



# CONFLICT AVOIDANCE AND LANDSLIDE UPDATE SYSTEM FOR VEHICLES IN DEEP CURVES

<sup>1</sup>Sangeetha Rao .S, <sup>2</sup>Kumaraswamy P, <sup>3</sup>Pushkar, <sup>4</sup>Yarub Baba

<sup>1</sup> Assistant professor, CSE, City Engineering College,

<sup>2,3,4,5</sup> Student of Computer Science and Engineering at City Engineering College, Bengaluru, India.

**Abstract:** The paper aims to decrease the number of accidents that occur on curved roadways. To do this, a warning LCD Display that displays as a vehicle approaches from the other side of the bend serves as a message to the driver. The IR transmitter and receiver sensor, which is connected to the Arduino Uno microcontroller, is used to detect the vehicle. And Motor operated gates are fixed upon each sides for free passage of vehicles from one side to other side. On the winding roads in the ghat portion, this might save thousands of lives. By implementing a new technique, they come up with a plan to prevent accidents after determining their causes and effects. Two IR sensors make up the new method, which alerts the vehicle on the opposite road. Landslide is one of the hazardous and critical geographical process, which damages to civil infrastructure and property as well as causes loss of life. This paper is an attempt with regard to the expansion of a landslide susceptible approach by using Accelerometer Sensor. And Rain Sensor is used for detecting heavy rainfall. Upon detecting the landslide condition or Heavy Rains it warns on display as a message and closes gates on either sides of ghat till road condition gets normal.

**Keywords :** Accidents prevention, Curved roadways ,Warning LCD Display, IR sensor, Arduino Uno, microcontroller

Motor operated gates, Ghat roads, Landslide detection, Accelerometer Sensor, Rain Sensor, Road safety, Gate closure

## I. INTRODUCTION

The "Conflict Avoidance and Landslide Update System for Vehicles in Deep Curves" is an innovative project designed to address the pressing issues of road safety in challenging terrains, specifically in ghat sections with deep curves and potential landslide risks. The utilization of advanced technologies such as Arduino Uno, IR sensors, Rain sensor, ADXL sensors, LCD displays, and Zigbee communication reflects a comprehensive and sophisticated approach to enhancing safety on these hazardous roads. The system's primary objective is to provide real-time assistance to drivers navigating through deep curves by employing a multifaceted sensor network. IR sensors play a crucial role in detecting obstacles on the road, alerting drivers to potential hazards and reducing the risk of collisions. Meanwhile, ADXL sensors monitor vehicle dynamics, offering insights into acceleration, deceleration, and lateral movements, allowing the system to provide timely updates on the vehicle's status. One of the notable features of this system is its ability to address environmental challenges, such as heavy rainfall and the threat of landslides. The Rain sensor allows the system to detect adverse weather conditions, providing drivers with timely warnings about the possibility of slippery roads and decreased traction. Additionally, the system incorporates landslide detection capabilities, enabling it to monitor and alert drivers to potential landslide risks in ghat-prone areas. The integration of an LCD display further enhances the system's effectiveness by providing drivers with critical information about the road conditions, potential obstacles, and weather updates. Zigbee communication facilitates seamless communication between the vehicle and the system, ensuring that real-time data is transmitted efficiently. In regions characterized by deep curves on mountainous roads, the risks are substantial, including reduced visibility, limited reaction time, and the constant threat of sudden obstructions due to landslides. The "Conflict Avoidance and Landslide Update System" addresses these challenges comprehensively, offering a holistic solution to improve road safety in these perilous terrains. By leveraging advanced technologies, the system not only enhances the driving experience but, more importantly, significantly reduces the likelihood of accidents, ultimately saving lives and preserving property and infrastructure.

## II. LITERATURE REVIEW

1. Harshada Targe, Anushka Mahajan, Mohit Patil, Yogesh Lilake, Vijay Sonawane(2021). Advanced Road Safety for Ghat Roads at Hairpin Bend The use of CCTV and LCD screens rather than Mirror. During night, driver can only be able to view headlight of the vehicle in the big LCD screen than the type and size of the vehicle .

