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Intelligent Driver Assitance For Vehichle Safety

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Abstract

The approach for preventing an accident can be done using the ultrasonic technology. This project mainly emphasizes on building a feasible device that specializes in detecting intrusions, closed range obstacles, and automatically maneuvering the vehicle away from the obstacle. Automobile safety can be advanced by anticipating a crash before it occurs and thereby providing sufficient time to deploy safety technologies. Premonitory functions like a buzzer or led are used if the driver approaches any obstruction. The driver is cautioned in advanced regarding what the road entails. The project is thus finalized as; one to build a general, easy-to-use and versatile system that prevents fatal accidents.

Keywords: Automatic ; Economic ; Ultrasonic sensor ;Maneuver

I. INTRODUCTION

This According to an international survey the number of people who suffer to road accidents comes to 1.3 million per annum. Most of these accidents occur mainly due to two factors –

1) Road conditions

Maintaining roadways in a proper condition is always a tough task because harsh weather and immense traffic deplete the quality of the roads, especially due to Heavy Lift Vehicles.

2) Driver distractions

Manual errors account for more than 25 % of the total accidents. In order to minimize the accident severity and occurrence, future safety technologies must develop ahead of passive.

From the figure (1) these clearly, bring to light the gravity of the situation and the enormous responsibility of vehicle drivers towards causing road accidents.

To support the vehicles will require new pre-crash sensors to alert the driver in accordance to the traffic conditions. Pre-crash sensing will have an impact in minimizing the accidents that occur at night due to impaired drivers. Also this safety feature also helps benefit in low light, bad weather and driver distractions.

The idea of this project is to prevent an accident by indicating the distance between a vehicle and an object, along with maneuvering the vehicle automatically. There are many technologies to prevent an accident, but the method shown is more economical and efficient in developing and under developed countries

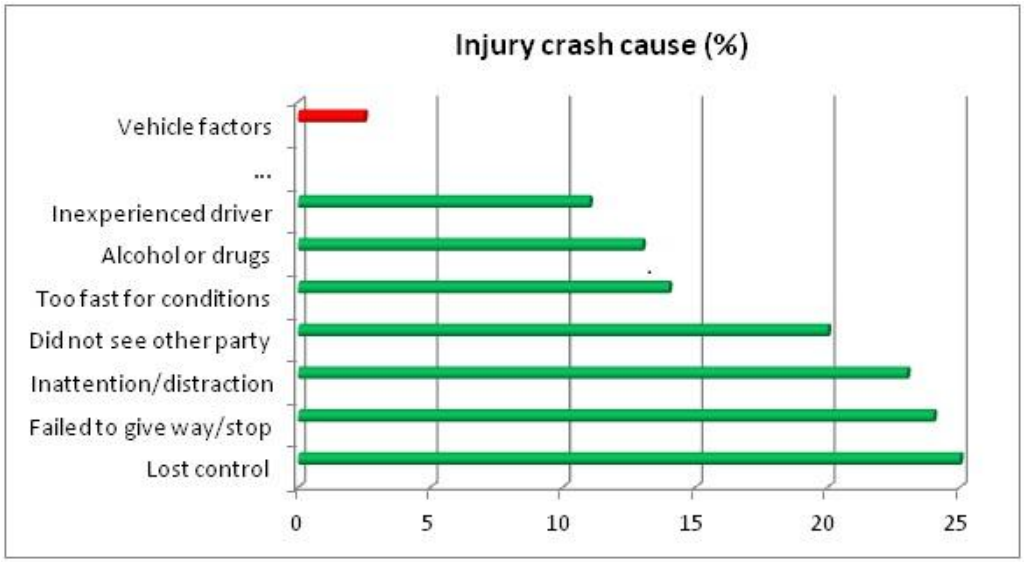

Fig. 1. Bar graph

II. PROPOSED SYSTEM

The proposed system is about preventing fatal accidents using ultrasonic technology. The main goal of the project is to prevent the automobile from a collision and to maneuver automobile around the obstacle after detecting the object.

principal hardware components are Ardunio Mega Micro-controller, Ultrasonic Sensor, DC motor, LCD for display, MAX-232 for serial communication, ZigBee module, LED, Buzzer. The software components are Ardunio IDE compiler.

