USING MACHINE LEARNING FOR

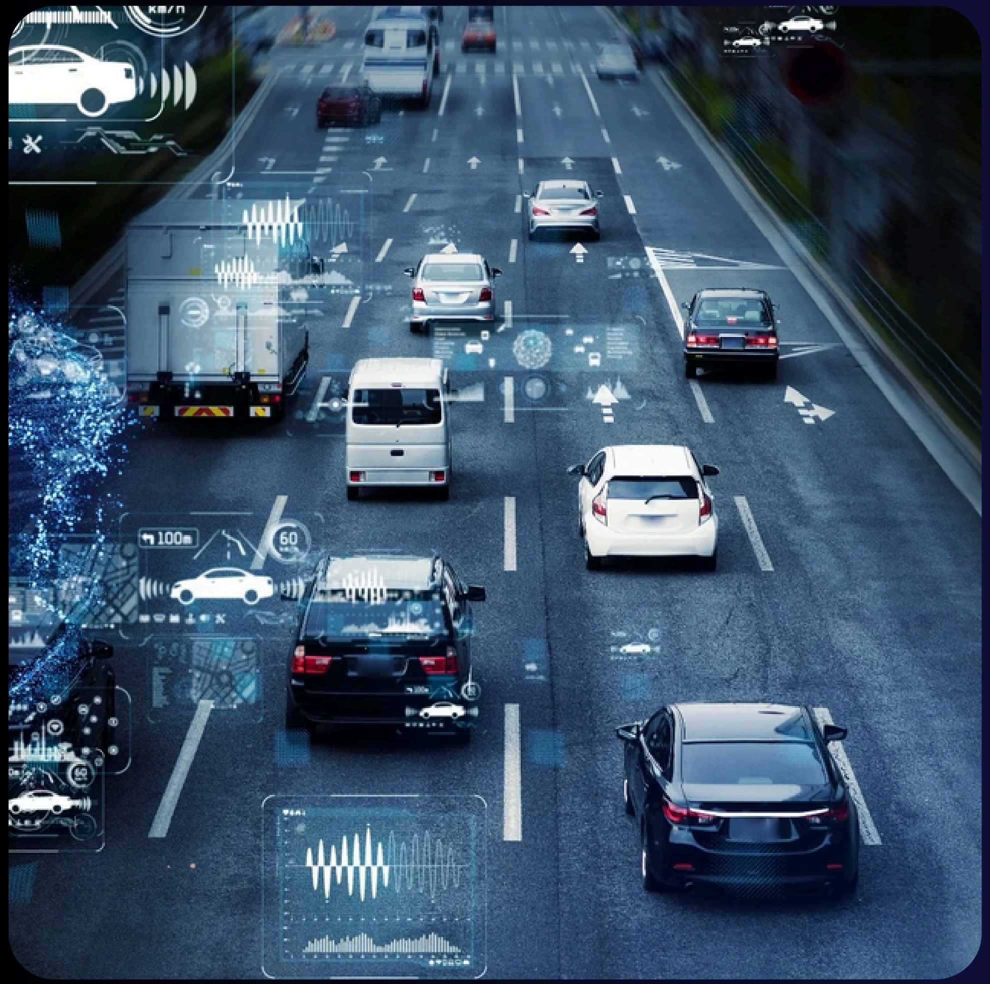
RAPTO

(Real-Time AI Public Transport Optimization)

Hack Hustle

MOVE MAKERS

KEY ISSUES :



01 TRAFFIC DELAYS AND CONGESTION

Traditional transport schedules don’t account for real-time traffic conditions. Congestion, road closures, or accidents often lead to delays, leaving commuters stranded and increasing their travel time.

02 PEAK DEMAND AND OVERCROWDING

During peak hours, buses and trains become overcrowded, leading to delays and an uncomfortable experience for commuters. Off-peak hours may see underutilized vehicles, resulting in inefficient resource usage and higher operational costs

03 ENVIRONMENTAL IMPACT

Large events (e.g., concerts, sports games) and unexpected disruptions (e.g., weather emergencies) can cause sudden spikes in demand in specific areas, which standard schedules can't adjust for quickly enough.

04 INFLEXIBILITY FOR LIVE EVENTS AND SPECIAL CIRCUMSTANCES

Inefficient scheduling and underutilized routes contribute to increased fuel consumption and emissions, impacting the environment

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SOLUTION OVERVIEW :

REAL-TIME ROUTE OPTIMIZATION

- The platform continuously monitors traffic and road conditions, using AI to adjust routes instantly to avoid congestion and delays. This ensures faster, more efficient travel for commuters by dynamically rerouting vehicles as needed.

DEMAND-RESPONSIVE SCHEDULING

- Using real-time data and commuter patterns, the system adjusts service frequency based on demand. During high-demand periods (e.g., rush hours or events), more vehicles are deployed; during low-demand times, fewer are used. This maximizes resource efficiency, reduces wait times, and improves passenger experience.

This AI-driven platform that dynamically optimizes public transport routes in real time based on demand, traffic, and events, enhancing efficiency and reducing delays for a smoother urban commute.

This models analyze commuter behavior, historical trends, and real-time data to forecast public transport demand, allowing transit authorities to adjust routes and schedules dynamically. This prevents overcrowding and improves the efficiency of public transport.

CORE TECHNOLOGY :

LSTM-BASED TIME SERIES FORECASTING:

Purpose: Predicts traffic patterns by analyzing historical traffic data over time.

Description: LSTM networks, a type of RNN, are ideal for sequential data like traffic volume. They learn from past patterns (e.g., rush-hour peaks) to accurately predict future congestion levels

GEOSPATIAL DATA PROCESSING:

Purpose: Enhances forecasting accuracy by factoring in geographic attributes.

Description: Incorporates road width, location, and conditions to model traffic flow. Wider roads boost capacity, lowering congestion. Geospatial data enables accurate, zone-specific predictions.

INTELLIGENT REROUTING:

Purpose: Reduces congestion by dynamically rerouting traffic

Description: The platform reroutes vehicles from congested areas to nearby zones with lower traffic, balancing flow based on density and road capacity.

BENEFITS AND IMPACT

REDUCED TRAVEL AND WAIT TIMES

By adjusting routes and schedules based on real-time data, the platform helps commuters reach their destinations faster with shorter waiting periods.

INCREASED OPERATIONAL EFFICIENCY

AI-driven demand forecasting allows transport providers to match vehicles and staff with commuter demand, reducing costs and enhancing resource use

REDUCED TRAVEL AND WAIT TIMES

Improved Commuter Satisfaction: Real-time updates, accurate arrival times, and personalized route suggestions enhance reliability, making public transit more appealing to users.

LOWER ENVIRONMENTAL IMPACT

Optimizing routes and minimizing idle time reduces fuel use and emissions, contributing to cleaner air and supporting sustainability goals.

CONCLUSION

ACHIEVEMENT

The real-time forecasting and rerouting model enhances traffic flow by continuously analyzing live data on traffic patterns, commuter demand, and potential disruptions (e.g.,
events). Using this data, the model predicts congestion hotspots and adjusts routes dynamically, directing public transport vehicles to less congested paths. This process helps to minimize delays, distribute traffic more evenly across the network, and ensure timely arrivals, ultimately improving overall traffic fluidity and passenger satisfaction.

FUTURE IMPROVEMENTS

To Expand model to include more features like accident data,advanced optimization algorithms and frontend UI due to shortage of time.

TEAM MEMBERS

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