



e-ISSN:2582-7219



# INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH IN SCIENCE, ENGINEERING AND TECHNOLOGY

Volume 7, Issue 5, May 2024



INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

Impact Factor: 7.521



6381 907 438



6381 907 438



ijmrset@gmail.com



www.ijmrset.com



# Prevention of Accident on Hilly Road by Using Automatic System (Sensor Based)

**Harshal Dange, Pallavi Wadive, Animesh Thete, Nitesh Kosare, Prashik Rakhade,  
Prof.M Aatif Nawab**

Department of Civil Engineering, Nagarjuna Institute of Engineering, Technology & Management, R.T.M.N.U,  
Satnavari Village Nagpur, Maharashtra, India

**ABSTRACT:** In developing countries accident is the major cause of death. If we gaze at the top 10 dangerous roads in the world we can see that all of them are mountain roads and curve roads. In the mountain roads there will be tight curves and the roads will be narrow. In these kinds of situations, the driver of a vehicle cannot see vehicles coming from opposite side. Thousands of people lose their lives each year because of this problem. Since we are talking about mountain roads here other side might be lead to a cliff. The solution for this problem is alerting the driver about the vehicle coming from opposite side. This is done by keeping an INFRARED sensor in one side of the road before the curve and keeping a LED light after the curve, so that if vehicle comes from one end of the curve sensor senses and LED light glows at the opposite side. By looking at the LED light on/off criteria driver can become alert and can slow down the speed of the Vehicle.

## I. INTRODUCTION

An accidents an unpleasant event that no one ever wants to occur in their life. It ruins the life of many people causing tremendous losing the life of people. Preventing accident (accident prevention) refers to activities designed to foresee and avoid accidents. There has been an increase of 17.4% in the total number of death rate caused by road accidents during the period of 2011-2014. This percentage has raised eyebrows and caught the attention of many to curb the growing rate. It is found that 80% of the times it is the fault of the driver. Much prevention system has been so far suggested and some were successful to a few percentages. But unfortunately still the accident rate remains a mysterious and very serious problem yet to be solved. So we suggest a technique to prevent accident by alcohol sensor since most of the accident occurring today is mainly because of drunk and drive. In order to avoid rash driving we go for a new technique of speed reduction system which uses the INFRARED waves fitted to the vehicle to detect the obstacles and the distance they are apart from which we could reduce the speed of the vehicle automatically if the obstacles are present mere closer. Prevention of accidents remains on one side as a huge question mark but rather on the other we look up for something as a life saving measures to safeguard our self in case of occurrence of any accidents. Many lives would have been saved if the emergency service could get the crash information in time. A study by Virtanen et al. shows that 4.6% of the fatalities in accidents could have been prevented only in Finland if the emergency serviceability provided at the place of accident at the proper time [1]. In order to solve the problem of death caused by accident which occur because of the delay in help provided by rescue, can be solved by a new system of accident detection International Journal of Advanced Technology in Engineering and Science [www.ijates.com](http://www.ijates.com) Volume No.02, Issue No. 11, November 2014 ISSN (online): 2348 – 7550 157 | P a g e technique which finds out the occurrence of accident through various sensors and intimate the occurrence of accident to the nearest rescue teams or patrol services by the use of GSM and GPS system. As proposed in the existing system as proposed by Accident Detection and Reporting System using GPS, GPRS and GSM Technology [2], which contains a major advantage in case of accident detection by speed monitoring since this case may fail to provide the required throughput as it is difficult to monitor the speed of the vehicle continuously as it may and also the efficiency of the system is very low when compared to the proposed system.

