Integrating Best-Practices for Aviation Accident Reporting into DMV Accident Reports for Ground Autonomous Vehicles

Sky O. Eurich, Dr. Francesca M. Favarò
San Jose State University, RiSAS Lab

Problem Statement
The CA DMV mandates the reporting of two types of situations:
1. Accidents reports: 1-page summary of the event of a collision (Form OL 316)
2. Yearly reports of all disengagements, failures for situations that did not lead to an accident, but are still flagged as system failures, and thus potentially dangerous to the public (now Form OL 311R)

GOAL: Improve current regulations by leveraging best-practices from the aviation field related to:
- Establishing a solid safety culture to account for new technology and the new role of human operator (back up, remote control center)
- Ensuring consistency in report formatting to include unified taxonomies towards the creation of a new template

A Need for Safety Culture
- Currently there is no system in place for sharing defect/error information across users and/or manufacturers
- Key ingredient to establish safety culture
- Did other drivers experience the same malfunction?
- Promote a safety culture regarding AVs, from the regulatory level to the individual user level
- Create an online portal for user-based safety and incident reporting, similar to how the Aviation Weather Center shares pilot reports (PIREPs) online and with federal agencies

CA DMV Accident (OL316)
- Can be improved with clear instructions on how to fill out the form, to include definitions of terminology used
- What constitutes minor vs major damage?
- Does not include section for detailed information about the AV involved

CA DMV Disengagement (OL311R)
- Can be made stronger with a unified taxonomy when reporting disengagement cause and two-layered chain of causality

NTSB Accident Report (6120.1)
- Highly detailed instructions with definitions of terminology used within the report
- Includes sections for exhaustive information about the vehicle suffering the accident:
  - e.g. engine & TBO, landing gear, additional equipment and instruments
  - Includes manufacturer information for various components and on-board equipment
  - Provides reporter with exhaustive weather, surface conditions, lighting, environment, and location options
  - Reporting options for pilot experience, total hours, time in type and certifications

Proposed Changes
- Current AVs incidents and accidents reporting method can be improved by taking the following ingredients:
  - Take into account software contributions to failure mechanisms and two-layered chain of causality for software failures
  - Make more informative by requiring information on mileage driven prior to disengagement
  - Definition of an official taxonomy
    - Manufacturers’ reports include a wide ranging set of disengagement causes, most of which are not clearly defined and are uninterpretable to everyone else
    - Collaboration with manufacturers is needed to pool together a list of terms employed and associated definitions
  - Inclusion of disengagement frequency (disengagements per miles driven) along with historical trends
  - Inclusion of detailed location information in each report type (beyond the type of road – similar to accident form)
  - Inclusion of detailed weather information in each report (similar to accident form)
  - Inclusion of technical specs and information about test vehicle

ASRS Incident Report
- Incorporates end users into aviation safety practices and facilitates a safety culture at all levels
- Includes Coding Taxonomy and Abbreviation supplements
- Provides reporter with the ability to list detailed weather information
- Online portal for report submission and database queries
- Database includes optional search parameters and outputs multiple file types
- Suggests reportable information about the chain of events and human performance considerations

Info and Contacts
- Email: sky.eurich@sjsu.edu
- Email: francesca.favaro@sjsu.edu
- http://www.sjsu.edu/people/francesca.favaro/

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