Distance Based Accident Avoidance System Using Arduino

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Abstract: In this paper, we introduce a new technique in automobile technology about how to keep 10 meter distance between one vehicle and another vehicle, so that the vehicle don't crash or cause any traffic problem. The aim of the system is to prevent accidents mainly due to not knowing the following distance (i.e., 5m) between one vehicle and another vehicle. The proposed system comprises an idea of having safety while reversing a vehicle, detects any object within the following distance, and displays the distance between one vehicle and another vehicle to the driver using LCD. We have used ultrasonic sensors to detect any vehicle on both front and back side of our vehicle. This system is also used in large crane which is mainly operated in harbour area. If the car reaches 10 meter, green colour light will glow. At 8 meter distance yellow colour light will glow. When it reaches 5 meter distance red colour light will glow. The distance is also indicated to the vehicle driver. By this proposed system, the safety is maintained on crowded areas and in vehicle reversing process.

Index Terms - : Microcontroller, Arduino, LED, LCD, Ultrasonic sensor,

I. INTRODUCTION

According to the world accident report, India has the very highest number of road accidents within the world. Road accidents have earned India a dubious distinction. With over 130,000 deaths annually, the country has overtaken China and now has the worst road traffic accident rate worldwide. As many as 1, 39, 091 people lost their lives in 4, 40,042 road accidents in the country last year. Tamil Nadu tops the list of with 16,175 deaths in 67,757 accidents, followed by Uttar Pradesh with 15,109 deaths in 24,478 accidents. Andhra Pradesh is third with 14,966 deaths in 39,344 accidents and Maharashtra fourth with 13,936 deaths in 45,247 accidents. The Capital city of Delhi accounts for about 1,866 deaths in 6,937 accidents. The states in India like Tamil Nadu, Uttar Pradesh and Andhra Pradesh accounted annually for 15.4%, 10.3% and 10.1% of the road accidents in the country. Road accidents have earned India a dubious distinction. With over 130,000 deaths annually, the country has overtaken china and now has the worst road traffic accident rate worldwide. One serious road accident in the country occurs every minute and 16 dies on Indian roads every hour. 1214 road crashes occur every day in India, Two wheelers accounts for 25% of total road crash deaths.

Reason:

There is no way to determine the exact distance of automobiles travelling behind as that will be responsible for accident

1. We are not sure that we will have a safe travel to reach our destination even a small distraction may bad to an accident.

2. Drowsiness have larger role in accidents. Most of the accidents occurs due to driven inattention since they doesn't have a way to get alert.

3. Accordingly to the national crime record, India bears nearly 30% of the world's total accident rates.

II. MODEL DESCRIPTION AND ANALYSIS

A). LED : - (light emitting diode) is a two lead semiconductor light source. It is a p-n junction diode that emits lights, when activated. If a suitable voltage is applied to the leads, electrons are able to recombine with electron holes within the devices and releasing energy in the form photon. This effect is called electroluminescence and the color of the light is determined by the energy band gap of the semiconductor. LEDs are typically small and integrated optical components.

B). POWER SUPPLY: - power supply is a device that supplies electric power to an electrical load. The term is most commonly applied to electric power converters that convert one form of electrical energy to another thought it may also refer to devices that convert another form of energy (mechanical, chemical, solar) to electrical energy. A power supply may be implemented as a discrete, stand –alone device or as an integral device that is hardwired to its load. All power supplies have a power input connection, which receives energy in the form of electric current from a source, and one or more power output connections that delivers current to the load.

C).ULTRASONIC SENSOR:-The ultrasonic sensor is a very affordable proximity/distance sensor that has been used mainly for object avoidance in various robotics projects. It essentially gives our arduino spacial awareness and can prevent our robot from crashing or falling off a table. It can also been used in turret applications, water level sensing and even as a parking sensor. The accuracy of ultrasonic sensor can be affected by temperature and humidity of the air it is being used in.

D). ARDUINO:-Arduino is an open source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often as a microcontroller) and a piece of software or IDE (integrated development environment) that runs on our computer. The arduino platform simply used c++ and other software for coding purpose. Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards and other circuits.

E).PCB:-A printed circuit board(PCB) mechanically supports and electrical connects and electrical components using conductive tracks, pads and other etched from copper sheets laminated onto a non-conductive substrate.PCB is used in all but the simplest electronic products. They are also used in some electrical products, such as passive switch boxes.

