Design and Fabrication of Eye Blink Braking System

Mr. Chetan Bachhav [1], Mr. Satyam Bawage [2], Mr. Abhijit Pawar [3], Mr. Bhushan Bhamare [4]

[1]B.E (Mechanical), Department of Mechanical Engineering, SIT Lonavala, Pune, Maharashtra, India.
[2] B.E (Mechanical), Department of Mechanical Engineering, SIT Lonavala, Pune, Maharashtra, India.
[3]B.E (Mechanical), Department of Mechanical Engineering, SIT Lonavala, Pune, Maharashtra, India.
[4]B.E (Mechanical), Department of Mechanical Engineering SIT Lonavala, Pune, Maharashtra, India.

---***---

Abstract- *The technology of pneumatic system has gained tremendous importance in workplace automation from old-fashioned works and coal mines to machine shops and space robots. It is important that technicians and must have a good knowledge of pneumatic system, air valves and accessories. The aim is to design and develop a control system based an intelligent electronically controlled automotive bumper activation system called "Intelligent Braking with Pneumatic Bumper ". This system consists of IR transmitter and Receiver circuit, Control Unit, Pneumatic bumper system and braking unit. The IR sensor is used to measure, and control eye blink This project involves controls the eye blink using IR sensor. The IR system is used to transmit the rays. In our eyes. The IR system is used to receive the reflected system rays from our eyes. If the eyes are closed, then the output of IR receiver is high, or the IR receiver output is low. It to know the eye is closing or opening position of the eye. Output is given to logic circuit to indicate the final output. alarm and the control signal are given to the bumper activation system braking unit. Pneumatic bumper system is used to provide safety to the vehicle. Now a day vehicle accident is the major problem. This breaking system is an innovative project for the purpose of preventing accidents that happens in the restricted roadways. The purpose of this system is based on intelligent electronically control automatic bumper and brake activation system known as "eye sensor braking with pneumatic bumper system". This system improves the response of vehicle braking control to keep safe distance between two vehicles.*

1.INTRODUCTION

Today India is the most fast developing country in the world. India is in the list of largest use of various types of vehicles on road . The available resources to run the vehicles like quality of roads, and new technologies in vehicles are causes for accidents. The total number of peoples which are dead during accidents is also large as compared to the different causes of death. Though there are different causes for these accidents but proper technology of braking system and technology to reduce the damage during accident are mainly effects on the accident rates. So today of proper braking system to prevent the accidents and pneumatic bumper system to reduce the damage of vehicles. this system

modification goal, we design the Automatic Braking system with Pneumatic Bumper system. The project which has been fully equipped and designed for vehicles. The aim to design and develop a control system based on electronically controlled automotive bumper activation system is called "Intelligent Braking with Pneumatic Bumper". The project has IR transmitter and Receiver circuit, Control Unit, and Pneumatic bumper system. The IR sensor measure and controls the eye blink. If eye blink count is low, then alarm will be on and bumper will be activated as well as brake will be applied.
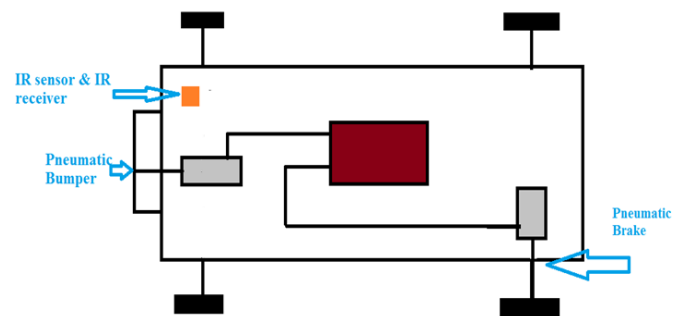

Fig 1 Block Diagram System

2.OBJECTIVE

Increasing the sureness of braking Application system. Increasing the response time for braking system. As Improve the pre-crash safety. Avoiding the percentage of passenger injury by using external vehicle safety. Reducing the requirement of internal safety devices like air bags.

