

# A Review Paper on Automatic (Intelligent) Braking System with Gas Sensor and Alcohol Detector

Aniruddha Deshmukh<sup>1</sup> Sagar Lande<sup>2</sup> Amit Korde<sup>3</sup> Mahesh Mahale<sup>4</sup> Prof. Pravin Darade<sup>5</sup>  
<sup>1,2,3,4</sup>Student <sup>5</sup>Professor

<sup>1,2,3,4,5</sup>SND College of Engineering & Research Center, India

*Abstract*— Road accidents are a commonplace in today's scenario. Accident prevention has been one of the leading areas of research. Our project is designed to prevent accidents due to loss of control, drunken driving, and rash driving. Using circuitry aided by a microcontroller kit to provide a real time monitoring system. In our work, braking distance and the distance of the obstacle are taken into consideration along with the speed of the vehicle to provide the basis for calculation. The microcontroller kit is powered with a microcontroller 16PI and programmed to calculate the braking distance and take actions accordingly. The Hall sensor helps in finding the speed of movement of the vehicle and the ultrasonic sensor senses the distance of the object in front. These sensors provide real-time inputs to the microcontroller program. Using a Hall sensor the system will sense the speed of the vehicle and with the microcontroller, it will calculate the braking distance: that is the distance required to bring the vehicle to a complete stop for that speed. Braking motors is incorporated to activate the brakes thereby achieving automatic braking procedures. The system helps in conjunction with the driver judgment if the driver doesn't sense the obstacle and applies the brake at the right time then the microcontroller initiates braking motor to apply the brakes automatically. Our future work deals with incorporating real time brake shoe wear system to provide enhanced feature for the intelligent braking system. Our Intelligent Safety concept car provides a glimpse into the future of automotive safety, and how much more advanced these individual systems can be for avoiding accidents and protecting vehicle occupants when they are integrated into one system. The future of automotive safety is more than just developing new technology; it is shifting the approach to safety. By looking at safety in terms of avoiding accidents in the first place – and then protecting occupants when a crash is unavoidable – we can prevent more accidents, save more lives, and reduce insurance and medical costs to society.

**Key words:** Gas Sensor, Alcohol Detector, Automatic Braking System

## I. INTRODUCTION

Driving is a compulsory activity for most people. People use cars to move from one place to another. The number of vehicles is increasing day by day. It is produced tacked tightly and risk to accident. Nowadays, the numbers of accident is so high and uncertainly. Accidents occur frequently and cause worst damage, serious injury and death. These accidents are mostly caused by delay of the driver to hit the brake. This project is designed to develop a new system that can solve this problem where drivers may not brake manually but the vehicles can stop automatically due to obstacles. The main target for this project is, cars can run automatic braking due to obstacles when the sensor senses the obstacles. The braking circuit function is to brake the car automatically after

received signal from the sensor. Accidents occur due to technical problem within the vehicle or due to mistake of driver. Sometimes the drivers lose control over the vehicle and sometimes accident occurs due to rash driving. When the drivers come to know that vehicle is going to collide they become nervous and they don't apply the brakes. Majority of the accidents occur this way. The system designed will prevent such accidents. It keeps track of any vehicles in front. It will continuously keep the track of the distance between the two vehicles. When two come dangerously close the microprocessor in the system activates the brakes and it will stop the vehicle. Accidents are considered as non-avertable. Accidents occur due technical problems within the vehicle or due the mistakes of the drivers. Sometimes the drivers may become fatigue and they lose the control over the vehicle and sometimes the accidents occur due to drunken drivers and sometimes due to rash driving. In all these cases the accidents occur because the brakes are not applied at right time. When the drivers come to know that the vehicle is going to collide they become nervous and they don't apply the brakes. Majority of the accidents occur only this way. The system designed will prevent such accidents. It keeps track of any vehicles in front. It will continuously keep track of the distance between the two vehicles. When two come dangerously close the microprocessor in the system will activate the brakes and it will slow down the vehicle or bring it to a stop if needed.

