A Literature Survey On Obstacle Detection And Their Movement For Automobiles

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Abstract: Obstacle detection has been the topic of much concern since past few decades. The most common myth of accident being unavoidable is a bane of any society. Accidents can be unintentional and sometimes can be random but are generally found to occur due to the unexpected obstacles on the moving path. We describe the design of the obstacle detector irrespective of their movements. It detects the discontinuities in terrain and alerts users of potential hazards like open manholes, potholes, protrusions, etc. which are common on Indian roads. Hence, automobile safety can be improved by anticipating a crash before it occurs and thereby providing additional time to deploy safety technologies. Warnings can be like alarms and beeps, if the vehicle is approaching a pothole, or any moving obstacle, driver can be warned in advance regarding what the road entails.

Key words: Obstacle Detection; Automobile Safety; Safety Technologies; Moving Obstacle;

I. INTRODUCTION

Road safety is not an issue that will resolve itself, every citizen has a responsibility for an action. We commit our combined knowledge, data, technology and networks to promote safety. Between 25 percent and 33 percent of global crashes are work-related and 36 percent of occupational deaths worldwide are due to road crashes. Hence, crash avoidance systems and devices help the driver and, increasingly, help the vehicle itself to avoid collision. This literature survey implements one such safety subsystem, Adaptive Cruise Control (ACC) using the ultrasonic sensors. This system uses an ultrasonic set up to allow the vehicle, to slow when approaching another vehicle or obstacle and accelerate again to the pre-set speed when traffic allows. ACC technology is widely regarded as a key component of any future generations of smart cars, as a form of artificial intelligence that may usefully be employed as a driving aid.

The obstacle detector works on the principle of SONAR. An ultrasonic distance sensors and ultrasonic motion sensors. Ultrasonic distance sensors generate high frequency sound waves and evaluate the echo which is received back by the sensor, measuring the time interval between sending the signal and receiving the echo to determine the distance to an object while, ultrasonic motion detector is a device that can detect movement of people or objects within a limited area. An ultrasonic transducer emits pulses at regular intervals, the interval being a function of the speed of travel. A receiver block listens to the echo. The echo round-trip time is a function of height. The receiver detects abrupt changes in terrain by comparing the round-trip time.

This application measures range in terms of physical distance and controls the speed of the motors. As the transit time of the echo drops below each threshold the duty cycle of signal varies and thus speed is controlled. On the other hand, motion sensors senses motion by analysing sound waves in its environment. Some just listen for sounds while others send out ultrasonic signals and analyse how they are reflected back. This type of motion sensor is often used in home security system but can also be used in automobiles to detect the sudden appearance of any object on the path and hence based on the threshold of duty cycle again the speed is controlled.

II. RESEARCH BACKGROUND

1. “Ultrasonic anti crashing system for automobiles” IEEE paper published in 2013, attempted to develop an anti-crash warning system combined with ultrasonic ranging technology and sensor technology for automobiles. It mainly focusses on potholes in the road and its detection and hence automatic or manual reduction in the speed of the vehicle in order to avoid crashing.

2. In “Cooperative vehicle collision avoidance using inter-vehicle packet forwarding” IEEE paper publishes in 2005, proposes a broadcast oriented packet forwarding mechanism for intra-platoon cooperative collision avoidance (CCA) using dedicated short range communication (DSRC) based wireless networks. Using an implicit acknowledgement strategy it is shown that with inter-vehicle spacing of nearly one second, the proposed mechanism is capable of saving up to 90 percent of vehicles in a platoon from chain crashes following emergency events at the front of the platoon.
**BLOCK DIAGRAM**

**ULTRASONIC DISTANCE SENSORS**

Ultrasonic distance sensors generate high frequency sound waves and evaluate the echo which is received back by the sensor, measuring the time interval between sending the signal and receiving the echo to determine the distance to an object while, ultrasonic motion detector is a device that can detect movement of people or objects within a limited area.

**ULTRASONIC MOTION SENSORS**

This sensors senses motion by analysing sound waves in its environment. Some just listen for sounds while others send out ultrasonic signals and analyse how they are reflected back.

**MICROCONTROLLER**

Criteria for choosing the Microcontroller:

1. Meet the computing needs of the task efficiently.
2. Cost effectiveness.
3. Availability of software development tools like assemblers, debuggers, C compilers, emulator, simulator, technical support.
4. Ready availability and reliability.

**ALARM**

The alarm or buzzer is connected between the supply rail (+v) and the input signal. This acts as a load on the driver. When the input signal coming in to the buzzer subsystem is low, a potential difference across the buzzer causes the current to flow. It is this flow of current that causes the buzzer to make sound.

**LCD (Liquid Crystal Display)**

LCD is a, flat display device made up of many colours or monochrome pixels arrayed in a front of light source or reflector. It is interfaced with microcontroller to display the distance to the object. It can be further programmed to display the speed of the motor thus helps debugging to a great extent.

**MOTORS**

PMDC (Permanent Magnet DC motors) are those whose poles are magnetised. They have high efficiency, high density and low maintenance cost due to the removal of brushes.

**EXPECTED RESULTS**

1. To develop a safety system that includes ultrasonic sensors which detects obstacles like potholes and humps, and is accompanied by gradual decrease in speed of motors.
2. A prototype of the entire set up is developed that measures and monitors the road condition from a distance of about 3m from the obstacle.
3. To notify the driver if there is any sudden movement of obstacle under any threat which should have a result of decrease in the speed of the vehicle and hence avoid accidents or crashes.

**III. CONCLUSION**

An attempt has been made in this survey to understand and comprehend the aspects of ultrasonic distance sensors from which we would be able to find the distance of the obstacle like potholes or humps and warn the driver so that the speed is decreased. Since there is also a collaboration of ultrasonic motion sensors, if any moving obstacles are noticed like animals or people trying to cross the road suddenly, the diver can be warned about it and hence the speed can either be decreased manually or by the automobile itself by the usage of Adaptive Cruise Control (ACC), where ACC is a system which uses an ultrasonic setup to allow the vehicle to slow when approaching another vehicle or obstacle and accelerate again to the pre-set speed.

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V. REFERENCES