3.PROBLEM DEFINITION

In vehicles there are different types of mechanism operated for braking system like hydraulic, pneumatic, mechanical, etc. All the braking mechanisms receive the input power directly from the driver so totally manual operated. When the driver saw the obstacle or any vehicle in front of his driving vehicle, he gets irritated or becomes mazy. Due to the driver fails to give proper input to system and proper working do not occur. Also, the driver may not pay the full attention during night travelling so there are chances to accidents. After the accident occurs, there is no provision to minimize the damages of vehicles. The bumpers have

specific capacity and when range of the accidental is very high then the bumpers is fails and the force transferred towards the passengers. So, the system never reduces the damage of vehicle and passengers. Overcome the unwanted effects we have to design the Automatic Braking System with Pneumatic Bumpers.

4.SCOPE

The objective of this work is to develop a New Automatic operated Machine.

This concept allows us to achieve our goal as well as better space management.

The new model takes into account all the real time conveying system and provide solution over their short coming.

The New model will get good efficiency compare to old method

5.LITERATURE REVIEW

5.1 Design of Accident Prevention System Using QRD 1114 and CNY70 Sensors Name of authors: Apeksha S. Chavan1, Dipali D. Pansare2, Swapnil P. Kadam3, Naval K. Mayekar4, Kavita V.Jha5, Poonam R. Bhagwat6

Sleep related accidents tend to be more severe, possibly because of the higher speeds involved and because the driver is unable to take any avoiding action, or even brake, prior to the collision. Horne describes typical sleep related accidents as ones where the driver runs off the road or collides with another vehicle or an object, without any sign of hard braking before the impact. Accidents are also caused when street lights are out specially on highways, long distance routes. Here, usually the upper dipper lights are in upper mode. So, when the driver fails to change the mode of the light and at the same time when the car comes from the opposite side.it causes the opposite driver to miss the judgement and gives rise to accident. Accidents are also caused due to the intruders coming suddenly in either side of the vehicle i.e. front, left or right. Due to which the driver misses the judgement and meets with an accident. Apeksha S. Chavan1, Dipali D. Pansare2, Swapnil P. Kadam3, Naval K. Mayekar4,KavitaV.Jha5,Poonam R. Bhagwat6

5.2 Prevention of Accident Due To Drowsy By Using Eye Blink B.Praveen kumar, K.Mahendrakan

Accident due to drowsy is prevented and controlled when the vehicle is out of control. And also, the drunken drive also prevented by installing alcohol detector in the vehicle. The term used here for the reorganization that the driver is drowsy is by using eye blink of the driver. In recent times drowsiness is one of the major causes for highway accidents. These types of accidents occurred due to drowsy and driver can't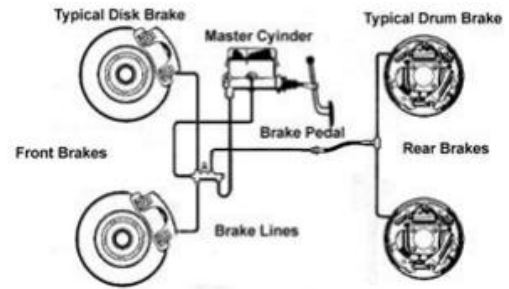 able to control the vehicle, when he/she wakes. The drowsiness is identified by the eye blink closure and blinking frequency through infrared sensor worn by driver by means of spectacles frame. The alcohol consumption is also verified during the starting process of the vehicle using alcohol detector. If the driver is drunk, then the buzzer indicates, and the vehicle doesn't allow the driver to start the vehicle. If the driver is drowsy, then the system will give buzzer signal and the speed of the vehicle is reduced and the obstacle sensor will senses the adjacent vehicle to avoid collision with that, and if there is no vehicle in left adjacent side then the vehicle move to the left end of the road by auto steering and controlling and vehicle will be parked with prior indications.

