

Design and fabrication of Stereo braking system

R.Dhivagar^{#1}, T.S Kiruba Shankar, K.Ravikumar, V Nirmal Kannan

U.G.Scholar, Mechanical Engineering, V.S.B Engineering College, Karur, Affiliated to Anna University, Chennai.
¹dhivagarmechnvsb@gmail.com

Assistant Professor, Mechanical Engineering, V.S.B Engineering College, Karur, Affiliated to Anna University, Chennai.
¹reachkiruba@rediffmail.com

Professor, Mechanical Engineering, V.S.B Engineering College, Karur, Affiliated to Anna University, Chennai.
³v.nirmalkannan@vsbec.com

Assistant Professor, Mechanical Engineering, SRM Institute of Science and Technology, Chennai.
⁴anuravi597@gmail.com

Abstract

The braking system is used to reduce the speed of the vehicle and the Drum brake and the Pneumatic brake are the old systems being used in automobiles. This project recommends that the braking system and the accelerator system both can be fixed in the Steering-Wheel itself of any kind automobile suitably.

By applying the proposed system, the braking and the accelerating could be applied through the driver's hands' actions effectively. So as to say, this hand's action could increase the response time to applying the brake than the old braking system which is applied through leg's action. The highlight of this project is physically challenged people could make use of this system so effectively than the normal people. Thereby road accidents could be reduced considerably.

1. Introduction:

Commonly, the driving system can be changed day-by-Day, because of some recent trends and technological improvement in the world. It considers an Automobile the braking and accelerating system can play vital role for the automobile manufacturing. There are some types of braking system are available as Drum brake, Pneumatic brake, Hydraulic brake those are used exist. This project recommends that the braking system and the accelerator system both can be fixed in the steering-wheel itself of any kind automobile suitably. It has to increase the driver's response to the braking system and accelerating system can be controlled to micro processor. By applying the proposed system, the braking and the accelerating could be applied through the driver's hand's actions effectively. So as to say, this hand's action could increase the response time to applying the brake than the existing system which is applied through leg's action. The highlight of this project is physically challenged people could make use of this system so effectively than the normal people. Thereby road accidents could be reduced considerably.

1.1 Objectives:

The main objective of this project is to increase the driver's response to the braking system, and also an accelerating system. Hand operated steering and braking system along with the acceleration is the proposed modification in the existing system. Combined braking and steering system is the thesis of the project and the project will enable physically person to drive the automobile. This project is physically challenged people could make use of this system so effectively than the normal people. Thereby road accidents could be reduced considerably.

2. Methodology:

By the use of microprocessor used in this project both in the braking system and accelerating system can be utilized. By the use of microprocessor in which detect the signals and frictional force can be set in the microprocessor through coding. This system has to increase the braking response and acceleration can be controlled by the use of this system. It can be compare to existing system is overcome and rectifying the problems retrieved, buy the use of this system. This project concern to reduce the accident and controlling of acceleration system significantly. It can be make use of it effectively by the physically challenged people and normal people. Cost of the project has to less, compare to existing system together. It is more efficient system compared to existing system.

3.VSS

Vehicle speed sensor or VSS measure transmission or transaxle output or wheel speed. The ECM uses his information to modify engine functions such as ignition shift points, And to initiate diagnostic routines. In which the speed sensor generates a magnetic pulse in the form of a wave proportional to the speed of the vehicle and the VSS is connected to a speedometer cable and positioned between the axle and the wheel of a vehicle. One of the most common types of VSS operates from a magnet that is also connected at the back of the Transmission housing behind the speedometer and the top section to the VSS senses the output of the transmission, whereas the opposite side of the VSS is connected to a rotating magnet, which generates a voltage that is then transmitted to a computational device that calculates the speed proportional to the moving vehicle. During motion of a vehicle, the VSS will generate four pulses in response to one rotation of the magnet.



4. Microprocessor

The internal arrangement of a **microprocessor** varies depending on the age of the design and the intended purposes of the microprocessor. The complexity of an integrated circuit (IC) is bounded by physical limitations on the number of transistor that can be put onto one chip, the number of package terminations that can connect the processor to other parts of the system, the number of interconnections it is possible to make on the chip, and the heat that the chip can dissipate. Advancing technology makes more complex and powerful chips feasible to manufacture.



5. Accelerometer sensor

An accelerometer is a device that measures proper acceleration. Proper acceleration, being the acceleration (or rate of change of velocity) of a body in its own instantaneous rest frame, is not the same as coordinate acceleration, being the acceleration in a fixed coordinate system. For example, an accelerometer at rest on the surface of the Earth will measure an acceleration due to Earth's gravity, straight upwards (by definition) of $g \approx 9.81 \text{ m/s}^2$. By contrast, accelerometers in free fall (falling toward the center of the Earth at a rate of about 9.81 m/s^2) will measure zero.

