

EMERGENCY COLLISION PREDICTION AT ROAD DEPARTURE USING MPLAB

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Abstract: To design a process of driving experiment which evaluate the Road-Departure Prevention (RDP) system in an emergency situation , in this case three level of major problems are simulated.1) When the obstacle occur it is used to measure the distance between the vehicle and the obstacle 2) Sense the human health condition 3) The accident. This process prevents the road departure and tends to reduce self-reported workload. The vehicle is controlled by control unit which reduce the vehicle speed. The system uses GSM technology which is embedded with the sensors for faster transmissions, which transfers the information and displays it in LCD. Vehicle embedded system based user security in real time system environment is proposed to provide security service in vehicle.

Keywords: PIC Microcontroller, GSM Module, Sensor.

I. INTRODUCTION

The collision avoidance system was designed to reduce the accident in automobile safety system. It was a forward collision warning system pre-crash system, it uses radar (all-weather) and sometimes laser and camera to detect an forthcoming crash. Once the detection is done the systems either provide an ominous to the driver when there is an inevitable collision or take action sovereignty without any chauffeur input (by braking or steering or both). Collision evasion by braking is opportune at low vehicle speeds (e.g. below 50 km/h), while collision restraint by steering is relevant at higher vehicle speeds.

The problem is all the more severe because the victims are overwhelmingly healthy before their crashes. More than 1 million people are killed on the world's roads each year. A report published by the WHO in October 2014 predicted that some 1.25 million people were killed and 50 million injured in traffic collisions on the roads everywhere the world each year and was the dominant cause of death among children 10–19 years of age. To beaten this problem , this process used to curtail this accident with the help of GSM, Ultrasonic sensor and microcontroller.

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It lacks one mobile number for send and receive the messages about the accident, health conditioning and distance which are display when the obstacle is occurred. Then the microcontroller is used to control the vehicle speed automatically and the buzzer is horned.

This process is simulated with the help of proteus PCB and MPLAB, which is used to integrate and extend discordant data sources into useful intelligence for more efficacious management and control of program management information. The steering torque and the front wheel angles were evaluated in emergency situation with haptic feedback and drive by wire, which gives relationship between the steering wheel angle and front wheel angle

II. SYSTEM DESIGN AND ANALYSIS

The system based on the wireless sensor network and GSM technology. This system is a control unit which controls the vehicle speed and measure the driver health condition, then measure the distance between the vehicle and the obstacle. In this method microcontroller, GSM, heart beat sensor, ultrasonic sensor, keypad, LCD, RS232 and alarm are used. In this processing method the inputs are given as image format then it converted into signal method on after the amplification. While the output values are displayed in LCD and then when the values are processed above in a required value that time the buzzer will be on, then the vehicle will move to off stage.

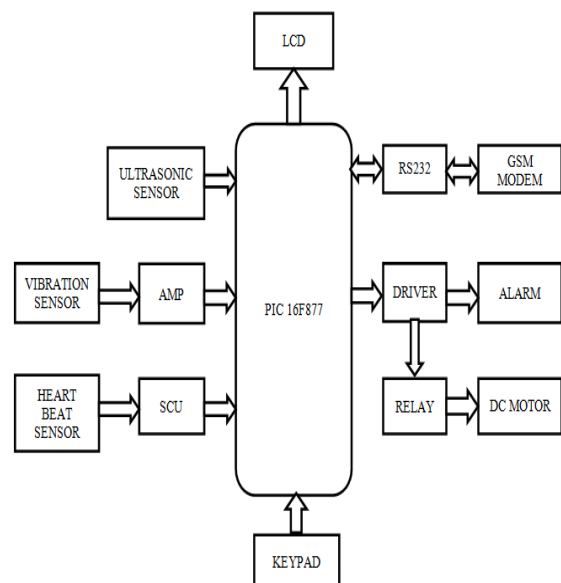


Fig 1. Block Diagram of Road Departure Using MPLab

In Vehicle Section, all the apparatus are connected to microcontroller. The Piezoelectric sensor is used as vibration sensor to measure flex, touch, vibration and shock. Piezoelectric sensor is a device which uses to measure the changes in acceleration, pressure, temperature, strain or force by converting them to an electric charge. Sensor based on piezoelectric effect can operate from transverse, longitudinal, shear forces and are insensitive to electric field and electromagnetic radiation. This piezoelectric sensor measures dynamic pressure which includes blast, ballistics and engine combustion under varying condition.

An electronic amplifier is an electronic device that increases power of a signal and converts alternating current into direct current. Indicator indicates through buzzer whether accident has occurred or not. The buzzer produces sound when accident occurs.

In Ultrasonic sensor a frequency of 40 KHz is to be generated which done by the oscillator. The engender frequency is transmitted through the ultrasonic transmitter sensor which is subjected back when an obstacle is placed.