5.3 Research paper: AUTOMATIC BRAKING WITH PNEUMATIC BUMPER SYSTEM Name of authors: Srinivasa Chari.V1, Dr.venkatesh P.R2, Dr.PrasannaRao N.S3, Adil Ahmed S 4
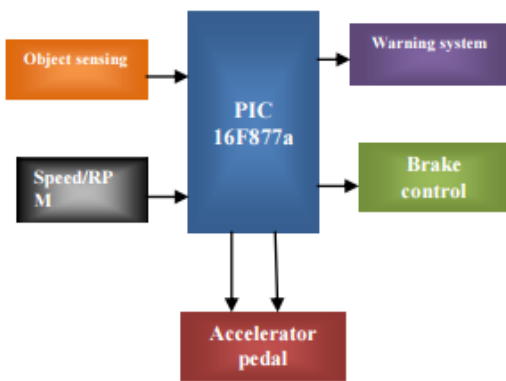
The technology of pneumatics plays a major role in the field of automation and modern machine shops and space robots. The aim is to design and develop a control system based intelligent electronically controlled automotive bumper activation and automatic braking system is called AUTOMATIC PNEUMATIC BUMPER AND BREAK ACTUATION BEFORE COLLISION. This project consists of IR transmitter and Receiver circuit, Control Unit, Pneumatic bumper system and pneumatic braking system. The IR sensor senses the obstacle. There is any obstacle closer to the vehicle (within 3-4 feet), the control signal is given to the bumper activation system and also pneumatic braking system simultaneously. The pneumatic bumper and braking system are used to product the man and vehicle. This bumper and braking activation system is only activated the vehicle speed above 30-40 km per hour. This vehicle speed is sensed by the proximity sensor and this signal is given to the control unit and pneumatic bumper and braking activation system. It is the project which has been fully equipped and designed for auto vehicles. The technology of pneumatics plays a major role in the field of automation and modern machine shops and space robots. The aim is to design and develop a control system based on intelligent electronically controlled automotive bumper activation system is called "automatic pneumatic bumper and break actuation before collision". The project consists of IR transmitter and Receiver circuit, Control Unit, Pneumatic bumper system. The IR sensor senses the obstacle. There is any obstacle closer to the vehicle (within 1feet), the control signal is given to the bumper and break activation system. This bumper activation system is activated when the vehicle speed above 40-50 km per hour. The speed is sensed by the proximity sensor and this signal is transfer to the control unit and pneumatic bumper activation system.

5.4 Automatic Safety System for Automobiles Name of authors: Dr. P. Poongodi PPG Institute of Technology, Coimbatore, Tamil Nadu, INDIA – 641012. Mr. P. Dineshkumar, Karpagam University, Coimbatore, Tamil Nadu, INDIA – 641021.

In this paper, the need for safety of vehicles by reducing the impact of crash by applying a smooth or partial braking with the help PIC 16F877a micro controller is proposed. The driver's risk of measuring a certain object from a particular distance and failing to notice within the critical limit such conditions are met while designing this work. Once a similar situation is faced the acceleration of the automobile will be directly controlled without disturbing the safe throttle (actual throttle mechanism) of the automobile, the designed machine itself takes the control of acceleration pedal if the brake is not applied within the critical distance.


The method is proposed in such a way to be applied to both low cost and existing vehicles as these were already build for the Indian roads. The deceleration is said to be negative acceleration. You are driving your car and the traffic light ahead turns red. You apply the brakes for 3.59 s, and the velocity of the car decreases to +4.99 m/s.If the car's deceleration has a magnitude of 2.53 m/s2. Average passenger car deceleration rate from coasting on level terrain with Auto Tran., from 60-70 mph speed range. The microcontroller used is the PIC 16F877A, which provides a safe and reliable method for controlling. The system needs to be attached to the existing method in which cars are designed so flexibility is a major need. the object sensed using any of the object sensor is given as input along with speed obtained from the RPM counter which will be sent to the controller based on the commands provided it will calculate the speed need to be controlled based on the PID algorithm. The above Figure is the proposed braking method the controlling of the rear brake will adjust the torque of the wheel enabling the system to control the application of brakes. The speed control will be only applied if the distance is below 45% to collide or else the driver will only have control after he applies the brake.