Accelerometers have multiple applications in industry and science. Highly sensitive accelerometers are components of inertial navigation systems for aircraft and missiles. Accelerometers are used to detect and monitor vibration in rotating machinery. Accelerometers are used in tablet computers and digital cameras so that images on screens are always displayed upright. Accelerometers are used in drones for flight stabilisation. Coordinated accelerometers can be used to measure differences in proper acceleration, particularly gravity, over their separation in space; i.e., gradient of the gravitational field. This gravity gradiometry is useful because absolute gravity is a weak effect and depends on local density of the Earth which is quite variable.

Single- and multi-axis models of accelerometer are available to detect magnitude and direction of the proper acceleration, as a vector quantity, and can be used to sense orientation (because direction of weight changes), coordinate acceleration, vibration, shock, and falling in a resistive medium (a case where the proper acceleration changes, since it starts at zero, then increases). Micromachined microelectromechanical systems (MEMS) accelerometers are increasingly present in portable electronic devices and video game controllers, to detect the position of the device or provide for game input.

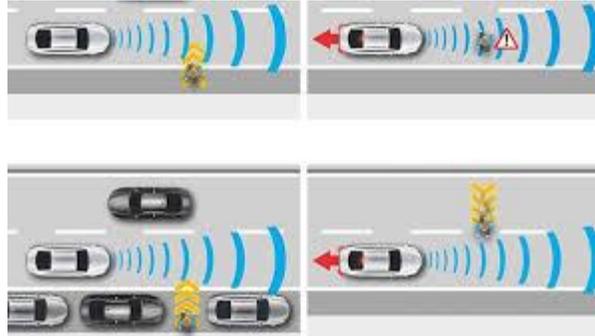


Brake assist system

Emergency brake assist (EBA) or **brake assist (BA or BAS)** is a generic term for an automobile braking technology that increases braking pressure in an emergency. The first application was developed jointly by Daimler-Benz and TRW/LucasVario. Research conducted in 1992 at the Mercedes-Benz driving simulator in Berlin revealed that more than 90% of drivers fail to brake with enough force when faced with an emergency.

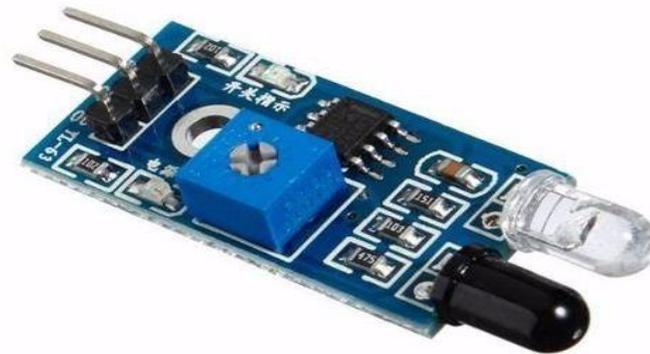
By interpreting the speed and force with which the brake pedal is pushed, the system detects if the driver is trying to execute an emergency stop, and if the brake pedal is not fully applied, the system overrides and fully applies the brakes until the anti-lock braking system (ABS) takes over to stop the wheels locking up.

This is a lower level of automation than a collision avoidance system, which may initiate braking on its own if the onboard computer detects an imminent collision.



6. IR sensor

Even though an IR LED looks like a normal LED, the radiation emitted by it is invisible to the human eye. Infrared receivers are also called as infrared sensors as they detect the radiation from an IR transmitter. ... Based on the intensity of the reception by the IR receiver, the output



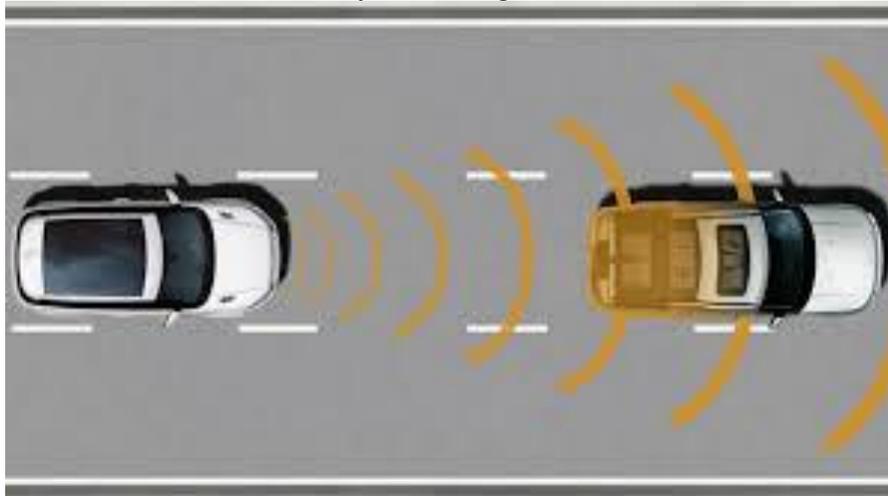
of the sensor is defined.

