Short-Term Traffic Speed Forecasting Using a Deep Learning Method Based on Multitemporal Traffic Flow Volume

1.SUMMARY

1.1 Motivation/Purpose/Aims/Hypothesis

This research aims to improve short-term traffic speed forecasting using a deep learning method. We propose a methodology that leverages traffic flow data to enhance traffic management and traveler route planning.

1.2 Contribution

The primary contribution of this study is the introduction of a traffic flow-based LSTM model, showcasing its effectiveness in traffic speed prediction. It can empower traffic management personnel to make informed decisions and assist travelers in route planning.

1.3 Methodology

Our research comprises two key components: traffic flow pattern extraction and deep learning methods, including LSTM, BP, CART, KNN, and SVR. We determined that LSTM, specifically using the "n=3 and m=3" pattern, yielded the best results.

1.4 Conclusion

The study emphasizes the significance of real-time traffic flow data in enhancing traffic speed prediction. The proposed LSTM model, when applied with the optimal traffic pattern, proved to be a robust solution for short-term traffic forecasting, aiding both travelers and road management.

*2. **Limitations***

2.1 First Limitation/Critique (Data Specificity): The research heavily relies on data from the Beijing Third Ring Expressway, potentially limiting the generalizability of the findings to other regions.

2.2 Second Limitation/Critique (External Factors): The study doesn't consider external factors such as weather conditions or road accidents, which could significantly impact traffic speed.

*3. **Synthesis***

We believe this research has the potential to transform how traffic management operates. By addressing the limitations and integrating additional external factors, this deep learning approach can enhance traffic forecasting models for broader applications. Real-time, accurate traffic speed prediction is invaluable for traffic management, route planning, and accident prevention.