

Both Side Overtaking Assisting (BSOA) System for Automotives

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ABSTRACT: The BSOA system comprises of a camera module fitted inside the left and right side mirror near the outermost edge of mirror case. The camera module captures the view emerging from the forward direction of the automotive which is generally very difficult to see for the driver during driving and also dictates the position of the front wheels by showing position of the bonnet on the display provided on the dashboard of the automotive. Due to this guidance, the driver can decide whether to overtake a previous vehicle or not. This BSOA system will help driver during parking and will help to reduce the number of accidents taking place during the lane change and overtaking.

KEYWORDS: Overtaking, Lane changing, Parking, Side mirror, Camera module, Wireless transmission.

I. INTRODUCTION

Numbers show that maximum crashes and deaths on roads took place in 2015 when drivers were overtaking and the second highest cases of fatalities happened while "diverging" or when changing lanes. Only in India in 2015 more than 50,000 accidents are recorded happened during overtaking and lane changing.

To overtake the previous running vehicle from the driver side, driver has to keep vehicle offset from the lane for some time on which he/she is driving, to see the required lane is free to overtake or not, which puts the life of the driver and the passengers in risk. Also during overtaking from the passenger side, driver cannot take the decision whether to overtake or not because he/she can't see the object or the vehicle running on passenger side lane. Hence maximum numbers of road accidents are happened during overtaking and lane changing.

Our aim is to provide a system which will assist the driver during driving for overtaking and lane changing from both side of the car. During designing such system the second thing we must have taken into consideration that, controlling of the system must be easy for the driver. Hence BSOA system is designed such that driver can see the live emerging view coming from the forward direction of the automotive easily and can operate it quickly.

II. RELATED WORK

The passing and overtaking of vehicles which are driving slowly, especially on two-lane roads, creates safety hazards due to sudden, emerging, oncoming traffic. When passing is desired, and the slower vehicle ahead is large or wide, as for example trucks and buses, it is difficult for the faster, following vehicle to be aware of oncoming traffic which would prevent passing. In order to allow safe passing by overtaking vehicles, the passing vehicle must pull out far to the left before beginning to pass so that the driver can decide whether or not it is safe to pass. Providing improved vision around large vehicles such as trucks or buses without requiring dangerous movement into the opposite lane to determine whether passing can take place is a highly desirable result for improved safety.

One attempted solution to this problem is shown in German Offenlegungsschrift DE 29 18 822 which discloses an exterior rear view mirror for vehicles by which the oncoming traffic is made visible for the driver by a deviation mirror. The arrangement of a number of mirrors within an exterior rear view housing results in a bulky mirror housing which as a part projecting laterally from the vehicle creates a risk of damage in parking lots or similar narrow lanes. Another

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attempted solution is shown in German Offenlegungsschrift DE 23 52708 which discloses an optical system for vehicles which includes an arrangement of prisms for displaying oncoming traffic. However, the field of view for the driver offered by the prisms is too small for his determining safely the traffic situation ahead of the vehicle.

US patent “Vehicular rear view mirror assembly with forward vision optical system” US 6104552 A discloses the prism system which shows the forward coming traffic to the driver, but the problem associated with this system is that, driver can’t see the view clearly since the prism are fitted with the mirror case. This creates more problems in rainy season. Also the prism system affects the aerodynamic efficiency of the automotive.

US patent “Camera built-in rear view mirror” US 20030098908 A discloses the camera built-in rear view mirror, which is applied to such as a side mirror or a door mirror of a vehicle. But this arrangement does not show the forward coming traffic; hence this system has only single purpose.

