**Public Transport Optimization**

**Introduction :**

Efficient public transportation systems play a pivotal role in the growth and sustainability of urban areas. They offer numerous benefits, including reduced traffic congestion, lower carbon emissions, improved accessibility, and increased mobility for the community. However, many public transportation systems face challenges such as inefficient routes, overcrowding, and outdated technology, leading to a decline in overall service quality. To address these issues, we are embarking on a comprehensive Public Transportation Optimization Project.

**Project Objectives :**

**1.** **Enhance Efficiency:** The primary objective of this project is to improve the efficiency of public transportation systems by optimizing routes, schedules, and resources.

**2.Reduce Congestion:** By providing more efficient public transportation, we aim to reduce traffic congestion and contribute to a cleaner, healthier environment.

**3.** **Increase Accessibility:** The project will focus on making public transportation more accessible to a broader range of people, including those with disabilities, the elderly, and low-income communities.

**4.** **Improve Customer Experience:** We intend to enhance the overall customer experience by offering real-time information, user-friendly payment systems, and more comfortable travel options.

**Methodology :**

**1.Data Analysis:** We will conduct a comprehensive analysis of historical transportation data, including ridership statistics, route performance, and customer feedback.

**2.Route Optimization:** Through the utilization of advanced algorithms and data analysis, we will optimize routes to ensure better coverage and reduced travel times.

**3.Schedule Optimization:** Adjusting and optimizing schedules to meet demand patterns and provide more convenient services to the public.

**BLOCK DIAGRAM :**

**A diagram of a computer system

Description automatically generated­**

**Components:**

* **ESP8266**
* **LED DISPLAY**
* **GPS TRACKER**
* **JUMPER CABLES**
* **SOLDERING KIT**
* **RFID AND GSM TECHNOLOGY**
* **BEAM COUNTER SENSOR**

**Coding:**

**# Import necessary libraries and modules**

**Import random**

**Import time**

**Class Vehicle:**

**Def \_\_init\_\_(self, vehicle\_id):**

**Self.vehicle\_id = vehicle\_id**

**Self.latitude = random.uniform(40.0, 41.0)**

**Self.longitude = random.uniform(-74.0, -73.0)**

**Def update\_location(self):**

**# Simulate GPS data updates**

**Self.latitude += random.uniform(-0.001, 0.001)**

**Self.longitude += random.uniform(-0.001, 0.001)**

**Def get\_location(self):**

**Return {“vehicle\_id”: self.vehicle\_id, “latitude”: self.latitude, “longitude”: self.longitude}**

**# Simulate multiple vehicles**

**Vehicles = [Vehicle(1), Vehicle(2), Vehicle(3)]**

**# Main loop to continuously update and send vehicle locations**

**While True:**

**For vehicle in vehicles:**

**Vehicle.update\_location()**

**Location\_data = vehicle.get\_location()**

**# Send location\_data to your IoT cloud platform or API**

**Print(location\_data) # Simulate data transmission**

**Time.sleep(10) # Update every 10 seconds**

**Passenger count:**

**# Initialize a passenger counter**

**Passenger\_count = 0**

**# Simulate passenger boarding and disembarking**

**Boarded\_passengers = [3, 2, 4, 1, 5] # Example: Passengers boarding at each stop**

**Disembarked\_passengers = [0, 1, 2, 3, 1] # Example: Passengers disembarking at each stop**

**# Main loop for tracking passenger count at each stop**

**For I in range(len(boarded\_passengers)):**

**# Update passenger count with boarding and disembarking**

**Passenger\_count += boarded\_passengers[i]**

**Passenger\_count -= disembarked\_passengers[i]**

**# Print the passenger count at each stop**

**Print(f”Passenger count at Stop {I + 1}: {passenger\_count}”)**

**Conclusion :**

This project seeks to transform public transportation into a more efficient, accessible, and sustainable mode of travel. By optimizing routes, schedules, and technology, we aim to enhance the overall transportation experience for the community while addressing congestion and environmental concerns. The success of this project will result in a more vibrant, sustainable, and accessible urban environment for all residents.