

Accident Prevention based on Automatic Detection of Obstacles

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Abstract - Everything around is becoming smart. So make our vehicles also to be smart. When we are travelling in our vehicle we may come across with some uncertain situations like sudden visit of animals on to the roads, human beings, uneven roads, speed-breakers etc are prone to accidents. Also with boom in AI and ML, there are various innovative solutions devised to address the challenges in the field of prevention of accidents. So in order to overcome this we have come across a solution that is to automatically detect obstacles which reduces the accidents. Here we propose an idea which identifies the obstacles and immediately an indication will be given for the vehicle driver through voice message or text message. So this will be most useful project in order to reduce the accidents and we can additionally add some other functionality also, like placing a GPS tracker in the vehicle so that when our vehicle is missing we can easily identify the vehicle through GPS tracker. There are many advantages of using this project and also we can add much functionality to this system.

Keywords – smart, vehicle, animals, accidents, prevention

I. INTRODUCTION

In present days the rate of accidents can be increased rapidly. Due to employment the usage of vehicles like cars, bikes are also increased, because of this reason the accidents can be happened due to over speed. People are going under risk because of their over speed, due to unavailability of advanced techniques, the rate of accidents can't be decreased. To reduce this accident rate in the country we introduced an optimum solution. Accident Prevention based on Automatic Detection of Obstacles is introduced; the main objective is to develop a system which automatically controls the speed of the vehicle and avoids accidents. Whenever any obstacle is detected in running vehicle depending on the distance automatically control the speed of vehicle and also gives alarm alert to the driver. Many accidents at High-ways are taking place due to close running of vehicles and uneven roads included with pits, then it is quite difficult to the following vehicle driver to control his vehicle, resulting accident. To avoid these kind of accidents, the system which contains alarm and display system can be arranged at r of each and every vehicle. If short circuit occurs in engine part smoke sensor will be activated and give an alert to driver and stop the vehicle. This is all done using data monitoring and this technique involves machine learning.

II. LITERATURE REVIEW

- According to the authors F. Yang, S. Wang, J. Li, Z. Liu, and Q. Sun[1] the methods used for detection of accidents were traditional methods which included the use of acceleration and velocity which are vehicle motion parameters captured by vehicular GPS devices to detect car accident. These methods mostly based on single type of features and cannot meet the performance need of accident detection in the aspect of accuracy. Now-a-days the technology has been emerged rapidly. With the development of computer and communication technologies, Cooperative Vehicle Infrastructure System and Internet of Vehicles have been developed rapidly.
- Under the research of authors S. Ramos, S. Gehrig, P. Pinggera, U. Franke, and C. Rother [2] who majorly concentrated on machine learning processing techniques such as image processing. The image recognition based on video captured by intelligent roadside devices in CVIS has become one of the best research points in the field of intelligent transportation system. This system could easily detect the rate of accidents which included many advantages such as high efficiency, flexible installation and low maintenance costs.
- The authors J. Redmon and A. Farhadi[3] included that there are many distinctive image and video features in traffic accidents, such as vehicle collision, rollover and so on. These methods are used to detect the collisions and accidents up to some extent, so they introduced other advanced techniques such as machine vision technology based on deep-learning which could easily extract and process complex images which improves the accuracy of detecting car accidents. The authors mainly have focus on such a general application scenario when there is an accident on the road, roadside intelligent devices recognize and locate it efficiently.

- Under the study of authors M. S. Amin, J. Jalil, and M. B. I. Reaz [4] they found that whenever an accident occurs there will be a dramatic change in the motion of the vehicle so that many research papers on accident detection detected the accidents based on motion parameters such as acceleration, velocity and so on. They used a diagnosis system to detect crash as early as possible based on the status of engine and monitor speed and the report will be sent to smartphone using Wi-Fi technology or cellular network.
- According to the authors Francesco Biral, Roberto Lot, Stefano Rota, Marco Fontana, and VéroniqueHuth [5] due to high demand for automobiles the traffic becomes hectic which leads to high number of road accidents. The author Francesco developed a safe rider project which provided a novel intersection system for motor riders. Initially the input value given to each plan is used as a measure of the correction that the rider has to apply to conform to an optimal-safe operation. A warning feedback is also given to the rider.
- The authors FerhatAttal, AbderrahmaneBoubezoul, Latifa Oukhellou, and Stephane espie [6] developed a pattern using machine learning especially focused on pattern recognition. The machine learning framework used the riding movement at a particular situation which is identified by the datasets collected from three accelerometer and three gyroscope sensors fitted to the vehicle.
- Under the study of the authors S. Abtahi, B. Hariri and S. Shirmohammadi[7] found the problem of driver's drowsiness during the travel and gave a method to detect the driver drowsiness and subsequently alerting them by sending messages. This idea reduced the number of accidents due to driver's tiredness and increases the transportation safety. The method included the detection of changes in mouth geometric features. Alcohol content in the driver's body is also detected using infrared breath analyzer which is placed at steering.
- The authors Mugila.G Muthulakshmi.M Santhiya.K, Prof.Dhivya.P[8] developed a smart helmet which detects whether the person is wearing helmet or not and also the person is drunk or not. If the person is drunk the vehicle will be jammed slowly. In this system a transmitter is placed in the helmet and receiver at the bike and a switch will be there to ensure that the person is wearing the helmet or not. And also a alcohol sensor is placed in the helmet near the mouth of the driver to check whether the driver is drunk.