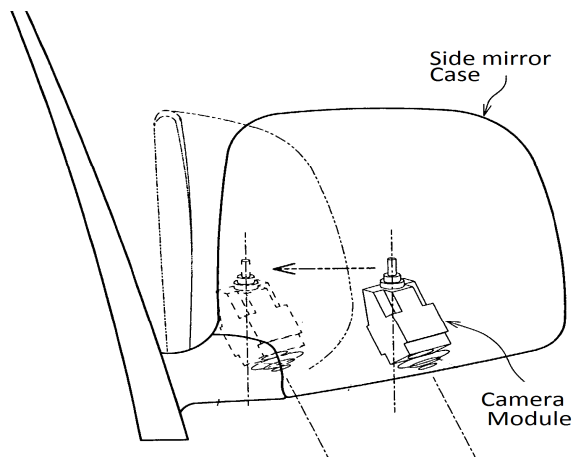


Fig: 1, camera oriented toward the ground in side mirror housing

As shown in Fig: 1, there are some systems are available which assist the driver for parking by showing the position of the front wheels but these systems are not useful for the other purpose. Japan Laid-Open Patent 2000-16181 discloses a door mirror having a small camera which is installed in side mirror housing and oriented toward the ground. Japan Laid-Open Patent 2000-62531 discloses a door mirror having a small camera installed out side mirror housing. Japan Laid-Open Patent 2000-168440 discloses a door mirror having a small camera installed inside mirror housing. Also Japan Laid-Open Patent 10-208198 discloses a door mirror having a small camera which is installed in side mirror housing and oriented toward the ground. Since the camera pointed towards the downward direction, hence the view obtained by the camera is not useful for the other purpose.

The above mentioned shortcomings, disadvantages and problems are knockout in this system.

III. BOTH SIDE OVERTAKING ASSISTING (BSOA) SYSTEM

As shown in Fig: 2, the both side overtaking assisting system (BSOA) comprises of four units; view capturing unit, display unit, controlling unit, and the storage unit.

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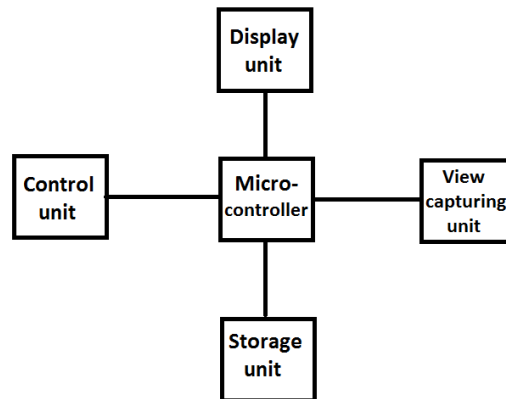


Fig: 2, components of the BSOA system

All these units are functionally connected to each other through a programmed micro controller. The view capturing unit includes camera modules; capable for providing clear view during night and day conditions, the controlling unit comprises of controlling switches, the display unit comprising of display module and the storage unit comprises of storage module, wherein the removable storage device is connected with the storage module.

As shown in Fig: 3, the camera module is fixed in the left and right side door mirror housing of the automotive. If the camera modules are fixed in separate housing and assemble on the surface of mirror case of the automotive then it may lower the look and the aerodynamic property of the automotive. The provision is provided at the bottom of the mirror case such that the camera module fixed inside the mirror case can be assemble and disassemble. This provision reduces the mirror cost during replacing it after physical damages. The transparent scratch resistant cover is fixed in front of the camera provided on the camera module; it keeps the camera module free from dust, water and other physical damages. The non-transparent covering surrounds the camera fixed on the camera module to avoid the unwanted light source which distracts the output video quality of the camera module.

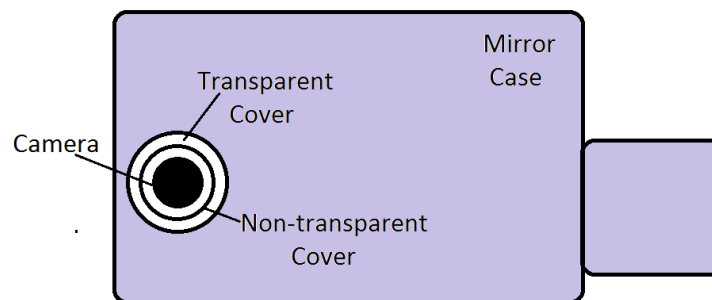


Fig: 3, mounting of camera module in the mirror housing.

