Police Crash Report Forms and ADAS

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Our study contributes to an understanding of ADAS crash data collection and optimal techniques for handling and validating the crash report data, making it a key resource for practitioners and scholars interested in using police-reported crash databases to assess the safety outcomes of ADAS features. We also aimed to answer whether and how ADAS information should be collected by crash reports, and provide recommendations and guidelines for enhancing crash reporting processes and future revisions of MMUCC.

METHODS

Our data for this research question come from three major sources: an exploratory literature review, a review of current crash report forms, and the two most recent versions of the Model Minimum Uniform Crash Criteria (MMUCC), available on the National Highway Traffic Safety Administration's (NHTSA) website. We reviewed all sections and fields on the crash report forms and in the MMUCC to identify the ADAS or AV-related terms, including the following key words and phrases: AV, autonomous, automated, driverless, automation, ADAS, driver assistance, automatic emergency braking, blind spot detection, cruise control, and technology. We created an inventory of the crash report forms for all 50 US states, using the latest publicly-available crash forms or manuals (whichever is the latest). Year of the latest information was identified from the form or manual.

FINDINGS AND DISCUSSION

A consistent and trustworthy data source for evaluating the involvement of ADAS features in traffic crashes is vital for assessing ADAS's safety outcomes and improving ADAS systems development and management. Unfortunately, no existing data sources can serve this purpose. In the MMUCC 6th edition, NHTSA reduced contents about ADAS and Automated Driving to reduce the workload of police officers. By emphasizing the ability to link the MMUCC data with state-level data, NHTSA now relies on state-level agencies to collect detailed information on ADAS and AV-involved collisions. Police crash reports data could help address this shortage of empirical data on ADAS and transportation crashes for the following three key reasons:

- Police crash reports employ a standardized approach to data collection that is less sensitive to employee turnover, which has the potential to improve available data over time [1]. Past studies have highlighted the importance of consistent terminology and compliance with standardized data collection in cross-state transportation safety trend analysis [2]. Inconsistencies in ADAS naming [3] pose a challenge to combining ADAS crash data collected by different entities if the data collection protocol is inconsistent. Police crash report data are informed by the MMUCC guidance to some degree. Although MMUCC is a voluntary standard, it is well prepared and commonly followed, leading to greater consistency in data collection.

- Previous studies suggest that the crash data obtained from police reports are more reliable and accurate than those obtained from self-reported crashes [4] or medical records [5]. Police-reported data also provide comprehensive information on the location, injury severity, vehicle models, and demographic details of drivers and victims. Police reports also include unstructured data such as descriptions of crashes and diagrams of crash scenes [6], the greater details of which can be used to provide important insights into ADAS system design and real-world effects. Police crash reports can also be linked with other data sources, including emergency records and medical treatment data, to provide additional layers of information [7] and greater detail of the long-term health implications of people involved in vehicle collisions.

- Police crash reports are a trusted data source used at federal, state, and local levels to examine transportation safety trends, develop transportation safety plans, and allocate transportation safety funding [8]. As some ADAS systems may benefit from particular road infrastructure and internet access (e.g., for connected AVs) [9], relevant fields need to be included in police-reported data to help local agencies plan and ultimately develop supportive infrastructure.

Although the potential benefits of using police crash reports to collect ADAS information are high, researchers have not explored how current crash reports collect ADAS information, nor have they adequately addressed the specifics of what and how ADAS information should be collected in crash reports. This study sought to fill those gap and recommend directions for improving the collection, streamlining, validation, and processing of ADAS-related data.

[1] Vachal, "Advancing Indian Nations' Motor Vehicle Crash Reporting."
[2] Nie et al., "Electronic Crash Reporting: Implementation of the Model Minimum Uniform Crash Criteria (MMUCC) and Crash Record Life Cycle Comparison."
[3] Abraham et al., "What's in a Name."
[4] Claros et al., "Examining Police and Driver Crash Reports in Wisconsin."
[5] Bilston and Brown, "Accuracy of Medical and Ambulance Record Restraint and Crash Data Information for Child Occupants."
[6] Lusk, Asgarzadeh, and Farvid, "Database Improvements for Motor Vehicle/Bicycle Crash Analysis."
[7] Hosseinzadeh et al., "Data Linkage for Crash Outcome Assessment."
[8] ODOT, 2020
[9] Lu, Wevers, and Van Der Heijden, "Technical Feasibility of Advanced Driver Assistance Systems (ADAS) for Road Traffic Safety."

article citation