Vehicle Safety Speed Controller under Driver Fatigue Using Eye Blink Sensor

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ABSTRACT

Accidents occurred at night time are mainly due to carelessness of human being such as sleepiness. To avoid that we design and develop a control system based on intelligent electronically controlled automotive braking system. It consists of IR transmitter and receiver circuit, control unit, pneumatic breaking system. The IR sensor is used to monitor the eye blink movement. If the eye blink movement varies beyond the normal condition set (3 sec); the IR sends the control signal to the breaking system through electronic control unit (ECU). Thus the pneumatic breaking system is used to break the system and alerts the driver to not sleep. From this accidents can prevent before it occurs.

Keywords: Electronic Control Unit, Peripheral Interface Controller etc

I. INTRODUCTION

In this project microcontroller is used to sense the eye blink status and control the other units. This project consists of microcontroller, relay driver circuit, infra-red sensor unit. When the eye blinking normal level is set to the microcontroller by the programming microcontroller and monitoring the eye blinking pulses with the set pulses. If the eye blinking is normal in microcontroller then it maintains the system in normal condition. When the eye blinking is below the set level that is when driver goes to sleep, this signal are collected from infra-red sensor unit, after receiving this low level pulses from microcontroller it immediately active the relay unit and automatic breaking is applied. So driver should be alerted.
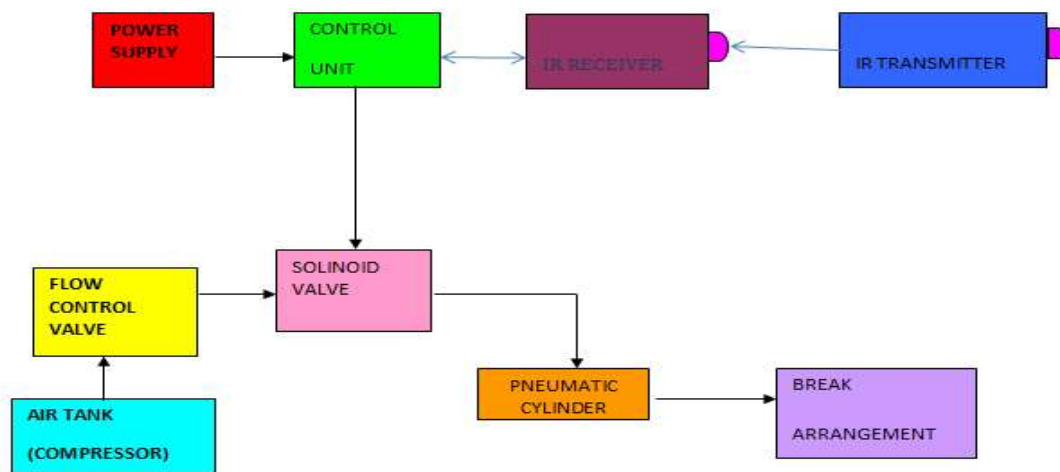
II. METHODOLOGY

Here we use PIC microcontroller to burn the program and to control the pneumatic breaking system. It acts as a intermediator between human and vehicle. PIC is a family of modified Harvard architecture microcontrollers made by Microchip Technology, derived from the PIC1650 originally developed by General Instrument's Microelectronics Division. The name PIC initially referred to "Peripheral Interface Controller" now it is "PIC" only. PICs are popular with both industrial developers and hobbyists alike due to their low cost, wide availability, large user base, extensive collection of application notes, availability of low cost or free development tools, and serial programming (and re-programming with flash memory) capability.

PNEUMATICS:

The word 'pneuma' comes from Greek and means breather wind. The word pneumatics is the study of air movement and its phenomena is derived from the word pneuma. Today pneumatics is mainly understood to means the application of air as a working medium in industry especially the driving and controlling of machines and equipment. Pneumatics has for some considerable time between used for carrying out the simplest mechanical tasks in more recent times has played a more important role in the development of

pneumatic technology for automation. Pneumatic systems operate on a supply of compressed air which must be made available in sufficient quantity and at a pressure to suit the capacity of the system. A compressor is a machine that takes in air, gas at a certain pressure and delivered the air at a high pressure. Compressor capacity is the actual quantity of air compressed and delivered and the volume expressed is that of the air at intake conditions namely at atmosphere pressure and normal ambient temperature. The compressibility of the air was first investigated by Robert Boyle in 1962 and that found that the product of pressure and volume of a particular quantity of gas.

III. COMPONENTS USED

PNEUMATIC COMPONENTS:
   i.   Solenoid valve
   ii.   Flow control valve
   iii. Connectors
   iv.   Double acting Pneumatic cylinder