F). LCD DISPLAY: - An LCD is an electronic display module which uses liquid crystal to produce a visible image. The 16x2 LCD display is a very basic module commonly used in DIYs and circuits. The 16x2 translates on a display 16 characters per line
In a 5x7 pixel matrix.

III SYSTEM INTRODUCTION:-

The accident avoidance system helps to avoid the regular accidents that will normally occurring on highways and in city traffic. These accidents are mainly happened by distraction, unconsciousness, and distance unknown between our vehicles. So let us consider the Indian roads and we will have 2 ultrasonic sensors where one is placed in the front and another one behind the car. Due to this sensor, we can calculate the distance of other automobiles nearing us. Thus we can locate other cars and we can protect ourselves from accidents. The diagrammatic representation of the scenario is explained as
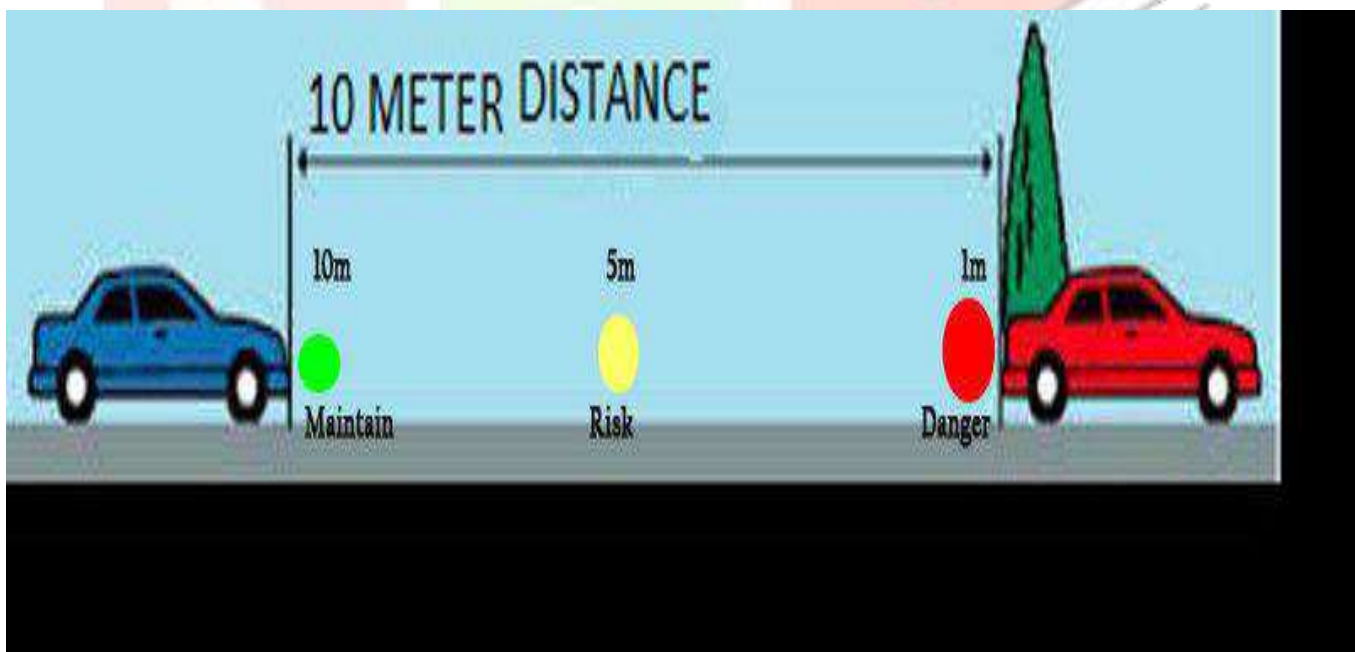