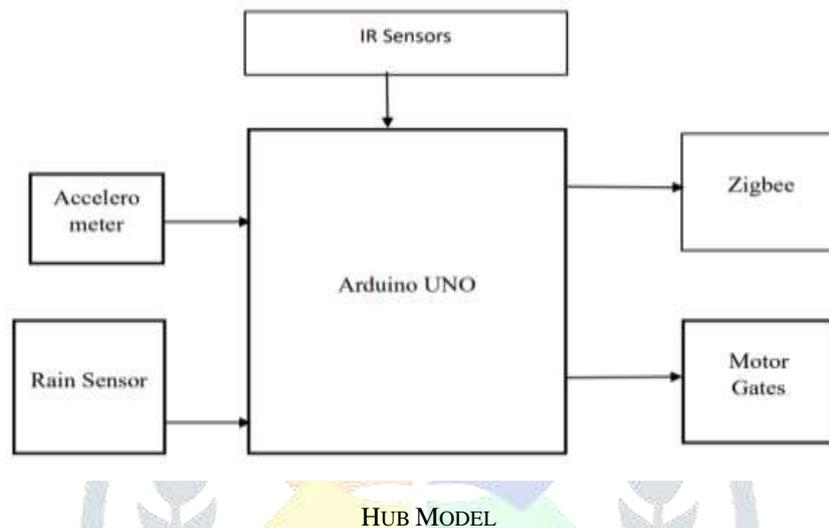
2. Anand M G, A Dhanya kumar, Bhaskar N, Mahaling S B. (2022) Sensor Based Accident Prevention System in Curving Use of Ultrasonic sensors to trigger signal of approaching vehicle. Waiting time is more in case of small vehicle approaching. Signal is Trigger for object.

3. Anuradha A Kasangottuwar, Trupthi Tagare, Vibha T G, Priyanka N, Chaithra (2022)A Implementation of Critical Intimation System for Avoiding Accidents in Hairpin Curves & Foggy Areas Use of IR sensors to calculate the speed of the approaching vehicle and given priority to high speed vehicle. Fails in case of both vehicles approaching with same speed.

4. Mrs. Sumaiya1, Ms. Agadi Prema Basavaraj, Mr. Aleen Ulla, Mr. Dhanraj Gedam, Mr. Mayur (2020).Smart Safety and Accident Prevention System for Curve Road IoT, Sensor ,Warning Signals and Displays .

5. M.M. Santhosh kumar, S. Bharath kumar reddy, S. Siva kumar reddy, Dr. J. Karunakara (2021) Automatic speed control of vehicle speed control of vehicle using vedio processing Integration of GPS and Wi-Fi, ARM Processor, Graphical User Interface

## Proposed System



The Arduino Uno would read data from the sensors and process it accordingly. Depending on the application, it could perform tasks like opening/closing gates, sending notifications, or adjusting settings based on sensor inputs. Zigbee communication would allow for remote monitoring and control of the system. Each component would require its own code to interface with the Arduino Uno, and the overall system logic would be programmed to coordinate the actions of the various sensors and actuators.

**IR Sensors (Infrared Sensors):** IR sensors are electronic devices that detect infrared radiation emitted or reflected by objects. IR sensors are commonly used in various applications such as proximity sensing, object detection, motion detection, and obstacle avoidance in robotics and automation systems. In the context of your previous discussions, IR sensors are used for vehicle detection on curved roads and landslide detection.



**Rain Sensors:** Rain sensors are devices that detect the presence or intensity of rainfall. Rain sensors are often utilized in automated irrigation systems, weather monitoring stations, and automotive applications. In the context of your previous discussions, rain sensors are used for detecting heavy rainfall on roads, triggering warnings or safety measures.



**Accelerometer:** An accelerometer is a sensor that measures acceleration forces. Accelerometers are commonly found in electronic devices such as smartphones, fitness trackers, and automotive systems. They are used to detect changes in speed, orientation, and vibration. In the context of your previous discussions, accelerometers are used for landslide detection and possibly for vehicle speed monitoring.