ELECTRONIC COMPONENT:
   i.   IR SENSOR UNIT
   ii.   Relay circuits

IV. BLOCK DIAGRAM

V. WORKING OPERATION

The IR TRANSMITTER circuit is to transmit the Infra-Red rays. If any obstacle is there in a path, the Infra-Red rays reflected. This reflected Infra-Red rays are received by the receiver circuit is 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. The operating principle of solenoid valve is already explained in the above chapter. If the solenoid valve is activated, the compressed air passes to the Double Acting Pneumatic Cylinder. The compressed air activates the pneumatic cylinder and moves the piston rod. If the piston moves forward, then the breaking arrangement activated. The breaking arrangement is used to break the wheel gradually or suddenly due to the piston movement. The breaking speed is varied by adjusting the valve is called "FLOW CONTROL VALVE". In our project, we have to apply this breaking arrangement in one wheel as a model. The compressed air drawn from the compressor in our project. The compressed air flow through the Polyurethane tube to the flow control valve. The flow control valve is connected to the solenoid valve as mentioned in the block diagram.
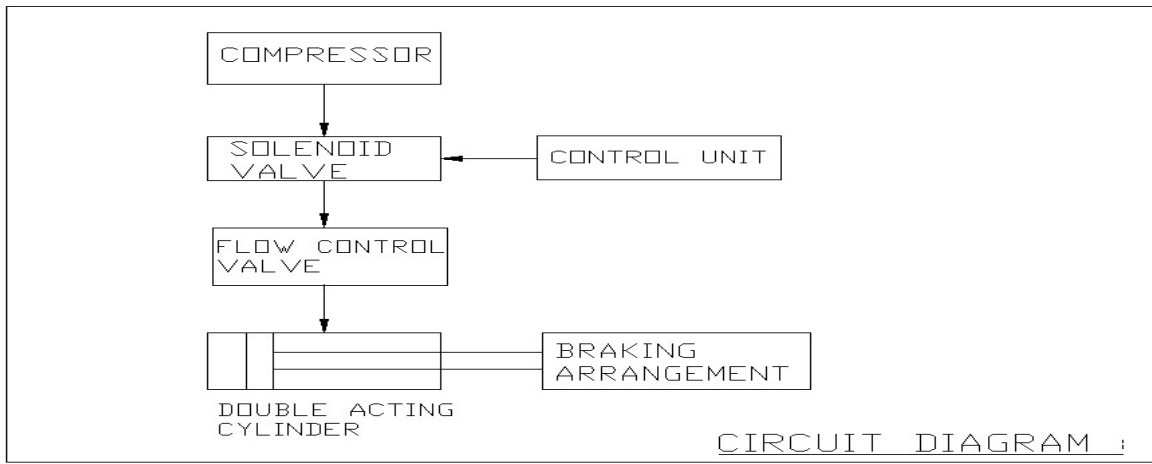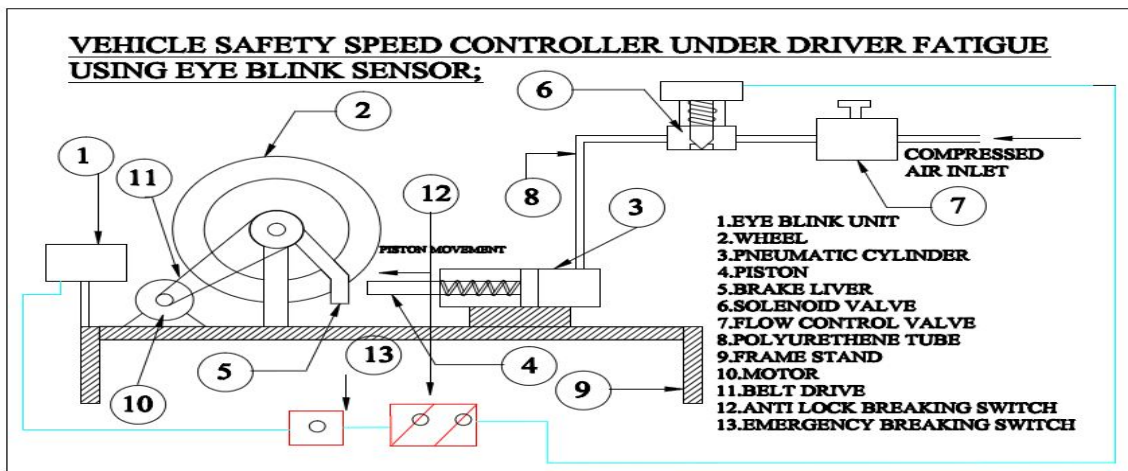
CIRCUIT DIAGRAM :

VI. DESIGN OF FABRICATED MODEL

VEHICLE SAFETY SPEED CONTROLLER UNDER DRIVER FATIGUE USING EYE BLINK SENSOR;

1.EYE BLINK UNIT
2.WHEEL
3.PNEUMATIC CYLINDER
4.PISTON
5.BRAKE LIVER
6.SOLENOID VALVE
7.FLOW CONTROL VALVE
8.POLYURETHENE TUBE
9.FRAME STAND
10.MOTOR
11.BELT DRIVE
12.ANTI LOCK BREAKING SWITCH
13.EMERGENCY BREAKING SWITCH

VII. APPLICATION

i. For automobile application
ii. Industrial application

VIII. ADVANTAGES

i. Brake cost will be less.
ii. Free from wear adjustment.
iii. Less power consumption
iv. Less skill technicians is sufficient to operate.
v. It gives simplified very operation.
vi. Installation is simplified very much.
vii. To avoid other burnable interactions viz…. (Diaphragm) is not used.
viii. Less time and more profit
ix. Accident should be avoided easily monitor the driver's actions.

XI. DISADVANTAGE

i. Difficult to implement
ii. Sudden break may lead to hit the vehicle by other vehicle who rides back of him.

XII. SNAPSHOTS

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