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Note on RECENT TECHNOLOGIES

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Automobile automation using Ultrasonics and Image processing along with smoke sensor and breath analyser

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Abstract—The main aim of the project to develop a system to automatically control speed and to avoid accidents using eye blink sensor and ultrasonic sensor along with breath analyser and smoke sensor. Whenever any obstacle is detected in a running vehicle, depending on the distance, it automatically controls the speed of vehicle. When the driver is in sleeping /drowsy position, the eye blink sensor, when it detects that there is no eye blink for more than 30 seconds, will automatically send signals to stop the car and give alarm to alert the driver. The ultrasonic sensor system continuously sends signals and monitors whether any car or other obstacles are in front of car. The distance up to which ultrasonic sensor can work may be up to 4 meter. When any obstacle or vehicle is detected by ultrasonic sensor system it will send signal to the embedded board. After receiving this signal the embedded board sends a signal to the motor to reduce the car speed automatically. Also to prevent drunken drive, a breath analyser is connected to the microcontroller which requires the driver to blow. If the alcohol is above the desired limit, the ignition does not start. It also randomly requests breath samples while driving and the car automatically stops when the alcohol content is found above the desired level. Many accidents at High-ways are taking place due to the close running of vehicles, all of sudden, if the in front vehicle driver reduces the speed or applied breaks, then it is quite difficult to the following vehicle driver to control his vehicle, resulting accident. To avoid this kind of accident, the warning system, which contains alarm and display system can arrange at rear side of each and every vehicle. If any short circuit occurs in engine part smoke sensor detecting and give alert to driver and stop the vehicle.

Keywords— *PIC16F877A, breath analyser, car automation unit, Ultrasonic sensor.*

1. INTRODUCTION

Accident avoidance system is an automobile safety system designed to reduce the severity of an accident. Also known as pre-crash system, forward collision warning system or collision mitigating system, it uses radar and sometimes laze rand camera sensors to detect an imminent crash. Once the detection is done, these systems either provide a warning to the driver when there is an imminent collision or take action autonomously without any driver input (by braking or steering or both) In 2009, the U.S.National Highway Traffic Safety Administration(NHTSA) began studying whether to make frontal collision warning systems and lane departure warning systems mandatory. In 2011, a question was submitted to the European Commission regarding stimulation of these "collision mitigation by braking" systems [1]. The mandatory fitting of Advanced Emergency Braking Systems in commercial vehicles will be implemented on 1 November 2013 for new vehicle types and on 1 November 2015 for all new vehicles in the European Union. This could, according to the impact assessment, ultimately prevent around 5,000 fatalities and 50,000 serious injuries per year across the EU. In an important 2012 study by the non-profit research organization Insurance Institute for Highway Safety, researchers examined how particular features of crash avoidance systems affected the number of claims under various forms of insurance coverage. They found that two crash avoidance features provide the biggest benefits:

- Autonomous braking that would brake on its own, if the driver does not, to avoid a forward collision
- Adaptive headlights that would shift the headlights in the direction the driver steers.

Unexpectedly, they found lane departure systems to be not helpful, and perhaps harmful, at the circa 2012 stage of development. Collision avoidance features are rapidly making their way into the new vehicle fleet.

BLOCK DIAGRAM

The below figure can represents the block diagram of the design.

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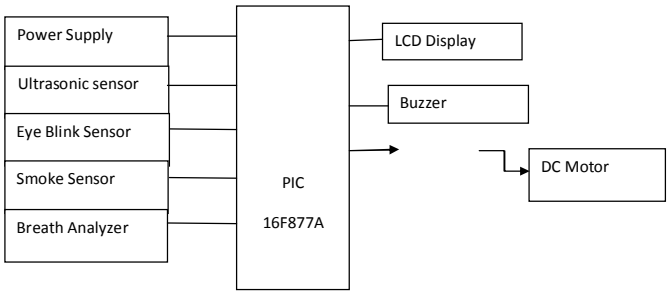

Fig.1 Block Diagram

2. Circuit Component

A. PIC

The microcontroller that has been used for this project is from PIC series. PIC microcontroller is the first RISC based microcontroller fabricated in CMOS (complementary metal oxide semiconductor) that uses separate bus for instruction and data allowing simultaneous access of program and data memory..

