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Auto Physical Damage

Advanced Driver-Assistance System Trends and Challenges

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7 MIN READ

Automotive safety trends have come a long way from the first seatbelts offered in the 1950s. Today's advanced driver-assistance systems (ADAS) do more than reduce the risk of injuries during a crash; some features are designed to help avoid accidents altogether.ADAS features first debuted as options on high-end luxury vehicles. However, it hasn't taken long for them to become widespread across multiple price points and styles. "At least one ADAS feature is available on 92.7 percent of new vehicles available in the U.S. as of May 2018," AAA reports.[1] If your shop isn't servicing this technology daily, it soon will be. When properly used these advanced systems could potentially prevent millions of crashes per year.[2] Unfortunately, despite their proliferation, many drivers are still unaware of their safety limitations. For example, research has shown that 80 percent of drivers did not know their vehicle's blind spot monitoring limitations or incorrectly believed that the systems could monitor the roadway behind the vehicle or reliably detect bicycles, pedestrians and vehicles passing at high speeds. The AAA Foundation for Traffic Safety found that "Lack of understanding or confusion about the proper function of ADAS technologies can lead to misuse and overreliance on the systems, which could result in a deadly crash."[3]

To improve safety on the road, it's essential that the automotive industry play an active role in education about technology which helps make our cars safer. In light of that, let's take a look at seven of the latest trends in advanced driver-assistance as well as what's new in driver safety education.

The Latest Advanced Driver-Assistance Systems

1. Automatic Emergency Braking Systems

According to the NHTSA powered site safercar.gov, “Automatic emergency braking (AEB) systems detect an impending forward crash with another vehicle in time to avoid or mitigate the crash.” Since 2006 two AEB systems have been available in the U.S. Dynamic brake support (DBS) automatically supplements the driver's braking if the driver doesn't brake hard enough to avoid a crash. Crash imminent braking (CIB) automatically applies the vehicle's brakes to slow or stop the car if the driver takes no action to avoid a crash.[4]

Once only available in luxury models, the list of vehicles offering this technology is quickly expanding. In 2018 ten automakers equipped most of their vehicles with AEB,[5] including the Chevy Malibu which earned an IIHS Top Safety Pick + Award when equipped with the Low Speed Forward Automatic Braking system.

> With nearly half of all two-vehicle crashes involving a rear-end collision, forward-collision warning along with automatic emergency braking is considered to be the next critical advance in automatic safety.

2. Forward-Collision Warning Systems

Consumer Reports describes forward-collision warning (FCW) as a system that uses sensors "to scan the road ahead, and to alert the driver if the distance to a vehicle ahead is closing too quickly. The systems alert the driver with an audible, haptic (touch), and/or visual cue."[6]

With nearly half of all two-vehicle crashes involving a rear-end collision, this technology along with AEB is considered to be the next critical advance in automatic safety.[6] The Insurance Institute for Highway Safety (IIHS) estimates as many as 1.9 million total crashes could be prevented or mitigated each year if forward-collision systems were standard on all vehicles.[6]

3. Pedestrian and Cyclist Detection

Until recently most vehicle's detection sensors focused on cars or trucks in the road ahead. However, some automakers are now offering pedestrian and cyclist detection collision avoidance systems.[7]

Volvo's Pedestrian Detection with full auto brake was the world's first offering of a "radar- and camera-based system that can detect pedestrians in front of the car, warn if anyone walks out into its path—and then automatically activate the car's full braking power if the driver fails to respond in time."

Note that there are limitations to this technology, such as difficulty identifying obstacles in low light or at night.

4. Lane Keep Assist

Going one step farther than offering a lane departure warning, lane keep assist (LKA) is technology that focuses on keeping a car from drifting out of its lane and steering it in the right direction. "The amount of steering input can range from gentle nudges meant to guide the driver, to full-on interventions," writes Digital Trends.[8]

Lexus offers a variety of lane assistance systems including All-Speed Dynamic Radar Cruise Control to help the driver keep their vehicle centered in the lane, even in traffic and on highways with gradual curves. Cadillac goes one step further offering the first true hands-free driver assistance. Super Cruise is available on 2019 CT6 models and is intended for use only on limited-access freeways separated from opposing traffic.

