Ultra Sonic Sensor Based Blind Spot Accident Prevention System

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ULTRA SONIC SENSOR BASED BLIND SPOT ACCIDENT PREVENTION SYSTEM

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Abstract

A blind spot detection device for protection against misshapenness such as automobiles collisions, obstacles, and accident that leads to great loss of human lives and can have disastrous results. Technology used for this purpose worked by detecting the other automobiles, obstacles and bystanders. Upon detecting, the device triggers a timer that delays the activation of alarm circuitry for a brief period of time. This time delay is instituted to minimize the triggers of nuisance alarm by a momentary intrusion in the hazard zone.

If the obstacle's presence is still detected after the delay time, LED`s and audible alarms are triggered to alert the system operator of the dangerous situation. The alarms remain activated for a time period, allowing the operator to clear the hazard zone.

1. Introduction

Blind Spot Accident Prevention System (BSAPS) is expected to increase road safety and to detect the road capacity for on road automobiles. Several of these systems will enter the market, some sooner, some later. Further more the current implementation of BSAPS is based on sensors. This is also lack of information about users, willingness to accept and pay for the new technology.

The areas most commonly referred to as blind spots are the rear quarter blind spots, areas towards the rear of the vehicle on both sides. Vehicles in the adjacent lanes of the road may fall into these blind spots, and a driver may be unable to see them using only the car's mirrors. Other areas that are sometimes called blind spots are those that are too low to see behind and in front of a vehicle. Also, in cases where side vision is hindered, areas to the left or right can become blind spots as well [1].

The overall objective of BSAPS is to develop a comprehensive framework, to analyze and detect the obstacles (entity) with high positive expected impact.

In the first stage of BSAPS, radio waves were transmitted and received at receiver-end of the sensors when an entity is detected. In the second stage, the radio waves that were received at receivers end activate the circuit. The output from the circuit can be presented in the form of glowing LED`s and audible alarms.

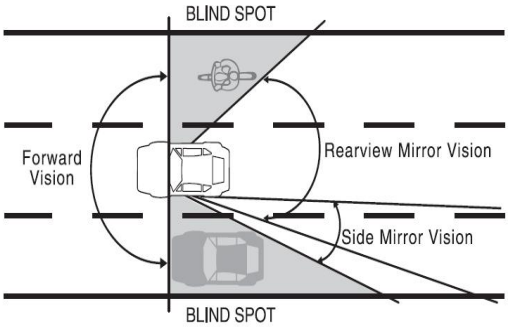

Fig 1.1 – Blind Spot Definition

The areas most commonly referred to as blind spots are the rear quarter blind spots, areas towards the rear of the vehicle on both sides. Vehicles in the adjacent lanes of the road may fall into these blind spots, and a driver may be unable to see them using only the car's mirrors. Other areas that are sometimes called blind spots are those that are too low to see behind and in front of a vehicle. Also, in cases where side vision is hindered, areas to the left or right can become blind spots as well [1].

2. System Description

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This system is a proximity detection device which uses radio frequency waves. It includes five parts - Front sensor, Left side sensor, Right side sensor, LED meter and Audible alarm.

2.1 Front sensor

The front sensor basically helpful for detecting seasonal black spots (In case of fog, failure of front lights). This sensor by sending radiowaves will detect presence of any entity and warns about the upcoming dangers in cases of temporary blindspots.

2.2 Left & Right side sensor

Basically a metal strip extending at back of vehicle from left to right covering whole back area which depends on type of vehicle and basically at the extreme left of that strip we employ a left side sensor and on the extreme right side of that we employ a right side sensor [7].

2.3 LED meter

This actually is the display meter in which LED`s are illuminated on detection of entity present nearby,indicating about risk.These LED`s will stop illuminating after clearance.This LED meter will be installed in front as shown in figure 2.1

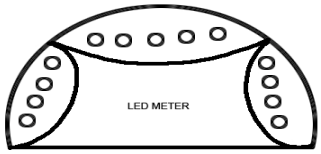

Fig 2.1 – LED Meter

The figure 2.2 represents left side sensor detection of blind spot as it is noted that LED`s of left hand side are glowing indicating presence of obstacle or an entity.

