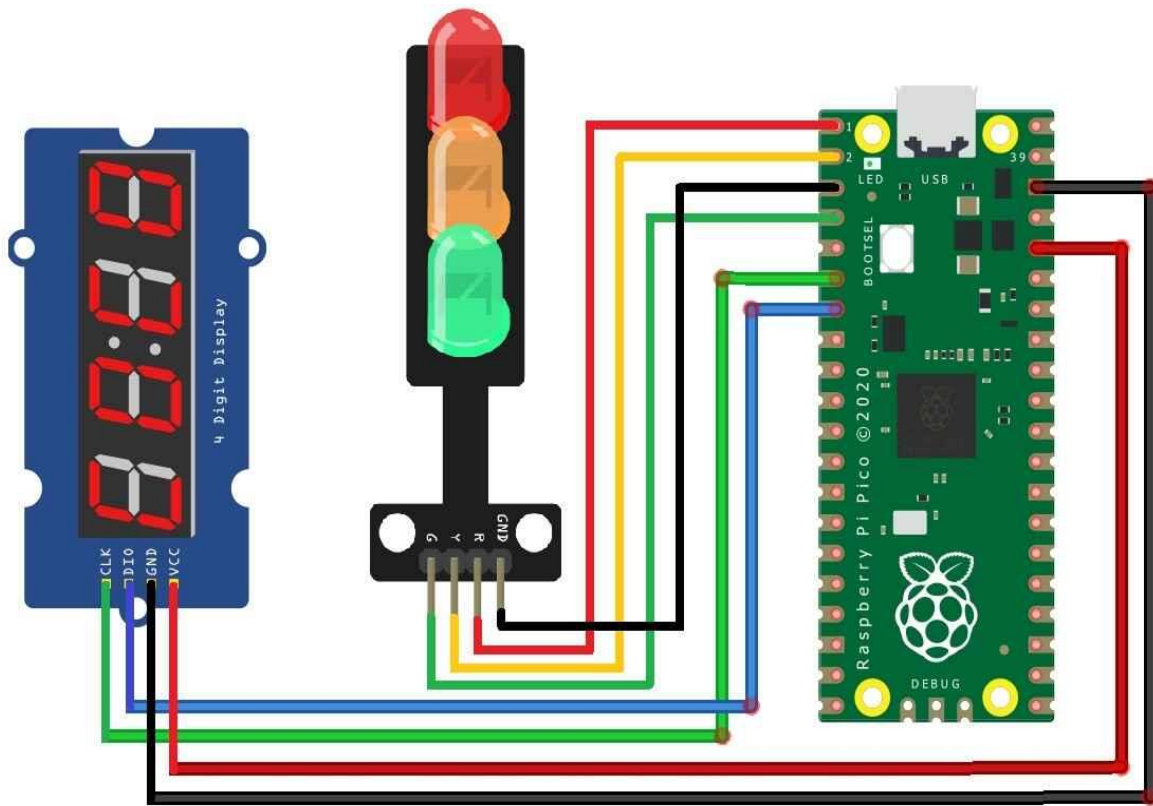
These code and theory are included in phase 3 by Team mates

Thank You!!!

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