

With Wejo data, TTI Enables TxDOT to Deploy Proactive Data-Driven Solutions That Improve Road Safety and Accessibility

Background

The Texas A&M Transportation Institute (TTI) is an agency of the State of Texas and member of The Texas A&M University System. TTI addresses complex transportation challenges and opportunities with innovation, objectivity, and unmatched technical expertise. TTI researchers are thought leaders in their fields, producing practical, implementable products and strategies, and ensuring the organizations they serve have the research-based results they need to make informed decisions.

The Texas Department of Transportation (TxDOT) is one of the organizations TTI serves. TTI is using an array of innovative technologies, including Wejo's Connected Vehicle Data (CVD), via the Esri ArcGIS Online

platform, in research projects aimed at assisting TxDOT in its efforts to improve roadway safety and access. One of these projects is focused on improving safety and accessibility to the Permian Basin region in West Texas.

Rapid development of energy exploration and production in the Permian Basin has resulted in significant economic growth for the area. As a result of that growth, more truck traffic is leading to congestion and increased public safety risks. TxDOT tasked TTI with taking a research-based, data-driven approach to examine trends regarding how the region's roads and the numerous driveways located near oil/gas leases were being used and recommend accessibility and safety improvements.

The challenge

As the TTI team began the project, it became clear the Permian Basin area was a data-poor environment. Traditional methods to collect data on traffic trends were not going to be fast or accurate enough. Due to the region's rural and vast geography, collecting the relevant data manually would be costly and time consuming, with a lack of infrastructure and physical sensors to leverage. The heavy truck traffic would also put team members in the field collecting data on remote highways in danger. And while traffic and crash reports from public record could be a useful start, they were retrospective in nature, limited in coverage of rural Texas, and, in some cases, could be years old. This made it challenging to access quality data that could provide reliable

insight into how the roads were currently being used in the Permian Basin, especially given the recent boom in economic activity there.

In addition, the TTI team was not just seeking basic reports on crashes and congestion for the analyses. Instead, team members wanted to gain insight into driver behaviors on the roads. They wanted to understand not just where crashes were happening, but what vehicles were doing before those crashes and how those actions could have been altered to avoid future accidents. This was data the team simply did not have.

Therefore, the TTI team decided it was critical to expand beyond traditional methods to safely and efficiently obtain a more granular picture of what was happening on roadways in the Permian Basin.

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If you think of a painting analogy, **CVD is the fine detail.** Traditional data sets are the broad-brush strokes – the shapefile, roadway design, traffic volume and crash reports – CVD is unmatched in its ability to add color to things like speed, hard-braking and turning movements that we otherwise would not have. //



Solution

TTI researchers looked to an array of state-of-the-art big data solutions to fill their need for expanded insights, including Wejo CVD. While traffic and crash reports alongside expert local insights provided a rough outline of what was happening in the Permian Basin, CVD filled in the gaps. Generated directly from active connected vehicles every few seconds, CVD includes things like vehicles' geographic coordinates, speed, timestamps, hard-braking and -acceleration events. It is easily visualized, and because it does not rely on physical sensor infrastructure, CVD reliably covers rural areas in the U.S.

The TTI team was able to use CVD alongside other traditional and telematic data sources to put together ESRI story maps that illustrated vehicle operating characteristics in a clear and succinct way across the region, including when vehicles were turning into driveways and where hard braking was happening. With CVD, the team could better understand the human behavior element in their road activity analysis – a critical piece of the puzzle when analyzing how to improve safety. The data was also helpful in providing snapshots into the impacts of traffic queueing at busy road construction sites in the Permian Basin.

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We bring CVD together with our traditional data collection methods and have found it to be **an awesome answer for our needs.** We want to keep the expert in the expert system but adding that behavioral layer you get from CVD provides a more comprehensive, data-driven picture. //





Result

With CVD, TTI could provide data-driven recommendations to TxDOT, including where to install new driveways or retrofit existing ones along the corridors in the Permian Basin region to improve accessibility, mobility, and public safety. Initial analysis indicated crashes in the area could be prevented by better turn lanes. The team also determined a better system to limit hard braking, and ultimately mitigate crashes, by alerting drivers of what's ahead. Recommendations included putting in place a mile marker and driveway signing program for permanent infrastructure, and adding transverse rumble strips and portable, changeable message signs for unexpected occurrences such as stalled vehicles or traffic queues.

Now in the process of implementing these recommendations, TxDOT can efficiently deploy strategies with data-driven solutions that will curb crashes and reduce fatalities. While the analysis of crash data will need to be evaluated over time, the initial results are very positive. With the TTI team's innovative big data collection method and analyses, they were able to bring TxDOT proactive ways of addressing and measuring road safety and accessibility. Instead of examining only crash data and implementing changes measured by crash reports five years from now, the TTI team is realizing the potential of CVD as a leading indicator of issues to help TxDOT develop data-driven actions to take before crashes and fatalities occur.

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Traditional traffic studies look only at infrastructure and not the human component. CVD changes that. **It lets us see how humans are interacting with a given environment** and make decisions based on that. Human error is often the reason for crashes, so if we can understand what's behind those errors and try to correct them with better road designs, signage or other means, it can have a huge impact on safety. //

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