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Design of a Safety Vehicle for Blind

V. Saipushpa
M.Tech Student,
Department of ECE,
KITS for women's, Kodada, T.S, India

Mr. V. Srinivasa Rao
Associate Professor,
Department of ECE,
KITS for women's, Kodada, T.S, India

ABSTRACT:

A blind spot monitor is a vehicle-based sensor device that detects other vehicles located to the driver's side and rear. Warnings can be visual, audible, vibrating or tactile.[1][2] However, blind spot monitors are an option that may include more than monitoring the sides of the vehicle. It can include "Cross Traffic Alert," "which alerts drivers backing out of a parking space when traffic is approaching from the sides. As the technology increases we can solve many problems of the people. There are lots of persons who cannot walk very easily due to blindness. For them travelling with safety is a major problem. An intelligent electric vehicle is thus required to solve their problem. The vehicle is made with a lot of technologies such as Digital image processing for obstacle detection, edge detection and road detection, Sonar, Infrared and Lidar based Obstacle avoidance, GPS and Map based location guidance for vehicle, GSM based emergency servicing and semi automatic control system for vehicle. We propose a design of completly intelligent electric vehicle for blind which can be implemented successfully. The vehicle is designed in such a w«y that it can climb footpaths. The vehicle is designed to obey all traffic signals so that the design is apt for real world.

Keywords: *Artificial Intelligence, Obstacle A voidance, Sonar, Lidar GPS & GSM.*

1. INTRODUCTION:

Vehicle Safety Technology (VST) in the automotive industry refers to special technology (Advanced driver assistance systems) developed to ensure the safety and security of automobiles and passengers. Notable examples include car-to-computer communication devices which utilize GPS tracking features, geo-fencing capabilities, remote speed sensing, theft deterrence, damage mitigation, and vehicle-to-vehicle communication.

BLIS is an acronym for Blind Spot Information System, a system of protection developed by Volvo. Volvo's previous parent Ford Motor Company has since adapted the system to its Ford, Lincoln (automobile), and Mercury (automobile) brands.

This system was first introduced on the redesigned 2007 Volvo S80 sedan and produced a visible alert when a car entered the blind spot while a driver was switching lanes, using two door mounted lenses to check the blind spot area for an impending collision.

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Mazda was the first Japanese automaker to offer a Blind spot monitor, which they refer to as BSM (Blind Spot Monitoring). It was initially introduced on the 2008 Mazda CX-9 Grand Touring and remained limited to only that highest trim level through the 2012 model year. For 2013, the CX-9 Touring and Grand Touring both have BSM standard. T

Mazda also added BSM to the redesigned 2009 Mazda6 s Grand touring when it was introduced. It was added to additional trim levels as low as the 2013 Mazda6 i Touring Plus. It has also been added to various versions of the Mazda3 and CX-5, often as part of any option package.

On Ford products, the system was first introduced in the spring of 2009 on the 2010 Ford Fusion and Fusion Hybrid, 2010 Mercury Milan and Milan Hybrid and 2010 Lincoln MKZ. If side view mirrors are properly adjusted in a car, there is no blind spot on the sides.[3][4][5][6] This method was first revealed by George Platzer in a 1995 paper presented to the Society of Automotive Engineers.[3][4][6] The method is frequently overlooked in Driver's education classes, and takes some getting used to. Calculated elimination of blind spots by trained drivers is cheap, and obviates the need for expensive technological solutions to that problem, provided drivers take the time to set up and use their mirrors properly.[3]

George Platzer received a patent for the blind spot monitor, and it has been incorporated into various products associated with Ford Motor Company.[3] The blind zone mirror has been touted as "an elegant and relatively inexpensive solution" to this recognized problem.[3]

2. METHODOLOGY:

A blind spot in a vehicle is an area around the vehicle that cannot be directly observed by the driver while at the controls, under existing circumstances.[1] Blind spots exist in a wide range of vehicles: cars, trucks, motorboats, sailboats. and aircraft. Other types of transport have no blind spots at all, such as bicycles, motorcycles and horses. Proper adjustment of mirrors and use of other technical solutions can eliminate or alleviate vehicle blind spots.