Fig Proposed Model

IV.HARDWARE DESCRIPTION:-

Arduino is a prototyping platform for controlling many devices. Through arduino, we can build many prototypes that we imagine. A basic arduino kit which forms the connection between the LCD and Ultrasonic sensor. Here the LCD is the source to display the output. Through this LCD display we can be able to see the distance of the vehicle that comes. Ultrasonic sensor is to sense the vehicle that nears about to 10 meters bread boards which allows implementing all the connection accompanied by the three LEDs.Connections are made to the arduino,LCD,LED, Ultrasonic sensor. The ultrasonic sensor is fixed in our car and it normally senses the car which is nearest to us on both front and back side. At distance of 10meter the green light will show the notification and when the car reaches 8meter he yellow color light alerts us and when the car reaches 5meter the red color light alerts us about the danger zone .The distance between one vehicle and another vehicle was displayed in LCD.
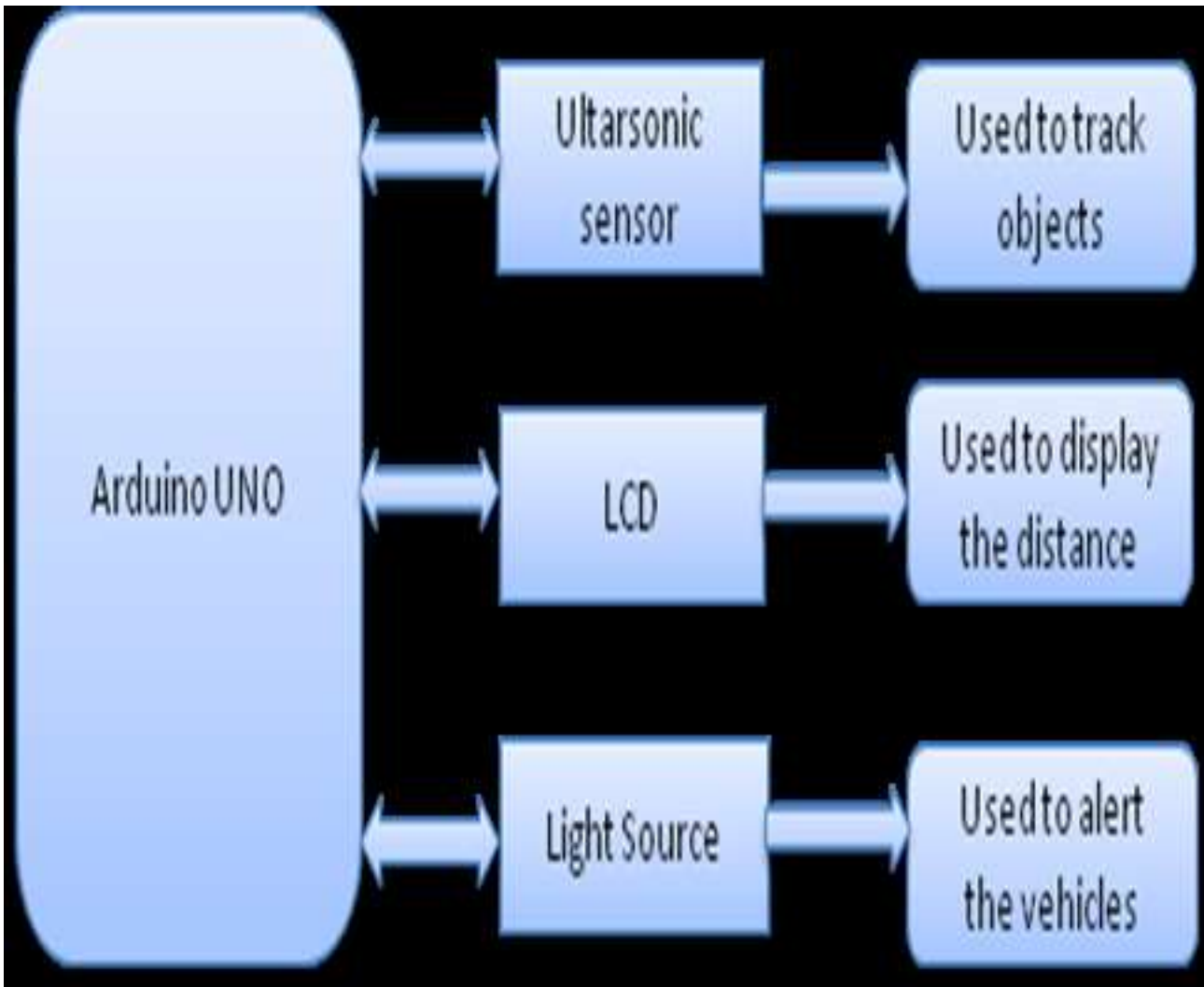

