

Wrong-Way Driving Entry Points on interstate highways Using land-use Impact Assessment and 911 calls

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\$ 120,001



Evaluating WWD hotspots on highways using 911 calls and impact assessment

The intense severity of wrong-way driving (WWD) accidents is alarming for traffic management agencies and incentivizing the need for economical, convenient, and efficient management to ensure safety of motorists. Most of the WWD crashes are the result of intoxicated driving, where the driver out of consciousness takes the wrong entrance to highway and put other motorists into a life-threatening danger. This study aims to identify WWD entry points of urban highway ramps and develop an analysis methodology. The methodology examines the origin and driving behavior of impaired drivers by utilizing a land-use impact assessment (alcohol-serving establishments (ASE) proximity to exit ramps) and 911 call and crash database. These entry points will help traffic control agencies to apply cost-effective countermeasures for detecting WWD in real time. Even though there are established WWD countermeasures exist in Bexar County highway such as- WWD sign, those countermeasures are not sufficient to solve the problem of WWD. The outcome of this research is to assist DOTs to reduce the number of WWD incidents in state highways. It will help the authorities to geolocate the potential hotspots of WWD in a specific region in which they can implement the warning WWD sensor countermeasure and alarm the motorists in their opposite way and call for law enforcement to intervene. Also, it will provide effective countermeasures that can be implemented region-wide and state-wide particularly at hot-spots zones with frequent incidents of WWD events.

Problem Statement

WWD events are infrequent on highways but often lead to severe injury and/or fatalities. The safety of highway motorists is jeopardized by drivers who make wrong-way entries on highways. The impaired drivers, who might be intoxicated or visually restricted, take the wrong way entrance ramp to enter the highway. Upon entering the highway, they either correct themselves by turning around, or continue to drive in the opposite direction until they crash with incoming traffic unless they are forced to

stop by law enforcement. The unpredictability of WWD behavior leaves no specific information for decision-makers to identify the exact geolocations of the entrances unless there is any detection system exist. State transportation agencies have been tackling wrong way driving (WWD) incidents by applying countermeasures at highways entry ramps to reduce their frequency. However, the lack of financial resources for utilizing costly detection and real-time warning systems at tens of entry points on highways in metropolitan areas is a barrier to decrease WWD crashes. According to the crash data of last two years in Texas, 72% of WWD accidents ended up with one or more fatalities. Also, the deployment of these warning detection systems are extremely costly to install at each entry point.

Objectives

The primary goal is to promote safety against WWD crashes by identifying the entry points to the highway systems. This type of crash constitutes only about three percent of all crashes on highways, tend to be more severe, increasing the probability for fatalities or incapacitating injuries. With lack of determining access points and hotspot region it delays the intervention of law enforcement. The technical objectives are to: 1) Identify direct contributing factors that lead to WWD at entry ramps such as geometric alignments, land-use characteristics, and driver behavior; 2) Combine crash data and 911 calls databases to estimate time and location of WWD entry ramps. This will enable DOT to target resources in solutions at these ramps; 3) Identify countermeasure strategies for remediation that could be applied state-wide, region-wide, at site-specific hotspot WWD zone.

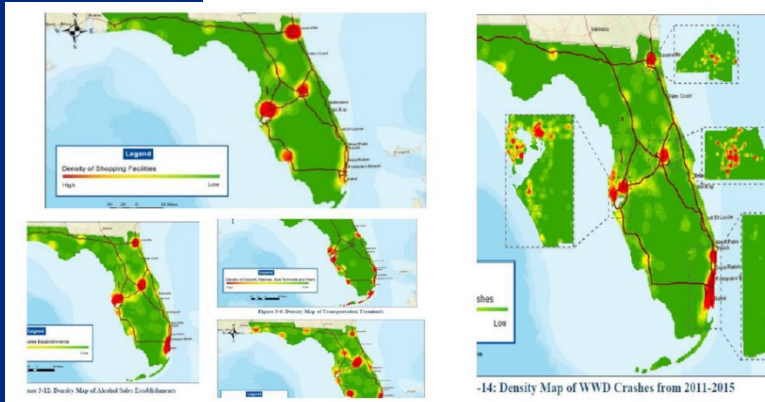


Figure 1. Land-use Impact Assessment by FDOT for WWD Mitigation.

Intended Implementation of Research

The proposed research project will provide funding to one Master student at UTSA. The research activities will provide the participating researchers with hands-on experience in data analysis and modeling, and geographic location analysis with software. Graduate students will have the opportunity to learn about this research project by incorporating our findings in a graduate level course. Engage undergraduate students in term projects related to WWD crashes and countermeasures. Virtual seminars will be given to professionals and industrial practitioners in conferences and workshops hosted by Tran-SET. Educational materials will be developed and made available to the transport industry and State DOTs. This material will be incorporated in transportation courses at UTSA, and disseminated through other universities in Region 6.

Anticipated Impacts/Benefits of Implementation

The proposed technology is centered upon the highway safety improvement by identifying WWD entrance locations. This is an innovative research concept that yet to be studied. Findings from this study will demonstrate integrating data analytics with mapping analysis of existing databases to ensure safety for highway user towards “vision zero” program. This field of knowledge will be introduced as an integral part of this study to the junior researchers and transportation engineers in public and private sectors through the proposed plan.

Web links

- Tran-SET’s website
<https://transet.lsu.edu/research-in-progress/>

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”.

Learn More

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