B. PIC164877

Various microcontrollers offer different kinds of memories. EEPROM, EPROM, FLASH etc. are some of the memories of which FLASH is the most recently developed. Technology that is used in pic16F877 is flash technology, so that data is retained even when the power is switched off. Easy Programming and Erasing are other features of PIC 16F877.

C. PIC Star Plus Programmer

The PIC start plus development system from microchip technology provides the product development engineer with a highly flexible low cost microcontroller design tool set for all microchip PIC micro devices. The PIC START PLUS development system includes PIC start plus development programmer and MP lab IDE. The PIC start plus programmer gives the product developer ability to program user software in to any of the supported microcontrollers. The PIC start plus software running under M Plab provides for full interactive control over the programmer.

D. LCD Display

LCD display is used to display the heart rate of the driver. Crystalloids dot –matrix (alphanumeric) liquid crystal displays is used in this paper. It is interfaced with the microcontroller through the I/O ports.

E. RS232

In telecommunications, RS-232 is a standard for serial binary data interconnection between a DTE (Data terminal equipment) and a DCE (Data Circuit-terminating Equipment). It is commonly used in computer serial ports. The standard defines the electrical characteristics and timing of signals, the meaning of signals, and the physical size and pin out of connectors.

F. Breath Analyser

Car Breathalyzer Devices, also called Ignition Interlock Devices (IID), are a small device that is about the size of a cell phone. The device is connected to your vehicle's ignition system. Prior to starting the vehicle, you are required to blow into the device to submit a breath sample. The device measures your breath alcohol level and compares it to a pre-set limit. If your breath alcohol level is below the pre-set limit, the vehicle will start. If your breath alcohol level is at or above the pre-set level, the IID will prevent the vehicle from starting. While you are operating the vehicle, the IID will alert you to submit a breath sample. This breath samples are random and are typically required several times while you are operating the vehicle. If the device detects that you have a breath alcohol level above the pre-set limit while you are driving, depending on your jurisdiction, the device will sound an alarm and may also trigger the vehicle's horn and/or flash the lights until you turn off the vehicle. For safety reasons, the IID will not turn off the vehicle if your breath alcohol level is above the pre-set limit while you are operating the vehicle. Some devices also notify law enforcement if your breath alcohol level is above the pre-set limit while you are operating the vehicle.

G. Smoke Sensor

These sensors are used to sense smoke from the car engine in case of a short circuit. It detects it by testing the air for particles and pollutant

H. Ultrasonic sensor

The ultrasonic sensor is preset on both the sides of the vehicle. It consists of a receiver and a transmitter. The transmitter sends ultrasonic waves and the receiver receives it. The time delay between the transmission and reception determines the position of the object.

3. Circuit Working

The sensor is present on either side of the car. If it detects an obstacle present in the left side, it sends signals to the microcontroller to turn the car to right and vice versa and also reduces the car speed automatically when an obstacle is present in the range of 4 meters. The eye blink sensor on detection of no blinking, sounds the alarm to wake up the car driver even then if no blinking is detected, it stops the car based on the signals of the ultrasonic sensor. The breath analyzer does not allow the ignition to be started if the alcohol level is above the desired limit. Frequent checks are also done to prevent alcohol consumption while driving.

4. ADVANTAGES AND DISADVANTAGES

I. *Advantages*:

- Low cost, less complicity
- By the using of this system we can control the speed very easily.
- Reliable
- Easy to implement

II. Disadvantage:

- This system can operate certain distance only.

III. Applications:

- This system can be used to avoid accidents.
- Transportation applications.

5. CONCLUSION

Automobile automation using Ultrasonics and Image Processing along with smoke sensor and Breath analyser is briefly discussed. Integrating features of all the hardware components used have developed it. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. Secondly, using highly advanced IC's and with the help of growing technology the project has been successfully implemented.

REFERENCES

[1] Crouse and Anglin, "Automotive Mechanics", Tata McGrawHill 2002.