A. Block Diagram:

The basic block diagram of the proposed system is as follows.

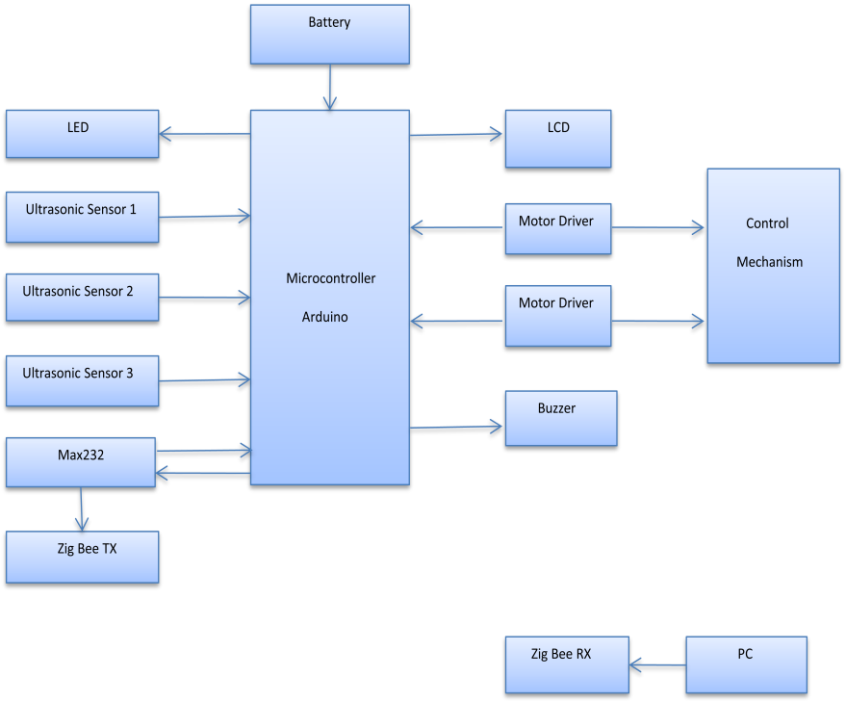

Fig. 2. Block Diagram

B. Hardware Components:

1) Power supply: 12V power supply is given to the DC gear motors and 5V power is given to rest all the components in the system.

2) Arduino Mega (Microcontroller): The MEGA 2560 is used as a microcontroller due to more availability of digital and analog pins than Arduino Uno.

Ultrasonic sensor 1: It acts as a front sensor for the vehicle and calculates the distance between the obstacle and the vehicle and transmits the same data to the microcontroller.

Ultrasonic sensor 2: It acts a left sensor for the vehicle, checks if any obstacle is present in the left and informs the microcontroller.

Ultrasonic sensor 3: It acts a right sensor for the vehicle, checks if any obstacle is present in the right and informs the microcontroller.

LCD (Liquid crystal display): Displays the distance and shows the values detected by the sensors.

Zigbee: Monitoring the vehicle by creating a personal area network and transmitting all the information to the PC.

MAX-232: To make the communication between the Zigbee and microcontroller.

Motor Driver: L293D Motor Driver is used for guiding the two DC motors simultaneously in any direction.

LED: To indicate the driver with an alert when the obstacle is near.

Buzzer: To indicate the driver that the brakes have been applied.

