

VEHICLE COLLISION AVOIDANCE SYSTEM

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ABSTRACT

As we seen in today's world, rapid growth of transport results in increase in number of accidents every day. Often vehicle companies trying to built Automation System in cars which has able to avoid collision from objects near to vehicle by using sensors in order to reduce the severity of a collision. The main reason of accident occurs due carelessness and breaking of traffic rules. In this paper, the implementation of the Collision Avoidance System is aimed to reduce the risks of collisions at the hairpin bend on a Hilly track, Ghats, or other Zero visibility turns. The proposed system contains a set of proximity sensors, warning lights and LCD screen which shows distance of vehicle coming from both sides of hairpin bend is installed by the side of the road. It shows the priority to pass first using warning lights. It uses two ultrasonic sensors which are placed on either side of the hairpin bend. The sensors are connected to the microprocessor(Raspberry Pi) which is placed at central of sensors. Based on the output of sensors, position of vehicles on either side of the bend is detected which is provided as an input to the microprocessor. The priority algorithm intelligently controls the movement of the vehicles at the hairpin bend based on the sensor values giving appropriate warnings on detection. For different conditions appropriate warning LED is triggered thereby prioritizing the vehicles' movement.

INTRODUCTION

Accidents may resulted in increase in death rate, increase traffic at hilly track. Accidents mainly occur due to carelessness, breaking traffic rules and bad conditions of the road. Road Traffic Accidents(RTA) is responsible for 1.2

million deaths worldwide each year. As a major component of road geometric design, curved road segment, due to their alignment characteristics are most prone to traffic crashes among all road geometric elements. To cross a Hairpin bend, curve roads in Ghats is not an easy task which leads to increase in chances of collision with other vehicles due to zero visibility. Driver has to be alert all the time while driving in such situations. In most of the situations first priority gives to vehicles which are going upward directions. But, rules are not strictly followed and hence resulting in roads blocks and accidents. In existing system drivers are unable to judge which and when vehicles arrive at curves. Hence, we have developed a model using Raspberry pi, Ultrasonic sensors.

IV. PROBLEM DEFINITION

To design an efficient automatic authorized vehicle collision avoidance system using Raspberry pi 3 and ultrasonic sensors.

LITERATURE SURVEY

Paper no 1. Implementation of Collision Avoidance System for hairpin bends in ghats using proximity sensors

Author Name: Chitransh Srivastava, Nikhil Acharya, Fervez Jaffer B.M., Sachin Bhat

Description: 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. But majority of vehicles on the road, especially heavy motor vehicles lack in such a system. In this paper, the implementation of the Collision Avoidance System is aimed to reduce the risks of collisions at the hairpin bend on a Hilly track, Ghats, or other Zero visibility turns. The proposed system contains a set of proximity sensors, warning lights combined with a convex mirror is installed by the side of the road. It uses four IR sensors, which are placed on either side of the hairpin bend. The sensors are mutually exclusive and are connected to microcontroller through wires. Based on the output of sensors, position of vehicles on either side of the bend is detected which is provided as an input to the microcontroller. The priority algorithm intelligently controls the movement of the vehicles at the hairpin bend based on the sensor values giving appropriate warnings on detection. For different conditions appropriate warning LED is triggered thereby prioritizing the vehicles' movement. In case of a system breakdown a caution LED is triggered also sending a signal to notify the maintenance department about the same.

Paper no 2. Implementation of Vehicle Mishap Averting System using Arduino Microcontroller

Authors Name: R.S. Rakul, S. Ravia, K.N. Thirukkuralkani

Description: The rapid growth in the transport sector has resulted in an increase of the accidents every day. The accident mainly occurs due to our carelessness and breaking of traffic rules. In this paper, the main goal of the proposed system is to avert collisions between vehicles mainly occurring in hairpin bends, short corners, blind curves, etc. by providing indication and making the vehicle drivers' alert. If any problems say, vehicle breakdown or repair of the vehicle, the interrupt signal will be sent to the control room thereby the problems can be solved. This system makes use of ultrasonic sensor and other embedded systems.

