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Development Of Road Safety In Hilly Region By Using Different Technologies

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ABSTRACT

On a road accident is a major issue of. Even with all model developments in the field of vehicle design , road lane design and management accident to accure.

Due to the steep turns, unexpected bends, and vulnerability or newness of the street, the sloping sections are more prone to accidents. Things are made worse by avalanches, floods, network failure, and other events. Because of the aforementioned causes, both tourists and locals encounter difficulties and suffer. Moreover, GPS/GSM frameworks don't function properly in these areas. The goal of the work is to lessen accidents at hairpin bends, allow efficient and smooth vehicle development, prevent noise pollution from horns, lessen driver confusion at conflict areas, assist those in need, and provide landslide alerts. This study looks at a module that makes use of the Internet of Things and wireless sensor networks to monitor and enhance security in sloped areas.

Remote sensing (WSN) makes use of autonomous sensing devices in areas vulnerable to the aforementioned factors. These sensors then send information to the worker about the likelihood of a disaster, thereby sending out a Warning signal to everyone so that the best assistance can be provided and steps can be taken to prevent the disaster or at least lessen its effects.

Timely accident detention and taking immediate action with respect to emergency health care of victim by informing an emergency center such as hospital or police station about the accident on a time plays a vital in a human safety and road traffic management. Accident detection can be done under various domain. Most od of the paper survey are used application of sensor technology, beside trying to detect accident detect automatically using machine learning and computer vision from surveillance system.

I. INTRODUCTION

These days, the most common problems are street car crashes and the passing accidents they cause. Also, it has an impact on the economy of the country. This program includes important topics including traffic accidents and their effects, causes of these accidents, their effects, ways to prevent them, and things we can do to improve the situation right now. [4] However, nowadays, crossing the ghat while on a lengthy expedition is anything but safe. The number of accidents in the ghat region is steadily rising. The seriousness of these accidents cannot be repaired. [7] Million deaths worldwide occur each year as a result of road traffic accidents (RTA). Along these lines, it is crucial to initially control this situation and implement some safety precautions in the ghat region. [3] According to Dr. R. Adams Cowley in 1961, consultees will have a worse probability of surviving if they are not brought to make the decision within an hour after the incident. [2] Mishaps frequently occur in Uttarakhand, a region of Northern India, owing of the helpless growth of public interstates and danger zones. The frequency of accidents in the ghat area is steadily increasing in India. In India, 1 out of every 6 actual casualties passes away, but in the United States, the ratio is 1 in 200. It will ultimately rank as the third-largest contributor to the global burden of the disease. 60,000 people are thought to die on the streets every year. [5]

- Engineering solutions.
- The application of regulations.
- Public transit regulations educators.

Measures taken to slow the rate of accidents include roadway planning, street lights, and compensation for damaged automobiles. For the application of guidelines, speed control, traffic lights, planning and management, segment recognition of legislation and guidelines, and clinical examination to this load of focuses came to mind. To inform the street user of the necessary security precautions taken when using the street, it is crucial to provide instruction pertaining to transit legislation. [6]

Throughout the last few decades, there has been a significant increase in the number of accidents, injuries, and fatalities per million people worldwide. This is a result of the increasing number of engine-powered vehicles, the diversity

of the traffic, and the lack of traffic separation. [1] These days, the number of vehicles on the road is surreal expanding. As a result, traffic congestion and street accidents are growing problems. Our work is motivated by a desire to learn more about how to improve street welfare, which is a hotly debated topic. Security software can be used to prevent accidents by transmitting over remote organizations.

