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Implementation of Collision Avoidance System for Hairpin Bends in Ghats Using Proximity Sensors

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Abstract: *People don't care enough to stay safe while driving on road. During a long travel accidents and deaths caused by them are the most serious issues now-adays. Research in this paper includes the main issues like ghat road accidents and their impacts, causes of this accident, effect of accident, preclusion and control so that we can improve this state. It is not safe now a-days to drive through the ghat areas while turning in the hairpin bends. The percentages of accidents in ghat sections are increasing day by day. Severity of these accidents is non reparable. So firstly it is important to control this situation and have some safety measures in hairpin bends. This paper includes some solutions and ideas to improve protection in ghat sections. Hairpin bend accidents occur mostly because of the driver unable to see the vehicle coming from the opposite sides of the road curves. Our system uses sensors to detect any vehicles reaching hair pin bend and alerts immediately on other side vehicles by red signal and also producing alert sound. If hair pin bend road is clear green signal is produced. Thus this system provides safety for drivers to prevent hill side accidents and ride safely in hill side roads. Often modern cars have a collision avoidance system built into them known as Pre-Crash System, Forward Collision Warning System, or Collision Mitigation System in order to reduce the severity of a collision*

Keywords: curve roads, accident prevention sensor, mountain road, hill roads,ultrasonic sensor, alerting the driver.,

I. INTRODUCTION

Hairpin curves are often built when a route climbs up or down a steep slope, so that it can travel mostly across the slope with only moderate steepness and are often arrayed in a zigzag pattern. Highways with repeating hairpin turns allow easier, safer ascents and descents of mountainous terrain than a direct, steep climb and descent, at the price of greater distances of travel and usually lower speed limits, due to the sharpness of the turn If you have ever ridden a bike up a steep hill, you might have found yourself zigzagging back and forth across the roadway to get up the hill. The same principle applies here. When designing a roadway, there are guidelines as to the length of the radius of curve based primarily on the design speed. The faster the designs speed, the longer the radius of the curve.

A. Vehicle Horn

This is one of the traditional ways to negotiate a hairpin bend. The drivers on both sides judge the distance of one another based on the intensities of sound from their respective horns. This method although being the simplest poses to be highly inefficient also causing a lot of confusion between the drivers.

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B. Headlights

Flashing headlights during the night works similar to the vehicle horn making it yet another inefficient method. Also, this method is completely ineffective in day light conditions.

C. Convex Mirrors

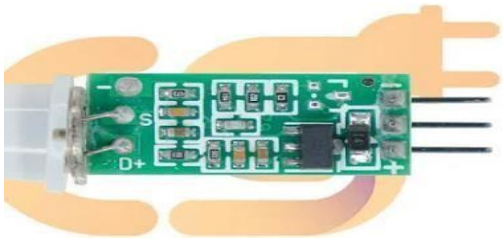
This setup is most widely used nowadays to give a glimpse of any vehicle approaching the hairpin bend from the opposite end. But these have their shortcomings such as the mirror needs to be kept clean at all times which is difficult in hilly areas as its always cold and misty, thereby reducing its visibility

II. SELECTION OF SENSORS

1.IR Sensor - Single:

The IR Sensor-Single is a general purpose proximity sensor.

Here we use it for collision detection. The module consist of a IR emitter and IR receiver pair. The high precision IR receiver always detects a IR signal. The module consists of 358 comparator IC. The output of sensor is high whenever it IR frequency and low otherwise.



Arduino Nano:

The Arduino Nano is a small, complete, and breadboardfriendly board based on the ATmega328 (Arduino Nano 3.0) or ATmega168 (Arduino Nano 2.x). It has more or less the same functionality of the Arduino Demilune, but in a different package. It lacks only a DC power jack, and works with a Mini-B USB cable instead of a standard one. The Nano was designed and is being produced by Gravities.

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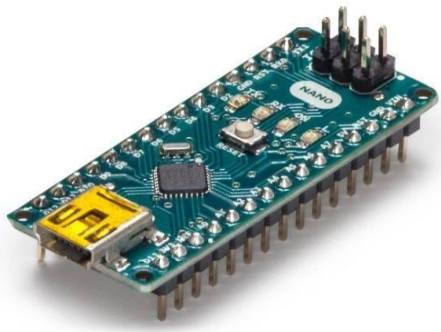

III. SELECTION OF BUZZER

Buzzer: Electronic buzzers are being used for appliances such as refrigerator & these are piezo based buzzers which give sound/beep after some delay time

DESIGN OF MODEL

IV. CONCLUSION

The implementation of a collision avoidance system for hairpin bends using proximity sensors has the potential to revolutionize road safety. By detecting the presence of other vehicles or obstacles in the vicinity of the bend, the system can alert drivers to potential hazards and provide them with sufficient time to take evasive action. However, the success of such a system will depend on careful design and calibration. The proximity sensors must be accurately calibrated to detect objects at the appropriate distance and angle, and the system must be integrated with other safety features, such as automatic braking or lane departure warnings, to provide a comprehensive safety net.

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