Paper no 3. Accident Prevention System and Security for Vehicles

Authors

Name: D. Haripriya, Puthanial. M, Dr. P. C. Kishore Raja

Description: This Project focuses mainly on road accidents occurring due to poor indication of sign boards, drowsy state and drunken state of drivers in both two wheelers and four wheelers. The eye blink sensor detects the drowsy state and alarms the driver using buzzer. The alcohol sensor detects the alcohol from breath and stops the engine by micro controller immediately. The light sensor detects the intensity of the light and adjusts it accordingly. The zones are indicated by placing the transmitter modules at particular zones. Vehicle Theft is prevented by making use of Transmitter-Receiver module.

Paper no 4. Accident Avoidance and Detection on Highways

Authors Name: S.P. Bhumkar, V.V. Deotare, R.V. Babar

Description: Technological approaches for detecting and monitoring fatigue levels of driver fatigue continue to emerge and many are now in the development, validation testing, or early implementation stages. Previous studies have reviewed available fatigue detection and prediction technologies and methodologies. As the name indicates this project is about advanced technologies in cars for making it more intelligent and interactive for avoiding accidents on roads. By using ARM7 this system becomes more efficient, reliable & effective. There are very less number of systems implemented on human behaviour detection in or with cars. In this paper, we describe a real-time online safety prototype that controls the vehicle speed under driver fatigue. The purpose of such a model is to advance a system to detect fatigue symptoms in drivers and control the speed of vehicle to avoid accidents. The main components of the system consist of number of real time sensors like gas, eye blink, alcohol, fuel, impact sensors.

V. PROPOSED SYSTEM

Proposed System consist of three major components which include Ultrasonic Sensors, LCD Screen, LED screen and ARM Processor. It uses two Ultrasonic sensors, which are placed on either side of the hairpin bend. Ultrasonic sensors are

installed on both of the side of the road. The sensors are mutually exclusive and are connected to ARM microprocessor through wires. Here we used Raspberry Pi. Based on the output of sensors, position of vehicles on either side of the bend is detected which is provided as an input to the microprocessor. The Ultrasonic Sensors works by emitting sound waves at a frequency too high for humans to hear. They then wait for the sound to be reflected back, calculating distance based on the time required. After that these sensors send the updated data to the processors. Then these updated data which has distance of vehicle from the Ultrasonic sensors are to be display on big LCD Screen and LED triggered according to the priority. Warning LEDs are placed at the center of the outer curve of a hairpin bend. Priority is based on the distance of vehicle from the center of the curve. Most probably the priority will give to the vehicle which move towards uphill.

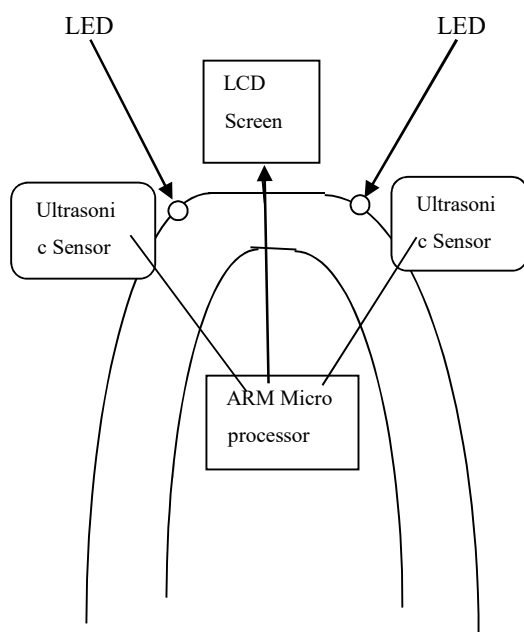


Fig 1: Vehicle Collision Avoidance System using IOT

VI. CONCLUSION

Our collision avoidance system consisting of an Ultrasonic sensors, warning LED or LCD and Raspberry Pie when implemented has proven to be effective than just a normal traffic mirror setup. This simple and effective methodology will enable the driver to have a better sense of terrain and drastically reduce road accidents in hairpin bends or other kinds of zero visibility turns. This idea will make the future transport system smarter and use of upcoming technologies.

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