Public Transport Optimization

Project : Development part 1

Introduction to public transport optimization:

- **In general optimization in the context of public transportation is an extremely Difficult task even for small transit network because of the large number Of variables and constraints and the discrete nature of variables and non Linearity of the objective function.**
- **Transport optimization helps shoppers,3PLs,and transportation consultants shipment,rates,and constraints to produce realistic load plans that reduce Overall frieght spend.**

Public transport optimization using iot with sensors:

Sensor for deployment:

- **To achieve effective public transport optimization,several types of sensors Can be deployed in vehicles and at transport infrastructure locations.Here Are the key sensors and their applications.**

Gps sensors:

Application: used for real time vehicles tracking and route optimization.

Benefits:provides accurate location data,helping to monitor vehicles movement,calculate ETA, and optimize routes based on traffic condition.

Passenger counting sensors:

Application: used to monitor passenger loads on vehicles.

Benefits: Allows for optimization of vehicle capacity ,leading to better resource allocation And service planning.

Temperature and climate sensors:

Application:monitoring and maintaining comfortable climate condition inside vehicles.

Benefits:Ensures passengers comfort and safety by regulating heating, ventilation,and Air conditioning systems.

Camera sensor(CCTV):

Application: surveillance and monitoring of passengers,drivers behaviour and security.

Benefits:Improve safety and security by recording video footage for analyze and

Incident resolution.

Select iot devices with sensors:

Research and choose iot devices that include the necessary sensors.

Deployment of IoT devices:

Install iot devices with sensor in public transport vehicle and at key infrastructure

Location.

Data collection:

IoT devices with sensor will collect data including gps, passenger counts, temperature

Proximity,and camera footage.

Data processing and storage:

Develop a data processing pipeline to clean and store the collected sensor data.

Python script development:

Create python script to analyze and process sensor data ,implementing algorithms

For optimization real time passenger information,and more.

Real-time passenger information :

Develop a user interface for passenger to access real-time information based on

Sensor data.

Optimization algorithms:

Utilize sensor data to improve route efficiency ,minimize delays,and optimize

Resource allocation.

Testing and validation:

Throughly test the system ,including sensor accuracy and script functionality.

Python program:

```
Import serial
Import requests
#configire the serial port (update the port name accordingly)
Ser=serial.serial('COMX',9600)
#Think speak settings
Thing speak_api_key='6EKT0ALDBXGG60Q1'
```

```
Thinkspeak_url=f’https://thinkspeak.com/channels/2303456/private _try
    While True:
        #Read passenger count data from Arduino
        Passenger _count=ser.readline().strip().decode(‘utf-8’)
        #send data to thinkspeak
        Response=request.get(f’{thinkspeak_url}&field1={passenger_count}’)
        If response.status_code==200:
            Print(f”passenger count to send thinkspeak:{passenger _count}”)
        Else:
            Print(“failed to send data to thinkspeak”)
    Except keyboard interrupt
        Ser.close()
        Print (“connection closed”)
```