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Parallel Parking Mechanism with Safety Sensor

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Abstract: ***In this paper, we developed a mechanism which is used for parallel parking. This mechanism is very simple and easily developed and by using this mechanism easily parallel parking of vehicle is done. In this paper we develop a system to provide the prior to accident information to the vehicle control unit so that it enable to the vehicle to prevent the happening of accident. During the vehicle moment the system continuously record the vehicle moving status and condition so that the record will provide the decision basis in the accident investigation if it unfortunately happened the fatal accident. The Intelligent safety system like speed sensor, alcoholic sensor and eye sensor are used for reducing the fatal accident.***

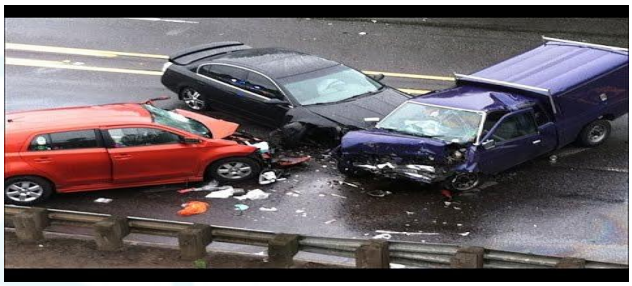
Keywords: Parallel parking, grid, intelligent safety, Control unit

1. Introduction

The percentage of the road accident is increases day by day. Most of the innocent people lost their life in the road accident so there have always been great needs of intelligent system. The intelligent vehicle system will increase the people life security on the road. It will keep track of safety related information about the vehicle Intelligent vehicles could warn drivers if there is a risk of collision when changing lanes, approaching a stationary or parked vehicle, or if another driver loses control. In human daily life and due to the developments of new technologies it makes the vehicle running fast and accelerating easily.

Driver drowsiness is recognized as an important factor in the vehicle accidents. It was demonstrated that driving performance deteriorates with increased drowsiness with resulting crashes constituting more than 20% of all vehicle accidents. But the life lost once cannot be re- winded. Advanced technology offers some hope avoid these up to some extent. This seminar involves measure and controls the eye blink using IR sensor. The IR transmitter is used to transmit the infrared rays in our eye. The IR receiver is used to receive the reflected infrared rays of eye. If the eye is closed means the output of IR receiver is high otherwise the IR receiver output is low. This to know the eye is closing or opening Position. This output is give to logic circuit to indicate the alarm. This seminar involves controlling accident due to unconscious through Eye blink. Here one

Eye blink sensor is fixed in vehicle where if anybody looses conscious and indicate through alarm [3]. In response to the growing economic loss due to traffic-related deaths, injuries and property damage on U.S. roadways, the U.S. DOT Intelligent Transportation Systems Joint Program Office (ITS JPO) has launched nine initiatives aimed at improving transportation safety, relieving congestion, and enhancing productivity. These initiatives reflect an ongoing recognition of the potential ITS technologies offer to enhance the operation of America's transportation systems [6].



Some safety warning systems that are currently available in the market and they are technically matured:

- Speed sensor
- Alcoholic sensor
- Eye sensor

In this system we used following system and mechanism;

- Parallel parking mechanism
- Speed sensor
- Eye sensor
- Alcoholic sensor

2. Parallel Parking Mechanism

Parallel parking is a method of parking a vehicle parallel to the road. (Hence the term „Parallel Parking") Parallel parking is considered to be one of the hardest skills for new driver to learn. Parallel parking enables the driver to park the vehicle in smaller space that"s why I am developing these mechanism in which the wheel of the vehicle is turn in 180 degree (90 degree in right side & 90 degree in left side). In existing method as follow:

Method 1:

To parallel park successfully, you need a space about 4-6 feet longer than your car. Then, it"s all about timing

- Use your indicator to signal a right turn. Stop to the side of the front car (the car you are parking behind), so that the cars are about even and about an arm"s length apart (20-26").

- While looking over your right shoulder, start backing slowly, then start turning the wheel to the right. Aim toward the right rear corner of the space.

