

# **Project Title : Public Transport Optimization**

## **Problem statement :**

With our changing habits, people are moving faster because of busy schedules and an increasingly fast-paced lifestyle. As a consequence, this requires smarter ways of managing our lives and maximising our time. 'Internet of Things' (IoT) is dramatically accelerating the pace of innovation in the public transportation industry and providing real solutions. Public transport refers to shared passenger transportation services like bus , trains , metro, trolleybus etc. There are many challenges that are faced by passengers while using public transportation . In this project, have a GPS system installed in your vehicles , it helps to find to track a stolen vehicles or it can be track a live location of the vehicle .

## **Code Explanation:**

From this code, we have used Serial Software library to interface ESP8266 and GPS module with Arduino. Then we have defined different pins for both and initialize UART with 9600 baud rate . Also included Liquid Crystal Library for interface LCD with Arduino.

## **Source code/python code :**

```
import serial

from serial import Serial

Serial1 = Serial(2, 3) # make RX arduino line is pin 2, make TX arduino line is pin 3.

gps = Serial(10, 11)

from RPLCD import CharLCD

lcd = CharLCD(cols=16, rows=2, pin_rs=14, pin_e=15, pins_data=[16, 17, 18, 19])

No_IP = False

IP = ""

webpage = ""

i = 0

k = 0
```

```
gps_status = 0
name = "<p>1. Name: Your Name </p>" # 22
dob = "<p>2. DOB: 12 feb 1993</p>" # 21
number = "<p>4. Vehicle No.: RJ05 XY 4201</p>" # 29
ordinat = "<p>Coordinates:</p>" # 17
latitude = ""
logitude = ""
gpsString = ""
test = "$GPGGA"
```

```
def check4IP(t1):
    """
    Check for IP address.

    Args:
        t1 (int): Time in milliseconds.
    """
    t2 = millis()
    while t2 + t1 > millis():
        while Serial1.available() > 0:
            if Serial1.find("WIFI GOT IP"):
                No_IP = True
```

```
def get_ip():
    """
    Get the IP address.
    """
    IP = ""
    ch = 0
```

```

while True:
    Serial1.println("AT+CIFSR")
    while Serial1.available() > 0:
        if Serial1.find("STAIP,"):
            delay(1000)
            Serial.print("IP Address:")
            while Serial1.available() > 0:
                ch = Serial1.read()
                if ch == '+':
                    break
                IP += ch
            if ch == '+':
                break
            if ch == '+':
                break
            delay(1000)
    lcd.clear()
    lcd.print(IP)
    lcd.setCursor(0, 1)
    lcd.print("Port: 80")
    Serial.print(IP)
    Serial.print("Port:")
    Serial.println(80)
    delay(1000)
import time

def connect_wifi(cmd: str, t: int):
    temp = 0
    i = 0

