Asian Journal of Applied Science and Technology (AJAST)
Volume 1, Issue 3, Pages 08-10, April 2017

Pre-Crash Sensing and Warning System in Hilly Region

R.Meena[1], R.Lavanya[2] and K.Suresh Kumar[3]

[1]*UG Scholar, Department of Electronics and Communication Engineering, IFET College of Engineering, Villupuram, Tamilnadu, India.*
[2]*UG Scholar, Department of Electronics and Communication Engineering, IFET College of Engineering, Villupuram, Tamilnadu, India.*
[3]*Senior Assistant Professor, Department of Electronics and Communication Engineering, IFET College of Engineering, Villupuram, Tamilnadu, India.*

Article Received: 20 March 2017 *Article Accepted: 29 March 2017* *Article Published: 01 April 2017*

ABSTRACT

Accidents are commonly occurring in hilly regions. They are caused because of curve roads and speed breakers placed in mountain roads. Many mountain climbing roads are having tight curves. The vehicles from opposite side cannot be visible to the driver. Millions of peoples are losing their life because of the accidents. And by arising these situations an idea is proposed to avoid those types of accidents by implementing the crash sensing and warning system. It will sense the vehicle from the opposite side detect the vehicles and gives the warning alarm. Here voice command starting the condition of the tyre is used, if air pressure is decreased. Visible mirror of the vehicles observe the high intensity of opposite vehicles that will automatically reduce intensity of light in our vehicle by using dim and dip sensor.

Keywords: Dim/Dip sensor, Voice playback module, Ultrasonic sensor and Pressure sensor.

1. INTRODUCTION

Nowadays accidents are widely happened in many areas and millions of people lost their lives. Most of the accidents are happened in hill regions especially at narrow curve roads like, Ooty, Kodaikanal and other states. In curve roads the other road end of vehicle cannot seen by driver. According to death about 2.5 million people die in India per annum. At night time accidents may happens by intensity of head light from opposite side of vehicles. Also, the light intensity problem occurs both curved roads and mountain roads. Vehicle movement control and accident avoidance in hilly track [1]. The main disadvantage of this is chances of mis-prediction. A hidden markov model based driver intention prediction system [2]. There is highly failure in hilly region. If the vehicle is in very speed then it is difficult to control and there are chances of falling to cliff [3]. To avoid these problems in curve roads or T roads we are introducing sensor based accident prevention system. [4].

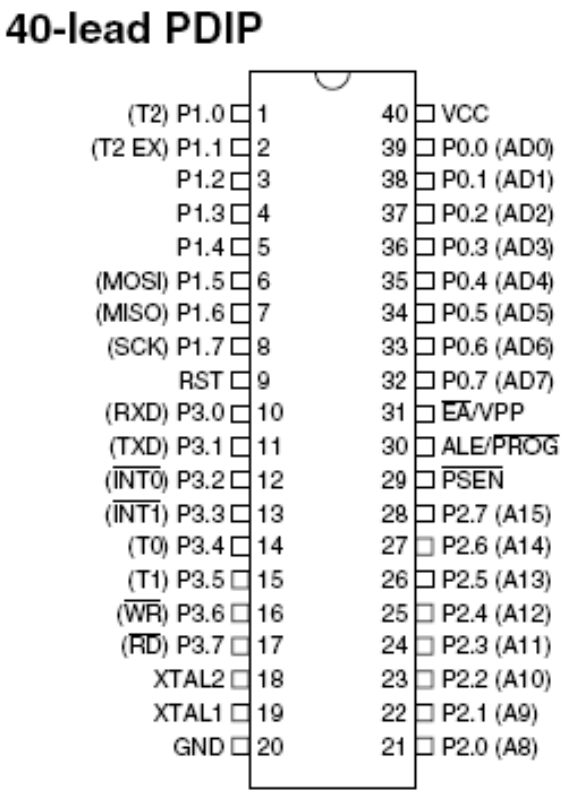
2. PROBLEM STATEMENT

By studying above papers we have some limitations (i.e.), accident by high intensity of light cannot eliminated by previous system and reduces of air pressure (tyre) cannot be sensed. In this paper we have implemented warning system to detect the opposite vehicle and along with this we introduce a Dim/Dip sensor to automatically reduce a intensity of light, when the opposite vehicle having an over brightness. By using pressure sensor that will eliminate accident happened by sudden reduction of tyre pressure.

