ACCIDENT MONITORING AND NOTIFICATION SYSTEM

A

MAJOR PROJECT REPORT

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IN

COMPUTER SCIENCE AND ENGINEERING

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CERTIFICATE

This is to Certified that this MAJOR project report "ACCIDENT MONITORING AND NOTIFICATION SYSTEM" is submitted by Chanchal Kumar (03114802716), Devang Sharma (03414802716) and Kshitij Jain (05214802716) who carried out the project work under my supervision.

I approve this MAJOR project for submission.

Guide - Mrs.Neetu Garg

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Abstract

In present days the rate of accidents can be increased rapidly. Due to employment the usage of vehicles like cars, bikes can be increased, because of this reason the accidents can happen due to over speed. Vehicle accidents are the paramount thread for the people's life which causes a serious wound or even death. The automotive companies have made lots of progress in alleviating this threat, but still the probability of detrimental effect due to an accident is not reduced. Infringement of speed is one of the elementary reasons for a vehicle accident. . As soon as the emergency service could divulge about an accident, the more the effect would be mitigated. For this purpose, we developed an Android based application that detects an accidental situation and sends emergency alert message to the nearest police station and health care center. This application is integrated with an external pressure sensor to extract the outward force of the vehicle body.In this we have used **Tensor Flow object detection API and socket.io API** for notification system**.** It measures speed and change of tilt angle with GPS and accelerometer sensors respectively on Android phone. By checking conditions, this application also capable of reducing the rate of false alarm. advanced techniques, the rate of accidents can't be decreased. To reduce the accident rate in the country this project introduces a optimum solution. Automatic alert system for vehicle accidents is introduced; the main objective is to control the accidents by sending a message to the registered mobile using wireless communications techniques. When an accident occurs at a city, the message is sent to the registered mobile . Vibration sensor will be activated when the accident occurs and the information is transferred to the registered number . GPS system will help in finding the location of the accident spot. The proposed system will check whether an accident has occurred and notifies to nearest medical centers,family and registered mobile numbers about the place of accident using various modules. The location can be sent through tracking system to cover the geographical coordinates over the area.

Acknowledgment

It gives me immense pleasure to express my deepest sense of gratitude and sincere thanks to my respected guide **Mrs.Neetu Garg** (Asst. Prof.,CSE Dept) **MAIT Delhi,** for their valuable guidance, encouragement and help for completing this work. Their useful suggestions for this whole work and cooperative behavior are sincerely acknowledged.

I am also grateful to my teachers, **Mrs.Neetu Garg** and **Mr.Moolchand Sharma** for their constant support and guidance.

I also wish to express my indebtedness to my parents as well as my family member whose blessings and support always helped me to face the challenges ahead

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(i) Tensor Flow

TensorFlow is a free and open-source software library for dataflow and differentiable programming across a range of tasks. It is a symbolic math library, and is also used for machine learning applications such as neural networks

Given an image or a video stream, an object detection model can identify which of a known set of objects might be present and provide information about their positions within the image.

(ii) Deep Learning

Deep Learning is a subfield of machine learning concerned with algorithms inspired by the structure and function of the brain called artificial neural networks. Learning can be supervised, semi-supervised or unsupervised. Deep learning architectures such as deep neural networks, deep belief networks, recurrent neural networks and convolutional neural networks have been applied to fields including computer vision, speech recognition, natural language processing, audio recognition, social network filtering, machine translation, bioinformatics, drug design, medical image analysis, material inspection and board game programs, where they have produced results comparable to and in some cases surpassing human expert performance.

Deep learning is a class of machine learning algorithms that uses multiple layers to progressively extract higher level features from the raw input. For example, in image processing, lower layers may identify edges, while higher layers may identify the concepts relevant to a human such as digits or letters or faces.

(iii) SSD model

We present a method for detecting objects in images using a single deep neural network. Our approach, named SSD, discretizes the output space of bounding boxes into a set of default boxes over different aspect ratios and scales per feature map location. At prediction time, the network generates scores for the presence of each object category in each default box and produces adjustments to the box to better match the object shape.

