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Smart braking system

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ABSTRACT

This paper describes a new smart braking system for bikes. Road accidents are commonplace in today's scenario. Accidents cause worse damage, serious injury, and even death. Accidents prevention has been one of the leading areas for research. Mainly focus on prevention of accidents due to nervousness, drunken driving, etc. Manual methods of applying brakes are always dangerous as it leads to accidents. Nowadays no. of accidents are increases. Unconsciousness of the driver, uncontrollable speed of the vehicle and manual operation of braking systems are the reason for accidents. It is necessary to control brakes automatically through electronics devices to minimize accident problems. In this research paper, we proposed an effective methodology for the automatic controlling of a braking system to prevent accidents with the help of electronics engineering. The system consists of ultrasonic sensor wave emitter fitted at the front portion of the bike and ultrasonic receiver to receive the signal. The actuator pulls the brake lever through which a piston is pushed which then uses hydraulic fluid to apply brakes (disc type). Here we use actuator in this system instead of servomotor. This reflected wave gives the signal to MCU to applying brakes automatically. By using this System we can reduce no. of accidents.

Keywords— Ultrasonic sensor, Automatic braking system, Actuator, Microcontroller chip

1. INTRODUCTION

The number of automobile users is increasing day by day. At the Same time, traffic congestion has become a worldwide problem. This problem is mainly due to human driving which involves reaction time delays and judgement errors that may affect traffic flow and cause accidents. Road accident is the most unwanted thing that happens to the road user. In the Indian scenario, normally vehicles equipped with ABS (Anti-Lock Braking System), traction control, brake assists etc. for driver's safety. All these systems employ different types of sensor to monitoring the condition of the vehicle and respond in an emergency situation. This smart braking system has to be work with ABS (Anti-Lock Braking system) equipped in a vehicle in order to increase vehicle stability during emergency braking. The primary objective of this paper is to develop a safety car braking system using ultrasonic sensor and to design a system with less human attention to the driving.

2. SMART BRAKING SYSTEM

The smart braking system is designed for preventing lots of accidents. It operates automatically not manually so chances of failure of this system are less due to this the chances of accidents is also reduced. It is a combination of electronics and mechanical engineering. It is an electro-mechanical device which is designed to prevent accidents and loss of human lives. This system contains Ultrasonic sensor, Relay switch, Micro Controller Unit, Actuator and brakes.

Some previous research paper helps me to design this system. We use ultrasonic sensor instead of an IR sensor because the range of IR sensor is 1m, and it can be affected by sunrays.

S.N. Sidek Intelligent Braking System (2010) has a lot of potential applications especially in developed countries where research on smart vehicle and smart highway are receiving ample attention. The system when integrated with another subsystem like a traction control system, intelligent throttle system, etc. will result in the smart vehicle. The driver at the end of the day will become a passenger, safety accorded the highest priority and journey will be optimized in term of time, duration, cost, efficiency and comfortability.

G.L. Gissinger (2002) describes a new Intelligent Braking system for motor vehicles. A mechatronic approach helped to avoid some drawbacks found in the conventional system. The Brake was designed according to the “full contact disc brake” principle. Indeed to provide better control, the regulator uses feedback information not only from slip but also from the braking torque.



Fig. 1: Ultrasonic sensor and MC Unit mounted on a motorbike

3. OPERATIONAL PROCEDURE

The procedure for performing the operation this system is:

In this system, we are using an ultrasonic sensor which has range 2m to 4m. This sensor is fitted over the front portion of the body which emits waves to analyse the speed motion of the vehicle and distance of obstacle (vehicle) in front of them. These sensors give real-time inputs to the microcontroller coding. Here relay switch is included to activate the actuator to pull brake lever to operate brakes. The actuator pulls the brake lever through which a piston is pushed which then uses hydraulic fluid to apply brakes (disc type). Relay switch is an electro-mechanical switch which operates when an electric current passes through them. Electric current passes due to sensors. When the sensor senses the obstacle send the signal to MCU Unit it sends current to Switch on the Switch. When relay Switch is ON then the actuator is activated. Overall this system operates automatically.

Aware of safety in terms of avoiding accidents like 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 by implementing this system. This system is also necessary implemented like wearing seat belts, helmets etc, in-vehicle by a government authority to reduce lots of accidents.

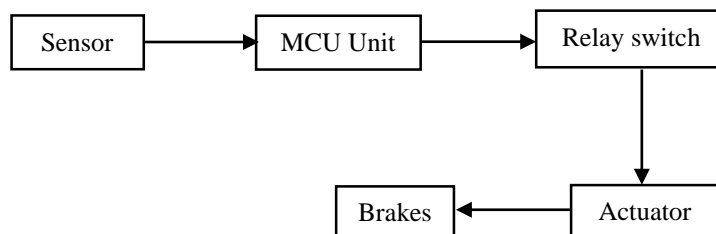


Fig. 2: Block diagram of Smart Braking System

4. CONCLUSION

The Braking system, if implemented can reduce the number of accidents and can save invaluable human lives and property. The whole system is wide open and can work with various brakes, various sensors and actuator solutions. It must be mentioned that the different subsystem such as sensors, actuators etc. have found other applications since they were designed. Now, this system is designed as a project work at a small level but we can adopt this system at an industry level so that we can prevent lots of accidents and human lives. The future of automotive safety is more than just developing new technology for preventing accidents.

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