

A Review Paper on Intelligent System for Automobile Accident Prevention

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Abstract— There is a problem of road accident which are increasing now a days. So it is the need of time to reduce the accidents by designing a system which saves life of passengers and driver. In the project we provide a means of accident prevention by using eye blink sensor and heart beat sensor wherein the vehicle is stopped immediately.

1.INTRODUCTION

The number of road accidents is increasing day by day due to various factors like Distracted Driving, Heart Attack, and Drowsiness. We are mainly focusing on the area of accidents caused by drowsiness and heart attack as various sensing devices are available. The number of road accidents is increasing day by day due to various factors like Distracted Driving, Heart Attack, and Drowsiness. We are mainly focusing on the area of accidents caused by drowsiness and heart attack as various sensing devices are available. More than 10 lakh people in India have lost their lives to road accidents in the last 10 years. India has the uncertain distinction of leading the world in road crash fatalities – 10% of total global road deaths occur here. In 2013 alone, almost 1.4 million people were killed and close to 5 lakhs were seriously injured or permanently disabled.

Table no 1- Data of Death and Injuries

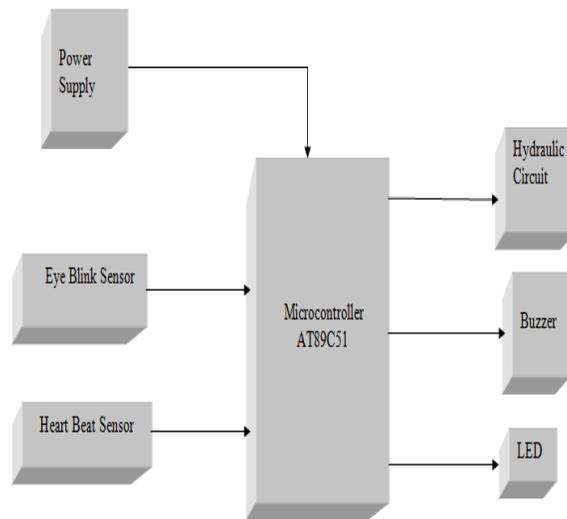
Year	Deaths	Injuries
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2013	137423	469900
2012	139091	469900
2011	1,36,834	468800
2010	1,33,938	470600
2009	1,26,896	466600

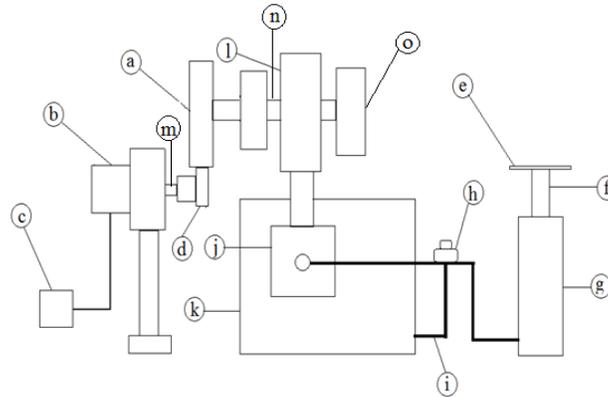
2. CONSTRUCTION

Our model mechanism is a combination of electrical and mechanical system in which Electrical signals are generated by electrical setup which is transmitted to the mechanical system to generate brake force.

BLOCK DIAGRAM



SETUP DIAGRAM



3. WORKING

This system works in conjunction with electrical and mechanical system wherein the electrical signal is either given by Heartbeat Sensor or Eye blink Sensor and further the mechanical system actuates producing the braking force.

3.1. Electrical System

3.1.1. Heartbeat Sensor

1) The pulse detection is done using a LED from one side of the finger and measure the intensity of light received on the other side using a LDR.

2) Whenever the heart pumps blood more light is absorbed by increased blood cells and we will observe a decrease in the intensity of light received on the LDR. As a result the resistance value of the LDR increases.