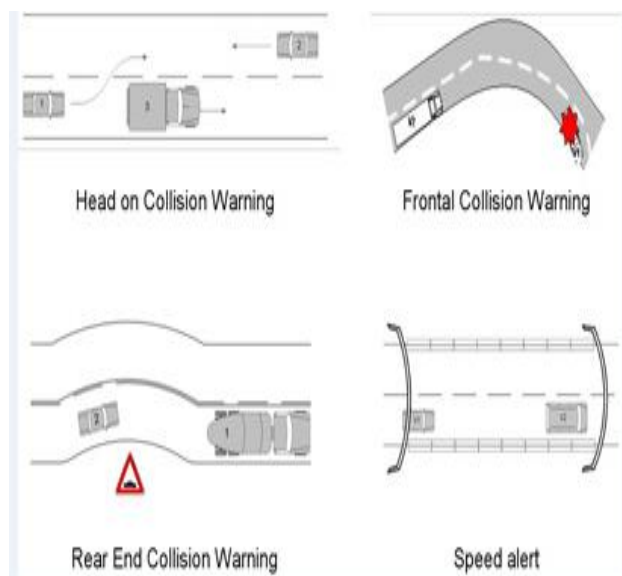


Fig 2. Model diagram of collision warning

The reflected back frequency is received in the ultrasonic receiver sensor. Thus with respect to the time the reflection of the noise to what distance is received. The received output is amplified, which is converted to voltage. This voltage output which is analog is given to ADC which converts the analog to 8 bit Digital output. The 8 bit data is interfaced with Microcontroller Through its I/O Lines. The data is thus monitored in the Display. The data is nothing but the distance travelled by the ultrasonic sensor.

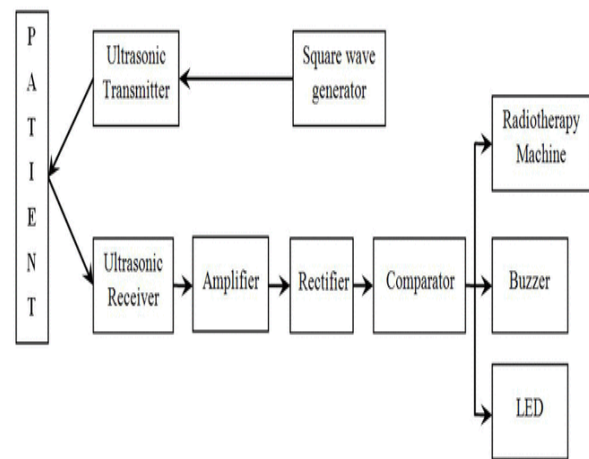


Fig 3. The Block Diagram of Ultrasonic Sensor

III. DESCRIPTION

A. PIC MICROCONTROLLER

PIC Microcontroller is a general purpose device, which assimilates a number of the components of a microprocessor system on to single chip. It has deep seated CPU, memory and peripherals to make it as a mini computer. It can signal through transmitter and receiver between the user and vehicle.

B. GSM MODEM

GSM uses Time Division Multiple Access (TDMA) and is the most widely used in the three digital wireless telephony technologies (TDMA, GSM, and CDMA). The sensor installed in the vehicle unit senses the accident and GPS tracks the location of the accident. Through GSM, it sends the location of the accident to the vehicle section. The buzzer produces sound when accident occurs. The central unit finds the vehicle, nearest to the accident spot and also the shortest path between the location of the accident and the nearest place.

C. LIQUID CRYSTAL DISPLAY

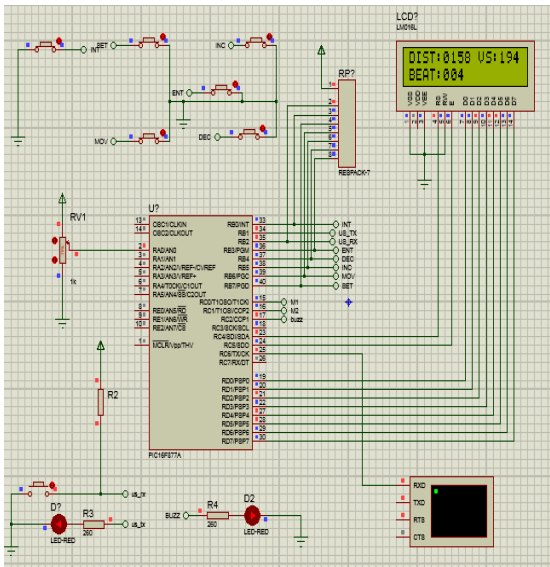
LCD is display the distance level between the vehicle and the obstacle, then sense the human heart beat level and accident.

D. MPLAB

In this project the MPLab is used for the code editing and analysis of the image signals. It makes the use of commends to find what type of departure is occur. Editing errors and breakpoints match the corresponding lines in source code. Then the MPLab compiler supports the editing point and Single step through C and C++ source code to inspect variables and structures at critical points.

IV. RESULTS AND DISCUSSION

The road departure system is designed using MPLAB and PROTEUS PCB. The distance, vibration and the heart beats are displayed in the LCD. Thus when the output value goes above the required value, the buzzer and LED are moved to ON stage. The heart beat sensor is used to measure the heart beat value.



V. CONCLUSION

The road departure System is designed to rescue the road accident. It shows that the implementation of GSM wireless networking devices which is used to transmit the information from vehicle to the driver through RS323 cable.

In this design, Number of challenges such as security, accident and measure the obstacle distance need to be optimized. Simulation results obtained from MPLAB and PROTEUS PCB in the simulation environment. Future enhancements include the driver security in the vehicle using embedded system environment. It is based on the RFID card.

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