

JOINT TRANSPORTATION RESEARCH PROGRAM

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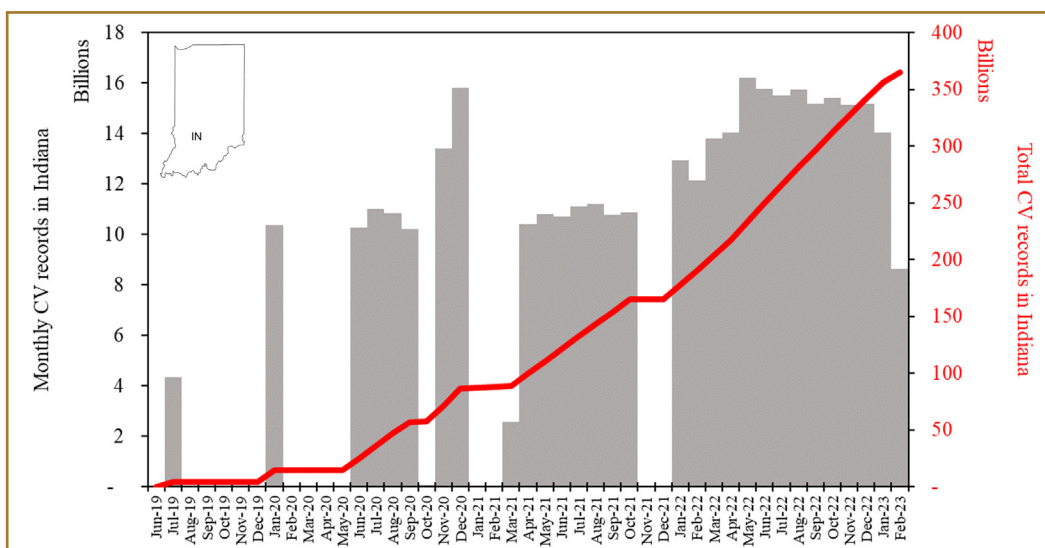
Connected Vehicle-Centric Dashboards for TMC of the Future

Motivation

The adoption of dashboards and tools into Traffic Management Centers (TMC) has been growing thanks to advancements in connected vehicle (CV) data. These tools are now being utilized—not only for analyzing work zones, severe crashes, winter operations, and traffic signals—but also for providing measures for characterizing overall system mobility, resiliency, and after-action assessments. Traditional tools are enriched by incorporating newer, higher-fidelity, and complementary datasets. As interest in these tools has grown, this project facilitated the improvements and added features to meet the needs of INDOT and their partners.

Study

Previous studies have extended to concepts that include the enhanced trajectory-based CV data into dashboards that aid agencies in assessing and managing roadways. This study presents the extension of these tools to further improve the value and insights they provide. It also highlights the evolution of CV data in Indiana. This study also assesses the growth in penetration rates after the addition of commercial truck data alongside the passenger car data. Sections of this study also present the impact of rain intensity on interstate traffic and incorporation of such weather data into heatmap and other tools. Updates to existing dashboards and a summary



Connected vehicle data records in Indiana (364.6 billion as of February 17th, 2023).

of newly developed dashboards are synopsized in this report. Finally, this report presents a case study that highlights the use of these tools to assess and analyze the impact of tornadoes on interstate traffic in Indiana.

Results & Impact

A summary of the results and key findings from this report are presented below.

- CV data in Indiana has grown to over 364 billion records (Figure 2.1).
- The average overall penetration rate of CV data on interstates has increased to 6.32% in May 2022 with trucks accounting for 1.7% (Figure 2.7).
- Very heavy rain events (precipitation rate greater than 8 mm/hour) have been found to decrease average speeds by 8.4% compared to no rain conditions (Figure 3.4).
- Implementation of the trajectory heatmap tool and improvements to the heatmap and delta speed v2 dashboards (Figure 4.1).
- An impact assessment of tornadoes on interstate traffic (Figure 5.1).

The work zone and hard braking reports disseminated weekly continue to simplify the identification of critical issues and monitor impact from the implementation of any corrective measures in such areas. Furthermore, additional agencies, such as the Indiana Toll Road have now adopted these tools and there is a new FHWA

Pooled Fund project on Work Zone Analytics (solicitation 1592) being initiated to facilitate implementation of these reporting metrics in other states.

Recommendations

The main recommendations from this study include, but are not limited to, the following.

- Continue the dissemination of upgrades to the existing tools and engagement with peer stakeholders.
- Continue to support tools (Figure 4.1).
- Continue to incorporate emerging datasets into real-time dashboards.

Recommended Citation for Report

Sakhare, R. S., Desai, J., Woker, W., Li, H., Mathew, J., Mahlberg, J., Saldivar-Carranza, E. D., Horton, D., & Bullock, D. M. (2023). Connected vehicle-centric dashboards for TMC of the future (Joint Transportation Research Program Publication No. FHWA/IN/JTRP-2023/17). West Lafayette, IN: Purdue University. <https://doi.org/10.5703/1288284317642>

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