3) This variation in resistance is converted into voltage variation using a signal conditioning circuit further which is given to microcontroller as an input.

4) The count value of pulses per minute will give you the Heart rate in bpm (Beats per Minute). We get count of heartbeat on LCD after each 30 seconds.

3.1.2. Eye blink Sensor

1) IR TRANSMITTER

When IR rays gets emitted from LED, it moves in the direction it is angled. When any obstacle interferes in the path, the IR rays get cut and it produces secondary wavelets which propagates mostly in return direction or in a direction opposite to that of the primary waves, which produces the net result like reflection of IR rays.

2) IR RECIEVER

The IR receiver is connected to a comparator. Whenever the infrared rays are received by the IR receiver then this signal is compared with the reference signal of the comparator. The IR receiver is connected to the inverting terminal of the comparator.

3) COMPARATOR

Comparator compares two analog signals and produces a one bit digital signal. Initially the red led is in ON state, after processing from comparator if the eye remains close the led switches to of state otherwise it continues its ON state.

3.2. Mechanical Setup

The electrical signal either received from heartbeat sensor or eyeblink sensor runs the electrical motor which rotates the gear mounted on the shaft via pinion. The shaft also has a cam mounted over it and the pump is placed in a reservoir. The oil from the reservoir goes to piston cylinder arrangement via fluid lines. The pump is actuated by cam. The return valve is connected to the piston cylinder arrangement which discharges back to the reservoir. Finally the force is generated at the piston cylinder arrangement.

4) Why Heartbeat and Eye blink sensor?

The eye blink sensor is placed on the lens of specs which the driver has to wear while driving the vehicle.

If the driver sleeps and his eye remain closed for more than 2 to 5 sec, signals is generated which switches the buzzer and the mechanical system starts functioning.

Where as in case of Heartbeat a heartbeat sensor is placed on the seat belt which detects the heart beat of the person who is driving the vehicle.

If Heart beat rate exceeds the given range i.e. less than 60 or greater than 100 signals is generated and buzzer will be on and the mechanical system starts functioning.

5) Advantages

- Response time of system is less.
- System is leak proof.
- Accuracy of sensor is quite considerable.
- Comparatively requires low cost for implementation.
- Space requirement is less.

6) Standard Parts used

Electrical

- 1) Microcontroller
- 1) Light emitting Diode(LED)
- 2) Light Dependent Resistor(LDR)
- 3) Infrared Transmitter and Receiver

Mechanical

- 1) Pinion and Gear
- 2) Double acting cylinder
- 3) Pump
- 4) Shaft

7) Conclusion

- (1) The designed system stops the car safely within 81sec(stopping distance= 30 to 40m at speed of 60km/hr) which is safe enough to save driver life.
- (2) Eye blinking: The proposed system stops the vehicle if driver is drowsy for more than 2sec.
- (3) Heart Beat: The proposed system stops vehicle safely if drivers heart beat is not in the range of 60 to 100 bpm.
- (4) The cost of equipment compared with vehicle cost is less & hence can be fitted as safety device which saves driver and passenger life.
- (5) Total 30% accidents which are caused due to drowsiness and heart attack can be overcome by proposed system.

8) Future Scope

- This work can be extended for alcohol detection and stopping the vehicle safely.
- The vehicle can be switched to Autopilot system in case of medical emergency by using more sensors and technology.
- The system generates a signal to inform nearest Medical/ Ambulance/ Police help through satellite communication system.
- GPS tracking system for detection of accidents or to find out position of vehicle after accident.
- Sway detection system can also implement.
- By using wire-less technology such as Car Talk2000 if the driver gets a heart attack or he is drunk it will send signals to nearby police station or hospital.
- The bad performance of driver is communicated to traffic control authority
- Also, GSM module can be introduced in the proposed system which would inform the Police Department about ill behavior of driver.

9) Source List

- Use of Intelligent Systems in Vehicles (Fieldwork: June - July 2006, Publication: December 2006]

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