III. EXISTING SYSTEM

A system to control the accidents by sending SMS to registered driver mobile number that some obstacle is there in their path of travel and acknowledging the driver to decrease the speed of the vehicle. The major concentration of obstacles includes other vehicles. It uses ultrasonic sensors which ranges and detects only the obstacles within 4 meters. This system has only way of sending messages and where it is not much useful and more over it is very much dangerous to check mobile while driving .This system reduces only speed of vehicle by sending the information.

IV. PROBLEMS OF EXISTING SYSTEM

- ❖ The driver may or may not be using the mobile to see the message received.
- ❖ The sensing range of ultrasonic sensor is too small, in the case when the speed of the vehicle is very high, the accident occurs before the driver reads the message.
- ❖ It does not concentrate on uneven roads and pits on the roads.
- ❖ No alarm or short circuit alerting sensors used.
- ❖ Doing the speed control of vehicle manually is not so effective.

V. PROPOSED SYSTEM

The system that we are proposing is accident prevention on automatic detection of obstacles. The idea is whenever any obstacles or any uneven roads, pits etc., occurs many accidents are taking place so in order to reduce such type of accidents we have come up with a solution accident prevention using machine learning. In this we will be training some data using machine learning, where using machine learning recursive processing data will be accessed multiple times and we don't need to update or perform any action on the data set all the time. So using this technology we can reduce the time we can reduce the cost too. The trained data will in the form of images which comes under image processing or using sensors we can implement this method.

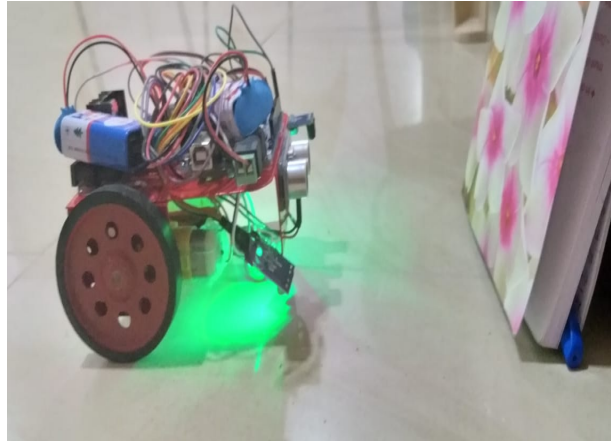


Fig 1: Prototype of Car

VI. MODULE DESCRIPTION

- *Training bot:*
The first and foremost thing that we do in our project is training the bot. Here training bot will contain all the past data about accidents. These will in the form of pictures.
- *Image processing:*
Image processing plays an important role in our project i.e., image processor will be fixed to the vehicle and it continuously monitors the road ways.
- *Checking:*
Here the checking module performs actions based on image processing. It checks the weather the pictures matched or not.
- *Matching:*
Here matching module takes place when the checking module completes it actions. If the checking module is succeeded then matching module takes place and it checks weather the pictures are mapped or not.
- *Result module:*
Here it is performed if matching module is succeeded. It generates a voice message and signal to driver that “something a head”.