Additionally, the network combines predictions from multiple feature maps with different resolutions to naturally handle objects of various sizes. Our SSD model is simple relative to methods that require object proposals because it completely eliminates proposal generation and subsequent pixel or feature resampling stage and encapsulates all computation in a single network. This makes SSD easy to train and straightforward to integrate into systems that require a detection component. Experimental results on the PASCAL VOC, MS COCO, and ILSVRC datasets confirm that SSD has comparable accuracy to methods that utilize an additional object proposal step and is much faster, while providing a unified framework for both training and inference.

(iv) Heatmap

Heatmap-based object detection can be, in some sense, considered an extension of one-shot based Object Detection. While one-shot based object detection algorithms try to directly regress the bounding box coordinates (or offsets), heatmap-based object detection provides probability distribution of bounding box corners/center.

Based on the positioning of these corner/center peaks in the heatmaps, resulting bounding boxes are predicted. Since a different heatmap can be created for every class, this method also combines detection and classification. While heatmap-based object detection is currently leading new research, it is still not as fast as conventional one-shot object detection algorithms. This is due to the fact that these algorithms require more complex backbone architectures (CNNs) to get respectable accuracy.

(v)OpenCV

OpenCV (*Open source computer vision*) is a library of programming functions mainly aimed at real-time computer vision.[1] Originally developed by Intel, it was later supported by Willow Garage then Itseez (which was later acquired by Intel[2]). The library is cross-platform and free for use under the open-source BSD license.

OpenCV supports some models from deep learning frameworks like TensorFlow, Torch, PyTorch (after converting to an ONNX model) and Caffe according to a defined list of supported layers.[3]. It promotes OpenVisionCapsules. [4], which is a portable format, compatible with all other format

(vi) ROI

The major hurdle for going from image classification to object detection is fixed size input requirement to the network because of existing fully connected layers. In object detection, each proposal will be of a different shape. So there is a need for converting all the proposals to fixed shape as required by fully connected layers. ROI Pooling is exactly doing this.

Region of Interest (ROI) pooling is used for utilising a single feature map for all the proposals generated by RPN in a single pass. ROI pooling solves the problem of fixed image size requirement for object detection networks.

ROI pooling produces the fixed-size feature maps from non-uniform inputs by doing max-pooling on the inputs. The number of output channels is equal to the number of input channels for this layer.

1.Introduction

With the increasing number of vehicles on the road there is a need to develop a system which provides information of vehicles to the driving assistant system in intelligent transportation system. It is an essential building block for traffic monitoring and many other applications. Smart traffic monitoring system is incomplete without the existence of system that is capable of detecting any traffic problems automatically, such as traffic rules violation and traffic jam. Thus, the problems solved by this project are:

a) **Accident in India**

In our country road accidents is a negative externality associated with expansion in road network, motorization and urbanization in the country. A major public health problem is the road traffic injuries, leading to loss of life and forever sufferings to the family of the victim causing disabilities and hospitalization. In case of India, road injuries is the number one causes of death and health loss among persons of age group 15-29 years. During the calendar year 2016, the total number of road accidents is reported at 4,80,652 causing injuries to 4,94,624 persons and claiming 1,50,785 lives in the country. and their number increases around 10% annually. Rail and coastal shipping account for about 32 per cent and 7 per cent, respectively, while the share of inland waterways transportation and air is less than 1 per cent each. Railways are a relatively cheaper mode of transport and are mainly used for transporting bulk materials over long distances.

b) **Deaths due to Over Speeding**

Over speeding or dangerous driving is the single largest killer on India's roads. According to data compiled by the Ministry of Road Transport and Highways, in 2015, 44.2 per cent (64,633 out of 1,46,133 deaths) of road accident deaths were a direct consequence of over speeding, while of the total accidents 47.9 per cent (2,40,463 out of 5,01,423 accidents) were linked to this. Therefore, we come out with this project to work with the use of technology to reduce the number of accidents in the country.

