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Surrogate Safety Assessment Model Overview

Overview

A simulation and analysis project with Federal Highway Administration (FHWA) to predict the safety of roadways before crashes occur.

The Surrogate Safety Assessment Model (SSAM) is a software application developed to automatically identify, classify, and evaluate traffic conflicts in the vehicle trajectory data output from microscopic traffic simulation models. The SSAM also has built-in statistical analysis features for conflict frequency and severity measures that can aid analysts in the design of safe traffic facilities.

SSAM (version 2.16) was initially developed and released to the public in 2008 with additional enhancements completed in 2017. This latest 2017 release, SSAM (version 3.0), improves software performance and adds capability of differentiating between at grade and grade separated conflicts at interchanges.

Description

The safety of intersections, interchanges, and other traffic facilities is most often assessed by tracking and analyzing police-reported motor vehicle crashes over time. Given the infrequent and random nature of crashes, this process is slow to reveal the need for remediation of either the roadway design or the flow-control strategy. This process is also not applicable to assess the safety of new roadway designs that have yet to be built or new flow-control strategies that have yet to be applied in the field.

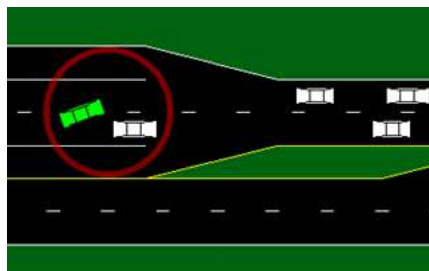
This research was funded by the FHWA, and consists of two initial projects:

- Surrogate Safety Measures From Traffic Simulation Models, Publication Number: [FHWA-RD-03-050](#).
- Surrogate Safety Assessment Model (SSAM) and Validation, Final Report: [FHWA-HRT-08-051](#).

Detail

A conflict is, simply put, a scenario where two road users will likely collide without evasive action. An example is illustrated in Figure 1, where a vehicle is angling across two lanes to the left turn bay and has abruptly cut in front of another vehicle that must decelerate to avoid a collision.

Traffic Studies



Traffic conflicts have been studied since the late 1960s as a technique to assess the safety of a location, with the understanding that conflict frequency is correlated with the risk of actual collision.

Conflict scenario from SSAM application

Software Applications for Analysis

Conflict studies traditionally use personnel trained to identify and record conflicts observed at an intersection. In this research, the SSAM software application was developed to automate conflict analysis by directly processing vehicle trajectory data. Researchers specified an open-standard "universal" vehicle trajectory data format designed to provide the location and dimensions of each vehicle approximately every 10th of a second. It is hoped that video processing technology will, in the coming years, be capable of automatically extracting vehicle trajectory data adequate for SSAM processing.

Although, the trajectory file format was previously supported as an export option by four popular traffic microsimulation packages—AIMSUN, Paramics, TEXAS, and VISSIM—the differentiating of grade separated conflicts feature is available for 1) VISSIM 9 (and its later release), and 2) ETFOOM (Enhanced Transportation Flow Open-Source Microscopic Model) Cloud Service (ECS) because of the implementation of the "z-coordinate" in trajectory files by their software developers. It is also important to recognize that the SSAM software is mainly focused on conventional automobile type of safety conflict analysis while the VISSIM trajectory output files would contain all traffic (vehicles, pedestrians, buses, bicycles, etc.) in its trajectory output files.

Resources

The SSAM software is available freely to the public. Please reference to the "SSAM Software Download" section below in order to download the SSAM software installation program and its related documents.

SSAM Software Download

Please find SSAM software code (version 3.0) and program information here on [GitHub](#). Please use Google Chrome if you do not have the latest version of Microsoft Edge.

Parties interested in downloading the SSAM software (version 3.0) are encouraged to carefully review the README.txt and documents in the "Documentation" folder prior to the installation of SSAM software. Please also be advised that FHWA is only distributing the SSAM software but does not provide any additional follow-up technical assistance.

This SSAM software tool and its related documents are disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The U.S. Government assumes no liability for the use of the information contained in this SSAM tool and its associated documents.

Project Contact

Clayton Chen
clayton.chen@dot.gov

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U.S. DEPARTMENT OF TRANSPORTATION

Federal Highway Administration

1200 NEW JERSEY AVENUE, SE

WASHINGTON, DC 20590

202-366-4000

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