II. LITERATURE SURVEY

Accident detection using a piezoelectric sensor. The end consequence was that emergency services were promptly provided with accurate accident information. [8] Using the Crucial Hint Framework to prevent accidents in tight curves and foggy areas. The results were the framework captures information exchange between cars regarding speed and distance, and the vehicle is offered a choice based on calculation through visual presentation. [3] By using sensor technology to prevent accidents, LED lights are activated, with an emphasis on the advancement of cars. [4] With a real-time system, accidents on a sloping track are avoided. The end product was a system to recognize signs of driver tiredness and regulate vehicle speed to prevent accidents. [1] Using piezoelectric sensors, assist with slope side for street safety. The outcome was changing the driver's perspective of the car from the opposite side. When a vehicle approaches from one end of the bend, the sensor capabilities detect LED light on the opposite side. By observing the LED light on/off criteria, the driver can become alert and slow down the car. [2] predicting accidents with sensors, Drivers will now be concerned about vehicles approaching from the opposite side as a result. [7] Using ultrasonic sensors to prevent accidents on hilly routes. The amount of accidents occurring at slope curves has decreased as a result, and there is now a light informing drivers that traffic is coming from the opposite side, allowing for adjustment.[6]

An accident prevention system using ultrasonic sensors. As a result, fewer accidents occurred on bends in the road thanks to LED lights that flash when a car approaches from the other side. [9] A technique for preventing accidents combining a vibration sensor, LED, ignition key, and a DC motor As a result, it was possible to anticipate vehicle robberies using the message, audio alarm, location, and photo options. [15] Because of the current arrangement, drivers cannot predict which and when vehicles will come at turns. By doing this, we have supported a model that enables drivers to better arrange the curve and assess the presence of vehicles from a distance. Similar to how a speed trap will aid the authorities in pursuing legal action against a car owner who disobeys the law.

Table 2.1: Karnataka accidents from 2014 to 2018

Year	Accidents Reported	Number of People Killed
2014	43,713	10,452
2015	44,011	10,856
2016	44,403	11,133
2017	42,542	10,609
2018	41,707	10,990

The number of accidents from 2014 to 2018 is displayed in Table 2.1. As the number of roadway accidents decreased, the number of fatalities increased. A total of 41,707 accidents were reported in the State in 2018, down from 42,542 in every 2017. Karnataka's accident ranking has also decreased from three out of 2017 to four out of 2018, following a fall in accidents of 835, or around 2% less than the previous year.

According to the data, the number of fatalities in the State increased by 381 — or around 3.6% — and it remained in fourth place overall for accident-related deaths. More than 54, 000 people have died in street accidents in the last five years.

I. DIFFERENT TECHNOLOGIES :

Vehicle Navigational and Guidance Systems Most of the leading motorised economies have reported on their research and development into vehicle navigation and guidance systems. The Auto-Guide system, which advises drivers before a trip on the quickest and/or cheapest routes, is being tested by the Transport and Road Research Laboratory (TRRL) in the United Kingdom. A significant industry cooperative initiative called PROMETHEUS is being carried out in Europe to co-ordinate research into "intelligent" vehicle technology. The CEC has started DRIVE as a distinct initiative to coordinate research into automated roadway technology. Joint government-industry research is also being conducted in Japan, with a focus on dashboard-mounted video screens for in-vehicle navigation systems. There appear to be many potentials to improve on technology currently present in modern cars, like cruise control, which automatically maintains a pre-set travel speed, and progress towards a "intelligent" vehicle. The safety-focused features of a "intelligent" car may include automatic braking, like in the RCA proposal from the early 1970s, and navigational tools.

Automated Speed Detection

Due to the potential for more severe damage and injuries in a collision, speeding cars are a key concern in the traffic system. Although there are many different opinions on the connection between vehicle speed and the frequency of crashes, it is generally believed that better adherence to speed restrictions will lessen the severity of crashes. Theoretically, it makes sense to assume that if actual speeds are decreased, the information processing load on drivers will also decrease, improving their ability to deal with traffic risks.

Bar-codes

As suggested by Tasani Pty. Ltd., the use of bar-codes painted on the road offers a method of sending data to a vehicle for display to the driver. To read the barcode painted on the road pavement with this technique, a scanner must be placed below the car. With this system, speed detection, offences would need to be recorded in a memory inside the car for subsequent review by the enforcement agency at predetermined intervals, let's say once a year. This would mandate that regardless of whether the vehicle was involved in speeding violations or not, the owner of the vehicle provide the in-vehicle recording device for questioning by the enforcement agency.

A different strategy would be to identify the vehicles with barcodes and use roadside scanners to record the identification number of any vehicles found to be travelling above the speed limit. In the packaging sector, bar-code technology is well-established, but it is still necessary to assess how reliably they can be read quickly. If Tasani has been successful in demonstrating the technology for pavement codes and car scanners, then it should be anticipated to operate in the opposite manner.

