An Implementation of Security and Trouble Tracking System for Car

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Abstract: The objective of this system is to secure the car after parking and find the trouble maker after the crush. This paper explains how to monitor the security and obtain the vehicle information during such incidents. Careless plotting of parking and un parking leads to accidents such situations are monitored and respective data is accumulated. Before above situation once it reaches the accident limit then the system detect fault and trigger to give safety indication to opposite and own vehicle. Emergency & fault signal alert information is really crucial message to every vehicle driver. It receives the emergency and fault signals around the vehicle it indicates that appropriate message to the driver in short period. It can be used to reconstruct what happened before an accident by using security management system. It also sense the distance of other moving vehicle and check the possibility to involve in an accident. If it sense fault it raise an indication by light and sound warning to the opponent vehicle.

Introduction
Automobile accidents happen everywhere in the Highways but the parking lot accident also detect as road accidents. Driver needs to be extra cautious in parking lot to the situation. Even if you take precautions, others may set in motion you to be involved in a parking lot car accident. Although parking lot accidents don't typically cause huge property damage, they can still cause significant neck and back injuries. We need a record for preceding the legal activities like claiming the insurance. Parking lot accidents generally cause the most confusion as to which driver is at fault in a given scenario. The fault determination in an accident depends on the specific details of each case. Unfortunately, parking lot accidents can and do happen from time to time. Accidents are very stressful events, physically, financially and emotionally. If there are no witnesses it often comes down to one driver’s word against the other. Sometimes it can be difficult to determine who is at fault in a parking lot accident. This system will help to tackle the problem in easiest manner.

The Ultrasonic sensor output pulse timing helps to detect the distance. By measuring the time which returns after emitting a sound wave, a distance to the object is measured. The high performance PIC microcontroller used for controlling the peripherals. High density camera has used to capture multiple images at a stretch.LCD display used to indicate the message to driver. The high space memory used to store the image and vehicle details.

Intention of the system
Car parking accident is smaller and ever harder to find the fault vehicle. There is no witness after vehicle involved in parking accident. The parking lot accident also consider as road accident but this kind of accident not support for death or heavy injuries mostly. It can create the high Economical impact such a way that single or more vehicles. Four Ultrasonic sensors are mounted in vehicle to transmit and receive the signal to detect the object detection around the vehicle. Camera mounted in car to capture the image after the opponent vehicle cross the crash limit. This would help to get the witness and that is useful for handling legal activities.

System Description
The security monitoring system for car parking contains an Ultrasonic sensor at each side of car to detect the vehicle which is making crash. these sensors integrated with Transmitter and Receiver. We can calculate the linear distance between own vehicle and opposite vehicle. Four small size and high image density cameras used at each side of the car to capture the images during crash time. the number of snaps helps to identify the problem in high resolution. One rotary camera has been used on top of the vehicle to capture image from top view helps to clear analysis for the crash. The top side camera rotation drive by integrated motor and controlled by microcontroller. On top of this having two
switches used to detect the parking and monitoring action starts by automatically or manually. LCD display used in dash board for indicating the message from the controller.

Once you park the vehicle who can switch it automatically or manually to start the monitoring process. It is having an Ultrasonic sensor to detect the vehicle which is coming near to the vehicle. Here we have assigned two limits for opponent vehicle detection such as limit 1 for warning limit, second limit for crash detection. If opponent vehicle cross the first limit by linear reduction in the distance area around the vehicle then the systems give an indication alarm & lighting on top of the vehicle. Even it cross the second limit area it starts to capture the image on the particular side. The captured images will be stored in a memory. The driver who enters inside the vehicle the display indicates about crash details. By using USB communication the captured image transferred to PC. This will helpful to find whose mistake and crash fault that owner can easily find with these records. And also this will very helpful for insurances and legal activities.

Distance Detection method
The system transmits a burst of ultrasonic sound waves towards the subject and then receives the corresponding echo. The time taken for the ultrasonic burst to travel the distance from the system to the subject and back to the system is accurately measured by the Ultrasonic sensor. The amplitude of the echo depends on the reflecting material, shape, and size. Sound-absorbing targets such as carpets and reflecting surfaces less than two square feet in area reflect poorly.

Formula used to detect the distance of the object is mentioned below,

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\text{Pulse width (µS)} / 58 = \text{distance (cm)} \quad \text{or} \quad \text{Pulse width (µS)} / 148 = \text{distance (inch)}
\]

These systems feature ultrasonic sensor to measure the distances to nearby objects by using the return signal receiver, it located in the front and/or rear bumper fascias or visually minimized within adjacent grills. The sensors emit acoustic pulses, with a control unit measuring the return interval of each reflected signal and calculating object distances. The system in turns warns the driver with acoustic tones, the frequency indicating object distance, a continuous tone indicating a minimal pre-defined distance. Systems may also include visual aids, such as LED or LCD readouts to indicate object distance.

Practical implementation for detection
During sensor installation the following points has to be followed.

- Ultrasonic sensors can miss smaller or narrow objects, and inclines can deflect the sound waves – a steep ramp, for example.
- They also only detect objects directly behind or in front of the car, and may not work if the sensors are dirty or out of alignment.
- Fitting usually requires drilling the bumper, but stick-on sensors are available (though unattractive). Practical test performance angle is 30 degree.

Conclusion
The system titled as “An Implementation of Security and Troubles tracking system for Car” is concluded as it designed to secure the vehicle after parked in a parking area and Troubles will be tracked in case the vehicle has involved in a crash while parking time. This application can be developed by a low cost Microcontroller like PIC 16F877A and Ultrasonic sensor, Camera, LED and Buzzer. We can implement this product by after Marketing in every vehicle. This system proposes to after marketing cars to detect the crash at parking time and crash analysis after the crash.

Reference


