Kansas Department of Transportation

TECHNICAL SUMMARY

Evaluation of Near-Miss Crashes Using a Video-Based Tool

Report Number: K-TRAN: KU-21-4 ▪ Publication Date: November 2023

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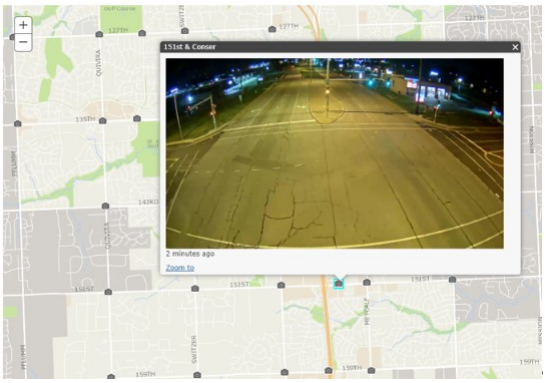

Overland Park Traffic Locations with Real-Time Update

Introduction

Vision-based trajectory data provide useful information for analyzing roadway safety and interactions of roadway users (e.g., drivers, pedestrians, bicyclists). Several companies offer vision-based software that promises to identify near-miss crashes between vehicles, pedestrians and vehicles, or bicycles and vehicles by estimating surrogate measures for these crashes using trajectory data. However, the accuracy of these tools for predicting near-miss crashes has not been evaluated. Transoft Solutions offers a popular vision-based tool that has been deployed in several cities throughout the United States and Canada. This research project evaluated the Transoft Solutions tool to assist local agencies, such as the Kansas Department of Transportation (KDOT), in identifying the benefits of deploying such technology in their network.

Project Description

This research investigated the prediction accuracy of a video-based tool developed by Transoft Solutions for predicting near-miss crashes at signalized intersections. The research team selected two signalized intersections in Overland Park, Kansas, and collected two weeks of video data from both locations. Only weekday data were collected for the two weeks in February and March 2021. The data were provided to Transoft Solutions, and analyzed results were accessed from the vendor website. Approximately 10 percent of the data were sampled for manual validation, which included drawing vehicle trajectories and conflict spots on top of the computer screen and measuring time manually in milliseconds. Both post-encroachment time (PET) and time-to-collision (TTC) data were validated based on three conflict categories (critical conflicts, minor conflicts, and potential conflicts) and three weather and traffic conditions

(rainy peak condition, sunny peak condition, and sunny off-peak condition). Four performance measures (mean absolute deviation - MAD, root mean squared error - RMSE, mean absolute percentage error - MAPE, and root mean squared log error - RMSLE) were selected, and a one-way analysis of variance (ANOVA) with Tukey's post hoc test was carried out for each analysis.

Project Results

Both the PET and the TTC data showed that sunny weather had better predictability than rainy weather. Statistical analysis revealed a significant difference between means from observed and predicted values for the PET data. Overall, the video-based tool by Transoft Solutions demonstrated moderate predictability and overestimated the conflict measures for both the PET and the TTC data.

Project Information

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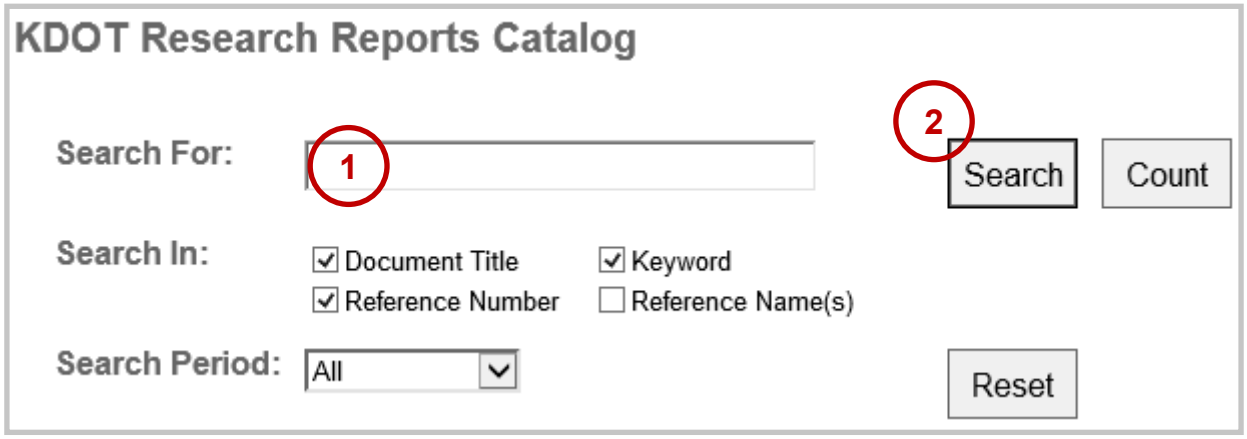

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