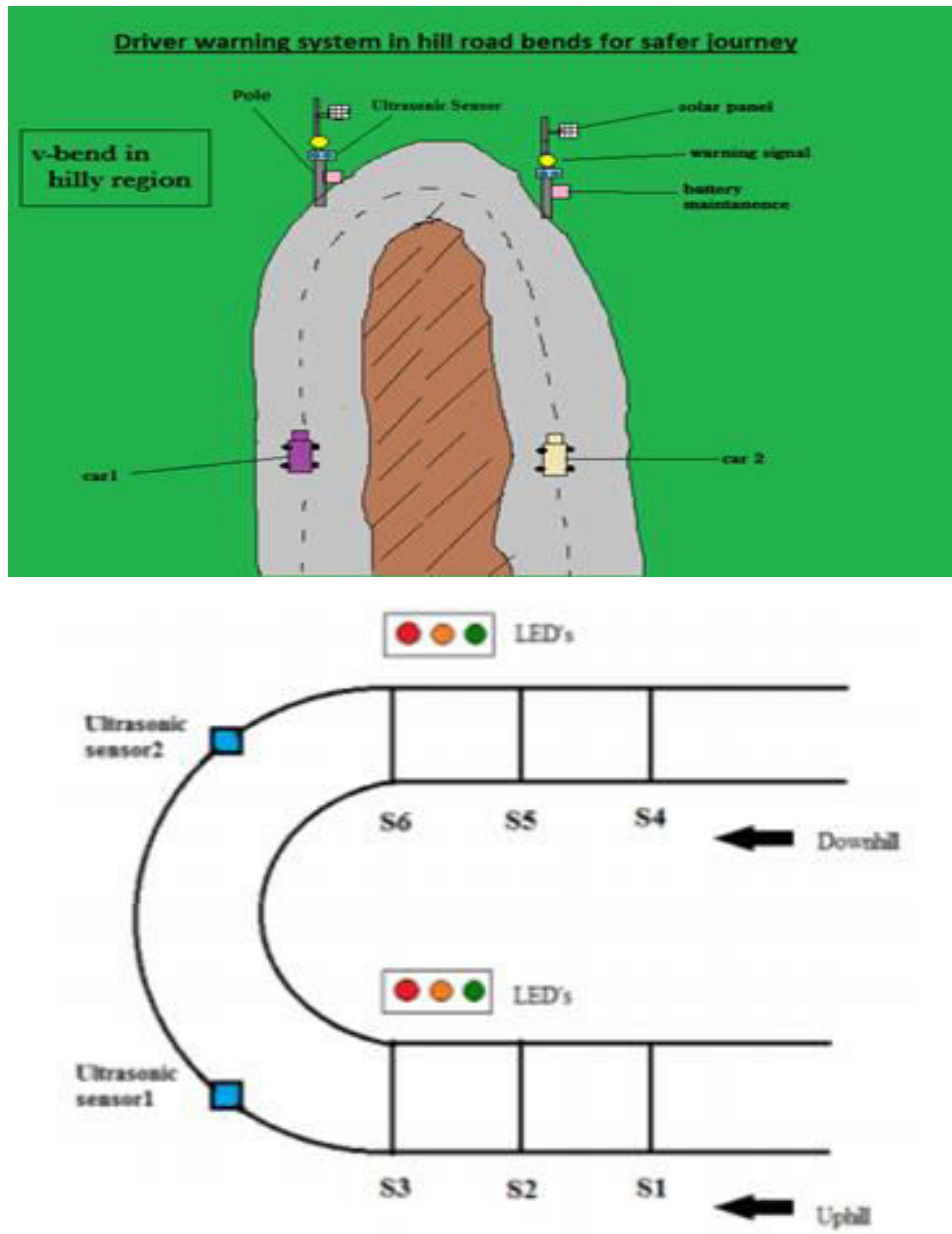


Figure no. 1 System Design

## II. LITRATURE REVIEW

In underground mining, ventilation systems are crucial to supply sufficient oxygen, maintaining non-explosive and non-toxic atmospheres and operating an efficient mine. Mine ventilation system can help in eliminating high risk atmosphere. Primitive techniques to monitor the mining atmosphere can be traced back to the use of canaries and other animals to alert miners, when the atmosphere becomes toxic. Integrating ventilation monitoring system enables mine to intelligently make ventilation changes based on the extensive data, the monitoring system provides Unexpected changes in the ventilation system are noticed by the monitoring arrangement, allowing prompt action to be considered. In underground mine, ventilation systems are critical to supply adequate oxygen, keeping up non-dangerous and non-lethal environments and an effective working mine. These small sized sensors are quite inexpensive compared to traditional sensors and also require limited computing and processing resources. These sensor nodes can detect, measure and collect information from the environment and based on some local statistical decision process, they can





convey the collected data to the control room. It has two major advantages over wired monitoring network systems:

1. There is no need of cables to lay and easy installation in blind areas, reducing cost of the monitoring system. The number of nodes can be increased to eliminate blind areas. Also, it offers a general communication and allocation of the goal.
2. The dense nodes ensure the data acquisition with high accuracy and optimum data transmission, and further realization of real-time monitoring system for mine environment.

### III. WORKING METHODOLOGY

STEP 1: Coding for micro controller Arduino UNO which consists of set of commands to process the data from sensor and to operate the LED as shown in fig. 2. Fig. 2. Program for micro controller Arduino UNO of sensor based accident prevention.

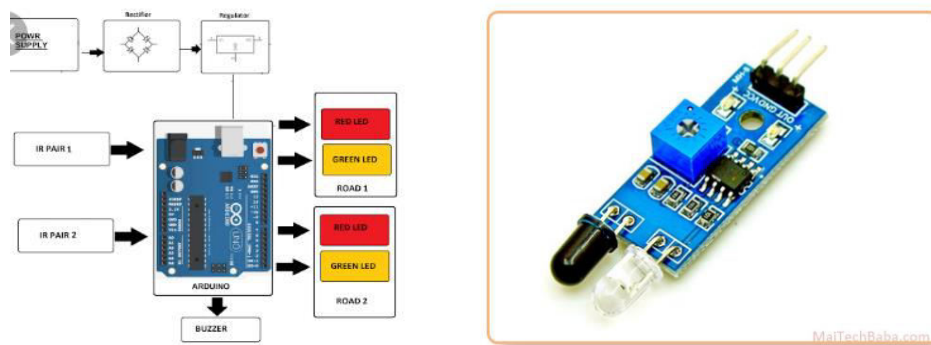


Figure no. 2 Circuit Design

STEP 2: Circuit connection having sensor and micro controller Arduino UNO where the sensor senses the obstacle and the micro controller Arduino UNO processes and operates LED as per the commands as shown in fig.3. Fig. 3. Circuit connections for sensor based accident prevention system.

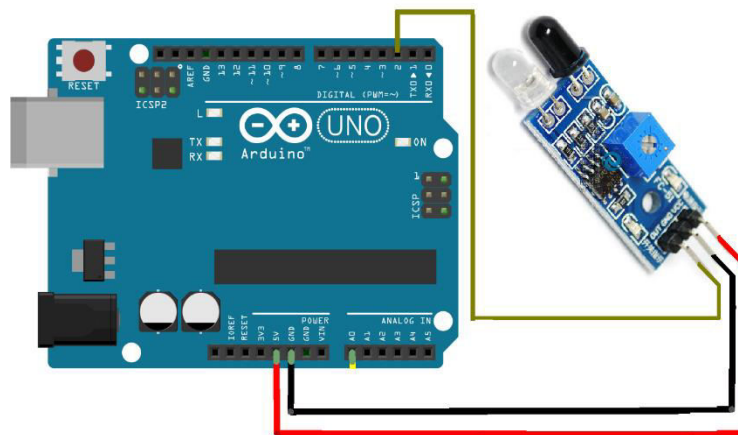


Figure no. 3 : Circuit connection for sensor based accident prevention system

STEP 3: Analysis, debugging and running the program. The program is uploaded to micro controller Arduino UNO. Sensor sends the signal and senses the object and gives the signal information to micro controller Arduino UNO. Micro controller Arduino UNO is powered by using laptop. It possesses and the output is shown in the serial monitor.