3. SYSTEM DESCRIPTION (HARDWARE SYSTEM)

3.1 Microcontroller: (AT89s52)

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology. It is compatible with the Industry-standard 80C51 instruction set and pin out. It contains four ports (P0, P1, P2, and P3).



Pin diagram of AT89s52 Microcontroller

PORT 0:

It is an 8-bit open drain bidirectional I/O port. In output port, each pin can connect eight TTL inputs. When 1s are written to port 0 pins, these pins can be used as high-impedance inputs. It receives the code bytes during Flash programming and outputs the code bytes during program verification. External pull-ups are required during program verification.

PORT 1:
It is an 8-bit bidirectional I/O port with internal pull-ups. The Port 1 output buffers can source four TTL inputs. When 1s are written to Port 1 pins, they are pulled high by the internal pull-ups and can be used as inputs. In addition, P1.0 and P1.1 can be configured to be the timer/counter 2 external count input (P1.0/T2) and the timer/counter 2 trigger input (P1.1/T2EX), respectively.

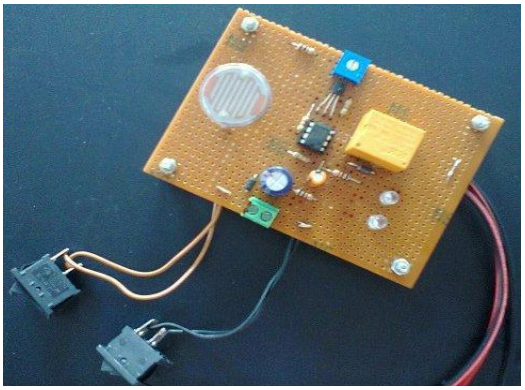
PORT 2:
It is an 8-bit bidirectional I/O port with internal pull-ups. The Port 2 output buffers can connect source four TTL inputs. When 1s are written to Port 2 pins, they are pulled high by the internal pull-ups and can be used as inputs. It also receives the high-order address bits and some control signals during Flash programming and verification.

PORT 3:
It is an 8-bit bidirectional I/O port with internal pull-ups. The Port 3 output buffers can sink/source four TTL inputs. When 1s are written to Port 3 pins, they are pulled high by the internal pull-ups and can be used as inputs.

3.2 Ultrasonic Sensor
HC-SR04 is a commonly used module for non-contact distance measurement of distance from 2cm to 400cm.

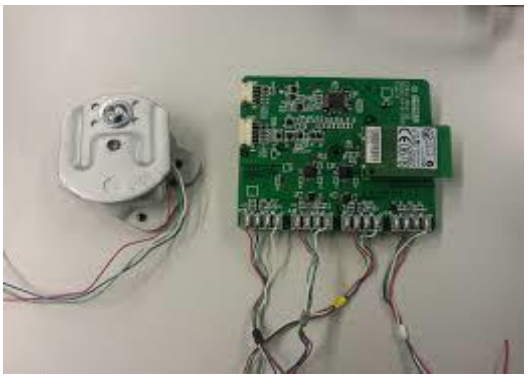
It has 4 pins:
VCC – 5V, input power; TRIG – Trigger Input; ECHO – Echo Output; GND – Ground. A trigger signal is provided to TRIG input, a HIGH signal of at least 10μS duration. This enables the module to transmit eight 40 KHz ultrasonic burst. If there is an obstacle in-front of the module, it will reflect those ultrasonic waves. If the signal comes back, the ECHO output of the module will be HIGH for duration of time taken for sending and receiving ultrasonic signals.

