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AI for optimising public transport routes and schedules

Abstract: (Within 200 Words)

Efficient public transportation is crucial for sustainable urban mobility. However, most city transit systems rely on static routes and fixed schedules, often resulting in underutilization, overcrowding, or increased waiting times. This project presents an AI-based solution to optimize public transport routes and schedules using open-source data and machine learning techniques. The approach involves identifying high-demand areas using clustering algorithms (e.g., K-Means), forecasting passenger flow through time-series models (e.g., ARIMA), and generating improved route suggestions using graph-based optimization. Open datasets such as General Transit Feed Specification (GTFS) and city traffic APIs are used for analysis and testing. The system is designed to adapt to temporal and spatial demand variations, aiming to reduce wait times and improve vehicle allocation. A prototype simulation demonstrates how dynamic routing and scheduling can enhance operational efficiency without requiring infrastructure changes. This project leverages only open-source tools (Python, Pandas, scikit-learn, NetworkX), making it accessible and cost-effective for academic development. Results highlight the potential of AI in improving public transit planning, especially for cities exploring smart transportation initiatives.

Keywords— Public transport, route optimization, machine learning, GTFS, time-series forecasting, urban mobility, smart cities.

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