In transport, driver visibility is the maximum distance at which the driver of a vehicle can see and identify prominent objects around the vehicle.[2] Visibility is primarily determined by weather conditions (see visibility) and by a vehicle's design.[3] The parts of a vehicle that influence visibility include the windshield, the dashboard and the pillars. Good driver visibility is essential to safe road traffic. Sign used in some countries to warn of a blind spot ahead on the road Blind spots may occur in the front of the driver when the A-pillar (also called the windshield pillar), side-view mirror, and interior rear-view mirror block a driver's view of the road. Behind the driver, there are additional pillars, headrests, passengers, and cargo, that may reduce visibility.

If side view mirrors are properly adjusted in a car, there are no blind spots on the sides.[4][5][6][7] Such an arrangement can greatly reduce the probability of side swipes and other accidents, particularly in lane changes. This method was first revealed by George Platzer in a 1995 paper presented to the Society of Automotive Engineers.[4][6][7][8] The method is frequently overlooked in driver's education classes, and takes some getting used to.[8][9] Calculated elimination of blind spots by properly trained drivers is cheap, and obviates the need for expensive technological solutions to that problem, provided drivers take the time to set up and use their mirrors effectively.[6][7] The arrangement — pointing the side view mirrors substantially outboard in a fixed mechanical formula — is relatively simple to achieve,

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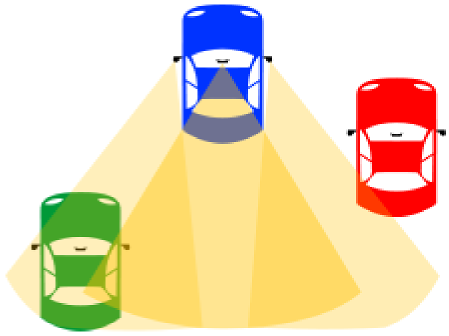
but it takes some knowledgeable effort. It is reputed to be a lifesaver.[4][5][6][7][8][9]

However, one source considers that method a driving mistake and claims it to be even more dangerous, because it creates other blind spots directly behind the vehicle—he lists nine reasons, e.g., when backing up—which are impossible to eliminate by a "shoulder check".[10][11]

Of course, rearward invisibility is an entirely different matter. The area directly behind vehicles is the source of Back-up collisions, particularly involving pedestrians, children and objects directly aft of a vehicle. That area has been called a "killing zone."[11][12] These problems are the object of a number of technological solutions, including (in rough order of technological complexity, simplest first): rear-view mirror, side-view mirror. fresnel lens, sonar, parking sensors and backup camera. A similar problem attaches to positions left and right of a vehicles' rear bumper as the driver attempts to back out of a parking space. Specially designed cross traffic alert warning systems have been developed.[6][13][14]

I.3. IMPLEMENTATION

As one is driving an automobile, blind spots are the areas of the road that cannot be seen while looking forward or through either the rear-view or side mirrors (expecting that the side mirrors are properly adjusted on a passenger auto – see above). The most common are the rear quarter blind spots, areas towards the rear of the vehicle on both sides. Vehicles in the adjacent lanes of the road that fall into these blind spots may not be visible using only the car's mirrors. Rear quarter blind spots can be:
checked by turning one's head briefly (risking rear-end collisions), reduced by installing mirrors with larger fields-of-view, or eliminated by reducing overlap between side and rear-view mirrors by adjusting side mirrors so the side of the car is barely visible when your head is between the front seats (for the right side mirror) and almost touching the driver's window (for the left side mirror), then checking to be sure you can see cars approaching from behind on either side when on the highway.[4][5][6][7] Other areas that are sometimes called blind spots are those that are too low to see behind, in front, or to the sides of a vehicle, especially those with a high seating point.[15]

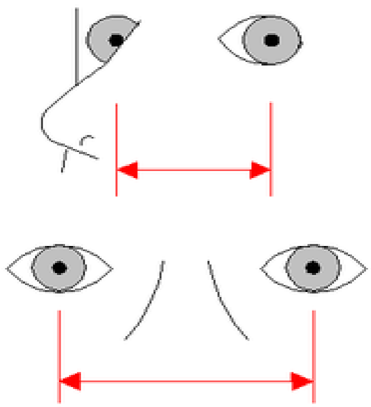


The blue car's driver sees the green car through his mirrors but cannot see the red car without turning to check his blind spot (the mirrors are not properly adjusted)