VII. FLOWCHART

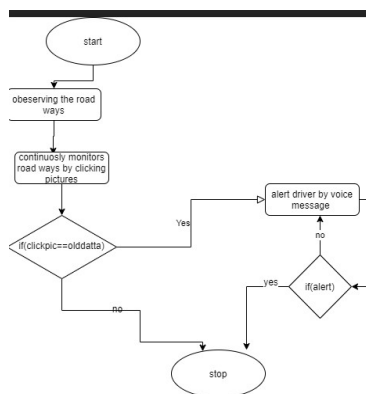


Fig 2: Flowchart for the proposed model

VIII. USE CASE DIAGRAM

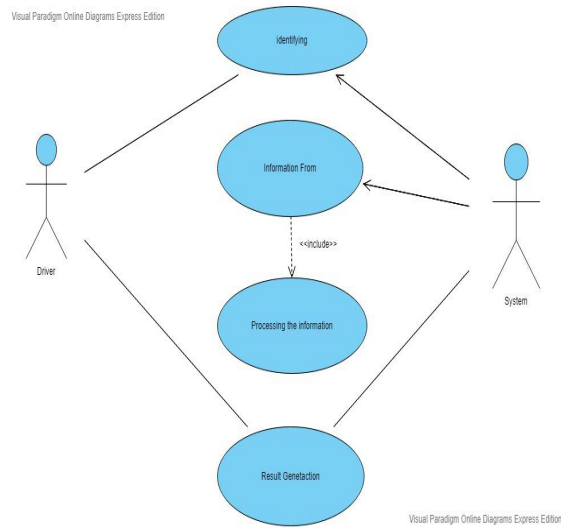


Fig 3: Use case diagram of proposed model

IX.RESULT GENERATION

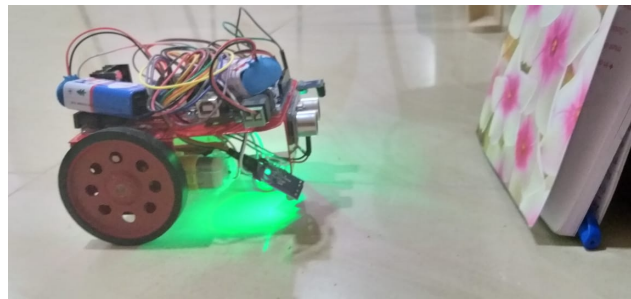


Fig 4: actual system.

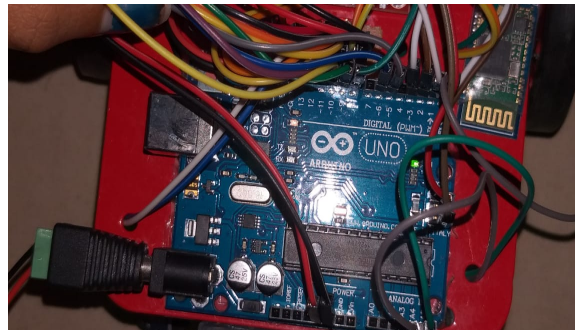


Fig 5: Arduino board

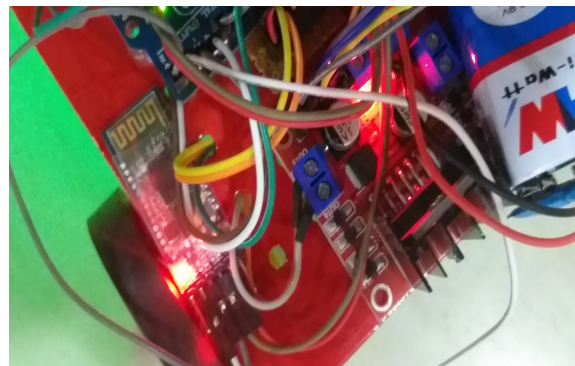


Fig 6: Buzzer sound with light when an obstacle occurs.

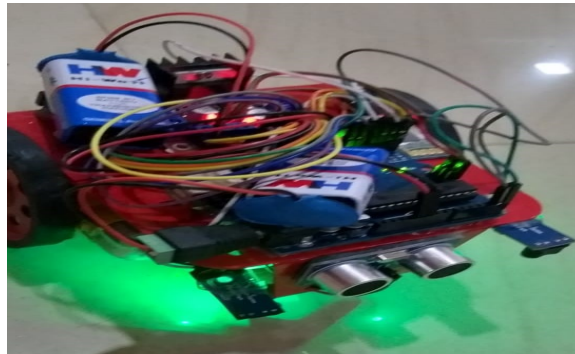


Fig 7: buzzer sound when an uneven roads occur.

X. CONCLUSION

The main theme of our project is to detect the obstacles and uneven roads etc. in order to prevent the accidents and this is all done using data set which monitors continuously sends signals to the driver when any obstacle or uneven roads or pits on the road gets detected. The signals will be sent to the cloud and if the cloud data matches the original data it gives the alert messages to driver and the speed of the vehicle will be automatically reduced.

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