2013 ATSIP DATA VISUALIZATION PROJECT AWARD

Mississippi Public Safety Data Laboratory
Social Science Research Center, Mississippi State University
Tonya T. Neaves, Project Director
1 Research Blvd. Ste. 103, Starkville, MS 39759
662-325-7033
psdl@ssrc.msstate.edu
http://psdl.ssrc.msstate.edu

INTRODUCTION. Visualizing traffic safety information is paramount. The power to effectively portray statistics regarding vehicle crashes has the ability to enact changes that can save lives. Much work has been done to show these statistics, especially with the work of the Fatality Analysis Reporting System, but these are generally only shown as raw values. While the specifics are good to know, it is not easy to get a visual overview as to what is actually happening on roadways and which are safer than others. The Mississippi Vehicle Crash Visualization System (VCVS) presents a way to quickly and easily visualize crash statistics, through the use of the system and query tools. This system was developed with the intention to permit users to identify and respond to areas that suffer the worst from accidents.

NEED. Trying to visualize traffic crashes is a difficult task, for there are many variables to be considered in conducting effective analysis. A technique to easily determine the parts of the road that are more prone to certain types of crashes, or accidents in general, to get a feel of the overall "crash landscape" of an area would be quite helpful. This VCVS attempts to visualize vehicle statistics such that insight can be easily gained from a system rather than having to crunch raw numbers. Crash data are presented as an aggregate over the data set rather than as individual incidents as it is infeasible and inefficient to show all accidents.

DATA. The crash data represented are provided by the Mississippi Public Safety Data Laboratory (PSDL) through collaboration with the Mississippi Office of Highway Safety. These records have been anonymized, and no personally identifiable information can be gleaned from the visualization presented here. The data are exported from ReportBeam, the electronic accident reporting system used by the State of Mississippi. These data have attributes such as time, day, year, number of injuries, number of vehicles, harmful event, and GPS location, among others. In this system, the only attributes considered are harmful event type and year of incident. Harmful event types were determined by those in charge of the ReportBeam system and have not been changed. Data are available from January 2004 until early October 2012. This data set included over 600,000 records across the entire state.
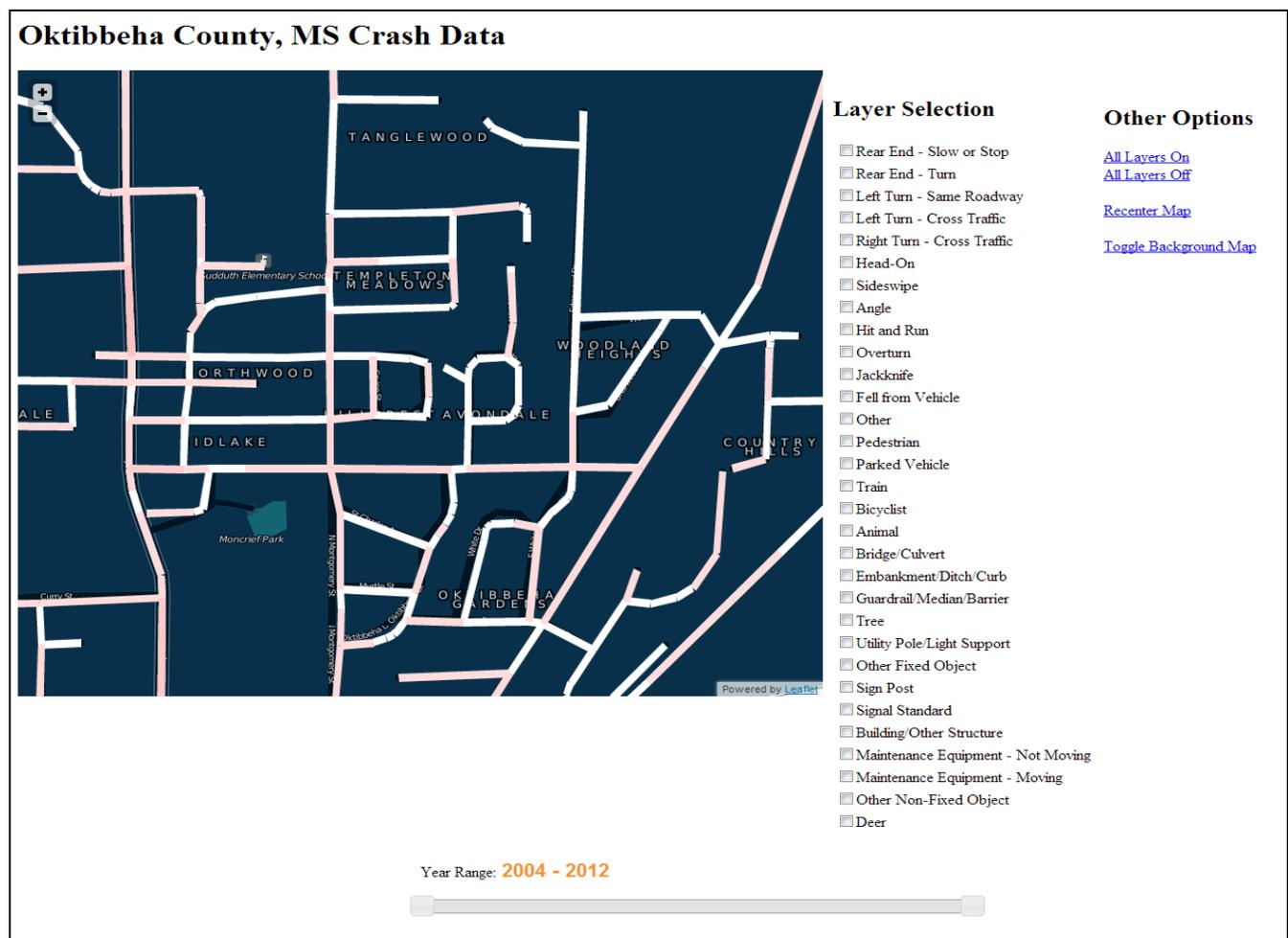
LIMITATIONS. Given that VCVS is still under development, it was determined that it was not feasible to plot each of the crash statistic points statewide for the given time frame. Instead, a subset of the data, those points located in Oktibbeha County, Mississippi, were exported and used for initial exploration validity of this system. Out of the 11,405 records obtained for Oktibbeha County, only 10,707 were useable as a result of location constraints as some GPS coordinates were given outside of the bounds of the county.

