**PHASE:2**

**PUBLIC TRANSPORTATION ANALYSIS**

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**INTRODUCTION:**

Public transportation systems play a vital role in urban environments, providing a cost-effective and sustainable means of commuting for millions of people worldwide. Ensuring the efficiency, reliability, and passenger satisfaction of these systems is of paramount importance. A Public Transport Analysis Project is designed to leverage data and advanced analytics to achieve these goals, offering valuable insights into the operation and improvement of public transport services.

**INNOVATION:**

* **Real-time Data Integration:** Implement a system that collects real-time data from buses, trains, and other public transportation vehicles. Analyse this data to optimize routes, predict delays, and improve overall efficiency.
* **Smart Ticketing Solutions:** Develop a smart ticketing system that uses contactless cards or mobile apps for payments. This can reduce congestion at ticket counters and make the payment process more convenient for passengers.
* **User Experience Analysis:**Conduct surveys and usability studies to gauge the experience of public transportation users. Use this feedback to make improvements in areas like accessibility, comfort, and safety.
* **Route Optimization:** Use machine learning algorithms to optimize bus and train routes based on historical data. This can help reduce travel times and energy consumption.
* **Accessibility for Persons with Disabilities:** Ensure that public transportation is fully accessible to people with disabilities. Analyse current accessibility and propose improvements.
* **Safety and Security Enhancements:**Analyse security measures in place and suggest innovations to enhance passenger safety. This could involve surveillance technologies, emergency response systems, or incident prediction algorithms.

**MACHINE LEARNING ALGORITHMS:**

Here are machine learning methods for predicting service disruptions and analysing passenger sentiment in public transport:

**Predicting Service Disruptions:**

1. **ARIMA**: A tool for forecasting transport delays.

2. **Isolation Forest and One-Class SVM**: Detect unusual events in transport data.

3. **Recurrent Neural Networks (RNNs):** Good for predicting delays**.**

**Analysing Passenger Sentiment:**

1. **VADER and Text Classification**: Understand if passenger feedback is positive, negative, or neutral.

2. **LDA:** Find common topics in feedback.

3. **Word Embeddings**: Helps to understand the context of words.

4. **Deep Learning (CNNs and RNNs):** Understand sentiment in text.

5. **BERT**: A powerful tool for understanding language.

6. **Random Forest and Gradient Boosting:** Useful for classifying text.

**CONCLUSION:**

In conclusion, incorporating machine learning algorithms for predicting service disruptions and analysing passenger sentiment in public transport is a valuable strategy. These methods can enhance service quality, improve reliability, and provide deeper insights into passenger satisfaction. By using the right algorithms and continuously refining the analysis, public transport authorities can make informed decisions, allocate resources more efficiently, and create a better travel experience for passengers.