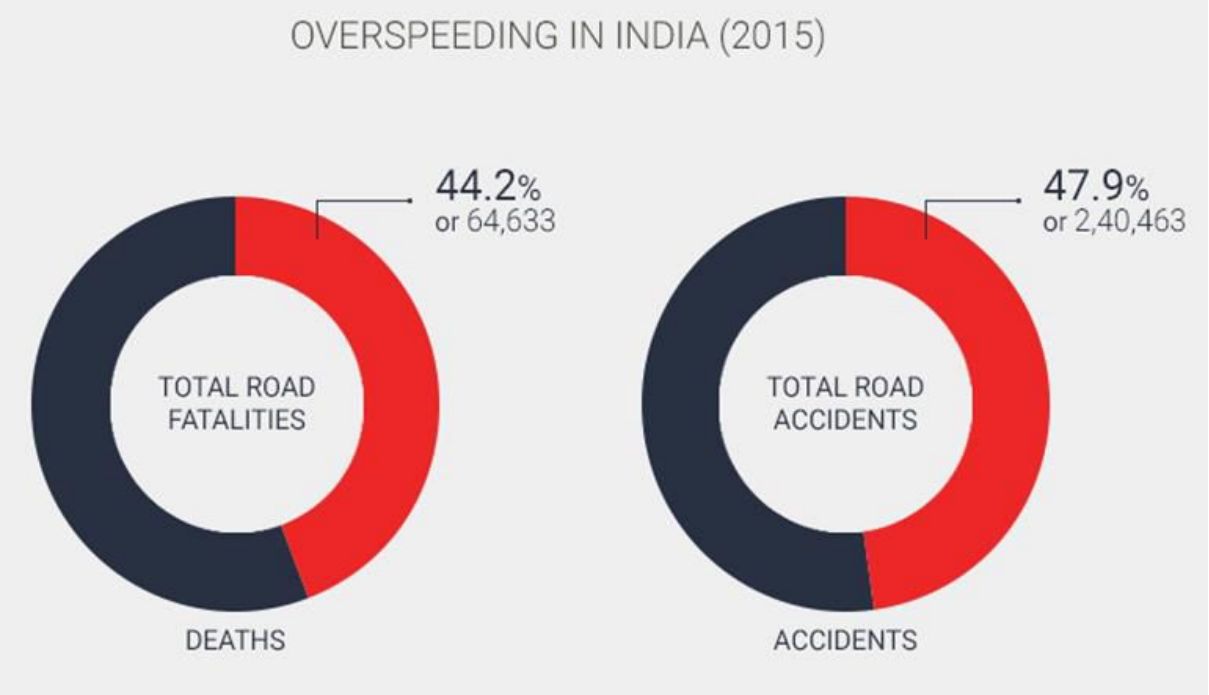

FIG 1.

c) Deaths due to Wrong Way

Driving Traffic police study reveals that, almost 30% of road accidents are caused by this dangerous convenience of driving into oncoming traffic. The cops have already booked 1,53,891 drivers till date. According to the Union ministry of road transport and highways, 5,705 people were killed across the country in accidents caused by using the wrong side of the road.

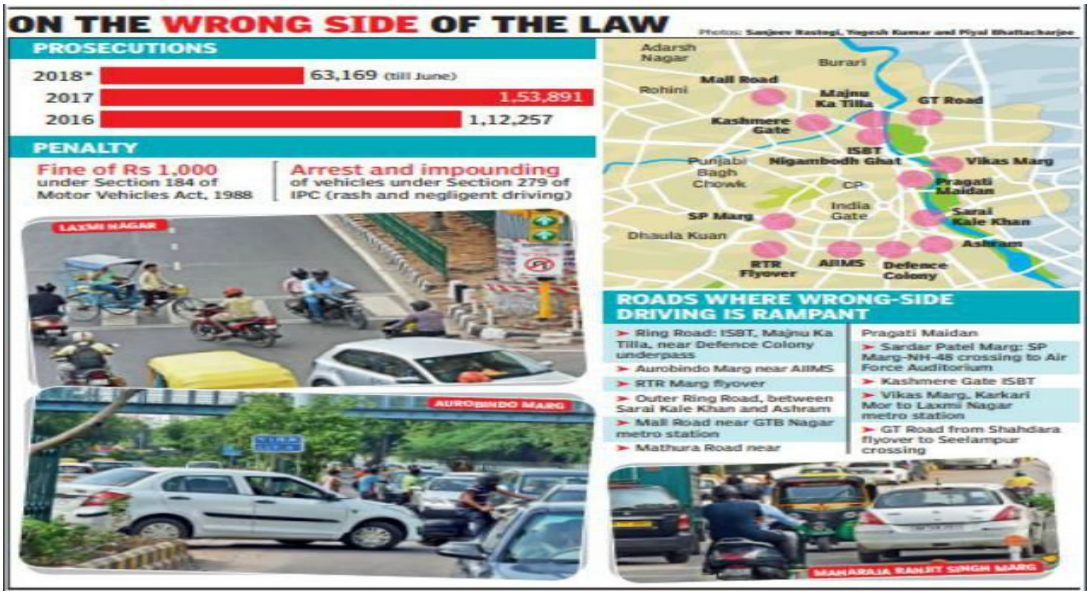

FIG 2(i).