Diagram for Voice module



DIM/DIP sensor

3.3 Pressure Sensor
This sensor senses the pressure of the car tyre and it will alert the driver to control the car while hill climbing. Some pressure sensors, such as those found in some traffic enforcement cameras, function in a binary manner, i.e., when pressure is applied to a pressure sensor, the sensor acts to complete or break an electrical circuit. These types of sensors are also known as a pressure switch.



Pressure sensor

4. SOFTWARE DESIGN

Accident Prevention System
The software design of microcontroller which is programmed by using AT89S52. This programming can be done by using embedded c. The pulse sends through trigger and then receives it through echo. Convert the received value into distance. If the distance is in range, time delay is set to 400else no actions are taken and the process is continued. Next check if time delay is zero, if it satisfies condition it wills turnoff LED.

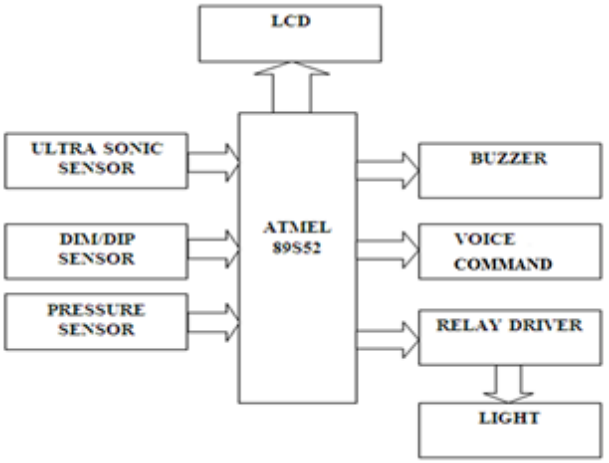
5. EXPERIMENTAL ANALYSIS

Coding for microcontroller AT89s52which consists of set of commands to process data from sensor and to operate. Circuit connection is having sensor and AT89s52 where the sensor senses the obstacle and the micro-controller processes and operates LED as per commands given. Detection of vehicle by sensor when vehicle passes through road. It is the experimental demonstration for this paper.

6. PROPOSED SYSTEM

In this paper we used three types of sensors namely light intensity sensor, pressure sensor, and ultrasonic sensor. Light

intensity sensor is used for measuring the brightness of light. If intensity is high, system will dim the light brightness through glass. The ultrasonic sensor is used to predict the vehicle comes in opposite side. To control the vehicles while hill climbing pressure sensor senses the pressure of the car tyre.



7. CONCLUSION

The sensors used here for controlling and preventing accident in most hilly regions and curve roads. The sensor which is placed in front of the vehicle, detects the obstacle in any form and alerts the driver by alarm indication. The light intensity of the opposite vehicle is also monitored and controlled by using certain controlling methods. The pressure of tyre is monitored periodically to avoid sudden damage due to high pressure. Thus our paper provides an ideal methodology for reducing accidents by increasing road safety measures.

REFERENCES

[1] Jessen Joseph Leo., R. Monisha.,et.al., "Vehicle movement control and accident avoidance in hilly track", *IEEE Int. Conf. on Electronics and Communication Systems (ICECS),* pp. 1-5 (2014).

[2] Duy Tran., Weihua Sheng.,et.al., "A Hidden Markov Model based driver intention prediction system", *IEEE Int. Conf. on Cyber Technology in Automation, Control, and Intelligent Systems* (CYBER), pp. 115-120 (2015).

[3] D. bindu tushara., "Wireless vehicle alert and colision prevention system design using atmel microcontroller", *ICEEOT-2016.*

[4] R.P. Mahapatra, "Ultra sonic sensor based blind spot accident prevention system", *ICACTE-2008.*

[5] Mohd Khairul, "Smart helmet with sensors for accident prevention", *ICEESE- 2013.*

[6] Johanscholtz et al., "Ontology layering in an early warning sensor (EWS) bicycle accident prevention system", *ICCVE-2014.*

[7] Jiang Yuying, "A surveillance method for driver's fatigue and distraction based on machine vision", *ICTMEE-2011.*