Fig Functional Diagram

V. WORKING:-

The basic idea behind this is to avoid accidents. It is a precautionary measure that alerts the driver. The initial stage begins from the ultrasonic sensor that identifies the vehicle in the front and back side. If the car reaches 10meters, green color light will glow that will show the notification. At 8meter distance yellow color light will alerts us. When it reaches 5meter distance red color light will alert us about the danger zone. At the same time the distance between one vehicle and another vehicle was displayed in LCD. Wire connection is made from the bread board to the LCD aurdino kit to the ultrasonic sensors and finally bread board to the arduino kit. This project will make easy calculation of a distance between one vehicle and another vehicle for the driver.
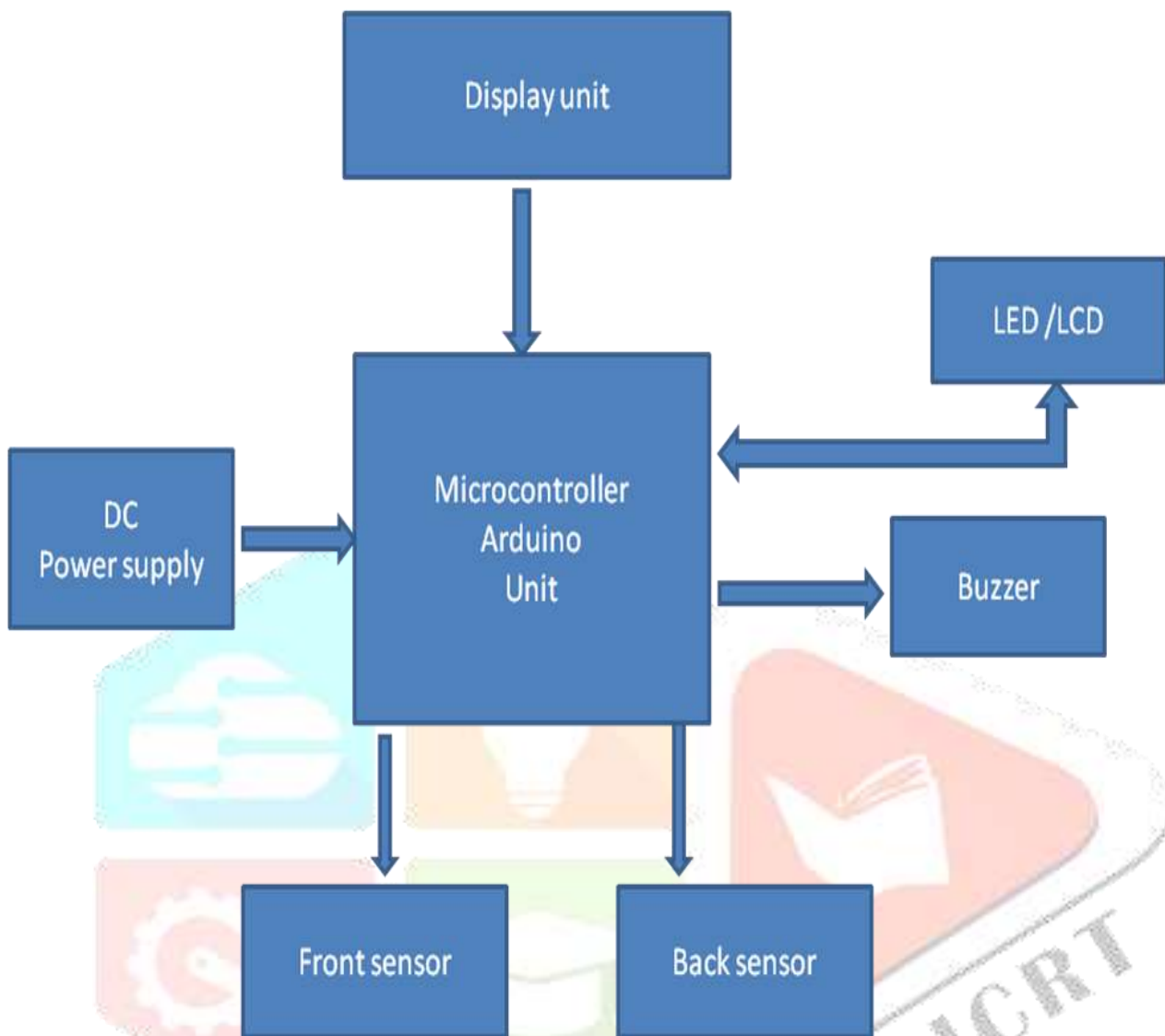
Fig Block Diagram

VI. CONCLUSION AND FUTURE WORK:-

In this paper we proposed and implement the accident avoidance system. Using this system we may avoid many accidents happened due to the following systems. The system comprises very low cost components such as ultrasonic sensor, LCD, LEDs, etc. This system might have many advantages such as

- Use to know the distance about following vehicles.
- In future, we are going to reduce the speed of one vehicle according to the following distance of other vehicle.

By this system, we may prevent many accidents and INDIA will become an accident less country.

VII. REFERENCES:-

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