Road Accidents is a very serious and high priority public health concern as statistics shows more than 1.25 million people die each year as a result of road crashes. Different risk factors such as Speeding, Drunk driving, No safety equipments, Distracted driving, Unsafe Vehicle, Law enforcement and more importantly Inadequate post-crash emergency care. Any delay in detecting and providing emergency care can lead to the increased severity of the accident.

With the advancement in the fields of Artificial Intelligence, Machine learning and Deep learning we are able to make our devices smarter and smarter. Traffic surveillance cameras are already installed in almost every part of the city. Accident Monitor is a web-based driver accident monitoring system that enables you to keep a central record of all vehicle-related accidents your employees may be involved in.

By recording all the essential information in one place you can easily spot trends and react quickly to any insurance claims.It's a common mistake for a company to start with risk assessments as a stand alone procedure. However it's important to consider the whole driver risk management life-cycle when deciding on a driver risk assessment service.

The sensor measure the distance between the vehicle and also it has been placed front side of the car. When the car will occur a crash with another then the automatically the motor will be off. So we cannot meet the accident. Then the information is send to the server and it has been send via as a message for the rescue team.

FIG 2(ii)

2. Literature Survey

To protect the vehicle and tracking so many advanced technologies are available in now a days. In olden days the information of accident can be transferred, but the place of accident spot cannot be identified. In any vehicle airbags are designed, air bags are used for security and safety travels. The air bag system was introduced in the year of 1968.

With the increase in number of vehicles in the country vehicle detection is an important in road traffic management system. Different traffic accident causes such as vehicle overspeeding, wrong way driving, collision and accident can be detected by CCTV installed on roads. The results obtained from traffic parameters can be applied for vehicle tracking, vehicle classification, parking area monitoring, road traffic monitoring and management etc. The main objective of this project is to decrease the deaths caused by accident occurring because over speeding, wrong war driving by ensuring public safety and also a building a better system for managing the traffic on the roads. The aim of this paper is to develop a system that can detect the vehicle accident which are caused by overspeeding, wrong way driving and collision detection on city roads. A prototype system is developed and tested. Many other systems have been proposed to reduce the accident. The existing system deals with two techniques where one is Object Detection API using Tensor place and other sensor is used to detect the angle and vibration sensor is used for detection the change in the vehicle.

VAHAN (Vehicle Accident Hazard Notifier) is a web app that notifies the driver whenever there is an accident on the road.

Along with that it also **sends a message to the nearest police station and hospital with an accurate location of the accident.**

(1) We aim to deploy our model using cameras on highways in a smart city.Bird's eye view of the traffic is considered while predicting the collision of vehicles but still our model works well enough on different views as well.

(2) Current Study shows that frequency of providing aid during an accidents tend to be as is or is lowering. Also one real life example given in show as, "the victim

has met with an accident and is severely injured, but no one among 45-50 people present near to that, did not tried to provide either aid or a help even after a 45 minutes after the accident", this happens majorly because people tend to be threaten by the police issues involved in this type of situations.Whereas our System is independent of any, & is able to provide notification of an accident to the victim‟s relatives & to the emergency services.

3. Approach

The proposed system will help in developing a smart city transportation system that is capable of sending alert to authorities by detecting the speeds of the car, car moving in wrong direction and collision which can help us in decreasing death caused by road accidents. Traffic jam can also be detected by slow speed and high volume of vehicles, and we can estimate road profile based on it. The road accidents can be reduced by speed detection of a vehicle and wrong direction of moving vehicle thus help to stop the violation of traffic rules to maintain smooth flow to traffic on city roads.

TensorFlow TensorFlow™ is a high-performance numerical computation open source software library. The TensorFlow Object Detection API is built on top of TensorFlow open source frame work that makes it object detection models easy to construct, train and deploy on the projects.