**Motor Gates:** Motor gates are mechanical gates or barriers that are operated by electric motors. Motor gates are used for controlling access to restricted areas, managing traffic flow, and enhancing security. In the context of your previous discussions, motor gates are installed on roads to regulate vehicle passage, especially in hazardous conditions such as landslides or heavy rain.

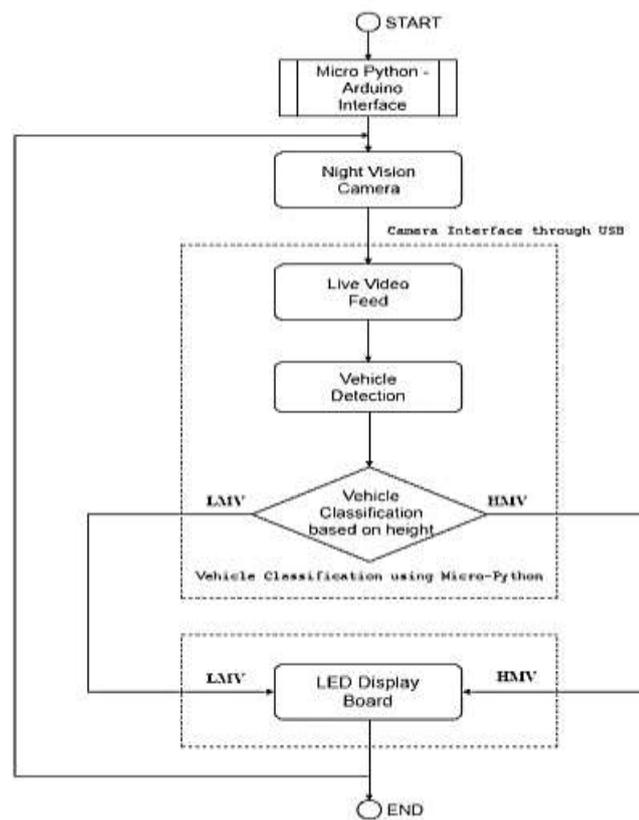


**Zigbee:** Zigbee is a wireless communication protocol based on the IEEE 802.15.4 standard. Zigbee is commonly used in home automation, industrial control systems, and wireless sensor networks. It provides low-power, low-data-rate wireless communication for devices in close proximity. In the context of your previous discussions, Zigbee may be used for wireless communication between sensors, controllers, and displays in the accident prevention and vehicle monitoring systems.

**Arduino UNO:** Arduino UNO is a popular open-source microcontroller board based on the ATmega328P chip. Arduino UNO is widely used for prototyping and building electronic projects, including IoT devices, robotics, and sensor-based systems. It provides an easy-to-use platform for programming and interfacing with various sensors and actuators. In the context of your previous discussions, Arduino UNO serves as the control unit for integrating and managing the sensors, motor gates, and communication modules in the proposed systems.

