Advanced driver-assistance systems

Advanced driver-assistance systems, or **ADAS**, are systems to help the driver in the driving process. When designed with a safe human-machine interface, they should increase car safety and more generally road safety.

Tesla driver assistance system may reduce accidents due to negligence and fatigue from long term driving.[1]

Most road accidents occurred due to the human error. Advanced driver-assistance systems are systems developed to automate, adapt and enhance vehicle systems for safety and better driving. The automated system which is provided by ADAS to the vehicle is proven to reduce road fatalities, by minimizing the human error.[2] Safety features are designed to avoid collisions and accidents by offering technologies that alert the driver to potential problems, or to avoid collisions by implementing safeguards and taking over control of the vehicle. Adaptive features may automate lighting, provide adaptive cruise control, automate braking, incorporate GPS/ traffic warnings, connect to smartphones, alert driver to other cars or dangers, lane departure warning system, automatic lane centering, or show what is in blind spots.

Contents

Description

An increasing number of modern vehicles have advanced driver-assistance systems such as electronic stability control, anti-lock brakes, lane departure warning, adaptive cruise control and traction control. These systems can be affected by mechanical alignment adjustments. This has led many manufacturers to require electronic resets for these systems, after a mechanical alignment is performed, ensure the wheel aligner you are considering to allow you to meet these safety requirements.[3]

There are many forms of ADAS available; some features are built into cars or are available as an add-on package. Also, there are aftermarket solutions available.[4] ADAS relies on inputs from multiple data sources, including automotive imaging, LiDAR, radar, image processing, computer vision, and in-car networking.[5] Additional inputs are possible from other sources separate from the primary vehicle platform, such as other vehicles, referred to as Vehicle-to-vehicle (V2V), or Vehicle-to-Infrastructure(such as mobile telephony or wifi data network) systems.

Advanced driver-assistance systems are one of the fastest-growing segments in automotive electronics,[6] with steadily increasing rates of adoption of industry-wide quality standards, in vehicular safety systems ISO 26262, developing technology specific standards, such as IEEE 2020 for Image Sensor quality[7] and communications protocols such as the Vehicle Information API.[8]

Next-generation ADAS will increasingly leverage wireless network connectivity to offer improved value by using car-to-car (also known as Vehicle to Vehicle, or V2V) and car-to-infrastructure (also known as Vehicle to Infrastructure, or V2X) data.[9]

Developments

On March 31, 2014, the US Department of Transportation's National Highway Traffic Safety Administration (NHTSA) announced that it will require all new vehicles under 10,000 pounds (4,500 kg) to have rear view cameras by May 2018.[10] The rule was required by Congress as part of the Cameron Gulbransen Kids Transportation Safety Act of 2007. The Act is named after two-year-old Cameron Gulbransen, who was killed when his father failed to see the toddler, and accidentally backed his SUV over him in the family's driveway.[11]

GM offers vibrating seat warning, in Cadillacs starting with the 2013 Cadillac ATS. If the driver begins drifting out of the traveling lane of a highway, the seat vibrates on the side of the seat in the direction of the drift, warning the driver of danger. The Safety Alert Seat also provides a vibrating pulse on both sides of the seat when a frontal threat is detected.[12] The system was first offered by Citroen in 2006 as part of its AFIL (Lane Departure Warning) system. See: Driver drowsiness detection.

Alcohol ignition interlock devices do not allow the driver to start the car if the breath alcohol level is above a predescribed amount.[13] The Automotive Coalition for Traffic Safety and the National Highway Traffic Safety Administration have called for a Driver Alcohol Detection System for Safety (DADSS) program to put alcohol detection devices in all cars.[14]

In September 2016, the US Department of Transportation's National Highway Traffic Safety Administration (NHTSA) published the Federal Automated Vehicles Policy[15], which describes the U.S. Department of Transportation's policies related to highly automated vehicles (HAV) which range from vehicles with advanced driver-assistance systems features to autonomous vehicles.

Implementations

- Tesla Autopilot
- Nissan ProPilot Assist
- mobileye

Feature Examples

- Adaptive cruise control (ACC)
- Glare-free high beam and pixel light
- Adaptive light control: swiveling curve lights
- Anti-lock braking system
- Automatic parking
- Automotive navigation system with typically GPS and TMC for providing up-to-date traffic information.
- Automotive night vision
- Blind spot monitor
- Collision avoidance system (Pre-crash system)
- Crosswind stabilization
- Cruise control
- Driver drowsiness detection
- Driver Monitoring System
- Electric vehicle warning sounds used in hybrids and plug-in electric vehicles
- Emergency driver assistant
- Forward Collision Warning
- Intersection assistant
- Hill descent control
- Intelligent speed adaptation or intelligent speed advice (ISA)
- Lane departure warning system
- Lane change assistance
- Night Vision
- Parking sensor
- Pedestrian protection system

- Rain sensor
- Surround View system
- Tire Pressure Monitoring
- Traffic sign recognition
- Turning assistant
- Vehicular communication systems
- Wrong-way driving warning

See also

- Autotech
- EuroFOT
- Intelligent Transportation System
- Traffic psychology

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