5. Adaptive Headlights

In the span of a hundred years headlights have gone from lanterns fueled by oil to using electricity to create light with LED bulbs,[9] but they've always served the same function of illuminating the road directly in front of the vehicle. Until now. Unlike these traditional headlights, new adaptive forward lighting (AFL) use electronic sensors that can detect steering angle to swivel based on the direction a car is heading. The benefit is that they increase visibility on dark curved roads and over hills.[10]

AFL is available across many General Motors vehicles and is touted to help improve the driver's ability to see things on the side of the road before they become a hazard.

6. Backup Camera

Backup cameras have been an available option on cars and trucks for over a decade, what's new about this technology is that federal law now requires that all vehicles made for the American market be equipped with rearview monitoring technology. Besides their safety benefits eliminating blind spots, they help drivers park more quickly.[11]

In the future, look for 360-degree “birds-eye view” camera systems and digital mirrors like those offered in the Lexus ES which replace side-view mirrors with exterior cameras and screens inside the car.

7. Drowsiness Detection

While most safety features are aimed at what is going on around a vehicle, new safety features are turning their attention to drivers. Current technology like Mercedes Attention Assist recognizes signs of driving fatigue through sensors which record steering behaviors and other parameters such as time driven and lane deviation. This data is compared against normal driving patterns, and if the system detects drowsiness, it will display a coffee cup and an alert message.

Within the next five years, vehicles may also be able to monitor head and eye movements, as well as heart rate and body temperature to determine if drivers are operating outside of their norms.[12]

> Today's technologies cannot be considered as a safe replacement for a human driver.

My Car Does What?

The answer to the question “My car does what?” is so critical to public safety that the National Safety Council has dedicated an entire national campaign to it. Their campaign focuses on educating drivers so that they understand that the key word in ADAS is “assistance.” Today's technologies cannot be considered as a safe replacement for a human driver.

According to new research, there is much work to be done in educating drivers. Nearly 40 percent of drivers did not know their forward collision warning and automatic emergency braking system's limitations, or confused the two technologies — incorrectly reporting that forward collision warning could apply the brakes in the case of an emergency when the technology is only designed to deliver a warning signal.[3]

ADAS Collision Repair Considerations

Technology helps make our cars safer, but when an accident does occur it also makes our cars significantly more complex and difficult to repair. As more and more advanced safety features become mandatory, the collision repair industry is presented with new challenges in achieving safe and proper repairs. Also, the adoption of advanced technologies on newly redesigned vehicles is having a pronounced impact on their repair costs. Read how the presence of ADAS functionality in just one vehicle component, the “smart windshield,” adds to the cost and complexity of collision repair: Windshield Complexity and Their Role in ADAS Functionality.

[1] Hawkins, Andrew. "The Names Car Companies Use to Describe Their High-Tech Features Sound Like Gibberish" TheVerge.com, 29 Jan. 2019. Web.

[2] AAA. "Advanced Driver Assistance Systems." Exchange.AAA.com, 29 Jan. 2019. Web.

[3] Johnson, Tamra. "Drivers Rely Too Heavily on New Vehicle Safety Technologies In Spite of Limitations" NewsRoom.AAA.com, 26 Sept. 2019. Web.

[4] Safecar. "Automatic Emergency Braking." SafeCar.gov, 29 Jan 2019. Web.

[5] Rader, Russ. "10 Automakers Equipped Most of Their 2018 Vehicles with Automatic Emergency Braking" NHTSA.gov, 13 Mar. 2019. Web.

[6] Bartlett, Jeff. "The Drive to Make Your Next Car Safer." ConsumerReports.org, 9 June 2015. Web.

[7] Ramey, Jay. "How Does Pedestrian and Cyclist Detection Work? Autoweek Explains" AutoWeek.com, 12 May 2017. Web.

[8] Edelstein, Stephen. "Everything You Need to Know About Lane Keep Assist and Lane Departure Warning" DigitalTrends.com, 26 Sept. 2017. Web.

[9] Hamer, Tony and Michele. "History of the Headlight." ThoughtCo.com, 5 March 2019. Web.

[10] My Car Does What. "Know More. Drive Safer." MyCarDoesWhat.org, 29 Jan. 2019. Web.

[11] Gareffa, Peter. "What You Need to Know About Backup Cameras." Edmunds.com, 8 Nov. 2018. Web.

[12] Taub, Eric. "Sleepy Behind the Wheel? Some Cars Can Tell." NYTimes.com, 16 March 2017. Web.

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