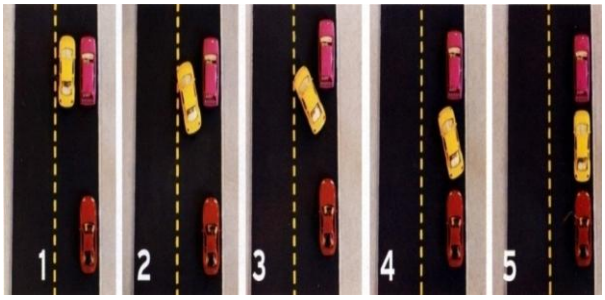


Figure 2.1: General Parallel Parking [8]

- When your front seat is in line with the rear bumper of the front car, stop and turn the steering wheel one revolution to the left to straighten the tires. Continue backing at this angle until your right front fender just clears the left rear fender of the front car. (At this point, your left rear bumper will be in line with the left front bumper of the back car.)
- Quickly turn the steering wheel to the left and finish reversing into the parking spot. Looking over your left shoulder during this part of the maneuver may help you align with the rear car – or use your rear view mirror.
- To straighten out, turn the steering wheel one revolution to the right before pulling forward [7].

Method 2:

In second concept, the idea is to lift the car on additional four wheels and park the car without using a steering mechanism. A lifting and parking mechanism which can be attached to the bottom of the car could be a solution for parallel parking. Figure depicts the working of lifting and parking mechanism. A driver finds a suitable parking place and stops there. Then he/she chooses the option to park vehicle towards right side or left side. on pressing the parking lever parking, mechanism starts mounted perpendicular to the kerb. This mechanism contain another four wheel on the basis of that car mechanism can work easily. Then car automatically moves on their wheels to the direction selected. After parking the car, driver presses the normal position lever and the mechanism automatically brings the car back to its normal position and parking can easily done [8].

New Method:

These projects explain the parallel parking mechanism and also explain the working of speed sensor. Parallel parking is a method of parking a vehicle parallel to the road. Parallel parking is considered to be one of the hardest skills for new driver to learn. Parallel parking enables the driver to park the vehicle in smaller space that‟s why we are developing these mechanism in which the wheel of the vehicle is turn in 180 degree (90 degree in right side & 90 degree in left side). By using the gear mechanism we successfully developed the mechanism which is used for parallel parking. The four wheels operate individually by means of the electrical motor. The four wheels are attached to four spur gears. The front two gears are attached to another gear by means of tooth belt. Gear which placed in centre between two gears the centre gear also operates by means of electrical motor. Similarly the mechanism is in the rear side also. When we need parallel parking at that time with the help of electrical motor the rear wheel and front wheel turn at any angle which we need. Generally for parallel parking we turn both four wheel in 90 degree and successfully parking is done.

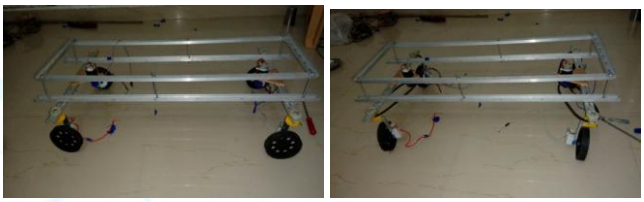


Figure 2.2: Parallel Parking Mechanism

3. Eye Sensor

This sensor involves measure and control the eye blink using IR sensor. The IR transmitter is used to transmit the infrared rays in our eye. The IR receiver is used to receive the reflected infrared rays of eye. If the eye is closed means the output of IR receiver is high otherwise the IR receive output is low. This to know the eye is closing or opening position. This output is give to logic circuit to indicate the alarm [4].

Figure 3.1: Eye Sensor [4]

It reports in statistics that the fatality rate increases by four times when the driver is sleepiness in driving therefore many researches are focused on finding the relationship between the sleepiness with the driver‟s eye- lids width, the visibility of the pupil, the motion of the head etc [9]. Industrial Technology Research Institute (ITRE) has even used the ultra wide bandwidth (UWB) technique to integrate low power pulsed electromagnetic (EM) waves to precisely measure the driver‟s physiological signals such as his heartbeat and respiration etc. It is also through the development of various system algorithms to detect driver‟s psychic status. In all these technology developments its main purpose is trying to emit warning signal to awake the driver before his falling into. A driver state of drowsiness can also be characterized by the resulting vehicle behavior such as the latera position, steering wheel movements, and time-to-line crossings whom correspondence should be addressed not intrusive, they are subject to several limitations related to the vehicle type, driver experience, and geometric characteristics and condition of the road. Among these various possibilities, the monitoring of a driver‟s eye state by a camera is

considered to be the most promising application due to its accuracy and Non-intrusiveness. The driver"s symptoms can be monitored to determine the driver"s drowsiness early enough to take preventive actions to avoid an accident [5]

Basically the block diagram mainly consists of 4 parts:

