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| PUBLIC TRANSPORT OPTIMIZATION | | | |
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| INTRODUCTION:Effective public transport systems play a pivotal role in the development and sustainability of urban areas. They are vital in reducing traffic congestion, air pollution, and carbon emissions, while simultaneously increasing accessibility and convenience for residents and visitors. However, many cities face challenges in optimizing their public transport networks to meet the growing demands of urbanization, changing commuter preferences, and technological advancements. This Public Transport Optimization Project is designed to address these challenges and create a more efficient and sustainable public transport system.The Public Transport Optimization Project aims to improve the efficiency, accessibility, and sustainability of the existing public transport network in [City Name]. By leveraging data analytics, technology, and innovative strategies, the project will identify key areas of improvement, develop solutions, and implement changes that benefit both commuters and the environment. This project will take a holistic approach, considering the needs of diverse stakeholders, from the citizens who rely on public transport to the city's policymakers and urban planners.BLOCK DIAGRAM:EXPLANATION:Public transport optimization is a multifaceted field that encompasses a wide range of strategies, technologies, and practices to enhance the efficiency and effectiveness of public transportation systems.It is a very complicated problem because planners must take into account multiple competing criteria (e.g., service requirements, asset utilization, cost minimization, workload fairness, etc.), components of the transportation system, and their interconnection. Moreover, transportation planners should consider many factors to create efficient plans, including but not limited to vehicle and driver availability, vehicle size and capacity, traffic details, travel time windows, and passengers’ locations, which are too many for one to handle efficiently in his head. On the other hand, plans often are required to be modified later due to unexpected events, such as vehicle breakdown, drivers’ sickness, and severe weather conditions, which make transportation planning even more complex. However, many transportation planners still create their transportation plans manually without using any tool that is equipped with advanced technologies, which is very hard and time-consuming for even the most experienced planners. Besides, increasing demand for faster planning, increasing pressure to reduce transportation costs through better decision making, and increasing complexity of transportation problems due to a significant increase in the size of transportation networks make manual transportation planning almost impossible.Public transport optimization is an ongoing process, and advances in technology, data analytics, and urban planning continue to drive improvements in public transportation systems worldwide. The goal is to create a convenient, reliable, and attractive alternative to private car travel, which can reduce congestion, lower emissions, and improve overall urban mobility.WORKING:The working process of public transport optimization involves a series of steps and strategies to enhance the efficiency and effectiveness of a public transportation system. Here's a simplified overview of the process:1. Data Collection and Analysis:- The process begins with collecting various types of data, including passenger demand, travel patterns, system performance, and infrastructure details.- Data analysis helps transit agencies understand current usage patterns, identify bottlenecks, and determine areas where optimization is needed.2. Demand Forecasting:- Using historical data and predictive modeling, transit agencies forecast future passenger demand. This is critical for resource allocation and route planning.3. Route Planning:- Based on demand forecasts and data analysis, transit agencies plan or adjust routes to maximize efficiency. This may involve creating direct routes, minimizing detours, and ensuring routes connect key destinations.4. Scheduling:- Transit agencies create schedules that optimize service frequency and capacity to meet peak and off-peak demands. Schedules should minimize passenger waiting times.5. Integration:- Public transport systems are integrated, allowing passengers to easily transfer between different modes of transportation, such as buses, trains, and trams.6. Real-Time Monitoring:- Public transport services are equipped with real-time monitoring systems that track vehicle locations and provide data to transit agencies and passengers.7. Real-Time Information:- Passengers receive real-time information through apps, websites, or displays at transit stops. This information helps passengers plan their journeys and adapt to service disruptions.8. Fare Systems:- Modern fare systems are implemented, allowing passengers to pay using contactless methods, mobile apps, and integrated ticketing across different modes.9. Infrastructure Improvements:- Infrastructure enhancements, such as dedicated bus lanes, transit signal priority, and accessibility features, are implemented to improve system efficiency and passenger experience.10. Environmental Considerations:- Public transport optimization includes environmentally friendly practices, such as electric buses or trains powered by renewable energy sources to reduce emissions.11. Accessibility and Inclusivity:- Efforts are made to ensure that public transport systems are accessible to all passengers, including those with disabilities, and meet diverse transportation needs.12. Policy and Funding:- Supportive government policies, funding mechanisms, and regulations play a critical role in enabling public transport optimization initiatives.13. Continuous Improvement:- Public transport optimization is an ongoing process. Transit agencies use feedback, data, and lessons learned to continuously improve services, adapt to changing conditions, and meet evolving passenger needs.The working process of public transport optimization relies on data, technology, planning, and ongoing adjustments to create a reliable, convenient, and attractive public transportation system that efficiently serves the needs of the community while promoting sustainable and environmentally friendly alternatives to private car travel.PROGRAM:#define BLYNK\_TEMPLATE\_ID "TMPL26V4fGv5q"#define BLYNK\_TEMPLATE\_NAME "Test"#define BLYNK\_AUTH\_TOKEN "XEHxNF\_Ur1Nt2p7wB5B20dNI1ZUwj34P"#include <WiFi.h>#include <WiFiClient.h>#include <BlynkSimpleEsp32.h>int duration1 = 0;int distance1 = 0;int duration2 = 0;int distance2 = 0;int dis1 = 0;int dis2 = 0;int dis\_new1 = 0;int dis\_new2 = 0;int entered = 0;int left = 0;int inside = 0;#define LED 2#define PIN\_TRIG1 15#define PIN\_ECHO1 14#define PIN\_TRIG2 13#define PIN\_ECHO2 12BlynkTimer timer;char auth[] = BLYNK\_AUTH\_TOKEN;char ssid[] = "Wokwi-GUEST"; // your network SSID (name)char pass[] = "";#define BLYNK\_PRINT Seriallong get\_distance1() {// Start a new measurement:digitalWrite(PIN\_TRIG1, HIGH);delayMicroseconds(10);digitalWrite(PIN\_TRIG1, LOW);// Read the result:duration1 = pulseIn(PIN\_ECHO1, HIGH);distance1 = duration1 / 58;return distance1;}long get\_distance2() {// Start a new measurement:digitalWrite(PIN\_TRIG2, HIGH);delayMicroseconds(10);digitalWrite(PIN\_TRIG2, LOW);// Read the result:duration2 = pulseIn(PIN\_ECHO2, HIGH);distance2 = duration2 / 58;return distance2;}void myTimer() {Serial.println("100");dis\_new1 = get\_distance1();dis\_new2 = get\_distance2();if (dis1 != dis\_new1 || dis2 != dis\_new2){Serial.println("200");if (dis1 < dis2){Serial.println("Enter loop");entered = entered + 1;inside = inside + 1;digitalWrite(LED, HIGH);Blynk.virtualWrite(V0, entered);Blynk.virtualWrite(V2, inside);dis1 = dis\_new1;delay(1000);digitalWrite(LED, LOW);}if (dis1 > dis2){Serial.println("Leave loop");left = left + 1;inside = inside - 1;Blynk.virtualWrite(V1, left);Blynk.virtualWrite(V2, inside);dis2 = dis\_new2;delay(1000);}}}void setup() {Serial.begin(115200);pinMode(LED, OUTPUT);pinMode(PIN\_TRIG1, OUTPUT);pinMode(PIN\_ECHO1, INPUT);pinMode(PIN\_TRIG2, OUTPUT);pinMode(PIN\_ECHO2, INPUT);Blynk.begin(auth, ssid, pass, "blynk.cloud", 8080);timer.setInterval(1000L, myTimer);} | |
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