

Safety Data Initiative (SDI) State and Local Tools Dashboard Demo

Transcript of Waze Demo Video

Speakers: Erika Sudderth and Daniel Flynn

Part 1

Speaker: Erika Sudderth

Slide 1:

In support of the US DOT Safety Data Initiative, our team at the Volpe National Transportation Systems Center has evaluated potential safety applications of crowd-sourced Waze data.

We first developed state-wide crash models that provided reliable hourly estimates of police-reportable crashes, based on Waze events and other roadway information. We then focused on testing safety applications of the methods with state and local transportation partners.

Slide 2:

Our team collaborated with the City of Bellevue, Washington to test if Waze event data offers actionable insights to inform their Vision Zero strategies.

The Volpe team first compiled an interactive dashboard integrating Waze events, police reported traffic crashes, and 911 calls related to traffic incidents from NORCOM. In the dashboard, the user can filter the crash reports by day of week, hour of day, or date range. The dashboard also includes some summary tables showing crash counts by data source over time. The dashboard helps Bellevue transportation planners explore patterns of individual crash reports from different data sources. By including the Waze and Norcom reports, they can identify locations where frequent traffic crashes are reported by the public, but may not result in a police report.

Slide 3:

To more clearly identify high risk roadway segments within the city of Bellevue, Volpe developed an additional set of dashboards to display traffic crash counts by roadway segments. These dashboards focus on police-reported crashes. The first shows the number of observed crash counts in 2018 on each roadway segment. Users can filter the data by time of day, weekend or weekday, road functional class, mobility areas and by Bellevue's high injury network. So we can look at all of the segments that are on the high injury network or all of the segments that are not on the high injury network. And the high injury network was developed in a separate study. And as each of these filters are applied, both the map and the chart at the bottom showing crash counts by day of week are updated.

Slide 4:

The second dashboard shows the same data, but weighted by crash severity to highlight the road segments with the most frequent and most severe police-reported crashes, such as this section of 118th Ave SE.

Slide 5:

These dashboards that Volpe developed with the City of Bellevue support a variety of traffic safety applications. In the final set of dashboards, we've mapped the camera locations that Bellevue identified as high priority locations to deploy video analytics for safety monitoring, with limited resources, in part using our dashboards.

To conclude, the data processing and integration methods that we've developed, along with the dashboard designs can be adapted to support a variety of traffic safety solutions at other small to medium cities.

I will now turn it over to Dan Flynn, who will demonstrate a state-wide application.

Part 2

Speaker: Daniel Flynn

Thank you -- I'll now demonstrate the work that we have been doing with the Tennessee Highway Patrol as a case study partner. The goal was to develop crash propensity models to better guide state troopers to where they can have the most impact in reducing crashes or responding to them quickly.

We developed a predictive analytics model based on the Highway Patrol's current tool, which uses historical crashes, weather forecasts, and upcoming special events to estimate where and when crashes are most likely to occur.

The Volpe team then took that model and added the crowdsourced Waze traffic incident data. First, we applied the predictive analytics model at the spatial and temporal scale currently used by the Highway Patrol, as shown in this dashboard.

This dashboard allows users to select by day of week (click day of week menu), hour of day (right click twice), or county, to zoom in on a particular focus time and place.

The map divides the state into grid cells 42 square miles in size, with colors representing a crash probability from 1 to 5, 5 being the highest. This model is based on one year of training data, and applied to an upcoming week. In this case, we trained the model on data from spring 2018 through spring 2019, and applied the model to an upcoming week in May 2019. Selecting Davidson County, where Nashville is, we can look at some of the details.

Each grid cell (hover over red) shows the maximum crash probability in the selected time period, with additional details on the variability.

Next, we used the same input data (historical crashes, weather, special events, and crowdsourced traffic incident reports from Waze) and applied it to a finer temporal and spatial scale. This dashboard shows the results at a one-hour and one square mile resolution. This model had very high accuracy over the one-year training period, and likewise we applied it to one future week in May 2019 for this demonstration.

Waze Demo Video Transcript

Again selecting Davidson County, we see some more detail on the hour by hour variation in the crash probabilities. Within a day of week, we can also see the hour by hour variation, zoomed in for a particular hexagon.

We continue to work with Tennessee highway patrol to transfer this approach to their operational model.

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