- LM358 Comparator
- Eye Blink Sensor
- LCD
- 8051 Microcontroller
- Buzzer

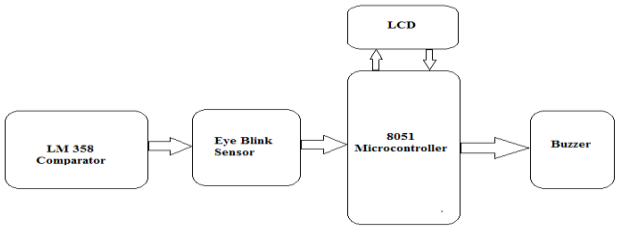


Figure 3.2: Block Diagram of Eye Sensor [4]

4. Alcoholic Sensor

This type of sensors in cars is a great safety factor which can be embedded in the steering of the cars. When the driver starts the ignition, sensor measures the content of the alcohol in his breath and automatically switches off the car which will stop the drink driving offenders. Thus we can reduce alcohol related road accidents and hence these kinds of detectors have a great relevance. It can also be used in schools, colleges, offices and some public places such as hospitals, libraries etc [2].

Figure .shows the block diagram of the proposed alcohol detection system. It consists of an alcohol sensor, a microcontroller, a relay and a buzzer. this is an alcohol sensor, which detects ethanol in the air. It is one of the straight forward gas sensors so it works almost the same way with other gas sensors. Typically, it is used as part of the breathalyzers or breath testers for the detection of ethanol in human breath. This sensor measures the content of alcohol from the breath of drunken people. The sensor delivers a current with linear relationship to the alcohol molecules from zero to very high concentrations. Output of the sensor is directly proportional to the alcohol content. When the alcohol molecules in the air meet the electrode that is between alumina and tin dioxide in the sensor, ethanol burns into acetic acid then more current is produced. So the more alcohol molecules more will be the current produced. Because of this current change, we get the different values from the sensor. Output of the sensor is then fed to the microcontroller for comparison.

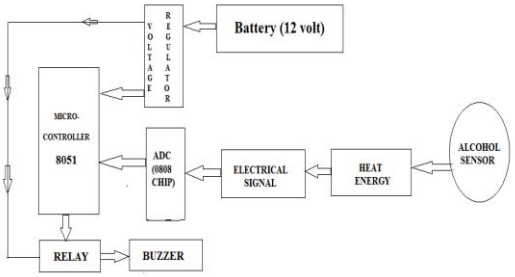


Figure 4.1: Block diagram of the proposed alcohol detection system

The output of the sensor is in the analog nature which should be converted into digital format. This is done by the analog to digital converter of the microcontroller unit. The microcontroller controls the entire circuit. When the measured value reaches the threshold (here it is 255) the microcontroller switches the ignition ON. Then relay cuts off automatically and buzzer produces sound. The LCD displays the message that sent from the microcontroller unit [1].

5. Speed Sensor

The wheel speed sensor is attached to the exactly near to the wheel. One disk is attached to that wheel in which four slots are present. The sensor is passes infrared through that disk. In the control unit we already set the speed limit. When infrared are passed through that disk the sensor count the RPM of the wheel. When the speed in above the set speed that time the control unit cut the supply and vehicle will be stop automatically.

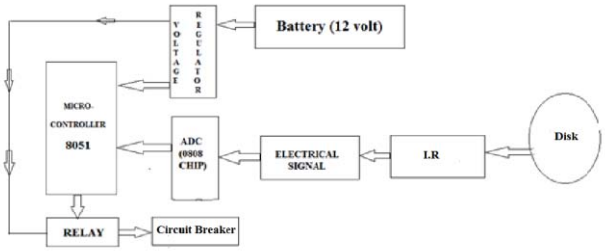


Figure 5.1: Block Diagram of Speed Sensor

6. Advantages, Disadvantages and Applications

6.1 Advantages

- Component establishes interface with other drivers very easy
- Life of the driver can be saved by using Eye Sensor, Alcoholic Sensor and Speed Sensor.
- Traffic management can be maintained by reducing accidents.
- Drunken driving also prevented by using Alcohol detector.
- Safe parking with no damage or distraction to nearer vehicles.
- Easy and efficient to test the alcohol content in the body.
- Helpful for police and provides an automatic safety systems for cars and other vehicles as well.

6.2 Disadvantages:

- Initial cost is very high
- Maintenance cost is also high
- The eye sensor is harmful to human eye

6.3 Field of Applications:

- "Alcohol Detector sensor" can be used in the various vehicles for detecting whether the driver has consumed alcohol or not
- This sensor can also be used in various companies or organization to detect alcohol consumption of employees
- Eye sensor also used in various companies or organisation at nigh shifting working

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