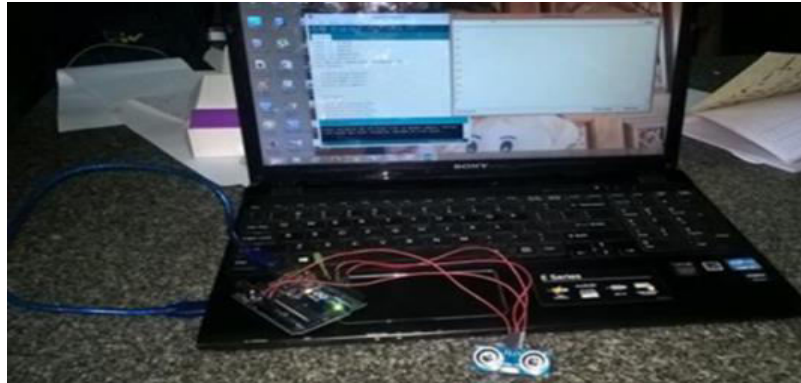


Figure no. 4 Analyzing the output of sensor based accident prevention system

STEP 4: Fixing the circuit to the model i.e. fixing micro-controller Arduino UNO, INFRARED sensor and LED light to the model of curve road as shown in fig.5. Fig. 5. Circuit fixed to the model of sensor based accident prevention system.

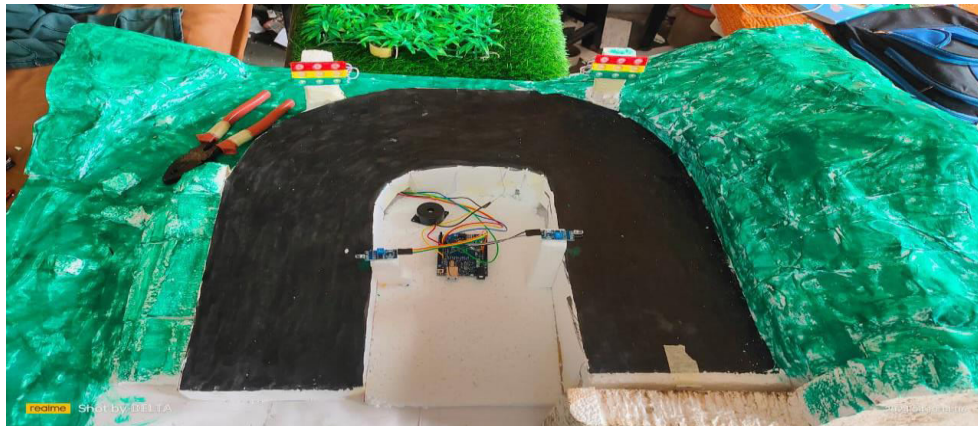


Figure no. 5 Circuit fixed to the model of sensor based accident prevention system

STEP 5: Detection of vehicle by the sensor when vehicle passes through the road. It is the experimental demonstration for this paper. The signal sent by the sensor hits the vehicle and it reflected back to the sensor as shown in fig. 6. Figure 6: Vehicle passing through the road.



Figure no. 6 Vehicle passing through the road



STEP 6: Output is obtained i.e. glowing of LED at the instant when the signal is received by the sensor after hitting the vehicle. As shown in fig. 7. Fig. 7. Final output of sensor based accident prevention system by glowing of LED light. IV.



*Figure no. 7 Final output of sensor-based accident prevention system by glowing of the LED light*

#### IV. PROJECT OUTPUT



*Figure no. 8 Image shows working model of project*



## V. ADVANTAGES

- Avoid accidents in curve roads mountains roads and hill roads.
- Saves thousands of lives.
- Easily implementable to the existing roads.
- Fully automated (No person is required to operate).
- Installation cost is very less.
- Vehicle monitoring systems can be implemented easily

## VI. CONCLUSION

Vehicle monitoring systems can be implemented easily. The purpose of this paper is to save thousands of precious lives and decrease the number of accidents in curve roads. This is possible by alerting the driver by means of LED light which glows when vehicle comes from the other side of the curve. The vehicle is detected by the help of INFRARED sensor which is interfaced to the micro controller Arduino UNO. By this we can save thousands of lives in the curve roads.