The output of all camera modules connected in the system is transmitted to the display module through wired transmission media. Wireless camera modules can be used in the BSOA system to knockout the complexity of transmission cables in the system.

As shown in Fig: 4, the controlling switches are provided on the steering wheel of the automotive for easy controlling of the system.

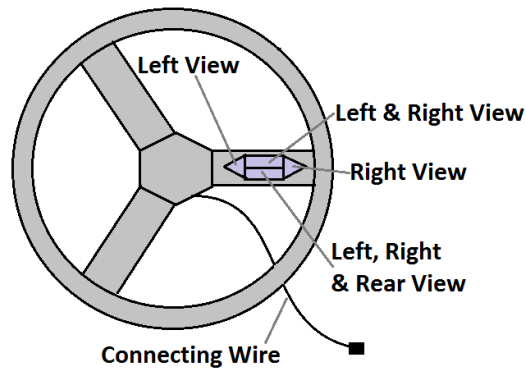


Fig: 4, mounting of controlling switches on the steering wheel.

For the separate type of view separate switch is assigned, due to which driver can choose the various types of view to see on the display screen, such that driver can choose only right side camera module or left side camera module or both side camera modules or the both side camera modules with the rear side camera module to show the view on the display screen at a same instant. To indicate the On/Off position of the controlling switch light indicator is provided inside the switch. The controlling switches are connected to the micro controller through connecting wire, here wireless transmission can also be used.

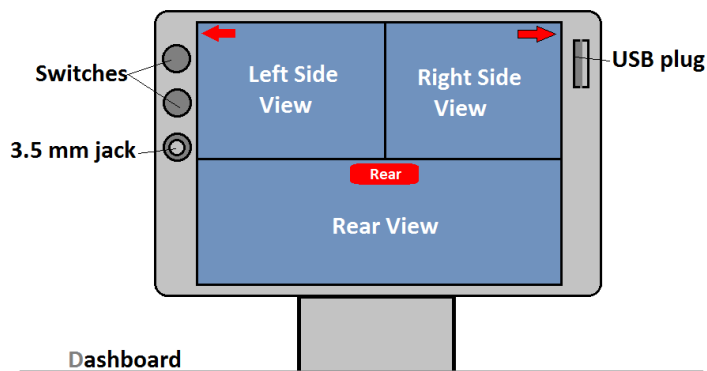


Fig: 5, schematic arrangement of the outputs of camera modules on Display screen

As shown in Fig: 5, the display screen is parted into 3 parts; when the driver presses respective switch to see the left side view, right side view and the rear side view at the same instant. To guide the driver, blinking symbols (arrows or letters) is used to indicate the direction from which live view is running on display screen; this helps to assist and avoids the confusion of the driver during driving. All these view of the automotive can be seen on the screen even when the automotive is in stationary position. The display module is programmed such that the user can use it for the entertainment purpose like playing music, videos, GPS and other general purpose like connecting pen drive, mobile devices etc only when the BSOA system is not using the display module. when the driver chooses to see only left side view and right side view at the same instant, then the display screen is parted into two parts only.

As shown below in Fig: 6, touch screen colour display screen is provided on the dashboard of the automotive for the easy of driver. The left and right side camera modules not only captures the view coming from the forward direction but also dictates the position of the front wheels by showing the bonnet position of the automotive, this provides parking assistance. The display module, controlling switches, camera modules and the storage module are connected to the micro controller.

