

Landslide Update and Conflict Avoidance System for Vehicles in Deep Curves

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Abstract: *The advancements of technology in artificial intelligence and in this project plays a major role for the purpose of natural disasters like landslides. Landslides are a catastrophic disaster worldwide that alter from terrain to terrain. 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. Landslide is one of the hazardous and critical geographical process, which damages to civil infrastructure and property as well as causes loss of life. 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, in this situation the motor operated gates are fixed upon each sides for free passage of vehicles from one side to other side. And, a siren buzzer that alerts the civilians in hilly and prone regions, this might save thousands of lives. Also, this project aims to decrease the number of accidents that occur on curved roadways. To do this, a warning is displayed as a vehicle approaches from the other side of the bend serves as a message to the driver.*

Keywords: artificial intelligence.

I. INTRODUCTION

The "Landslide Update and Conflict Avoidance System for Vehicles in Deep Curves" project leverages a combination of advanced technologies, to enhance potential landslide risks and road safety in areas with deep curves. It detects 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 and a siren that alerts the civilians in hilly and prone regions, this might save thousands of lives. Also, this system offers real-time assistance to drivers by detecting obstacles, monitoring vehicle dynamics, and providing critical updates on road conditions. Implementing a new technique, have come up with a plan to prevent accidents after determining their causes and effects which alerts the vehicle on the opposite road, where a warning is displayed as a vehicle approaches from the other side of the bend serves as a message to the driver. Deep curves on mountainous roads and the threat of landslides pose significant hazards to drivers and passengers. These challenges include reduced visibility, limited reaction time, and the potential for sudden obstructions due to landslides. This project aims to address these issues by creating a comprehensive solution to the landslide risks and how it can be acted upon creating less fatal accidents and assists drivers in navigating challenging road conditions while keeping them informed about the possible potential risks.

II. PROBLEM STATEMENT

In India more than 12% of the territory is landslide prone area killing approximately hundreds of people every year and has one of the highest rate of traffic accidents in the world. During landslides the fatality and injuries are mainly due to lack of proper guidance, quick communication and emergency alerts. The majority of road accidents are caused at high speeds or when the driver is unaware of other vehicles coming opposite to it, especially in deep curves (hairpin curve). Due to a lack of communication and zero visibility over the hairpin curves, vehicles travelling around hairpin bends are

extremely vulnerable to accidents. As a result, there must be proper guidance and communication in emergency situations and vehicles must take extreme caution when driving through hairpin curves.

Objectives

- Develop a real-time conflict avoidance system using Arduino Uno and IR sensors to identify obstacles and potential conflicts on the road, especially in deep curves.
- Implement an ADXL sensor to monitor Landslides and provide drivers with information on vehicle tilt and lateral acceleration in real-time.
- Utilize an LCD display to present visual warnings and updates to the driver regarding road conditions and potential conflicts.
- Establish a Zigbee communication network between vehicles to exchange critical information about road conditions, obstacles, and potential landslide risks.
- Ensure compatibility with existing vehicle systems and navigation devices, making it easy to retrofit vehicles with this system.

III. SYSTEM REQUIREMENTS

Hardware Requirements

- Arduino UNO
- IR Sensor
- ADXL Sensor
- Rain Sensor
- LCD Display
- Zigbee Communicator
- Buzzer
- Motor Gates

Software Requirements

- Embedded C
- Arduino IDE
- Open CV
- Python

IV. CONCLUSION

This system aims to prevent accidents, improve road safety, and save lives while optimizing traffic flow in areas prone to deep curves and landslides. It provides real-time assistance and updates to drivers navigating challenging terrains. 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

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