

# Investigating Problem of Distracted Drivers on Louisiana Roadways

Highlight | Feb. 2018

Project No. 17SALSU10

PI: Dr. Xiaoduan Sun (ULL)

POP: June 2017 –  
November 2018

## *Determining the impact of driver distractions on the safety and operations of Louisiana's roadways*

While the ongoing developments of autonomous vehicles show a great promise to reduce fatalities and injuries, the full implementation will take years to become a reality. Effective crash countermeasures can provide quick payoff in crash reductions. Distracted driving is ranked as one of the most serious problems faced by DOTs and law enforcement agencies today. The need to address this issue and implement effective countermeasures is urgent for roadway safety improvement.

This project aims to investigate the scale of the problem in Louisiana, analyze characteristics of distracted drivers and how their behaviors affect roadway safety. To address this objective, the research team will collect the data including possibly distractive driving frequencies, type of distractive driving behavior, traffic citation data and crash data. The research outcomes will provide recommendations to combat distracted driving thereby potentially reducing fatalities and serious injuries caused by such unforgiving and yet common types of driving behavior admitted by many drivers.

## Problem Statement

Distracted driving is the act of engaging in other activities while driving, which take the driver's attention away from the road. Louisiana's definition for distracted driving is, "A distracted or inattentive driver is one who is actively engaged in any activity that diverts his/her attention away from the task of driving. The distraction could be manual, visual or cognitive and be inside or outside the vehicle."

Even with the law banning cellphone usages while driving in many states including Louisiana and significant effort made on curbing distracted driving over the last decade, it is still a leading cause of car crashes in the United States. Texting, talking on a cell phone, eating and drinking are the most common driver distraction. The National Highway Traffic Safety Administration (NHTSA) reports that 660,000 Americans are using cell phones at any given moment. In 2015, distracted

driving fatalities represented 22.8 percent of all fatalities and 48.4 percent of serious injuries. Based on the crash database, distracted driving causes 19.5 percent of fatalities and 31.8 percent of serious injuries in Louisiana. A share of 55.6 percent of all injury crashes and 55.8 percent of total property damage only crashes occur on Louisiana roads due to distraction in driving. Distracted driving is ranked as one of the most serious problems faced by DOTs and law enforcement agencies today. The need to address this issue and implement effective countermeasures is urgent for the state to reach Zero Death Destination goal. This proposal aims to improve public safety by conducting indepth investigation on the scope of the problem and providing recommendations to address distracted driving.

## Summary

The research team is exploring the crash investigation reports of distracted driving related crashes. Crashes with at least one distracted driver on all type of highways occurred between 2006 and 2015 are currently being studied. Preliminary analysis showed somewhat increasing trend of distracted driving crashes over the years. Conventional statistical methods and data mining algorithms will be used to predict distracted driving crashes. Manual observation of visible distracted driving behaviors at selected intersections and on selected segments is currently underway. The project team has selected three segments and three intersections for observation. Graduate and undergraduate students are collecting data related to vehicle type, gender, age group and distraction type (i.e. hand-held cell phone, manipulation by texting or ear device). At intersection, drivers of stopped vehicles at red light are observed for potential distracted behavior. On segment, drivers passing a reference point during a certain time interval are observed. Data have been collected for a total of three hours at intersection and for four hours observation on segment. Statistical analysis will continue to be performed on the collected data to

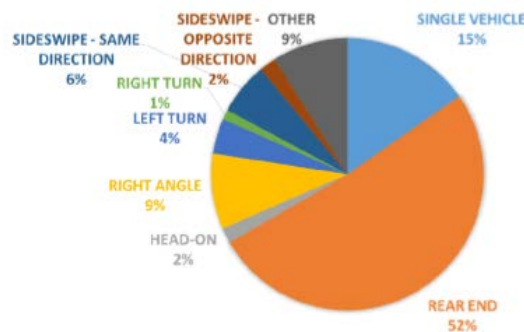


identify vulnerable groups, inter-relationships among attributes, other significant patterns.

Analysis of driving behaviors from recorded videos of thirty-five drivers is ongoing with an aim to identify the combination of emotions that lead to distracted behaviors while driving. Mounted cameras were set up inside thirty-five vehicles to identify distracted driving behavior. High definition videos, separated in three-minute clips, were analyzed utilizing FaceReader software. The software recognizes emotions in the form of facial expressions based on the movement of eyes, mouth etc. Analysis of valence of emotions will be used to identify distracted driving behavior utilizing advanced data mining algorithms.

## Findings

A total of 157,155 crashes with at least one distracted driver occurred during 2006-2015 in Louisiana were identified for analysis. According to the crash reports, drivers were distracted by cell phone, 13.6%, other electronic device (pager, navigation device, etc.), 3.3%, other inside the vehicle (e.g. talking with passenger), 42.3%, other outside the vehicle (e.g. distracted by outside object), 40.8%. Crash analysis by collision type shows majority of distracted behaviors result into rear end and single vehicle crashes (Figure 1). Preliminary analysis of crash data shows that cell phone and outside distractive elements contribute most to distraction related crashes in Louisiana. Urban roadways are more prone to distracted driving related crashes than rural roadways. As the research work progresses, analysis results will be updated.



**Figure 1. Distracted driving crashes on Louisiana roadways by collision type during 2006-2015.**

Analysis from manually observed data collected so far indicates gender and time of the day do not significantly impact distracted driving. Age group and vehicle type show association with distracted driving both at intersection and on segment. However, the results are only valid for one intersection and one segment. The overall result might change based on further data collection from two intersections and two segments.

Face Capture technology captures facial expression and converts into digital form. FaceReader software, a specific type of Face Capture Program, recognizes gaze direction, head orientation, and personal characteristics to some extent. It measures valence of several emotions of the user and presents the emotions graphically. Facial expressions are coded to determine characteristics which distinguish distracted driving behaviors from non-distracted driving behaviors. A total of eighty-four valid video sections were analyzed. In-vehicle video data analysis using FaceReader software requires iterative testing for more accurate combination of valence of emotions aiming at better prediction of distracted driving behavior.

## Impacts

The research outcomes should provide recommendations to combat distracted driving and thereby potentially reducing fatalities and serious injuries caused by such unforgiving and yet common type of behavior admitted by many drivers.

## Tran-SET

Tran-SET is Region 6's University Transportation Center. It is a collaborative partnership between 11 institutions (see below) across 5 states (AR, LA, NM, OK, and TX). Tran-SET is led by Louisiana State University. It was established in late November 2016 "to address the accelerated deterioration of transportation infrastructure through the development, evaluation, and implementation of cutting-edge technologies, novel materials, and innovative construction management processes".

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For more information about Tran-SET, please visit [our website](#), LinkedIn, Twitter, Facebook, and YouTube pages. Also, please feel free to contact Mr. Christopher Melson (Tran-SET Program Manager) directly at [transet@lsu.edu](mailto:transet@lsu.edu).

