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In 2019, **26% of all motor vehicle-related fatalities** in the United States occurred in speed-related crashes. Traffic Sign Recognition is one vehicle safety system that endeavors to aid driver awareness of speed limits and other road signs. As a result, more and more new vehicles in the U.S. come with Traffic Sign Recognition as a standard or optional feature.

Read on to learn more about Traffic Sign Recognition in cars, how Traffic Sign Recognition works, and how this ADAS system is essential to other intelligent vehicle technologies.

What is Traffic Sign Recognition?

Traffic Sign Recognition (TSR) is an advanced driver assistance system (ADAS) that recognizes and relays traffic sign information to drivers via the instrument panel, multimedia, or heads-up display. In the United States, TSR systems can recognize *speed limit signs*, *do not enter signs*, and *stop signs*. Some can even detect *yield signs*, though it depends on the model. TSR aims to help make drivers more aware and able to make better safer driving decisions.

How does Traffic Sign Recognition work?

Traffic Sign Recognition uses advanced forward-facing cameras, generally mounted to the windshield, near the rear-view mirror. The camera handles road sign detection, and software processes them to classify what certain traffic signs mean. After traffic sign classification, the information is relayed to the driver, nearly in real-time.

TSR often uses the same forward-facing ADAS camera that tracks lane markings and informs your vehicle's lane departure warning system. So, it's common for these features to come in the same ADAS package.

Speed Limit Sign Recognition: TSR + GPS

What if there is no traffic sign where there should be one?

Traffic sign detection doesn't work under all circumstances, significantly when road signs are damaged, missing, or located miles apart. Due to the inherent issues with identifying road signs, some vehicles use a combination of TSR and navigation system GPS data to power their current speed limit display. Combining data from different sources makes for a better-informed driving experience.

Using Speed Limit Data to Limit Vehicle Speeds

What if your vehicle could provide speed limit data and real-time feedback on your speed relative to the limit?

Intelligent Speed Assistance (ISA), also called intelligent speed adaptation, is a similar advanced vehicle safety system largely unknown in the U.S. It uses GPS data, digital map data, and/or TSR system data from onboard cameras to display the speed limit to the driver. Then, depending on the ISA system, it provides speed limit alerts, gas pedal resistance, or limits gas flow to limit the speed entirely. However, commonly, ISA systems include a driver override via increased gas pedal pressure or the press of a steering wheel button. Drivers can also switch off ISA systems in their vehicle settings.

As of model year 2022, all new vehicles sold in the European Union will have ISA. In the United States, some cars are available with optional ISA advisory systems, like the **Mazda** Traffic Sign Recognition system, which includes an excessive speed warning (more on that below). However, the technology isn't yet widespread.

Which cars have Traffic Sign Recognition?

TSR is available from many automakers, but you won't find it in the basic ADAS package offered by most brands. Adoption of this ADAS lags far behind many other features, and you won't get it on just any new vehicle. Here are several automakers offering some version of TSR on new vehicles sold in the United States:

- Volvo Road Sign Information
- Audi Traffic Sign Recognition
- BMW Speed Limit Information
- **Mercedes-Benz Traffic Sign Assist**
- Honda Traffic Sign Recognition System
- **Mazda Traffic Sign Recognition**
- **Ford Speed Sign Recognition**

Traffic Sign Recognition Technology Today

Today, current technology isn't capable of determining all traffic signs or of operating in all conditions. Several circumstances limit the performance of TSR systems, including the following:

- Dirty or improperly adjusted headlights

- Dirty, foggy, or blocked windshield
- Warped, twisted, or bent signs
- Abnormal tire or wheel conditions
- A tilted vehicle due to a heavy load or modified suspension

While TSR and similar vehicle sensing technologies are instrumental in moving toward fully autonomous driving, we aren't there yet. Even TSR is merely a driver-assistance system. Drivers can't rely solely on any ADAS system to drive for them.

TSR Camera Calibration

Forward sensing cameras are not self-calibrating. Professional calibration is requisite for most ADAS systems to work correctly following fender benders, windshield replacement, suspension, or alignment changes. During calibrations, sensors, including forward-facing cameras, are aligned to the proper position. They are re-aimed to "see" traffic signs for you (in the right place relative to the car). As of the 2022 model year, all new U.S. passenger cars will have at least one ADAS standard. As a result, a growing wave of vehicles will need ADAS calibrations within the next few years. Despite this, most auto body shops are not prepared to handle these complex procedures. According to a 2020 industry survey, a mere **1 in 4 shop owners** reported being equipped to handle ADAS calibrations.

Key Take-aways

- In 2019, 26% of motor vehicle-related fatalities in the U.S. were due to speed-related crashes.
- Traffic Sign Recognition (TSR) is an Advanced Driver Assistance System (ADAS) that recognizes and displays traffic sign information to drivers.
- TSR uses forward-facing cameras to detect and classify traffic signs, helping drivers make safer decisions.
- TSR is often combined with GPS data to provide speed limit information even when signs are missing or damaged.
- Intelligent Speed Assistance (ISA) uses GPS and TSR data to display speed limits and can limit vehicle speed as well.
- TSR is available from various automakers in the U.S., but its adoption lags behind other ADAS features.
- TSR has limitations, including issues with headlights, windshields, signs, tires, and vehicle tilt.
- Professional calibration is required for ADAS systems to work correctly after specific events like windshield replacement.
- Car ADAS Solutions offers support and services for implementing ADAS calibration solutions.

FAQ – Traffic Sign Recognition and ADAS

What is Traffic Sign Recognition (TSR)?

Traffic Sign Recognition (TSR) is an advanced driver assistance system (ADAS) that identifies and communicates traffic sign information to drivers through displays like the instrument panel, multimedia system, or heads-up display. In the U.S., TSR typically recognizes speed limit signs, stop signs, and more, depending on the vehicle model.

How does Traffic Sign Recognition work?

TSR uses forward-facing cameras, usually mounted near the rear-view mirror on the windshield, to detect road signs. These signs are then processed by software to determine their meaning and are displayed to the driver, helping enhance awareness of speed limits and other critical information.

Is Traffic Sign Recognition the same as Intelligent Speed Assistance (ISA)?

No, Traffic Sign Recognition (TSR) and Intelligent Speed Assistance (ISA) are related but distinct systems. TSR focuses on recognizing and displaying traffic signs, while ISA uses GPS data, digital maps, and TSR information to display speed limits and may even restrict a vehicle's speed to comply with those limits.

Are all vehicles equipped with Traffic Sign Recognition (TSR)?

No, TSR availability varies by automaker and model. It is not a standard feature in most basic ADAS packages, and its adoption in the U.S. is still growing. Some automakers offer TSR as an optional feature in select models.

What are the limitations of Traffic Sign Recognition (TSR) systems?

TSR systems may have limitations in certain conditions, including issues with dirty or misaligned headlights, obstructed windshields, damaged road signs, abnormal tire or wheel conditions, or when a vehicle is tilted due to heavy loads. Drivers should not solely rely on TSR or any ADAS system for driving.

Why is camera calibration necessary for TSR and other ADAS systems?

Forward-facing cameras used in TSR and other ADAS functions require professional calibration after specific events such as windshield replacement, accidents, suspension changes, or wheel alignment. Calibration ensures the cameras are correctly positioned to detect traffic signs and operate accurately.

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