UTC Project Information	
Project Title	Behavior-based Predictive Safety Analytics – Pilot Study
University	Virginia Tech
Principal Investigator	Johan Engstrom
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Funding Source(s) and Amounts Provided (by each agency or organization)	Safe-D (Federal): $60,000
Total Project Cost	$60,000
Agency ID or Contract Number	Grant No: 69A3551747115 Project: 02-020
Start and End Dates	4/28-2017 - 12/31 2017
Brief Description of Research Project	This project addresses the emerging field of behavior-based predictive safety analytics, focusing on the prediction of road crash involvement based on individual driver behavior characteristics. This has a range of applications in the areas of fleet safety management and insurance, but may also be used to evaluate the potential safety benefits of automated driving systems. A particular focus in the project is to explore the possibilities of using large sets of naturalistic crash and behavior data collected as part of commercial fleet- and behavior change management programs, collecting tens of thousands of crashes annually. Since this data is subject to legal, ethical and business-related constraints, an important activity in the project is to discuss with relevant stakeholders how barriers in using this data for academic research can be overcome. Moreover, a state-of-the-art review will be conducted and a conceptual framework for relating behavior to crash causation/risk developed. Based on this, a proof-of-concept demonstration of how crash involvement may be predicted on the basis of individual driver behavior will be performed, utilizing an available naturalistic dataset of sufficient size. Finally, a curriculum for undergraduate and graduate studies on behavior-based predictive safety analytics will be developed along with a module in graduate-level course. The present project is designed as an eight-month pilot initiative with the objective to provide the basis for a future more comprehensive research effort.

Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	**(1) Final report** A summary of the main results from the project. **(2) Report on proof-of concept demonstration** Description of the methodology and results from the proof-of-concept demonstration on predicting crash risk from individual driver behavior characteristics. **(3) EWD plan** • A report outlining curricula for how graduate and undergraduate education can be enhanced to support the development of advanced predictive crash analytics, including the identification of a set of key study topics and suggestions how they can be integrated in existing courses. • Course material will be developed for a specific PhD-level course module devoted to predictive risk analysis, to be taught as part of the subsequent larger effort envisioned to start early 2018. • The main educational audience targeted here is students, both at the undergraduate and graduate levels as well as other stakeholders (e.g. behavior-based service providers, fleets, insurance companies, vehicle OEMs or federal agencies) for in-house competence development. **(4) T2 plan** • As part of Task 4 (Opportunities and barriers for utilizing commercial naturalistic crash data in academic research), a series of meetings will be set up with a set of key stakeholders (fleet safety/predictive analytics service providers, vehicle OEMs, commercial vehicle fleets, insurance companies and federal agencies). Besides data access, a further objective of these meetings will be to obtain feedback on how these organizations believe that they could benefit from, and deploy, the results from the present project. • Project results will be disseminated through existing networks of the project members, social media and common T2 activities arranged in Safe-D. • To the extent that novel innovations are developed in the project (e.g., novel risk prediction methods), Virginia Tech Intellectual Properties (VTIP) and SDSU's Technology Transfer Office will be utilized to ensure that IP is protected and exploit the possibilities for future commercialization.
Impacts/Benefits of Implementation (actual, not anticipated)	The goal of the project is to investigate how crash risk may be predicted from individual driver behavior or driving style based on naturalistic crash/behavior data. The successful development of such predictive models have huge potential benefits in as it makes it possible to identify and coach unsafe drivers early. This is also an area of strong current commercial interest in the insurance and commercial transportation sectors.

Web Links
    • Reports
    • Project website
	http://www.vtti.vt.edu/utc/safe-d/index.php/projects/behavior-based-predictive-safety-analytics-pilot-study/