A roadside device incorporating current technology for measuring vehicle speed with a bar-code reader would need to be created. The usage of barcodes attached to the sides of containers was suggested in a proposal created in the United States to help keep track of empty containers.

Transponders

In Melbourne, trams and buses are equipped with vehicle transponders to help with traffic signal operations. This technology is already well established. In an experimental automatic toll collecting system for the Coronado Bridge in San Diego, transponders have been installed in roughly 1000 automobiles in California (Bushey, 1989).

A commercial product that Westinghouse Systems is offering "allows railways, trucking and shipping corporations to track automatically vast numbers of freight cars, vehicles, containers or other modules" (Westinghouse Systems, 1988).

Vehicles have an electronic tag installed that can transmit a stored message to a roadside scanner. Before being transferred to an external processing unit, the message can be up to 24 characters long and up to 5000 messages can be saved in the scanner. Westinghouse claims that in testing using tags attached to railroad waggons, accuracy of 100°/C was achieved at speeds ranging from 35 to 45 mph.

Number plates

The literature on image processing for number plate recognition has been reviewed by Wigan (1985). The technique appears to be doable, according to this review, but there doesn't yet seem to be a system that has been successfully field tested. Together with the technology of pattern recognition by machine vision, there are a number of practical considerations. For instance, how to make sure the license plate is visible in poor lighting.

This strategy would be the most preferable if automatic number plate scanning technology could be developed because it could be used without altering or enhancing the fleet of vehicles already in use.

Electronic Tachographs and In-vehicle Recorders

In the past, tachographs were employed to track the driving habits of large vehicles. Monitoring can be done to ensure that drivers follow rules regarding driving times and vehicle speeds or for fleet management objectives.

Electronic tachographs, which have recently replaced older paper tape systems, are more adaptable, dependable, and tamper-proof. These gadgets have been cited by proponents of tighter regulation of the tracking sector as a way to monitor driver compliance with rules. The idea might be applied to all cars if these gadgets are proven to be effective in policing truck drivers.

Harmonie Radar System

Shefer and Klensch proposed this technique in a study (1973). The experiment system described in the paper was created and put to the test at the RCA Laboratories.

Avoiding the cross-talk and subsequent false calls issues of simple radar was a key goal in the development of the harmonic radar technology. The approach entails attaching passive harmonic reflectors, or "1ags," to objects that are intended to be picked up by the search vehicle. These things could be obstacles in the road or the backs of other cars. An antenna that transmits radar signals and receives reflected signals from "lags" is mounted on the front of the "search" vehicle. The device can calculate the distance ahead to the "1ag" and the speed difference between the "search" vehicle and the object being detected by analyzing specific aspects of the returning signal. The vehicle's brakes can be automatically applied when specific conditions are satisfied, such as when the distance is below a given range and the closing speed is above a certain threshold.

III. PROPOSED SYSTEM

In our project, we suggested a computation to prevent accidents and clogs in sloped areas and hair clip twists. In our suggested method, implication will communicate more quickly, which will help keep cars from colliding and also help reduce jams. Also, we'll want to identify avalanches as well as assist people who are in need.

IV. SYSTEM DESIGN

An infrared (IR) sensor is an electrical device that acts upon and recognizes infrared radiation in its ambient environment. LEDs and IR sensors are the hardware prerequisites for our project. The suggested work's methodology involves using proximity sensors to implement a collision avoidance system in hair clip twists on a sloping track, Ghats, or other situations where it is impossible to notice turns.

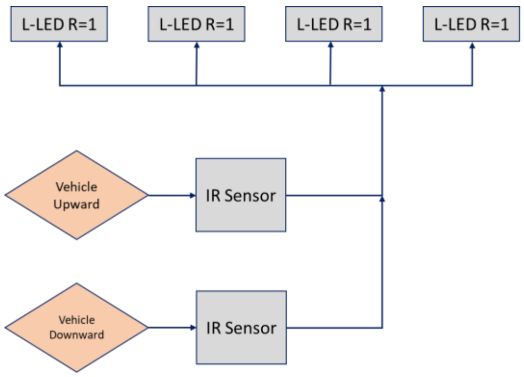

Figure 1. Block diagram

It makes use of two IR sensors that are attached on the side of the fastener twist. A sensor is installed by the side of the challenging section of the road, and a second sensor is installed by the side of the deteriorating section of the road.