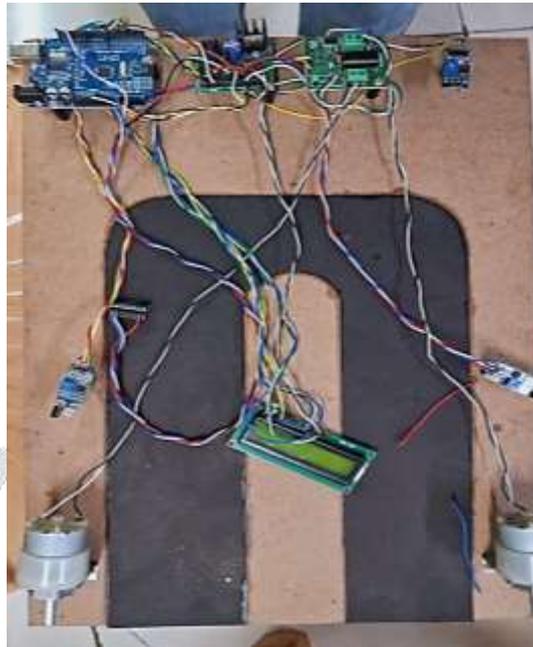


### Working Flow



Working flow of landslide vehicle system

## I. RESULT



### Working and result of landslide vehicle system

The Conflict Avoidance and Landslide Update System utilizes IR sensors to detect vehicles approaching deep curves, rain sensors to identify slippery road conditions, and an Arduino Uno to process data. A motor gate mechanism adjusts traffic flow based on sensor inputs, while an accelerometer detects potential landslides. Zigbee facilitates communication between vehicles and infrastructure for real-time updates. Overall, the system enhances road safety by alerting drivers to potential hazards and dynamically controlling traffic flow in hazardous conditions.

### Conclusion

The "Conflict Avoidance and Landslide Update System for Vehicles in Deep Curves" project utilizes Arduino Uno, IR sensors, ADXL sensors, LCD displays, and Zigbee communication to provide real-time assistance and updates to drivers navigating challenging terrains. This system aims to prevent accidents, improve road safety, and save lives while optimizing traffic flow in areas prone to deep curves and landslides. For the driver to easily observe a vehicle approaching from the opposite direction, convex mirrors are utilized in the existing system at curves. This system functions fine during the day but fails miserably at night. The suggested method makes advantage of sensors at hairpin turns, which function incredibly well at night. We will be able to remedy the issue by placing the sensors on either side of the curves. The sensor sends a signal that looks like this if the vehicle is 10 meters from the bend. The various hazardous impact of landslides on environment where studied. An efficient environment for analyzing and displaying results with powerful set of tools. This project aims at avoiding collision in hair pin curves as much as possible. This system was also designed for reducing traffic congestion which accounts for easy vehicle Movement in hilly areas. The system is robust in nature which includes advanced cameras and complex calculations which provides real time solution for collision avoidance and traffic congestion.

### REFERENCE

- [1] Harshada Targe, Anushka Mahajan, Mohit Patil, Yogesh Lilake, Vijay Sonawane Advanced Road Safety for Ghat Roads at Hairpin Bend Cousin International research journal of engineering technology (2021).
- [2]. Anand M G, A Dhanya kumar, Bhaskar N, Mahaling S B. Sensor Based Accident Prevention System in Curving International Conference of Computer and Applied Sciences (2022).
- [3]. Anuradha A Kasangottuwar, Trupthi Tagare, Vibha T G, Priyanka N, Chaithra A Implementation of Critical Intimation System for Avoiding Accidents in Hairpin Curves & Foggy Areas International Conference of Computer and Applied Sciences (2022).

- [4]. Mrs. Sumaiya1, Ms. Agadi Prema Basavaraj, Mr. Aleen Ulla, Mr. Dhanraj Gedam, Mr. Mayur Smart Safety and Accident Prevention System, IEEE International Conference on Smart computing (2020).
- [5]. M.M. Santhosh kumar, S. Bharath kumar reddy, S. Siva kumar reddy, Dr. J. Karunakara Automatic speed control of vehicle speed control of vehicle International research journal of engineering Technology (2021)
- [6] Kashyap Balu K, Ansal , Ashwin M, Adarsh V, Bybin Paul Safety evaluation of combined curves International Research Journal of Engineering and Technology(2019)
- [7] Pinlong Cai, Jia He, Yikang Li Hybrid cooperative intersection management for connected automated vehicles and pedestrians Journal of Intelligent and Connected Vehicles(2023)
- [8] M Juanita Sarah Rachel, S Kalaiselvi, R Salini Lane Detection using Neural Networks International Research Journal of Engineering and Technology (2020)
- [9] Mrs. Sumaiya1, Ms. Agadi Prema Basavaraj, Mr. Aleen Ulla, Mr. Dhanraj Gedam, Mr. Mayur ] Smart Safety and Accident Prevention System for Curve Roads International Research Journal of Engineering and Technology(2023)
- [10] Jerry Soman, Jisha Akkara Development of Accident Prediction Model on Horizontal Curves International Research Journal of Engineering and Technology (2019)