Cruise control

Some modern vehicles have systems for adaptive cruise control (ACC), which is a general term meaning improved cruise control. These improvements can be automatic braking or dynamic set-speed type controls.

Automatic Braking Type: the automatic braking type use either a single or combination of sensors (radar, lidar, and camera) to allow the vehicle to keep pace with the car it is following, slow when closing in on the vehicle in front and accelerating again to the present speed when traffic allows. Some systems also feature forward collision warning systems, which warn the driver if a vehicle in front—given the speed of both vehicles—gets too close (within the present

headway or braking distance).



Dynamic Set Speed Type: The dynamic set speed uses the GPS position of speed limit signs, from a database. Some are modifiable by the driver. At least one, incorporates crowdsourcing, so driver input is shared, improving the database for all users.

Non-Braking Type: The speed can be adjusted to allow traffic calming. One visual method uses Open CV

Dynamic radar cruise control: uses a camera and millimeter-wave radar to maintain a set point distance from vehicles in front of the car; the system will automatically slow down or speed up based on the vehicles in front.

Vehicles with adaptive cruise control are considered a Level 1 autonomous car, as defined by SAE International.

7.Literature survey

Mr. Zachary Bornemann said that Development of hand control interface for manual transmission vehicles system can be implemented.

It literature reviewed for this project the team researched and reviewed currently available assisted driving devices as well as information concerning paraplegics and their disabilities. Zero leg-input designs currently exist for driving automatic cars, and there are manual transmission solutions, however they lead to a reduced driving experience. Those devices developed for operating a manual transmission car without use of the pedals must include three main input components: brake, gas, and clutch. There does not seem to be devices on the market that incorporate all three components in the same system.

Literature review on the acceptance and road safety, ethical, legal, social and economic implications of automated vehicles, The main author Mr. Niklas Strand said that deliverable summarizes the findings of an extensive literature review on the acceptance, behavioral intentions, road safety, as well as ethical, legal, social (ELSI) and economic considerations in the

scope of vehicle automation. The theoretical fundamentals and relevant findings of recent public opinion research regarding user acceptance of automation are presented. Also the view of organized stakeholders is taken into account. Regarding the road safety there is a potential for increased road safety but drivers tend to pick up non-related driving tasks instead.

8. Conclusion

In stereo braking system is used to reduce the speed of the vehicle, this project recommends that the braking system and the accelerator system both can be fixed in the Steering-Wheel itself of any kind automobile suitably. The braking and the accelerating could be applied through the driver's hands' actions effectively. So as to say, this hand's action could increase the response time to applying the brake than the old braking system which is applied through leg's action. The highlight of this project is physically challenged people could make use of this system so effectively than the normal people. Thereby road accidents could be reduced considerably, and in this system has very efficient to compare the previous system suitably and acceleration ratio is very high sensitive it very comfort for the driver.

9. Acknowledgement

I would like to express my hearty thanks of gratitude to my professor (Dr. V. Nirmal Kannan). He gave me the guidance and motivated speech to do this project on the topic of (Stereo braking), which helps me to do lot of researches and I came to know about so many new things, I am really thankful to him

Final I would also thank to my parents and friends, who helped me a lot in finalizing this project within the limited time.

REFERENCE:

- [1] Dr. V. NirmalKannan, T. Gopalakrishnan, Dr. R. Parthasarathi "FEA Models and Experimental Results Of 3D Printing Process For Fabricating A Mini Robot" Indian J.Sci.Res. 17(2): 135 - 140, 2017 ISSN: 0976-2876 (Print), ISSN: 2250-0138(Online)
- [2] Nirmal Kannan V and Sankaranarayanan G "Mechanical And Structural Characteristics Of P(Hema) Hydrogel For Lumbar Disc Prosthesis" International Journal of Biomedical Research [ISSN No: 0970-938X] 2015;26(4):s49-51
- [3] P. Sevvil, V. Nirmal Kannan, S. Parameshwaran and Mohan Kumar "Proof of Concept Fabrication of Multi-axis Pneumatic Mechanism for Dumpers" *Int. J. Vehicle Structures & Systems*, 7(4), 172-174 ISSN: 0975-3060 (Print), 0975-3540 (Online) 2015
- [4] Dineshkumar S, NirmalKannanV, Sankaranarayanan G "Parameter Optimization of ABS-M30i Parts Produced by Fused Deposition Modeling for Minimum Surface Roughness" International Journal of Current Engineering and Technology-*IJCET INPRESSCO,USA*[ISSN 2277-4106] April 2014 pg.no.93-97
- [5] Sevvil P, Nirmal Kannan V, Mars Mukesh S "Innovative Electro Magnetic Braking System" International Journal of Innovative Research in Science,Engineering and Technology Volume 3, Special Issue 2, April 2014[ISSN(PRINT):2347-6710 (ONLINE):2319-8753