Understanding Patterns in Marijuana-Impaired Traffic Crashes: A Case Study on Louisiana

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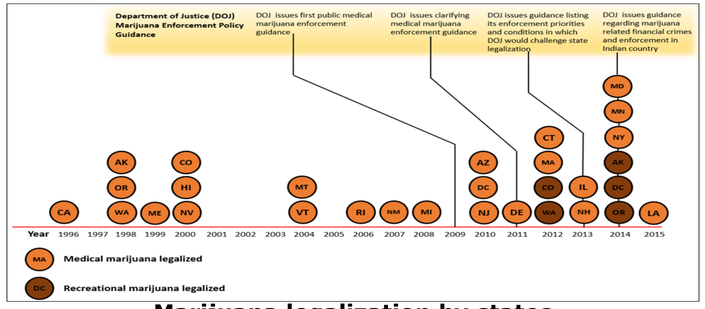
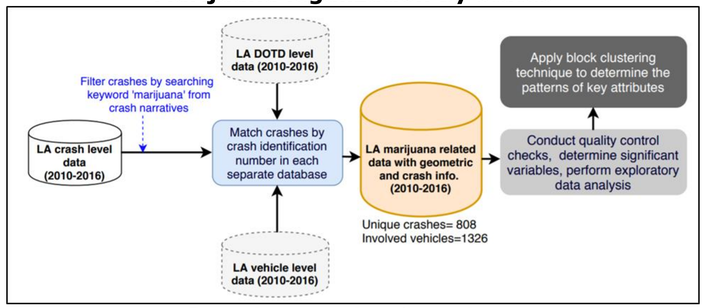
Abstract

- In Louisiana, crashes involving marijuana have increased by 195 percent (from 2010 to 2016).
- This study collected seven years of marijuana-involved crash data from Louisiana to identify the key association factors and their patterns.
- The research team identifies the hidden association patterns of key attributes from the complex crash dataset using the cluster correspondence analysis.



Marijuana legalization by states



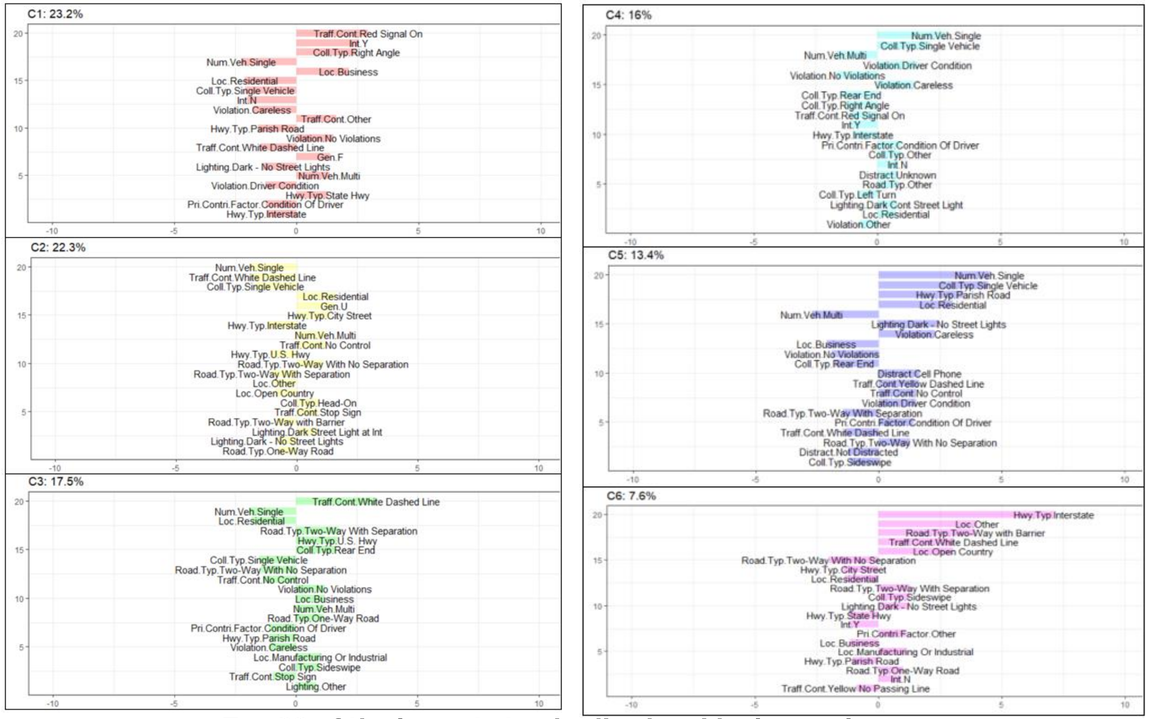
Data integration flowchart

Methodology

- Used a text searching algorithm to determine the crashes associated with the keywords: "marijuana," "cannabis," and "benzodiazepine."
- From the total crash data, 808 marijuana involved crashes were identified from 2010–2016 crash data.
- Applied cluster correspondence analysis to determine the patterns of the key associations from complex nature of crash data.

Key Findings

- The biplot display depicts two clusters are near to the origin (Cluster 2 and Cluster 3), two clusters (Cluster 1, 4) are within the ranges of the origin. The rest clusters (Cluster 5, and Cluster 6) have large distances from the origin.
- Some of the key clusters are: single-vehicle crashes during dark with no streetlights, multi-vehicle rear-end crashes at two-lane roadways with separation, multiple vehicle head-on crashes at two-lane roadways with no separation, female drivers at the intersection involved in multiple-vehicle right-angle crashes, careless single-vehicle crashes, and open country interstate crashes.



Top 20 of the largest standardized residuals per cluster

Conclusions

- The reactions of cannabis consumption are difficult to acquire, but its effect on driving is considered as less severe than alcohol.
- Six different clusters of attribute groups were identified using the analytical method.
- Swerving in the lane, slower reaction time, impaired decision-making, impaired driving performance, and risk-taking are just some of the side effects drivers suffer under the influence of marijuana.