III. **METHODOLOGY**

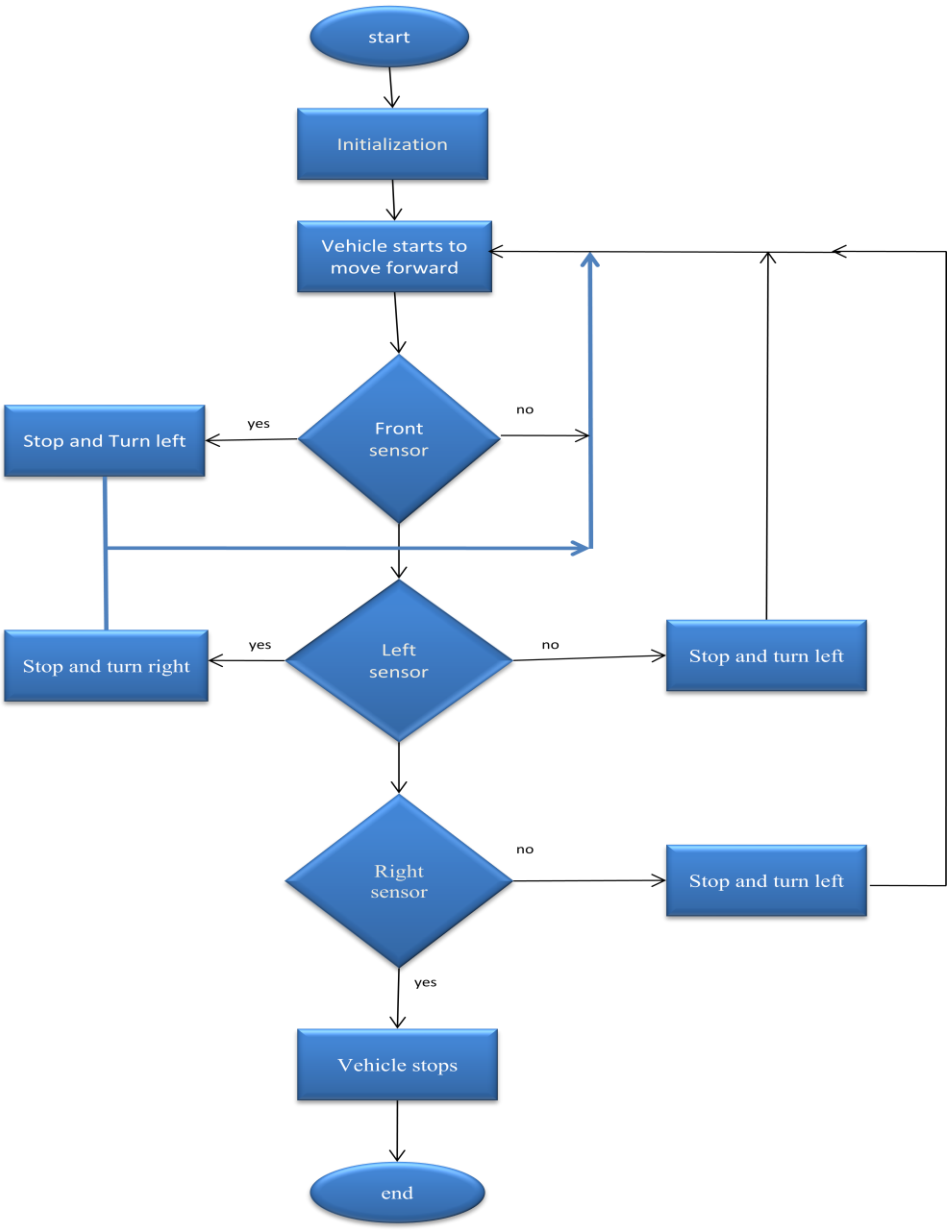

Fig. 3. Flow Chart

***A . Initialization*:**

Three Ultrasonic are attached to the vehicle, one in the front side and the other two are attached to the left and right sides of the vehicle. LCD (Liquid Crystal Display) is attached to the vehicle from where the proper working condition of the system can be observed. The vehicle will start automatically when the power supply is connected to it. As the vehicle runs on two DC gear motors, separate power supplies are needed, 12 V for a vehicle DC gear motors and 5V for the circuitry, Arduino mega board, LCD needs 5 V for operation, DC motors are driven by the driver circuit, this circuit is used for the individual movement of the motors. the vehicle starts to move forward. This whole information is transmitted to PC via Zigbee module, Zigbee actually creates a personal area network, by this the PC and vehicle are connected and the vehicle movements are monitored from the PC.

