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Advanced Road Safety System for Blind Corners

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Abstract - The vast majority of the mishaps have in dazzle bends because of the nearness of impediment between the approaching vehicles and the drivers can't see the oncoming vehicle. A few drivers observe the principles by sounding before entering the bend, by a greater part of them don't adhere to the standards which could prompt deadly mishaps. With the improvement in innovation and accessibility of small scale controllers for implanted applications, it gives a chance to formulate answers for genuine issues. The fundamental target of the paper is to structure a framework to caution the incoming vehicle driver about the nearness of another vehicle in a similar bend. Ultrasonic Sensor is interfaced with Arduino to ascertain the separation. On the off chance that the separation is not exactly the threshold, the necessary messages appear on the LCD and LED's glow.

Key Words: *Blind Corner, Arduino Uno, Ultrasonic Sensor, Piezoelectric Buzzer, Advanced road safety.*

1. INTRODUCTION

World Health Organization (WHO)[1] reported that 1.2 million individuals from everywhere throughout the world die due to accidents and 20 to 50 million individuals experience the ill effects of wounds as a result of street mishaps every year. A ton of mishaps happens at the intersections. The blind corner is one sort of the convergences where the mishaps happen without any indication. This is on the grounds that one vehicle from one side of the corner can't see different vehicles from the opposite side of the corner. We consider the visually impaired corners as the corners with snags and they once in a while have space for a walkway. The daze corners can be commonly found in numerous areas, for instance, in the urban areas of Asian nations, in a little rear entryway, in neighborhood way, and inside the association territory and even mountainous roads. These areas are encompassed by structures that deter the driver's view as appeared in Figure 1. Not exclusively can the structures cause the visually impaired corner, yet additionally dividers, trees, and building locales can likewise cause the visually impaired corner. Besides, the traffic lights are once in a while found in such areas. That is the reason the mishaps could happen effectively at the visually impaired corners. Consequently, there is a requirement for a framework that can make the driver all together aware of taking prudent steps to keep away from any mishaps.

Figure 1. Representation of Blind corners with Elevated Curves

2. LITERATURE SURVEY

The creators [2] have talked about executing a basic insinuation framework to maintain a strategic distance from mishaps in dazzle bends. With the assistance of IR sensors, they identify the approaching and outgoing traffic. The IR sensor utilized can frequently give bogus signs dependent on temperature variety and can't adequately gauge separation in excess of 15 cms. With the assistance of an ultrasonic sensor, this can be wiped out.

As indicated by creators [3] has proposed in their work about ultrasonic sensor applications in estimating distance. In excess of 250 examples are considered with reflection surface being wood, paper, material, and plastic. In light of the end drawn by the creators, it is plainly referenced that ultrasonic sensors can adequately identify the nearness of obstacle of the referenced five sorts.

The work proposed by [4] makes reference to the significance of visually impaired corners enter strategy for autonomous vehicles. With the implementation of dynamic matrix mapping and successful Trajectory planning, the left and right maneuver guidelines can be given to the autonomous vehicle. The visually impaired corner being the most troublesome piece of the street framework for autonomous vehicle thinking about unexpected nearness of pedestrian and perspective on edge hindered by vegetation.

According to the author [5], ultrasonic sensors can be effectively used for distance measurement with speeds up to 30m/sec. The sensor can measure the distance based on the time of flight of the pulse emitted by the sensor from a reference point on the ground and the vehicle.

Figure 2. Conventional mirror arrangement in Blind curves

3. BLOCK DIAGRAM AND COMPONENTS

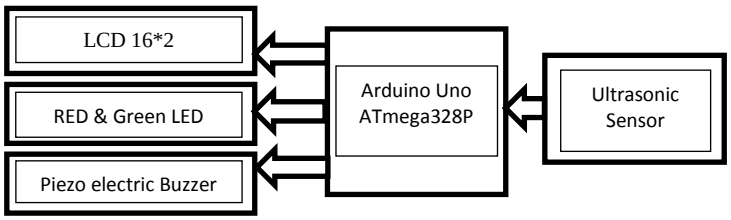

Figure 3. Block diagram of the proposed system

3.1 HARDWARE COMPONENTS

1. Arduino Uno ATmega328P

Arduino Uno consists of an Atmega328P microcontroller which is interfaced with the Ultrasonic sensor to measure the accurate distance. The Arduino Uno has an 8-bit microcontroller that can be easily programmed using Arduino IDE.

2. Ultrasonic Sensor

The ultrasonic sensor is used to measure the distance between the reference point and the vehicle oncoming. A suitable code is designed to trigger the sensor and the echo received back after reflecting from the surface is processed to indicate the accurate distance. The sensor measurement does not depend on factors like temperature, humidity on a greater note.

3. Piezoelectric Buzzer

The piezoelectric buzzer is used to produce hazard pattern sound to alert the driver. The Buzzer can be powered directly from Arduino board

4. Indicators

Two types of indicators have been implemented in this project, namely the LED system and LCD system. The LED system consists of red and green LEDs to indicate the current situation of the vehicular movement in the curve. The LCD displays the message for the driver based on the situation.