```

```
while True:
    print(cmd)
    Serial1.println(cmd)
    while Serial1.available() > 0:
        if Serial1.find("OK"):
            i = 8
        time.sleep(t)
        if i > 5:
            break
        i += 1
    if i == 8:
        print("OK")
    else:
        print("Error")
    time.sleep(1)
```

```
def setup():
    Serial1.begin(9600)
    Serial.begin(9600)
    lcd.begin(16, 2)
    lcd.print("Vehicle Tracking")
    lcd.setCursor(0, 1)
    lcd.print("  System  ")
    time.sleep(2)
    lcd.clear()
    lcd.print("WIFI Connecting..")
    time.sleep(1)
    connect_wifi("AT", 1000)
    connect_wifi("AT+CWMODE=3", 1000)
```

```
connect_wifi("AT+CWQAP", 1000)
connect_wifi("AT+RST", 5000)
check4IP(5000)
if not No_IP:
    print("Connecting Wifi....")
    connect_wifi("AT+CWJAP=\"1st floor\", \"muda1884\"", 7000)
else:
    pass
print("Wifi Connected")
lcd.clear()
lcd.print("WIFI Connected")
time.sleep(2)
lcd.clear()
lcd.print("Getting IP")
get_ip()
time.sleep(2)
connect_wifi("AT+CWMUX=1", 100)
connect_wifi("AT+CIPSERVER=1,80", 100)
Serial1.end()
lcd.clear()
lcd.print("Waiting For GPS")
lcd.setCursor(0, 1)
lcd.print("  Signal  ")
time.sleep(2)
gps.begin(9600)
get_gps()
show_coordinate()
gps.end()
Serial1.begin(9600)
```

```
time.sleep(2)
lcd.clear()
lcd.print("GPS is Ready")
time.sleep(1)
lcd.clear()
lcd.print("System Ready")
print("System Ready..")
```

```
def loop():
    k = 0
    print("Please Refresh Ur Page")
    lcd.setCursor(0, 0)
    lcd.print("Please Refresh ")
    lcd.setCursor(0, 1)
    lcd.print("Your Web Page.. ")
    while k < 1000:
        k += 1
        while Serial1.available():
            if Serial1.find("0,CONNECT"):
                Serial1.end()
                gps.begin(9600)
                get_gps()
                gps.end()
                Serial1.begin(9600)
                Serial1.flush()
                print("Start Printing")
                Send()
                show_coordinate()
                print("Done Printing")
```

```
    time.sleep(5)
    lcd.clear()
    lcd.print("System Ready")
    time.sleep(1)
    k = 1200
    break
time.sleep(0.001)
```

```
def gpsEvent():
    gpsString = ""
    while True:
        while gps.available() > 0:
            inChar = chr(gps.read())
            gpsString += inChar
            i += 1
            if i < 7:
                if gpsString[i-1] != test[i-1]:
                    i = 0
                    gpsString = ""
            if inChar == '\r':
                if i > 65:
                    gps_status = 1
                    break
            else:
                i = 0
```

```
def get_gps():
    gps_status = 0
    x = 0
```

```
while gps_status == 0:
    gpsEvent()
    str_length = i
    latitude = ""
    longitude = ""
    coordinate2dec()
    i = 0
    x = 0
    str_length = 0
```

```
def show_coordinate():
    lcd.clear()
    lcd.print("Latitude:")
    lcd.print(latitude)
    lcd.setCursor(0, 1)
    lcd.print("Longitude:")
    lcd.print(longitude)
    Serial.print("Latitude:")
    Serial.println(latitude)
    Serial.print("Longitude:")
    Serial.println(longitude)
```

```
def coordinate2dec():
    lat_degree = ""
    for i in range(18, 20):
        lat_degree += gpsString[i]
    lat_minute = ""
```



```

for i in range(20, 28):
    lat_minute += gpsString[i]
long_degree = ""
for i in range(30, 33):
    long_degree += gpsString[i]
long_minute = ""
for i in range(33, 41):
    long_minute += gpsString[i]
minute = float(lat_minute)
minute = minute / 60
degree = float(lat_degree)
latitude = degree + minute
minute = float(long_minute)
minute = minute / 60
degree = float(long_degree)
longitude = degree + minute

```

```
def send():
```

```

    webpage = "<h1>Welcome to Saddam Khan's Page</h1><body bgcolor=f0f0f0>"
    webpage += name
    webpage += dob
    webpage += number
    webpage += cordinat
    webpage += "<p>Latitude:"
    webpage += latitude
    webpage += "</p>"
    webpage += "<p>Longitude:"
    webpage += longitude

```

```

webpage += "</p>"
webpage += "<a href=\"http://maps.google.com/maps?&z=15&mrt=yp&t=k&q="
webpage += latitude
webpage += "+"
webpage += longitude
webpage += "\">Click Here for google map</a>"
sendwebdata()
webpage = ""
while True:
    Serial.println("AT+CIPCLOSE=0")
    Serial1.println("AT+CIPCLOSE=0")
    while Serial1.available():
        if Serial1.find("0,CLOSE"):
            return
    delay(500)
    i += 1
    if i > 5:
        i = 0
    if i == 0:
        break

def sendwebdata():
    i = 0
    while True:
        l = len(webpage)
        Serial1.print("AT+CIPSEND=0,")
        Serial1.println(l + 2)
        Serial.println(l + 2)

```

```
Serial.println(webpage)
Serial1.println(webpage)
while Serial1.available():
    if Serial1.find("OK"):
        return
i += 1
if i > 5:
    i = 0
if i == 0:
    break
delay(200)
```