TAARS 2024 Conference Lesson Plan

Overview

After the crash, you need to know if an autonomous or driver assistance system was installed in the vehicle, if it functioned properly, and if it affected the outcome of the accident. Get a detailed look at the rapidly growing field of self-driving vehicles and driver assistance systems. What is available, how does it work, and what will happen in a crash scenario? How does it affect product liability and accident reconstruction? All major auto manufacturers are equipping the majority of their new vehicles with such technology, and it's important for the accident reconstructionist to "stay ahead of the curve". We'll look at how to determine if the systems were installed, if they were enabled, and if they functioned as designed. The presentation will be interspersed with many videos and photos, allowing attendees to experience for themselves the implications of this exciting new field. Examples of the systems at work will be demonstrated, and attendees will conduct tests and demonstrations on a closed test facility to evaluate ADAS performance.

Learning Objectives:

By attending this seminar, participants will be able to:

- Summarize what technology exists, both in current production and under development
- Identify applicable state and federal regulations
- Explain the ethical and societal implications of the technology
- Define performance parameters based on currently available standards and protocols
- Use available electronic data specifically tailored for ADAS systems
- Formulate a plan to approach accident reconstruction using the new technology

Who Should Attend

This course is designed for accident reconstructionists involved in the investigation and analysis of vehicle crashes who need to understand the field of self-driving vehicles, and how to apply it in a collision reconstruction. In addition, this course can be valuable to professionals involved in risk analysis and product liability.

Prerequisites

Prior experience with accident reconstruction and the litigation process is beneficial. An engineering background is helpful but not required.

Topical Outline

- Overview of the Available Technology
    - Adaptive cruise control
    - Blind spot monitoring and cross traffic alert
    - Lane departure warning and lane keeping
    - Lane centering
    - Forward collision warning and automatic emergency braking
    - Traffic signal awareness
    - Full automation
- SAE Levels of Self-Driving Vehicles
    - Level 1: Cruise Control
    - Levels 2-3: Adaptive cruise control and lane keeping/departure warning
    - Levels 4-5: Hands-off operation

    - The significance of fallback performance
- The Enabling Technologies
    - Sensors
        - Sonar/ultrasound
        - Cameras, including driver monitoring
        - Radar
        - GPS
        - LIDAR
        - V2V/V2I
    - Computing capabilities
    - Actuators
        - EPAS (Electric Power Assist Steering)
        - Throttle by wire
        - ESC (Electronic Stability Control) brake control
    - Infrastructure
        - Road mapping
        - Networked signal timing
- Breakout on above topics
    - Sonar/ultrasound
    - Radar – forward 2 stage, BLIS/CTA, and range/speed/azimuth. Reflective values
    - LIDAR – 360 degree scene mapping and need for high computing power
    - V2V/V2I – Vehicle-to-Vehicle and Vehicle-to-Infrastructure; Platooning and advance warning of road conditions; Partial adoption effects
    - Computing capabilities
        - Image classification
        - Artificial intelligence and neural nets
        - Probabilistic decision making
- Current state of rapidly changing technology
    - Current OEM production
    - Supplier and independents
- Standards and Protocols
    - IIHS, NHTSA, Euro NCAP, ISO, SAE
    - Surrogate vehicles
- Media and public perception
- Liability and Litigation
    - Current status
    - Crash and injury statistics
    - Future status
    - Insurance implications
- EDR Examples
    - Toyota Vehicle Control History
    - Nissan Consult III
    - Bendix Wingman
    - Detroit Assurance
- Examples of ADAS – Successes and Challenges
- Testing and demonstration on closed test facility
- Future Work

    - Exemplar EDR data
    - Fingerprinting ADAS performance
- Wrap-up and Conclusion

Instructor: Alan Moore

Mr. Moore is a mechanical engineer and principal of A.B. Moore Forensic Engineering. He specializes in vehicle accident reconstruction, vehicle design analysis, and mechanical engineering consulting. His past experience includes two decades of accident reconstruction and automotive engineering. He previously worked at Ford Motor Company and General Dynamics as a vehicle design engineer. Mr. Moore also served as a high-performance driving coach for aspiring race car drivers through the Porsche Club of America. Mr. Moore holds a Bachelor of Science in Mechanical Engineering from Michigan State University and a Master's degree in Business Administration from the University of Florida. He is a licensed Professional Engineer, a Board Certified Forensic Engineer, and an ACTAR-certified accident reconstructionist.