No one can argue that these numbers are staggering: in 2009, according to the National Highway Traffic Safety Administration (NHTSA), 5,474 people were killed and approximately 448,000 injured in crashes caused by driver distraction. According to a recent study by Virginia Tech, that accounts for about 80% of all accidents on the USA’s highways.

Collision Avoidance Systems are the most advanced technology available to fight road accidents and reverse this alarming trend. According to the Insurance Institute for Highway Safety (IIHS), as much as 1,165,000 accidents, 66,000 injuries and 879 deaths can be avoided by using forward collision warning systems. 179,000 accidents, 37,000 injuries and 7,529 deaths can be avoided by using lane departure warning systems. However, all approaches are not equal.

Collision technologies typically employ either radar- or camera-based (artificial vision) technologies. While radar may sound “higher tech,” camera systems are more effective, less costly, can provide more integrated technologies on a single, more reliable platform and are easier to install and maintain.

Radar does have its apparent advantages, including a long detection range (up to 150 yards) comparing to about 120 yards for a camera and an ability to operate under extreme weather conditions (camera cannot see when the driver cannot see). However, radar’s field of view is much narrower than a camera-based system (15 degrees vs. 35 degrees), and may give the driver a false sense of security when the driver cannot see. It is also more prone to false positives compared to cameras when it detects an object like a guardrail or vehicles traveling in different lanes, especially around curves.

Despite radar’s limitations, it is much more complicated and costly to install and maintain compared to camera-based systems. Some radar-based systems cost approximately $3,000 USD. Camera-based systems can be installed in less than 1.5 hours inside the windshield without causing permanent damage to the vehicle’s body or dashboard while the radar device itself must be placed on the outside of the vehicle and therefore more prone to damage and requires regular cleaning; two factors that increase maintenance costs.

A camera is much more effective at detecting and differentiating between moving and stationary objects. Radar has a limited ability to detect non-metallic objects including pedestrians, while a camera—when supported by artificial intelligence such as Mobileye’s, can not only detect and distinguish a pedestrian from all other objects, but can also monitor the behavior of a person and warn the driver if they’re likely to become a danger. Camera-based technology can actually specify types or sizes of objects and take that data into consideration during the threat assessment process, and its wider field of view enables better tracking of vehicles when the road curves. This combination of false positives, narrow field of view, limited ability to detect non-metallic objects, not detecting non-moving objects, higher cost, increased maintenance requirements all add-up to make vision based systems a better choice than radar for forward collision warning systems.

Experts do agree that active braking for trucks will be viable in the future, but only when it is based on two sensors fusion – both radar and a camera.

As accident avoidance technologies become more common in new models, our roadways will become exponentially safer. We applaud any efforts by the NHTSA, auto manufacturers and consumers to implement forward collision warning and lane departure warning systems in cars and trucks, and recommend they choose fusion or camera-based systems over radar for reasons of cost and effectiveness.

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