3.1 Technologies Used:

- **Tensorflow object Detection API *(object detection)***
- **Socket.io *(for real time communication)***
- **Node.js *(sever side programming)***

3.1.1 Tensorflow object Detection API *(object detection)*

A General Framework for Object Detection

Typically, we follow three steps when building an object detection framework:

1. First, a deep learning model or algorithm is used to generate a large set of bounding boxes spanning the full image (that is, an object localization component)
2. Next, visual features are extracted for each of the bounding boxes. They are evaluated and it is determined whether and which objects are present in the boxes based on visual features (i.e. an object classification component)
3. In the final post-processing step, overlapping boxes are combined into a single bounding box (that is, non-maximum suppression)
4. Object detection is the craft of detecting instances of a certain class, like animals, humans and many more in an image or video.The Tensorflow Object Detection API makes it easy to detect objects by using pre trained object detection models,

3.1.2 Socket.io

Socket.IO is a JavaScript library for realtime web applications. It enables realtime, bi-directional communication between web clients/application and servers. It has two parts: a client-side library that runs in the browser, and a server-side library for Node.js. Both components have a nearly identical API. Like Node.js, it is event-driven. Socket.IO provides the ability to implement real-time analytics, binary streaming, instant messaging, and document collaboration.It handles the connection transparently. It will automatically upgrade to WebSocket if possible. This requires the programmer to only have Socket.IO knowledge. Web scokets are always open which allow bi directional flow of data between client and server.

Socket.IO is not a WebSocket library with fallback options to other realtime protocols. It is a custom realtime transport protocol implementation on top of other realtime protocols. A Socket.IO implementing server cannot connect to a non-Socket.IO WebSocket client. A Socket.IO implementing client cannot talk to a non-Socket.IO WebSocket or Long Polling Comet server. Socket.IO requires using the Socket.IO libraries on both client and server side.

3.1.3 Node.js

Node.js is an open source server environment. It is free, runs on various platforms (Windows, Linux, Unix, Mac OS X, etc.).
Node.js uses JavaScript on the server. It uses asynchronous programming.

Node.js eliminates the waiting, and simply continues with the next request.

Node.js runs single-threaded, non-blocking, asynchronously programming, which is very memory efficient.

- Node.js files contain tasks that will be executed on certain events
- A typical event is someone trying to access a port on the server
- Node.js files must be initiated on the server before having any effect
- Node.js files have extension ".js"

Node.js – in simple words – is **server-side JavaScript**. It has been getting a lot of buzz these days. If you've heard of it or you're interested in learning and getting some hands on it – this post is for you.

So what exactly is the need of using JavaScript in the server. To make the concept of Node.js clear , compare it with the ordinary server-side languages such as PHP. Node.js uses an **event-based server execution procedure** rather than the multithreaded execution in PHP.

Node.js is along with some **hosting provider suggestions and installation tips**. Intermediate level knowledge of JavaScript, jQuery and Ajax are required,

Traffic jam can also be detected by slow speed and high volume of vehicles, and we can estimate road profile based on it.The accident monitoring and notification system will help in developing a smart city transportation system that is capable of sending alert to authorities by detecting the speeds of the car, car moving in wrong direction and collision which can help us in decreasing death caused by road accidents. The road accidents can be reduced by speed detection of a vehicle and wrong direction of moving vehicle thus help to stop the violation of traffic rules to maintain smooth flow to traffic on city roads.

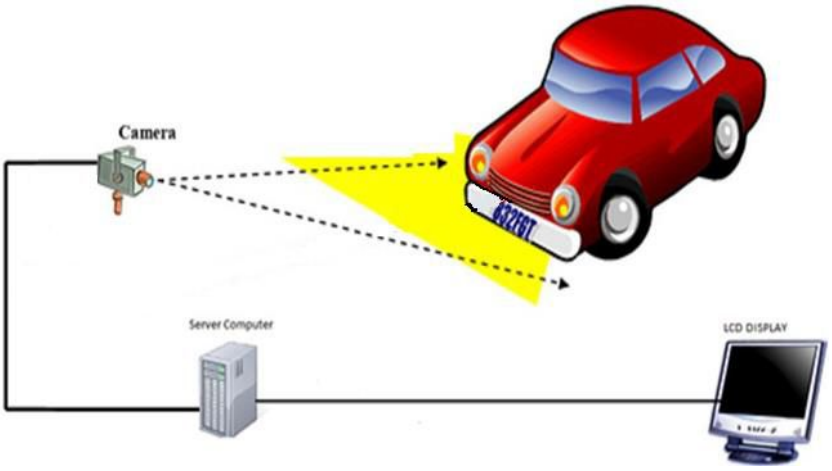

FIG3.