The system will take over if it is too close this will make the brakes and accelerator pedals to be cut from the drivers control and the system will apply the brake and here the algorithm provides a smooth operation of the vehicle and sudden jerks will not be realized. The method was simulated, the results were verified through MATLAB 2009R and the graphs are plotted. Safety and automation are the main trend of future vehicle development. In the future authors believe that safety and warning measurement will be the basic all existing vehicles. The warning and smooth braking system will not only prevent accidents but ensures comfortable travelling at the highways also. When the driver cannot operate the car effectively or vehicle unrestrained or driver doze off, it can help the vehicle slowing down on braking.

5.5 "Fabrication of Auto-Braking System for Pre-Crash Safety Using Sensor" International Journal of Control and Automation Vol. 2, No. 1, March 2009 Name of authors –Eung Soo Kim

The Auto-Braking System was designed by VHDL and fabricated to keep a distance between two cars. It provides PreCrash Safety System for Intelligent Car. This module can detect the distance between front vehicle and driver's vehicle to keep a constant distance using a sensor and operate the brake system forcibly if the driver does not decrease the speed of car. The system displays the distance between the two vehicles and the speed of your vehicle. The performance of the system was good. The fabricated auto-braking system has the sensor part and signal processing part to prevent an accident as shown in Figure 1. It performed monitoring the environment and sensor signal processing. The sensor embedded in vehicle will detect the road environment, such as self-velocity, distance from front vehicle, and surroundings vehicles, using infrared sensor and ultrasonic sensor. These sensors were operated all the time during driving. The processing part accepted the signal from sensors and processed the signals and generated the instructions and transferred the generated instruction to control unit of transmission and brake of vehicle. There are three cases occurred in real situations. One case is that the distance between the front car and driver's car is far enough to defend crashing and self-velocity is the same velocity of front car or slower than that of front car. In this case, the driver's car is continuously running without changing its

velocity. Another case is that the distance between the front car and driver's car is near and self-velocity is slower than that of front car. In this case, the driver's car is also continuously running without changing its velocity. Another case is that the distance between the front car and driver's car is near and self-velocity is faster than that of front car. In this case, the driver's car is continuously running only when the driver reduce speed. But if the driver does not reduce speed, the auto-braking system may forcibly reduce the speed of driver's car to protect an accident.
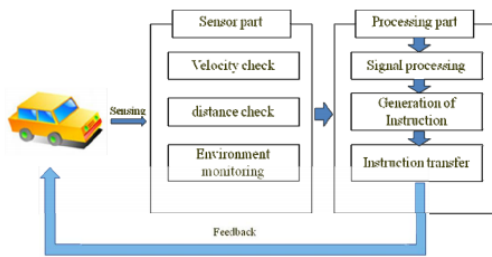
The reason is that if the driver does not reduce speed, the accident will be occurred, and the driver will be hurt. The auto-braking system was designed by VHDL and fabricated using FPGA to prevent accident. The system was mounted on a miniature car and tested. When the distance was getting closer, the auto-braking system was working, and the speed will slow down if a driver does not reduce the speed of automobile. We also fabricated the auto-braking system using Labview. We will replace an ultrasonic sensor with a radar sensor as the auto-braking system is mounted on a real automobile.

