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Intelligent Braking System by Using Microcontroller and Sensor

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Abstract

We want to reduce the risk in accidents. Most commonly Antilock Braking system (ABS) used in Honda vehicle but WE want to used sensor and microcontroller in the braking system. In some vehicle commonly known as smart vehicle the automatic traction control system is used. We are introducing the braking system with mechatronics view. The safety of passenger is main aim of travelling company. Then a microcontroller is used for control the speed of the vehicle then the detection pulse information to push the brake pedal and apply brake to the car stupendously for safety purpose.

Keyword- *ABS, Sensor, microcontroller, Smart vehicle, Braking process*

I.INTRODUCTION

Driving is most common thing in human being life. But the accident is commonly happened most of people loss there life. Drunk drive, Brake down of system, tracking on phone is these some reason of accident .When the driver become nervous due to they will be known that the vehicle is going to collide and they don't apply the brake. Majority of the accidents occur due to this reason. The braking process is highly non linear process thus the controller abilities are very important. The prediction capabilities are the most impotent controller ability. The brake actuation pressure should be set with respect to driver demands and electronically controlled system such as ABS, ASR, EBS,ESC and/or road surface. The paper is focus on brake performance, brake actuation pressure .The sensor sense the distance between obstacle and vehicle. It will send the single towards actuator. The signal send to microcontroller then system acts brake. To overcome the problem of accidents we want to design a project which will be reduce the accidents and save the life of many people. We will introduced a braking system which will included by microcontroller and sensor. Our Intelligent safety concept car provides a future of automotive safety. Automatic speed reducing and Automatic horn disabling in the restricted area are the additional features include in this system.

II PROBLEM STATEMENT

In accident the loss of invaluable lives, material and money are occurs .The classical methods of accidents are not very efficient and loss of life is continuing. The air bags, GPS, robot driven car, tracked car are some system which can avert accident to some extent.

III LITERATURE SURVEY

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 intelligentmechatronic system includes an ultrasonic wave emitter provided on the front portion of a car producing and emitting ultrasonic waves frontward 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

IV OBJECTIVES

1. To ensure the braking of vehicle in proper time.
2. To increase as per as possible the crashing distance during accident.
3. To increase the safety as high as possible during per crash.
4. To increase as per as possible external safety to vehicle body.
5. To reduce the requirement of safety devices like air bag.

V NEED

To reduce the accident, it will be happened rapidly in society. In accidents many people loss there life. Now a day the high no of accident occurs. To prevent the man, money this system is necessary to design.

VI FACTORS CONSIDERED

1.Braking Distance

The braking distance is most important part of this project. This will decides the, at which the system will occur the brake. It is calculated by the formula given below,

Braking distance = $V2 / 2\mu g$ m

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

μ - Coefficient of friction of the road = 0.8

g - Acceleration due to gravity = 9.81 m/s2

Table showing braking distance particular speeds

Table 1.1.Braking distance particular speeds

Velocity (Km/hr.)	Braking Distance (m)
60	17.69
50	12.28
40	7.86
30	4.42
05	0.12

2. Distance of obstacle in Front

The distance of any obstacle, tree at road side, road block are detected by ultrasonic sensor and it feed to microcontroller .

VII INSTRUMENT USED

The devices used in the system are ultrasonic sensor, Hall sensor, Optical sensor, microcontroller, Brake, Braking motor. The information of components as follows,

1.Ultrasonic sensor

On the piezoelectric effect the ultrasonic sensor is work. It Use the time of flight principle to estimate the distance to an object in ultrasonic sensor. The distance, angular position, velocity, and nature of surrounding obstacles can be detected. It has low cost and good response time. The performance is reduces due to fluctuations in operating voltage. The 40 KHz frequency wave send by the transmitter of ultrasonic sensor. The ultrasonic sensor do not affected by environmental changes. When the ultrasonic wave will be reflected from obstacles it will be received by ultrasonic receiver. The ultrasonic sensor is located at front of vehicle.

2. Hall sensor

It is nothing but transducer. The output voltage is responsible for change in magnetic field density. In proximity switching, positioning, speed detection and current sensing application the hall sensor is used.
The rotation of wheel is completed ones the plus will be generated by sensor, this pulse given to the microcontroller.
It is located at inner side of mud guard.

3.Optical sensor

The optical sensor produced the equivalent analog output for the distance of the obstacle from its location. It used infrared signals to detect the obstacle. This infrared signal is received by receiver and transmitted to the microcontroller.
In the front of vehicle the optical sensor is fitted.

4. Brake

In this system we will used the band brake. It used due to it is act at high velocity and the heaviness of the vehicle.

5.5 Microcontroller

Microcontroller control the hole system.ATMEGA8-16PI this microcontroller is used. This microcontroller required low power. The two port is for ultrasonic sensor and other fore proximity sensor. Remaining ports are output port.

VIII METHODOLOGY

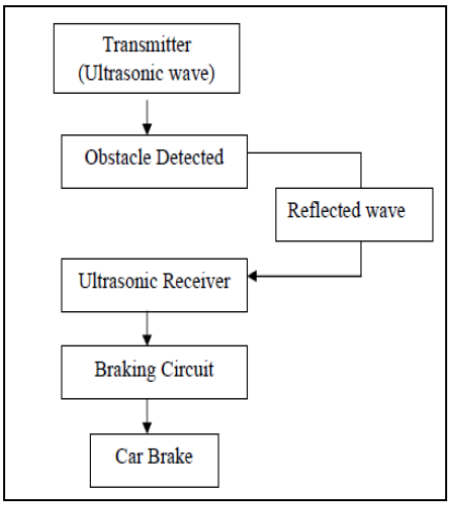

Fig.1 Model Methodology Diagram

IX ADVANTAGES

1. In time braking of the vehicle.
2. During accident there is large distance between vehicles.
3. High safety.
4. Reduce the requirement of the internal safety device like air bag.

X. DISADVANTAGES

1 Initial cost of the system is high.

2 If program is fail, then whole system will collapsed.

CONCLUSION

The intelligent braking system provides a glimpse into the future of automotive safety and it is advanced to avoiding accident and protecting vehicle occupant .The speed of vehicle is controlling according to predetermined distance is shown. Consecutive sample of the distance calculated the relative speed of the vehicle with respect to the obstacle. With the fusion of ultrasonic and hall sensor the resulted into short distance measurement, the system provides safety and satisfy its goals within the budget limit. By using the intelligent braking system, we will save the life of many of people, System have chip cost and good performance**.**

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