3.2 Software and Libraries used

The main libraries used in this project to implement different modules together are:

Python 3

Python is a high-level, interpreted, interactive and object-oriented scripting language. Python is designed to be highly readable. The other languages use punctuation, but python uses English keywords instead. Python 3.0 is a new version of the language that is incompatible with the 2.x line of releases.

OpenCV

OpenCV (Open Source Computer Vision Library) is a machine learning open source computer vision software library. OpenCV is built to increase the use of machine perception in commercial sector by providing a common infrastructure for new technologies and computer applications. By using this library code can be modified easily and utilized for business.

TensorFlow

TensorFlow™ is a high-performance numerical computation open source software library. The TensorFlow Object Detection API is built on top of TensorFlow

open source frame work that makes it object detection models easy to construct, train and deploy on the projects.

Socket.Io

Socket.Io is a JavaScript library for realtime web applications. It enables realtime, bi-directional communication between web clients (or web applications) and servers. It is event driven like Node.js and it has two parts: a client-side library that runs in the browser, and a server-side library for Node.js. Both components have a nearly identical API. It is lightning fast, reliable and can broadcast to multiple sockets at a time.

3.3 Working of Proposed System

The proposed system consists of 3 different modules. These are explained below:

Car Speed Module detects the speed of the car ensuring the road safety and reduce in the number of road accidents caused due to overspeeding.

Collision Prevention Module detects distance between car and object and help to pre-charge brakes in conjunct with automatic braking or emergency brake assist system.

Wrong Way Detection Module detects car moving in wrong direction by mainly the two causes overtaking and lazy/reckless driving

Accident Detection Module detects accident caused due to overspeeding, wrong way driving. Also, it sends alert to authorities so that on time help can be provided to the road accident victim.

a) Module 1: Car Speed

In this the vehicle is detected by frames using OpenCV and then with the help of the tensorflow detection api these frames are processed and vehicle is detected. After the Vehicle is detected its image is stored and then check for the direction of the vehicle by using the approach defined in car count module. The main area of interest for us is when

the car crosses the ROI line area. The pixel length is calculated by subtracting the bottom position with the bottom position of the detected car. After that the real scale length is calculated by multiplying pixel length with 44 to convert the pixel length in meter. Total time passed is also calculated by subtracting the current frame number at which the car is detected from the current frame number detected lists. To know the scale of the total time elapsed for a vehicle to pass through ROI area (24 = fps) the Total time passed is multiplied with 24.

FIG 4

b) Module 2: Collision Prevention

A collision Detection system, also known as a precrash system, forward collision warning system, or collision mitigating system, is an automobile safety system designed to prevent or reduce the severity of a collision.

The camera on the dashboard detect he object by using TensorFlow object detection api and then calculate the distance relative to object from camera. If the distance is less than 0.5 m then the warning is issued on the car dashboard with the alarming sound in the speakers of the car.

Having analyzed the results the loss of speed after impact depends on the initial

speed of a car and the angle of collision. The bigger collision angles the higher speed loss is after the hit. From the car movement trajectories after the modeled accident it is observed that the character of the trajectory depends on: the angle of collision, the car speed before the impact. The bigger the angle between the movement direction and the road fencing, the bigger the deflection of the trajectory appears.

c) Module 3: Wrong Way Detection

Wrong way driving crashes occur infrequently, accounting for almost 3 percent of all crashes, but they have a very high likelihood of resulting in fatal or serious injury crashes. The causes associated with wrong-way crashes tend to make them spatially concentrated to particular stretches of roads, making it important to identify and monitor such high-risk locations. The detail about two popular scenarios of people driving in wrong direction are as follows:

Scenario 1 (Overtaking):

IDEAL: According to the traffic rules of India, there should be no overtaking when there is a single lane for both the directions of traffic as shown in the figure 6.

