Electronic Assisted Hydraulic Braking System

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Abstract- *In this research, a new automatic braking system was designed and tested to prevent collisions between a driver's vehicle and bstacles (vehicles, pedestrians). The primary objective of this work is to develop a safety car braking system using ultrasonic sensor and to design a vehicle with that can manage less human attention to the driving. An appropriate mechanism was used to operate and control the brake system automatically and it different from the previous systems which operate brake pedal according to signals incoming. A suitable electric pump is used to provide fluid flow and pressure value and two solenoid valves are used to control the direction of brake fluid in the hydraulic brake system. The proposed system operated using three parts; sensing part, the second part depends on using a control unit and another part depends on a suitable actuator. It can detect the distance between obstacles and the driver's vehicle by the ultrasonic sensor and using a hydraulic pump and solenoids valves to operate the brake system if the driver does not push the brake pedal in the right time to stop the vehicle, this system can automatically stop the vehicle without driver input. The performance of the system was excellent and the errors between measured braking time and theoretical braking time were between one and two percent.*

I. INTRODUCTION

The brake system is the most important system in vehicles that converts the kinetic energy of the moving vehicle into thermal energy while stopping it. The basic functions of a brake system are to slow the speed of the vehicle, to maintain its speed during downhill operation, and to hold the vehicle stationary after it has come to a complete stop. Driving is a compulsory activity for most people and the numbers of vehicles as well as the number of accidents are continuously increasing. These accidents are mostly caused by the delay of the driver to hit the brake pedal. The automatic braking is a technology for automobiles to sense an imminent collision with another vehicle, person or obstacle and to apply brakes to slow the vehicle without any driver input. Sensors are used to detect other vehicles or obstacles, these can be radar, video, infrared, laser, ultrasonic or other sensing technologies.

Advanced driver assistance systems (ADAS) are defined here as vehicle-based intelligent safety systems which could improve road safety in terms of crash avoidance, crash severity mitigation and protection and post-crash phases. ADAS can, indeed, be defined as integrated in-vehicle or infrastructure based systems which contribute to more than one of these crash-phases. For example, intelligent speed adaptation and advanced braking systems have the potential to prevent the crash or mitigate the severity of a crash. This text discusses a variety of measures that are being promoted widely as ADAS, e-Safety or active safety measures, the knowledge about which is gradually evolving, including information on the costs and benefits of such measures.

II. PROBLEM STATEMENT

In conventional vehicles there are different mechanism operated for braking system like hydraulic, hydraulicsoil, mechanical, etc. But all these braking mechanisms receive the signal or input power directly from the driver so it totally manual operated. When the driver saw the obstacle or any vehicle in front of his driving vehicle, he was irritated or becomes mazy. Due to this the driver fails to give the proper input to braking system and proper working is not occurs. Also the driver may not able to pay the full attention during night travelling so there are many chances to accidents.

III. METHODOLOGY

Design of machine:- In our attempt to design a special purpose machine we have adopted a very a very careful approach, the total design work has been divided into two parts mainly:

- System Design
- Mechanical Design

System design mainly concerns with the various physical constraints and ergonomics, space requirements, arrangement of various components on the main frame of machine no of controls position of these controls ease of maintenance scope of further improvement; height of m/c from ground etc

For design parts detail design is done and dimensions thus obtained are compared to next highest dimension which are readily available in market this simplifies the assembly as

well as post production servicing work.The various tolerances on work pieces are specified in the manufacturing drawings. The process charts are prepared & passed on to the manufacturing stage .The parts are to be purchased directly are specified &selected from standard catalogues.

IV. OBJECTIVES

- To measure distance of obstacle.
- To control vehicle for avoiding accidents.
- To actuate hydraulic brake.
- To apply brakes if driver fails to do it.

V. CONCLUSION

In this paper, we used a unit that simulates and it is similar to the reality of working the vehicle on the road. This syste operated manually and automatic in parallel, when the vehicle reached a certain distance, if the driver does not respond and hit the brake pedal in a right time, this system can automatically stop the vehicle without driver input. This system consists of an ultrasonic sensor, microcontroller, electric pump, and two solenoids valves, where ultrasonic used to measure the distance between an obstacle and vehicle and send signals to the microcontroller, microcontroller received these signals and processed it, then send signals to rely, to activated solenoids valves and braking is done automatically. From results we concluded, this system cheap, easy maintenance, a control system which has been used simple and the performance of the system is excellent.

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