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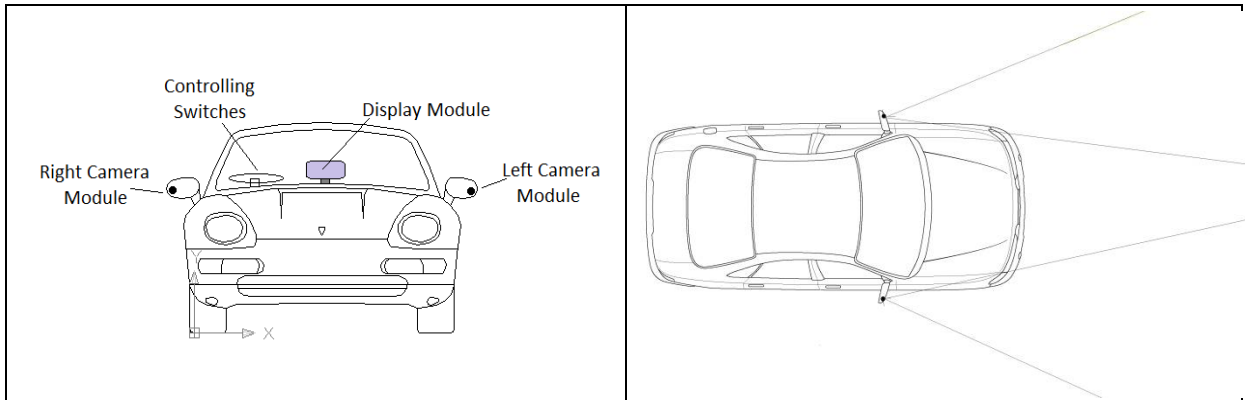


Fig: 6, front vies of the car with the BSOA system's accessories.

The systems consist of the steps of:

- 1] Driver presses the assigned switch for the required type of view.
- 2] The micro controller receives the 'On' command for the respective camera module.
- 3] The camera module starts transmitting the live capturing view to the micro controller.
- 4] The display module receives the input from the micro controller and shows live view.
- 5] Again driver presses the controlling switch and 'Off' command is send to the controller for that camera module.
- 6] Camera module switch offs.

The storage module provided in the system stores the view captured by the all camera modules present in the system. The system is programmed such that, when the automotive starts, the BSOA system gets activated even when the it is not being used by driver and starts to store the view captured by the all the camera modules in the storage device. Whether this function is optional and can be enable or disable from the system setting. The storage module is programmed with auto delete function. This function deletes data stored in the storage device after set intervals of the days. The stored data can be seen after and will be helpful for the investigation of road accidents.

IV. ADVANTAGES OF BSOA SYSTEM

- [01] System assists driver during overtaking from both i.e. left and right side of the automotive.
- [02] The camera module gives the front emerging view and also dictates the position of the front wheels which is generally typical to see for the driver (Blind spots).
- [03] System stores the captured dada and can be seen after on the display device.
- [04] In system the camera module can be assemble and dissemble from the mirror case easily.
- [05] More than 2 camera modules can be connected with the system.
- [06] Driver can choose the required type of view to see on the display.
- [07] System can be use even when the automotive is not in running position.
- [08] Driver can see the rear view of the automotive, even when the automotive is running in a forward direction.
- [09] All camera modules connected in the system provides clear view on the display screen during night and day conditions.
- [10] The display connected with the system can be used for the general and the entertainment purpose.
- [11] System is compact is in size.

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V. CONCLUSION

BSOA system will play important role in assisting the driver during lane changing, overtaking and parking automotive. Driver can't see the emerging view from the forward direction of the passenger side; here this system will assist the driver in taking the decision whether to overtake or not. In short, it can say that BSOA system will save so many lives in near future **if implemented and installed by the automobile manufacturers** in their vehicles.

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BIOGRAPHY



Er. Saurabh Vikas Chaudhari, Mechanical Engineer and he is working on gravity based power generation systems and has applied for *Patent*. He researched and collaborate the gravitational theories of Sir Isaac Newton and Mr. Lawrence Tseung to generate energy. He is the first, who puts the pulse mechanism based on I.C Engine working phenomena (applied for patent) and using mathematical calculation he proved, that the *efficiency* of the system can exceeds 100% by using the pulse wheel/flywheel and can be unbound. He mathematically illustrated the first pulsed power transmission theory in Mechanical Engineering.

His main areas of research interest are designing machineries for the best performance, enhancing electric car's fuel mechanism and improving the efficiency of present power generating and transmission systems.