People have become much more dependent on transportation systems in recent years, transportation systems themselves face not only several opportunities but several challenges as well. Continuous growth of population all over the world creates a great challenge to the transport management systems. The conventional methods are no longer effective enough for solving complex and challenging transportation management problems. Knowledge from different research areas is needed for developing these systems. Very often complex transportation systems require integration of different methods from different branches of science. Our Collision Avoidance System consisting of a Arduino UNO R3, INFRARED sensors, warning LEDs, BUZZER when implemented has proven to be more effective than just a normal traffic mirror setup.

## REFERENCES

- [1] Highlights of 2009 Motor Vehicle crashes, Traffic Safety Facts, Research Notes, NHTSA (National Highway traffic Safety Administration). [Online]. Accessed on 16 October 2011. Available: [nrd.nhtsa.dot.gov/Pubs/811363.PDF](http://nrd.nhtsa.dot.gov/Pubs/811363.PDF)
- [2] nrd.nhtsa.dot.gov/Pubs/811363.PDF
- [3] Virtanen, N., Schriock off, A. and Loom, J., 2005. Impacts of an automatic emergency call system on accident consequences. In *Proceedings of the 18th ICTCT, Workshop Transport telemetric and safety. Finland* (pp. 1-6).
- [4] ICTCT, Workshop Transport telemetric and safety, 2005, pp. 1-6.
- [5] S. M. Tang and H. J. Gao, "Traffic-incident detection-algorithm based on nonparametric regression," *IEEE Transactions on Intelligent Transportation Systems*, vol. 6, 2005, pp. 38-42.
- [6] L. Chuan-Zhi, H. Ru-fu, Y.E. Hong-Wu, "Method of Freeway Incident Detection Using wireless Positioning," in *Proceedings of the IEEE International Conference on Automation and Logistics*, 2008, pp. 2801 -2804.
- [7] C. Thompson, J. White, B. Dougherty, A. Albright, and D. C. Schmidt, "Using Smart phones to Detect Car Accidents and Provide Situational Awareness to Emergency Responding ers," in *3rd International ICST Conference on Mobile Wireless Middle WARE, Operating Systems, and Applications (Mobil ware 2010)*, 2010
- [8] Jessen Joseph Leo., R. Monisha, et.al.: Vehicle movement control and accident avoidance in hilly track, *IEEE Int. Conf. on Electronics and Communication Systems (ICECS)*.pp. 1-5(2014). [9] Ki-Hyeon Kim., Dong-Hoon Yum.,et.al. :Improving driver's visual field using estimation of curvature, *IEEE Int. Conf. on Control Automation and Systems (ICCAS)*.pp. 728-731(2010).
- [10] Duy Tran., Weihua Shange. I. :A Hidden Markov Model based driver intention prediction system, *IEEE Int. Conf. on Cyber Technology in Automation, Control, and Intelligent Systems (CYBER)*.pp. 115-120(2015).
- [11] Jiang Yuying., Wu Yuzhen .,et.al. :A surveillance method for driver's fatigue and distraction based on machine vision, *IEEE Int. Conf. on Transportation, Mechanical, and Electrical Engineering (TMEE)*.pp. 727 – 730(2011).
- [12] Ashtha, K. and Ankitha, K., 2016. Smart shopping cart using embedded system and wireless modules. *Recent Patents on Computer Science (CSENG)*, UAE, 8, pp.1-6.
- [13] Ashtha, K. and Arpitha, S., 2016. Novel wireless data communication for fisherman. *International journal of computer science and mobile computing (IJCSMC)*, 5(4), pp.511-517.
- [14] Navaneeth, K.R. and Yashas, A.N., 2023. Advanced car accident prevention system.





INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA



# INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH IN SCIENCE, ENGINEERING AND TECHNOLOGY

| Mobile No: +91-6381907438 | Whatsapp: +91-6381907438 | [ijmrset@gmail.com](mailto:ijmrset@gmail.com) |

[www.ijmrset.com](http://www.ijmrset.com)