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Real-Time Arterial Traffic Performance Measures Using GPS-Instrumented Vehicles

Presenter

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In recent years, GPS-enabled devices are becoming much more prevalent and affordable, allowing for inexpensive data collection. This study is a "proof of concept" for using GPS probe vehicle data to identify performance indices for arterial roadways. An algorithm was written for processing GeoLogger GPS probe vehicle data. The algorithm is capable of automatically performing data quality assurance, based on user-defined limitations.

The algorithm was developed and tested using GPS data collected in Brookings, South Dakota during the P.M. peak hour. Brookings is a mid-sized city in South Dakota, and this analysis demonstrates the feasibility of implementing this method in smaller jurisdictions.

The algorithm produces tables summarizing each trip completed, as well as a summary based on a user-defined sample time interval. For every trip, important performance data is determined, including: actual travel time, delay, number of stops, peak speed, average speed, and average speed-while-moving. Additionally, for the user-defined sample period (every 5 minutes in this study), summary statistics are calculated for all links traversed by any probe vehicle in the sample time interval.

The method developed in this study is designed for future development using low cost, location-aware devices such as cellular phones. This may enable rapid implementation of ITS systems for smaller jurisdictions with limited existing data collection infrastructure.