

# 2022 Mid-Continent Transportation Research Symposium

Ames, Iowa

September 14–15, 2022

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## Virtual Detection of Problematic Ramps Using Connected Vehicle Data

Raghupathi Kandiboina, Iowa State University

Anuj Sharma, Iowa State University

### Abstract

Objective: Identifying the anomalous ramps based on the abnormal driving behavior using connected vehicle data

Introduction: Connected vehicle (CV) data is established to be one of the reliable sources for incident detection, traffic maintenance and management on highways. However, its use on identifying the anomalous locations based on driving behavior is limited. Hence, the present study is an attempt to identify the problematic ramps using vehicle probe data provided by WEJO, which captures a portion of the traffic volumes in IOWA. The data provides hard acceleration and hard braking events which are considered to be abnormal driving behavior that occurs during the extreme driving conditions. Thus, the problematic ramps are expected to be identified based on the frequency of hard acceleration and hard braking events detected by probe data with respect to the traffic volume and time of the day.

Methodology:

- (1) Identifying the hard acceleration and hard break events on ramps along with the vehicle trajectories using probe data.
- (2) Establishing the event clusters on ramps using DBSCAN algorithm at a proximity of reasonable distance and time.
- (3) Detecting the problematic ramps having high frequent clusters with respect to volume and time of occurrence.
- (4) Identifying the standard reasons for the abnormal driving behavior on the identified ramps.

Expected results:

The ramps having issues such as defects in geometric design, signal design and surface condition etc. can be identified using the above method for further action.