B. Detection:

These three Ultrasonic sensors are connected to the Arduino microcontroller. the front ultrasonic sensor continuously sends out a high-frequency sound pulse and checks for the reflected echo signal, by which it can detect the presence of an obstacle. The range of Ultrasonic sensors is limited to the certain distances for the detection of the obstacle, as the range of Ultrasonic sensors is unlimited. These ranges are limited accordingly, for the working of the project, by detecting the obstacle and then preventing it from the collision.

***C. Alarming System*:**

These Ultrasonic sensors are used to determine the exact position of the obstacle and gather range information from all three sides of the vehicle. The minimum detection distance which ranges between 3-4 meters. When the distance is in this range, the LED turns “ON” so that the driver get beware of an obstacle

***D. Algorithm for maneuvering the vehicle*:**

Figure (3) explains the flow diagram of the automatic maneuvering of the vehicle algorithm.

Firstly, the secure distance that must be kept in between the vehicle and the obstacle is considered as 5 meters. Thus, if the front sensor does not detect any obstacle or vehicle within this range the vehicle continues to move forward.

Secondly, the unsafe distance between the vehicle and the obstacle is considered as 3-4 meters. Thus, if the front sensor detects any obstacle or vehicle within this range, the

vehicle automatically alerts the driver with a LED indicator.

Thirdly, the unsafe distance between the vehicle and the obstacle is considered as 2 meters. Thus, if the front sensor detects any obstacle or vehicle within this range, the brake is applied automatically and it alerts the driver with a buzzer.

Fourthly, after applying the brakes automatically the vehicle waits for 3 seconds and the front sensor measures the distance between the vehicle and the obstacle , thus if the sensors detects any obstacle or vehicle within the range, it automatically turns left and moves forward, If not it moves simply forward without any turning.

Fifthly, while moving towards left, if the left sensor detects any object, the vehicles checks the right sensor, if nothing is detected it turns right and move forward.

Finally, if the all the sensors detect the obstacles it stops, checks for possible maneuvering the vehicle by analyzing all the sensors.

E. Monitoring of the vehicle:

Zigbee transmitter module transmits the detected obstacle distance and the vehicle maneuver details to the Zigbee receiver module, which is connected to the PC. These are connected by a personal area network for the secure monitoring of the vehicle.

V. ACKNOWLEDGMENT

I take this opportunity to express my profound gratitude and deep regards to my guide (MR. S. Manikandaswamy) for his exemplary guidance and constant encouragement throughout the course of this thesis. The advice and guidance are given by him every now and then shall carry me a long way in the journey of life on which I am about to begin.

V. CONCLUSION

The existing systems used front sensor which only applied brakes to prevent the accident. The proposed system uses the three sided sensor and turning assistance. It can be summarised that the proposed system has high values of braking system compared to the existing systems. Hence the vehicle could be stopped in a shorter distance and turning assistance in the prior direction compared to the existing systems

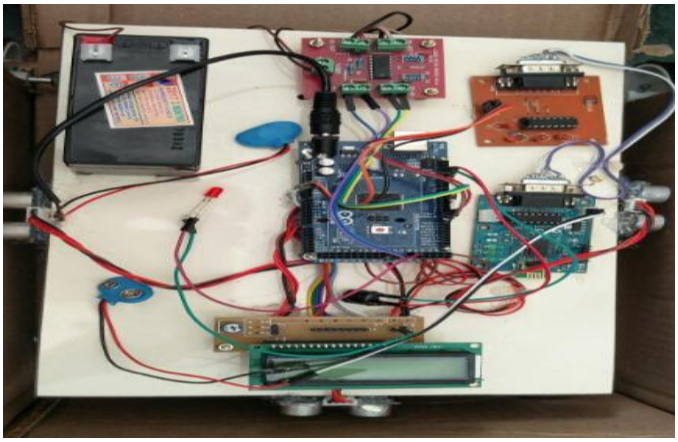

Fig. 4. Hardware Module

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