5. Power Adaptor

A 9V battery is used to power the entire system. With the help of voltage regulators, the voltage is feed as per the system requirement.

4. SYSTEM IMPLEMENTATION

In this undertaking, the framework comprises ultrasonic sensor signal as input, ATmega328P microcontroller, and LCD, LED as a yield gadget which is interfaced with the microcontroller (Arduino Uno Rev3) as shown in figure 3. The fundamental standard of the ultrasonic sensor is that the sensor measures distance by radiating a short ultrasonic burst and afterward tuning in for the eco. Leveled out of a microcontroller, the sensor produces a short 40 kHz blast. This blast adventures or goes through the air hits an article and after that reflects back to the sensor. The sensor gives a yield heartbeat to the Arduino microcontroller that will end when the reverberation is identified; subsequently, the width of one heartbeat to the following is taken into computation by a program to bring about the separation of the item. The separation along these lines determined is adapted to get the legitimate exact distance between the moving vehicle and the reference. According to threshold conditions, we can fix the distance after which the message has appeared on the LCD board. Let us think about a model, the base separation at which the sensor triggers the LCD show be 20 cm, presently when a vehicle/object goes inside that run the presentation shows the message in the opposite LCD panel which is written in the code (For our situation "ALERT"). Any separation past 20cm isn't identified by the sensor and the message showed will be in the code (For our situation – "Street CLEAR AHEAD"). The ultrasonic sensor measures the distance on one lane of the road and the message is displayed on the other side lane LCD panel and vice versa. Thus, advising the driver about the nearness regarding the vehicle in the visually impaired corner.

The LED indicators are also interfaced with the microcontroller which correspondingly Indicates with the output message if the road is clear the green LED will be on and red LED will be off, when there is a vehicle it the corner

the green LED will remain on and red LED starts blinking indicating the presence of the vehicle in the corner. Thus, signaling the driver about the vehicle. The implemented system is shown in Figures 4 and 5.

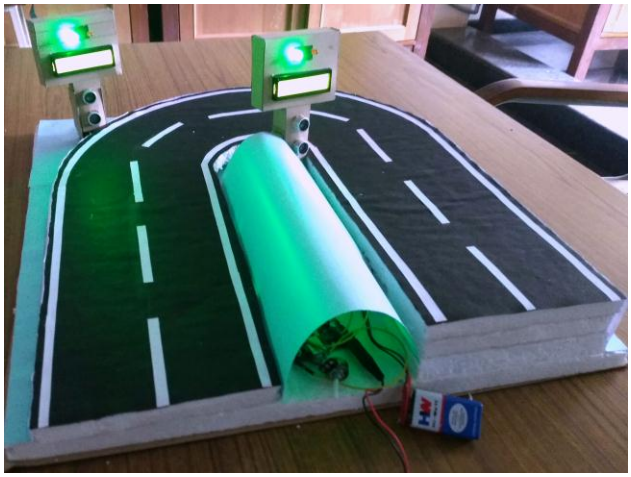

Figure 4. Front view of the Advanced Road Safety System for the Blind Corners model

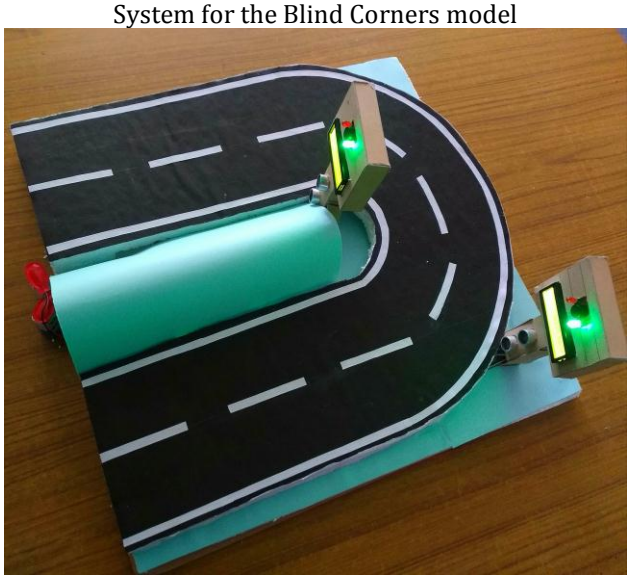

Figure 5. Top View of the Advanced Road Safety system for the Blind Corners model

5. RESULT and CONCLUSIONS

Thus, the system helps to prevent head-on collision and also a fatal accident that is very frequent in blind corners. With the inclusion of both visual and audio systems, the current situation in the corner can be showcased. The system alerts the driver before entering the corner itself so that driver can take precautionary steps in order to sail through the corner. Thus, it will be an effective solution that can be implemented in mountain and ghat roads where mirrors cannot be used effectively due to low visibility refer to figure 2. This system can greatly improve the safety of the passengers traveling through those roads.

6. FUTURE SCOPE

The connections between the sensors and microcontrollers can be made wireless and it can be interfaced with the cloud service to monitor the traffic through the corners and to study their behaviors through the corners which give us a clear idea about the reasons for accidents. With the advancement in sensor technology, the most precise and cost effect sensor can be used to build the system which makes the cost of the system lower.

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BIOGRAPHIES

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