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CALTRANS DIVISION OF RESEARCH, INNOVATION AND SYSTEM INFORMATION

TRANSFORMING IDEAS INTO SOLUTIONS

Research Notes

Use of Third-Party Data and Emerging Technologies to Enhance Traffic Monitoring

This project will evaluate whether vehicle tracking data collected by third-party vendors could effectively be used to analyze truck movements in high-traffic urban/suburban networks.

Construction

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Project Title: Use of Third-Party Data and Emerging Technologies to Enhance Traffic Monitoring

Task Number: 4333

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Task Manager:

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WHAT IS THE NEED?

Determine how traffic data offered by third-party vendors and emerging detection technologies could effectively be used to support California Department of Transportation (Caltrans) traffic monitoring operations, either as an addition to the existing data collection infrastructure or as a replacement source for the data currently collected. Also, this is to establish recommendations for when to use new detection technologies, such as Light Detection and Ranging (LiDAR) sensors and camera-based machine vision and analytics.

WHAT ARE WE DOING?

- Develop performance-based data specifications defining the key parameters needed by Caltrans from third-party vendors to ensure that the data being acquired reliably represents traffic conditions at sites of interest.
- Assess how third-party data offerings can be used to fill in gaps in Caltrans's current traffic data collection approach and even replace traditional detection methods where relevant.
- Develop an approach for identifying new traffic monitoring locations and selecting an effective data collection method for these locations in an environment in which traditional detection methods and reliable third-party data are both available.
- Develop updated guidelines for the selection of traffic detection technology to favor in various situations considering recent new technologies, such as LiDAR and camera-based machine vision and analytics.

Caltrans

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- Develop a method for assessing whether data continuously collected from freeway mainline Performance Measurement System (PeMS) sensors could be used to augment, or even replace, data collected manually for the Census program and for performing, if necessary, adjustments to the PeMS data being used to account for identified data collection issues.

WHAT IS OUR GOAL?

The general objective of the project is to evaluate how third-party traffic data and emerging technologies could be used to enhance Caltrans traffic monitoring capabilities. Since different vendors may rely on different data sources or technologies, as well as provide platforms with different analytical capabilities, the evaluations are not meant to provide how-to guides on how to use data from a specific vendor or specific detection technologies. The objective is to conduct generic evaluations and develop generic guidelines and methods highlighting how third-party data or emerging detection technologies can be effectively leveraged to benefit Caltrans traffic monitoring operations.

WHAT IS THE BENEFIT?

Results from this study will be immediately applicable for network performance assessment and project evaluation tasks. They will allow Caltrans staff to better utilize third-party data and emerging detection technologies to expand general traffic and trucking monitoring capabilities within the state, more efficiently analyze traffic demand and traffic movements, and allow them to conduct more rigorous evaluations of how proposed projects may be affected by changes in general traffic or may conversely influence traffic patterns, vehicle-miles traveled (VMT), and vehicle emissions. More robust assessments of traffic activities may also lead to better estimates of safety risks associated with transportation activities.

By determining whether some analyses could be done with third-party data or emerging roadside detection technologies, this project could further justify the use of fewer in-pavement sensors. In turn, the use of fewer sensors could reduce the need for traffic-disruptive maintenance work on these sensors and accident risks for both Caltrans staff and the general traffic.

WHAT IS THE PROGRESS TO DATE?

The researcher is developing a generic performance-based data specification for the use of 3rd-party data by Caltrans to monitor passenger car and truck traffic. They have established a wish-list of data elements that would make 3rd-party data easy to use, compare, and fuse.

The researcher has finished interviewing Caltrans employees from different divisions and departments to gather information. After that, they were able to create the first draft of the technical memo. The document presents the summary of the findings from expert interviews and a review of available documents on data flows within Caltrans. This focuses on developing general performance-based specifications for the use of third-party data by Caltrans to monitor car and truck traffic within the state.