The position of the vehicles on one or the other side of the twist is identified based on sensor data, which is provided as input to the microcontroller. The microprocessor that operates on a 9V power source executes a Priority calculation that causes the warning LEDs to shine and, as a result, intelligently regulates the growth of vehicles along the curve. At the center of a barrette's twist, cautioning LEDs are placed next to an arched mirror. A second LED is requested in order to signal a structural failure.

Also, we are able to use a bell to alarm the client. In order to identify the car in a speed trap, we can calculate speed using sensor and RFID input. When a vehicle passes by, the computation will take note of its speed and save it in a cloud-based information base so that it can be sent to the authorized person for further operations. For this reason, an Android application will be made so that authorized individuals can receive ongoing updates on their phones.

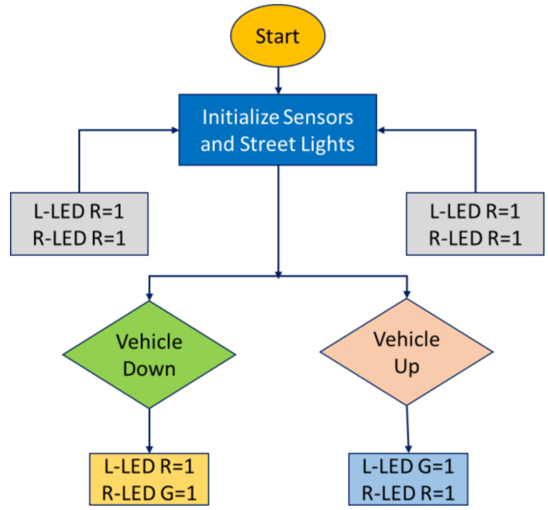

Figure 2. Flowchart

The algorithm flow utilized to priorities the vehicle's motion while navigating a hairpin bend is shown in Fig.5.2. The sensors are set up to begin tracking the motion of the vehicle. Both red and green LEDs are present in L-LEDs, which are used for uplink, and R-LEDs, which are used for downlink. Red Lights will first be turned on. Vehicles climbing the curve are given preference so they can keep going. If an uplink vehicle is found, the downlink strobe lights will turn red when they are on and green when they are off. Strobe lights will become green and turn on if a car is found in the downlink. In order to distinguish between approved and illegal cars, a notification will be delivered whenever the emergency button is touched.

V. RESULT AND DISCUSSION

The benefits listed below demonstrate how our project was successful.

1) Prevent collisions on curved, mountainous, and hilly roadways.
2) Preserves many lives.
3) Simple to integrate into the current roads.
4) Complete automation (No person is required to operate).
5) The price of installation is quite low.

VI. CONCLUSION

Accidents have increased steadily as a result of quick advancements in automobiles and transportation. Accidents frequently occur as a result of carelessness, disregard for traffic laws, and poor street conditions. Bended roadway segments, which make up a sizeable amount of the street mathematical plan, are often more prone to car accidents than other street mathematical components because of their arrangement characteristics. According to a summary, 10% of all auto accidents involved collisions with bent fragments. Thus, the number of passes made up 13% of the total number of passes. Arranging tight twists and bends is definitely not an easy task in narrow streets, hilly areas, and Ghats segments. In these situations, the driver must be continually alert when operating a vehicle. Accidents typically result from a vehicle travelling at excessive speed through a sharp bend. Vehicles travelling uphill should be given first preference in Ghats and clip turns. But regulations are not strictly adhered to, which leads to accidents and crowded streets. Drivers are unable to predict which vehicles will arrive at bends and when under the current system. As a result, we developed a model that enables drivers to plan the bend and more accurately assess how the vehicles seem from the other end. Similar to how a speed trap system will help the authorities take action against a driver who disobeys the rules.

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