## II. LITERATURE REVIEW

The exhausted literature study has been carried out on design and fabrication for IBS. The findings of various scholars in the field of design, fabrication and analysis of IBS have been presented below:

Milind S.Deotale, et al [2000] Road accidents are a common place in today's scenario. Accident prevention has been one of the leading areas of research. In Indian scenario normally vehicles are equipped with ABS, traction control, brake assist etc. for driver's safety. This paper focuses on a system known as 'Intelligent braking system' which employ several sensors to respond when emergency conditions occur. The system includes an infrared wave emitter provided on the front portion of the car. An infrared receiver is also fitted to receive the signal. The reflected wave gives the distance between the obstacle and the vehicle. Then a microcontroller is used to detect the pulses and apply brakes to the vehicle. IBS car provides the glimpse into the future of automotive safety. By IBS system we can prevent more accidents and save more lives.

S. N. Sidek et al [2010] Intelligent braking system has a lot of potential applications especially in developed countries where research on smart vehicle and intelligent highway are receiving ample attention. The system when integrated with other subsystems like automatic traction

control system, intelligent throttle system, and auto cruise system, etc will result in smart vehicle maneuver. The driver at the end of the day will become the passenger, safety accorded the highest priority and the journey will be optimized in term of time duration, cost, efficiency and comfort ability. The impact of such design and development will cater for the need of contemporary society that aspires quality drive as well as to accommodate the advancement of technology especially in the area of smart sensor and actuator. The emergence of digital signal processor enhances the capacity and features of universal microcontroller

E. Perez, et al [2009] Currently, vehicles are often equipped with active safety systems to reduce the risk of accidents, many of which occur in the urban environments. The most popular include ABS, Traction Control and Stability Control. All these systems employ different types of sensors to constantly monitor the conditions of the vehicle, and respond in an emergency situation. In this paper the use of ultrasonic sensors in safety systems for controlling the speed of a vehicle is proposed. An intelligent mechatronic system includes an ultrasonic wave emitter provided on the front portion of a car producing and emitting ultrasonic waves forward in a predetermined distance. An ultrasonic receiver is also placed on the front portion of the car operatively receiving a reflective ultrasonic wave signal. The reflected wave (detected pulse) gives the distance between the obstacle and the vehicle. Then a microcontroller is used to control the speed of the vehicle based on the detection pulse information to push the brake pedal and apply brake to the car stupendously for safety purpose.

Aleksendric, D. et al [2012] Intelligent modeling, prediction and control of the braking process are not an easy task if using classical modeling techniques, regarding its complexity. In this paper, the new approach has been proposed for easy and effective monitoring, modeling, prediction, and control of the braking process i.e. the brake performance during a braking cycle. The context based control of the disc brake actuation pressure was used for improving the dynamic control of braking process versus influence of the previous and current values of the disc brake actuation pressure, the vehicle speed, and the brake interface temperature. For these purposes, two different dynamic neural models have been developed and integrated into the microcontroller.

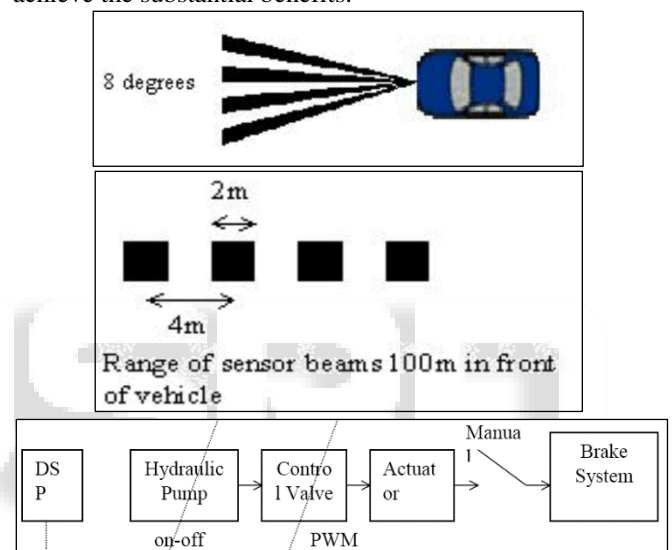
### III. METHODOLOGY

Systems are extended over the body of the vehicle used, a communication module that supports to provide a one halt control of the vehicle by means of the master controller of the digital driving system. Accident prevention is one of the most important areas of research today. Our paper is designed to stop/control accidents caused by loss of control, drunken driving and rash driving, by means of circuitry aided by a microcontroller kit. In our work, braking distance and the distance of the hurdle are taken into consideration along with the speed of the vehicle.