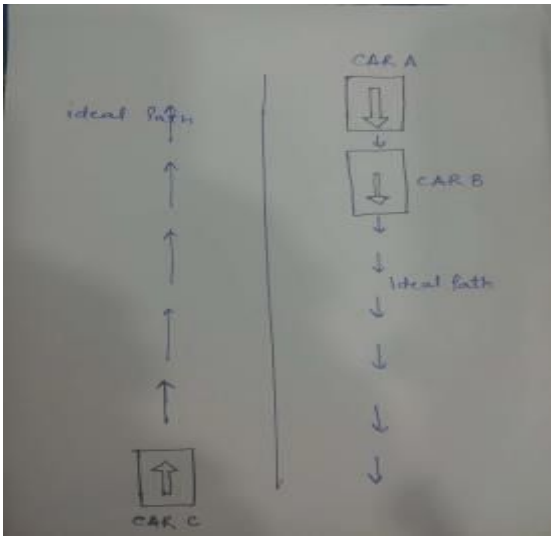

FIG 6.

REALITY:

Most of them do not adhere to that rule and overtake the vehicles by moving onto other lane (opposite traffic lane) There is a very high probability that the overtaking car (Car

A), the car being overtaken (Car B) and the car travelling on the opposite lane (Car C) can meet with an accident.

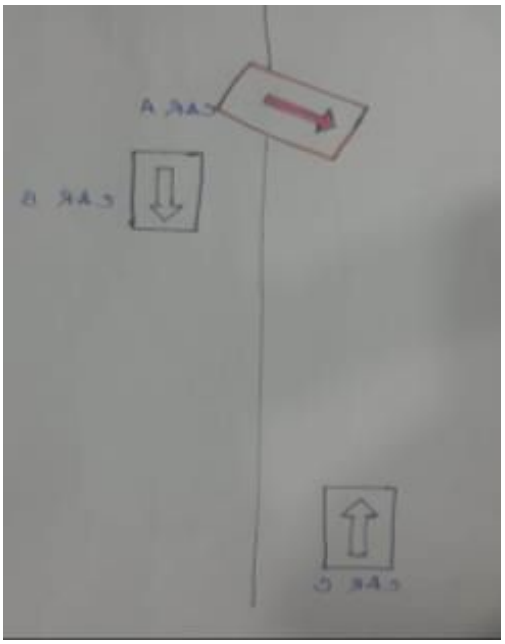

FIG 7(i)

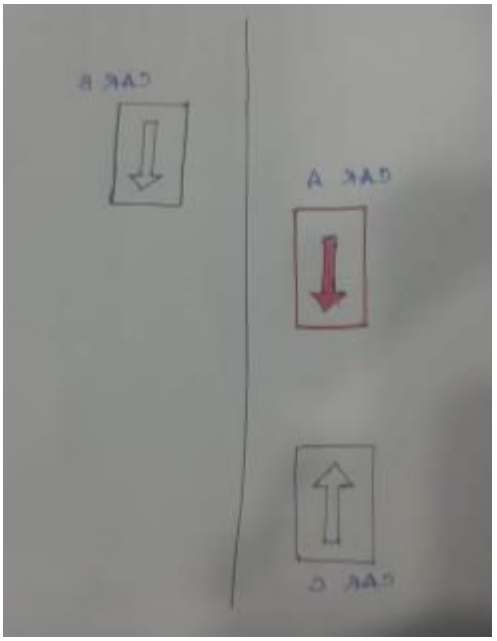

FIG 7(ii)

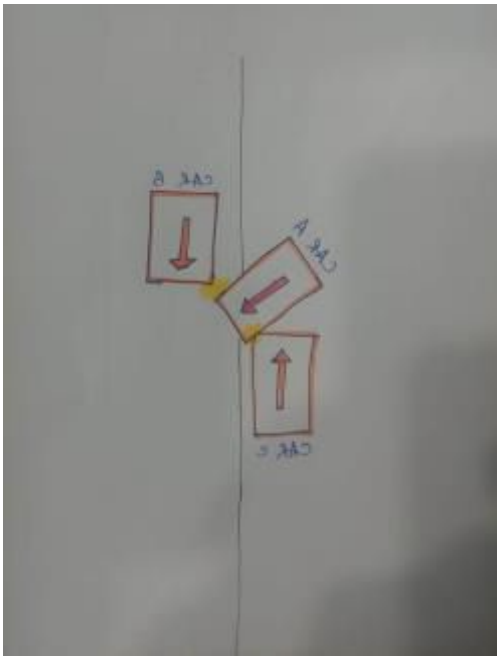

FIG 7(iii)

Scenario 2 (Lazy/Reckless Driving)

IDEAL: As shown in the figure 8, the Car A should cross over to the right lane and then cross into the desired street.