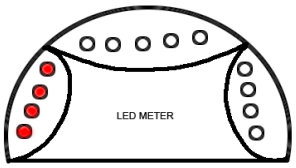

Fig 2.2 – Left Side LED Meter

The figure 2.3 represents right side sensor detection of blind spot as it is noted that LED`s of right hand side are glowing indicating presence of obstacle or an entity.

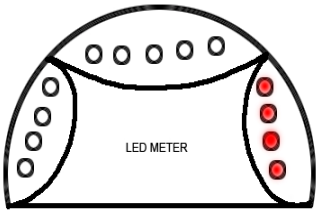

Fig 2.3 – Right Side Sensor LED Meter

The figure 2.4 represents front sensor detection of temporary blind spot as it is noted that LED`s of top (front) side are glowing indicating presence of obstacle or an entity.

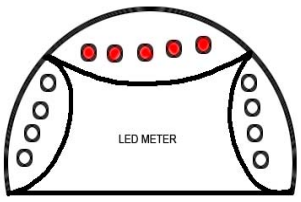

Fig 2.4 – Front Side Sensor LED Meter

2.4 Audible alarm

As soon as detection of an entity is confirmed and led`s start illuminating on LED meter, an audible alarm gets activated giving signal of detection. This audible alarm is very helpful in case of LED failure or display failure. The sensor that is dealt in this section were placed as shown in figure 2.5

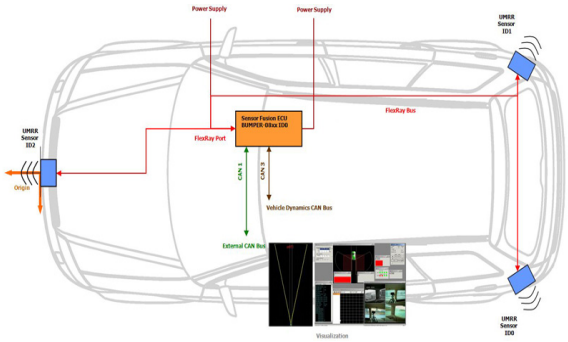

Fig 2.5 – Sensor Placement[5]

3. Blind Spot Accident Prevention System

3.1 Field of invention

The present invention relates a blind spot detection and more particularly to a proximity detection device for detecting the presence of a person within a radio frequency zone of a radio frequency transmiter. Upon detection, the device set on the audible alarms and illuminates the LEDs defining the presence of a device in radio frequency zone. After the clearance of devices (obstacles) from radio frequency zone, alarm and LED`s are triggerd off [8].

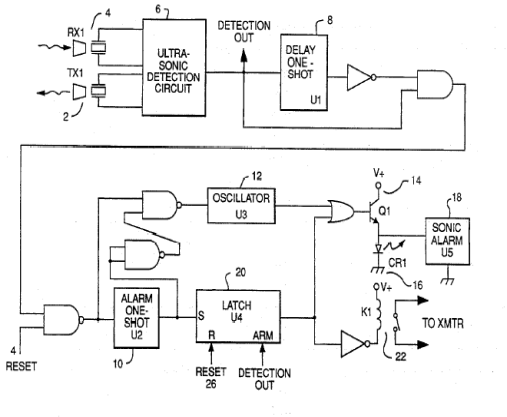

Fig 3.1 – Main Circuit Diagram

3.2 Circuit Description

Referring to Figure 3.1 the system circuit block diagram is now described. The device uses detection circuitry, employing one or more sensor means, to detect a presence in the RFR zone. The detection circuit may employ, as sensor means, ultrasonic, passive, infrared (IR), active IR, or other sensors, either individually or in combination. The sensor elements of the preferred embodiment have an angular response pattern that nearly matches the antenna beam pattern and the detection circuit's sensitivity is set to detect motion at a distance at which the RFR, which is expressed as a power density quantity, doesn't exceed the maximum permissible exposure limits. This safe distance is determined by direct measurement of the power density or by calculation using the theoretical effective isotropic radiated power of the communication system. This will define a re-determined area that the sensors of the present invention will monitor for the presence of a person or object.