5.6 "A Deceleration control method of automobile for collision avoidance based on driver perceptual risk" IEEE international Conference on Intelligent Robots and Systems, Oct 4881-4886 Name of authors-Takahiro Wada

To reduce rear-end crash of automobiles, it is important to judge necessity of deceleration assistance as earlier as possible and initiate the assistance naturally. On the other hand, we have derived a mathematical model of driver's perceptual risk of proximity in car following situation and successfully derived driver deceleration model to describe deceleration patterns and brake initiation timing of expert driver. In this research, an automatic braking system for collision avoidance will be proposed based on the formulated brake profile model and brake initiation model of expert driver to realize smooth, secure brake assistance naturally. It will be shown that the proposed control method can generate smooth profile for various conditions. In addition, experimental results using a driving simulator will show validity of the proposed system based on subjective evaluation

5.7 "A Theory of Visual Control of Braking Based on Information About Time to Collision", Perception, Vol 5, pp 437-459 Name of authors –Lee

Collision Warning Systems (CWS) are safety systems designed to warn the driver about an imminent collision. A CWS monitors the dynamic state of the traffic in real time by processing information from various proprioceptive and exteroceptive sensors. It assesses the potential threat level and decides whether a warning should be issued to the driver through auditory and/or visual signals. Several measures have already been defined for threat assessment and various CWS have been proposed in literature. In this paper, we will focus on two time-based measures that assess both front and rear collision threats. In particular, a new threat metric, the time-to-last-second-acceleration (Tlsa), for lead vehicles in rear-end collision is proposed and compared with its counterpart, the time-to-last-second-braking (Tlsb). The Tlsa is a novel time-based approach that focuses on the lead vehicle (as opposed to the following vehicle). It inherits the properties of the Tlsb and, as such, is coherent with the human judgment of urgency and severity of threats. It directly quantifies the threat level of the current dynamic situation before a required evasive action (i.e. maximum acceleration) needs to be applied. Furthermore, different warning thresholds are proposed by considering the average driver reaction time. Its effect on decreasing the severity of a rear-end collision is studied and its reliability is tested using a well-established physics-based robotics simulator, namely Webots.

6.WORKING

We have pleasure in introducing our new project "eye sensor braking system",which is fully equipped by IR sensors circuit,automatic braking and Pneumatic bumper activation circuit when the driver is not applying the brakes manually in case of emergency. It is a genuine project which is fully equipped and designed for Automobile vehicles. This forms an integral part of best quality. This product underwent strenuous test in our Automobile vehicles, and it is good.

The important components of our project are,

IR transmitter
IR receiver
Control Unit with Power supply
Solenoid Valve
Flow control Valve
Braking system
Pneumatic bumper
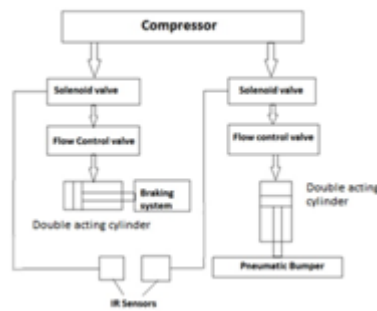Air Tank (Compressor)

Fig 2 Proposed block diagram of project

The IR TRANSMITTER circuit is to transmit the Infra-Red rays. The IR transmitter is used to transmit the infrared rays in our eyes. The IR receiver is used to receive the reflected infrared rays from our eyes. If the eyes are closed it means the output of IR receiver is high otherwise the IR receiver output is low. This to know the eye is closing or opening position of the eyes. This reflected Infra-Red rays are received by the receiver circuit which is called as called "IR RECEIVER". The IR receiver circuit receives the reflected IR rays and giving the control signal to the control circuit. The control circuit is used to activate the solenoid valve. This system works when driver does not apply brake manually In this case the chances of accident are very high. When any obstacle is detected by IR sensor the signals are send to both braking and bumper system. Thus, the brakes are applied, and bumper is activated. This system can help to save the people sitting inside the vehicle and also will save the external body of vehicle from getting damaged.