The speed of motion of the vehicle and the distance of the object in front are analyzed by means of the ultrasonic sensor. These sensors give real time inputs to the microcontroller coding. Using the Hall sensor the system will

analyze the speed of the vehicle with the microcontroller, the distance required to bring the vehicle to a complete stop for that speed is been calculated. Braking motors are included to activate the brakes thereby attaining automatic braking procedures. The system helps in coincidence with the driver judgment if the driver doesn't sense the obstacle and applies the brake at the right time then the microcontroller initiates braking motor to reduce speed automatically, if driver will not taken an action for a particular. Our future work deals with incorporating real time brake shoe wear system to provide enhanced feature for the intelligent braking system.

Aware of safety in terms of avoiding accidents in the first place and then protecting occupants when a crash is unavoidable, we can avoid more accidents, save more lives, and reduce insurance and medical costs to society. Intelligent Braking System approach provides a significant shift from the traditional approach to safety, but it is necessary to achieve the substantial benefits.



### IV. FACTORS CONSIDERED

The Factors considered in designing the system are

- 1) Braking Distance
- 2) Distance of obstacle in front

#### A. Braking Distance

The braking distance is the main factor considered in this system. Braking distance for a particular speed is the distance between the point of application of the brakes and the point at which the vehicle comes to a complete stop from the present speed. It is calculated using the following formula

$$\text{Braking distance} = V^2 / 2\mu g$$

Where V - Velocity of the vehicle (m/s)

$\mu$  - Coefficient of friction of the road = 0.8

g - Acceleration due to gravity = 9.81 m/s<sup>2</sup>

In the formula the condition of the brakes and the road conditions are not considered for coefficient of friction.

Table showing braking distance particular speeds

#### B. Distance of Obstacle in Front

The distance of any obstacle, a parked or a moving vehicle, a road block, a tree in the roadside, is sensed using an Ultrasonic sensor and it is fed to the microcontroller

### C. Advantages

- 1) The braking of vehicle in time.
- 2) The large crashing distance during accident.
- 3) The safety during per crash.
- 4) The external safety to vehicle body
- 5) Reduction the requirement of internal safety device like air bags.
- 6) Safety and comfort ability of modern car.

### D. Disadvantages

- 1) It is programmed if program fail then system collapse.
- 2) Initial cost of equipment is high.

## V. APPLICATION

- 1) This system is used in the all of vehicle like car, motorcycle etc.
- 2) Automated guided vehicle in industries
- 3) Avoid accident during manufacturing in production line

## VI. CONCLUSION

The Braking system, if implemented can avert lots of accidents and can save invaluable human lives and property. Implementation of such an advanced system can be made compulsory similar to wearing of seat belts so that accidents can be averted to some extent. Our Intelligent braking system provides a glimpse into the future of automotive safety, and how much more advanced these individual systems can be for avoiding accidents and protecting vehicle occupants when they are integrated into one system. The future of automotive safety is more than just developing new technology; it is shifting the approach to safety. Intelligent braking system approach represents a significant shift from the traditional approach to safety, but it is fundamental to achieving the substantial benefits.

## REFERENCES

- [1] Salami M.J.E., Sidek S.N., "Design of Intelligent Braking System", Proc.TENCON 2000, vol. II, Kuala Lumpur
- [2] Nocker G., Muller R., "Intelligetn Cruise Control with Fuzzy Logic",Daimler-Benz AG, Forchung und Technik.
- [3] Maretzke J., Jacob U., "Distance Warning and Control as a Means of Increasing Road Safety and Ease of Operation", Volkswagen AG, Germany,389/359 ImechE 1992
- [4] P. Kachroo, "Nonlinear control strategies and vehicltraction control", Univ. of California.