The sensors used in the example illustrated in Figure 3.1 are an ultrasonic transducer pair, transmitter 2 and receiver 4. An ultrasonic detection circuit 6 or other detection means connected to the sensor means controls sensor signal transmission and monitors sensor output signals at the receiver 4. The ultrasonic detection circuit 6 as an intrusion, causing the output of the detection circuit to go active that is to be asserted, will interpret aberrations in the received sensor signal.

The activated output of the ultrasonic detection circuit triggers the delay one-shot 8 to begin a predetermined timed delay period prior to alarm activation. The delay is set so that detection circuit responses of a brief nature (caused by a bird flying through the hazard zone, for example) will not trigger nuisance alarms. If the hazard zone is cleared, causing the detection circuit 6 to become inactive, before the delay one-shot 8 times out, the alarms remain quiet and system operation continues uninterrupted.

If the detection circuit 6 is still active when the delay one-shot 8 times out, the alarm one-shot 10 is triggered to begin the predetermined timed alarm period. An oscillator 12 or other oscillating actuation means is also triggered, sending pulses to the alarm drive circuit 14 that energizes the alarm LED 16 and the audible alarm 18. Other visual output means and audible output means may be used to provide visual and audible outputs. Thus, during the timed alarm period, the transmitter is still enabled, but a pulsing visual and audible warning alarm is sent to the intruder and/or the operator, the alarm being actuated by the alarm drive circuit 14.

If the detection circuit 6 becomes inactive before the alarm one-shot 10 times out, the alarms are quieted and system operation continues uninterrupted. If the detection circuit 6 is still activated when the alarm one-shot 10 times out, the oscillator 12 is deactivated and a latch 20 or other continuous actuation means is set, energizing the transmitter shutoff relay 22 or other switch means and sending a constant (non-pulsing) signal to the alarm drive circuit 14 and therefore to the LED and audible alarm 18. Thus, the LED and audible alarm light and sound continuously and the transmitter is disabled and shuts down. While a particular circuit has been shown as the preferred embodiment, other circuit configurations may be used in conjunction with sensor means, transmitter switch means, and means for actuating the alarm LED and audible alarm. Any such circuit, employing detection means for interpreting a sensor output signal and timing means for controlling the transmitter shutoff relay 22 and alarm drive circuit 14 is contemplated for use with the present invention.

Also, the sequence described for pulsing the alarms, providing continuous alarms, and turning off the transmitter, is the preferred sequence, but alternate sequences are contemplated. For example, the latch 20 may first be enabled, providing a continuous alarm until the delay one-shot 8 times out. At this point, the latch 20 may be disabled and the oscillator 12 enabled, providing a pulsing alarm. The particular sequence involved is not critical to the present invention.

A reset button 26 or other reset means is provided on the latch 20 to deactivate the alarms and the transmitter shutoff relay. When the reset button 26 is pushed, the RF transmitter will be enabled as long as the detection circuit 6, output signal is no longer asserted. A circuit test button 24 or other test means is also provided to test device operation while the transmitter is deactivated. When the circuit test button 24 is pushed, the alarm LED and audible alarm will be activated and the RF transmitter will be disabled, preferably in the sequence followed in normal operation [4].

4. Conclusion

This BSAPS by usage of sensors detect the blind spots in the sensors range and indicates the presence of entities (automobiles) and as the detection is made the LED`s and audible alarm are triggered. After the passage of an entity from the area, the LED`s and audible alarms are trigged off indicating the driver for comfort passage to right or left accordingly. Thus, this system will help a great deal in increasing road safety, reduces accidents and misshapenness.

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