7.ADVANTAGES:

1.Easy construction.
2.It provide safety of driver and vehicle.
3. It reduce accident intensity.
4. this system improve the response time of vehicle braking to keep safe   distance between two vehicles.

8.DISADVANTAGES:

1.Cost is high because of use of compressor.
2.IR sensor range is small.
3.only useful for front side protection.
4.Not useful when vehicle will be come at back side.

9.FUTURE SCOPE

Infrared sensors can be replaced by ultrasonic sensors.Pneumatic bumpers can be replaced by external air bags.Infrared sensors can sense eye blinking and give signal to solenoid valve when driver sleeps.

9.CONCLUSION

Behind the designing of this system, our main aim is to improve the prevention technique of accidents and also reducing the hazard from accidents like damage of vehicle, injury of humans, etc. We observed that our work is able to achieve all the objectives which are necessary. Initial cost of cars with air bags is always high. Usually air bags are given to high end cars. By implementing this project, we can reduce cost of high-end cars by giving similar kind of safety. Air bags are helpful to provide internal safety to people sitting in vehicle, whereas in our project we will be giving internal plus external safety to car from damage. Thus, we will reduce initial cost of cars and also provide better safety.

10.REFERENCES

1. SRINIVASA CHARI.V, DR.VENKATESH P.R, DR.PRASANNA RAO N.S, ADIL AHMED S "AUTOMATIC PNEUMATIC BUMPER AND BREAK ACTUATION BEFORE COLLISION", 2015, INTERNATIONAL RESEARCH JOURNAL OF ENGINEERING AND TECHNOLOGY (IRJET) VOLUME: 02 ISSUE: 04, PP1015-1023

2. Dr. P. Poongodi. Mr. P. Dineshkumar, "Automatic Safety System for Automobiles"

3. DR.EUNG SOO KIM,"FABRICATION OF AUTO BRAKING SYSTEM USING SENSOR", INTERNATIONAL JOURNAL OF CONTROL AND AUTOMATION, VOL-2, AND NO1.

4. Takahiro Wada, "A Deceleration control method of automobile for collision avoidance based on driver perceptual risk"
   IEEE international Conference on Intelligent Robots and Systems, Oct 4881-4886.

5. Lee,"A Theory of Visual Control of Braking Based on Information About Time to Collision", Perception, Vol 5, pp 437-459

6. J. T. WANG, "AN EXTENDABLE AND RETRACTABLE BUMPER"

7. JADHAV N. D., GULMIRE S.M., GHUTUKADE R.S., GAIKWAD A.S., PROF.FEGADE S.G. "AUTOMATIC BRAKING WITH PNEUMATIC BUMPER SYSTEM" 2015,IJSART VOLUME 1 ISSUE 5,PP

8. KATORE S.R., KADLAG S.C., MANE P.V., PAWAR G.V., PROF.LONDHE B.C., "AUTOMATIC BRAKING WITH PNEUMATIC BUMPER SYSTEM", 2015, INTERNATIONAL JOURNAL OF ENGINEERING, EDUCATION AND TECHNOLOGY (IJEET), VOLUME 3, ISSUE 2

9. Erik Coelingh, LottaJakobsson, Henrik Lind, Magdalena Lindman, "COLLISION WARNING WITH AUTO BRAKE - A REAL-LIFE SAFETY PERSPECTIVE", Volvo Car Corporation Sweden Paper Number 07-0450.

BIOGRAPHIES

Mr. Chetan Yashavant Bachhav
BE Mechanical
Sinhgad Institute Of Technology

Mr. Abhijit Dhondiba Pawar
BE Mechanical
Sinhgad Institute Of Technology

Mr. Satyam Vaijnath Bawage
BE Mechanical
Sinhgad Institute Of Technology

Mr. Bhushan Gopal Bhamare
BE Mechanical
Sinhgad Institute Of Technology