DESIGN. The VCVS takes data set of accident locations and their attributes and coordinates them with the nearest road such that each has a grounded spatial location. The visualization shows these roads as segments whose colors correspond to the number of accidents that have occurred nearest to them. The visualization also allows for querying of the data in temporal aspects, namely the selection of accidents

between specific years. It is also possible to query specific types of accidents to find how they are distributed spatially over the crash landscape and over time as well. Details are given on demand when a specific road segment is selected which gives a further breakdown of the accidents that have occurred in that area. If a user so desires, it is possible to switch between a light and a dark map background.

USE. Users of this system should be able to easily determine where crashes of certain types occur. This is achieved by allowing the user to pan around Oktibbeha County and find portions of roads that are brightly red colored. Users should also be able to determine what different crashes occur in different places, and this is achieved by allowing users to select which crash type they are interested in (rear end, bicyclist, sign post, ditch, etc.). Users should also be able to determine the trends of crashes over a specified time period. Users should be able to explore the area and gain insight of accident statistics more easily than simply looking at numbers in a spreadsheet.

IMPACT. The expected users of this system are legislative policymakers, administrative decision-makers, and/or law enforcement officers in the areas of public safety, public health, emergency management, and/or transportation who can determine problem areas on roads and can launch commissions to make those sections of roadways safer. Other users are statisticians who would like to easily find information of interest and conduct analysis of those areas for reports regarding traffic safety in particular. Any individual who wishes to be more informed regarding the safety of roads in Oktibbeha County could be a potential user of this visualization as it is not confidential or proprietary information.

To utilize the VCVS, please visit http://psdl.ssrc.msstate.edu/dataviz/beta/civs/.