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Review on Intelligent Braking System

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Abstract: Road accidents are a commonplace in today's scenario. Accident prevention has been one of the leading areas of research. In Indian scenarionormally vehicles are equipped with ABS (Anti-Lock Braking System), traction control, brake assist etc. for driver's safety. This paper focuses on a system known as 'Intelligent braking system' (IBS) 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.

Keywords: Braking system, optical sensor, ABS

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I. INTRODUCTION

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.

II. LITERATURE REVIEW

The existing approaches in preventing accidents are:
Honda's idea of ABS which helps the rider get hassle free braking experience in muddy and watery surfaces by applying a distributed braking and prevents skidding and wheel locking [1]
Volvo launched XC60 SUV which was equipped with laser assisted braking. This is capable to sense a collision up to 50 mps and apply brakes automatically [1]
Drawbacks in the existing approaches:

- ABS can only help if the rider applies it in right time manually and maintains the distance calculations. ABS has its own braking distance.
- Moreover most of the commuter bikes in India don't have ABS because it's very expensive.[2]
- Volvo's laser assisted braking could not work effectively in rainfall and snowfall season and laser is easily affected by atmospheric conditions.[3]

III. FACTORS CONSIDERED

Factors considered in designing the system are:

- Braking distance
- Distance of obstacle in front.

1.1. 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 by using following formula.

Braking Distance = $V^2 / 2\mu g$ (meter)

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

μ = Coefficient of friction of road = 0.8

g = Acceleration due to gravity = $9.81(m/s^2)$

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

Table showing braking distance:

Velocity (km/hr)	Braking Distance (m)
60	17.69

50	12.28
40	7.86
30	4.42
05	0.12

3.2. Distance of obstacle in front

The distance of any obstacle, a parked or a moving vehicle or a road block is sensed using an Optical sensor and it is fed to microcontroller.

IV. CONCEPT PROPOSED

With the proposed framework these sorts of mischances can be turned away. Utilizing a HALL sensor the framework will sense the rate of the vehicle and with the microcontroller, it will compute the braking separation: that is the separation required to convey the vehicle to a complete stop for that speed. Utilizing an Optical sensor, the framework will sense any moving or stationary hindrance in front and ceaselessly monitor its separation.

At the point when the driver sees a deterrent in front and backs off there is no issue. Then again, in the event that he doesn't have any significant bearing brakes and continue the same velocity, he goes to a point where the separation of the impediment equivalents to braking separation. This is the last risk for the driver to apply the brake and back off the vehicle. In the event that regardless he goes at the same speed, the microcontroller in the framework will actuate the brakes and evade an impact by conveying the vehicle to a stop.

Regularly, one would not stop at a moment that the vehicle is touching the impediment. Some separation is left before the snag. The separation is additionally accounted by the microcontroller. Assume for 50 km/hr if the braking separation is say 12.28 m, then 0.5 m is included and the braking separation is computed as 12.78m.

V. INSTRUMENTS USED

5.1 HALL SENSOR:

A Hall sensor is a transducer that fluctuates its yield voltage because of changes in attractive field thickness. Corridor sensors are utilized for nearness exchanging, situating, speed discovery and current detecting operations. In its most straightforward structure, the sensor works as a similarity transducer, specifically giving back a voltage. With a known attractive field, it's a separation from the Hall plate can be resolved. Utilizing gatherings of sensors, the relative position of the magnet can be derived.

Purposes behind selecting this gadget:

The options for pace estimation can be tachometers however interfacing of ordinary tachometers with the microcontroller is troublesome. So the utilization of tachometers for velocity estimation is precluded. Lobby Effect gadgets when properly bundled are safe to tidy, earth, mud and water. These qualities improve Hall Effect gadgets for position detecting than option implies.

5.2. OPTICAL SENSOR

This senses the distance of the obstacle from its location and gives an equivalent analog output for the distance sensed.

Working Principle:

The optical sensor uses infrared signals to detect the distance and the obstacle. It has a transmitter and receiver. Transmitter transmits the signals. If any obstacle interrupts that signal then it has been reflected towards the receiver. Then it gives signal to the microcontroller.

Location:

This sensor is fitted in front of the vehicle. This sensor gets switched on once the vehicle is started and the sensor gives out the analog output continuously depending on the position of obstacle.

Specification:

Range	:	1-32 m
Resolution	:	12 inches
Signal Output	:	0-5 V
Excitation Voltage:		12-24 V

5.3 MICROCONTROLLER

The whole control of the system is in the hands of ATMEGA8-16PI microcontroller. A microcontroller is a computer on a chip. It is a type of microprocessor emphasizing self-sufficiency and cost effectiveness, in contrast to a general purpose microprocessor.

Reasons behind selection:

This is a low power, elite CMOS 8 bit microcomputer with 4K bytes of glimmer programmable and erasable read only memory (PEROM). The chip streak permits the project memory to be reconstructed in framework or by an ordinary non unpredictable memory developer. It is an intense microcomputer giving

exceedingly adaptable and financially savvy answer for some installed control applications.

5.4 Brakes

Band brakes will be utilized for breaking the vehicle. As indicated by the most extreme velocity and the heaviness of the vehicle the band brake and the bearing required has been outlined.

Interfacing:

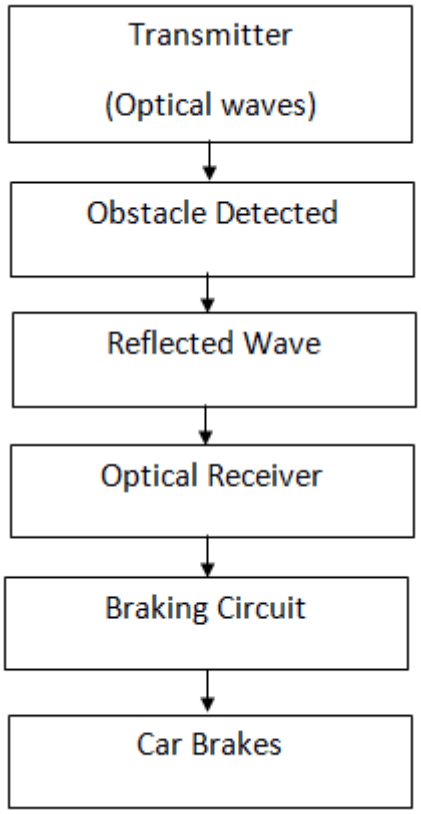
Of the ports of the microcontroller two were utilized as data ports one for optical sensor and other for nearness sensor. The other port was utilized as yield port to offer sign to the stopping mechanism. The signs from closeness sensor were given in port B through two bits. The yield is taken from port C.

Specifications:

Make : Atmel

Microcontroller : ATMEGA8-16PI

Methodology



VI. CONCLUSION

The Infrared Braking System, if executed in auto it deflects heaps of mishaps and can spare human lives and property. Execution of such a propelled framework can be made mandatory like wearing of safety belts with the goal that mischances can be deflected to some degree. Our Infrared Braking System gives a look into the eventual fate of car wellbeing and the amount more propelled this individual framework can be for staying away from mischances and ensuring vehicle tenants when they are incorporated into one framework. The fate of car security is more than simply building up another innovation; it is moving the way to deal with wellbeing. INFRARED BRAKING SYSTEM approach speaks to a huge movement from the conventional way to deal with wellbeing, yet it is crucial to accomplishing the significant advantages.

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