4. DISCUSSION

BLIS is an acronym for Blind Spot Information System, a system of protection developed by Volvo. Volvo's previous parent Ford Motor Company has since adapted the system to its Ford, Lincoln, and Mercury brands. This system was first introduced in the Volvo S80 sedan and produced a visible alert when a car entered the blind spot while a driver was switching lanes, using two door mounted lenses to check the blind spot area for an impending collision. On Ford products, the system was first introduced in the spring of 2009 on the 2010 Ford Fusion and Fusion Hybrid, 2010 Mercury Milan and Milan Hybrid and 2010 Lincoln MKZ and Mazda 6. This technology was also introduced on the 2010 Mazda CX-9 Grand Touring model. Some newer and more costly systems use side radar offering better performance and also warn of fast approaching vehicles entering the blind spot. Driver height can also affect visibility. An A-pillar that is split up and has a small triangle window (Front Quarter glass) can give a short driver visibility problems. Some cars the windshield is fillet with the roof-line with a big radius. A fillet round A-pillar can give a tall driver visibility problems. Also sometimes the A-pillar can block the driver from seeing motorcyclists.

Also the B-pillar can block the vision of a tall driver in small 4 door cars.



Turning your head reduces blind spot

A driver may reduce the size of a blind spot or eliminate it completely by turning their head in the direction of the obstruction. This allows the driver to see better around the obstruction and allows the driver better depth perception

Some modern car designs have an extremely flat A-pillar angle with the horizon. For example, the Pontiac Firebird and Chevrolet Camarofrom 1993-2002 had a windshield angle of 68° with the vertical, which equals just 22° with the horizon.[16]

A flatter A-pillar's advantages include reducing the overall drag coefficient and making the car body stronger in a frontal collision, at the expense of reducing driver visibility in a 180° field of view from left to right. A flatter A-pillar (and therefore windscreen) is also a factor when calculating the effects of a collision with a pedestrian. In general a flatter angle will result in a more gentle impact, directing the pedestrian "up and over" rather than directly into the windscreen. This is particularly true for cars like the Mercedes-Benz A-Class which also have a low angled engine cover.

This diagram shows the blocked view in a horizontal-plane in front of the driver. The front-end blind spots caused by this can create problems in traffic situations, such as in roundabouts, intersections, and road crossings. Front-end blind spots are influenced by the following design criteria:

1. Distance between the driver and the pillar
2. Thickness of the pillar
3. The angle of the pillar in a vertical plane side view
4. The angle of the pillar in a vertical plane front view
5. The form of the pillar straight or arc-form
6. Angle of the windshield
7. Height of the driver in relation to the dashboard
8. Speed of the opposite car

5. Conclusion

Blind spots also exist in front of boats.[20] When the boat accelerates, the bow rises, increasing the size of the blind spot. Large vessels can have up to several hundreds of meters of blind spot. This is generally known as the dead visual range of a ship. To address this, cameras are sometimes placed in the front of the vessel to cover the missing field of view. Blind spots exist where areas behind the sail are obscured from the view of a helmsman on a sailboat or windsurfer. This is especially true when they are heeled over; consequently, transparent windows are sometimes sewn into the sails. Other design factors may prevent a manufacturer from maximizing visibility. These include safety, as narrower pillars cannot be made strong as easily as thicker pillars, and size restraints pertaining to aerodynamics, as taller, more vertical windshields create additional drag and reduce fuel efficiency. They also include fashion and cost, whereby design and appearance considerations can be deemed preeminent.

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Author Details

Miss. **V.Saipushpa**.
M.Tech Student, Department of ECE in KITS for women's, Kodada, T.S, India.

Mr.**V.Srinivasa Rao**
Working as a Associate at ECE in KITS for women's, Kodada, T.S, India JNTUH Hyderabad. He has 13 years of UG/PG Teaching Experience.