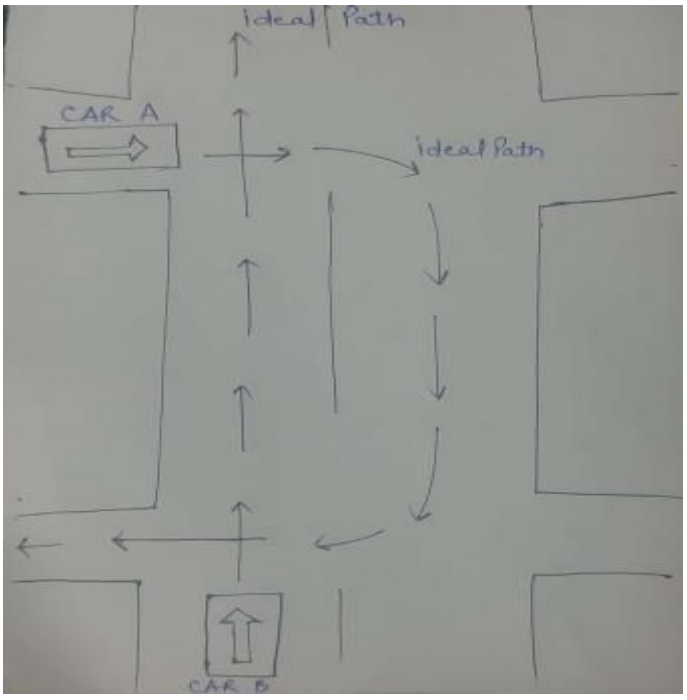

FIG 8.

REALITY:

Lazy or reckless driving is one of the most common practices by common man used for saving fuel and time. The Car A travels in the left lane (wrong lane) and tries to sneak into the adjacent lane. This can cause an accident if at the same time there is another car like Car B which travels in the right direction but ends up in an accident.

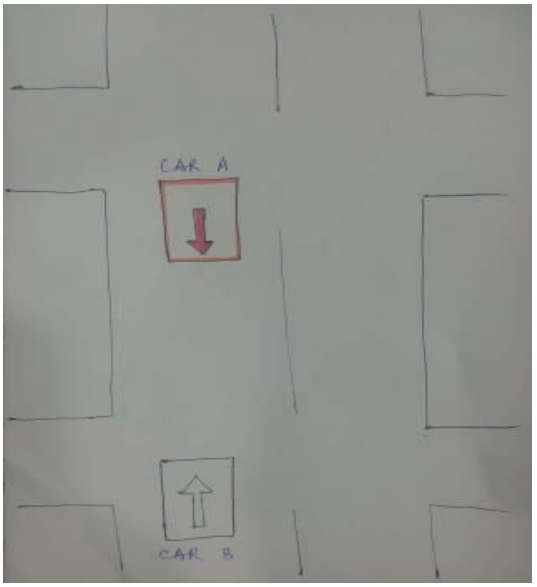

Figure 9 (i)

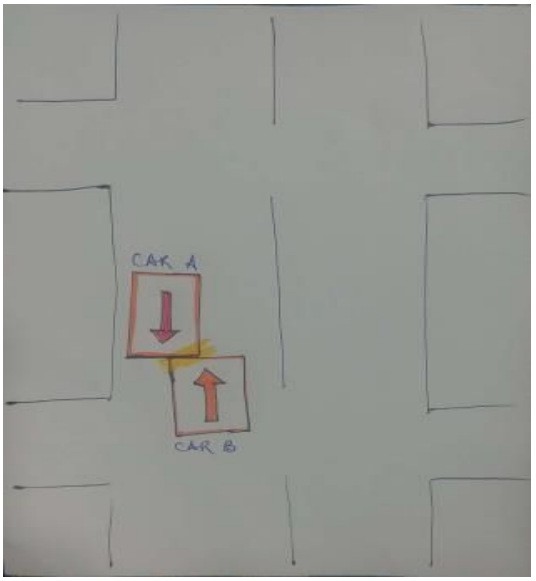

Figure 9(ii)

3.4 Design of solution

As a solution for the above stated problem by setting up a device which consist of an SBC (SingleBoard Computer) like Raspberry Pi, a siren, a red LED light. The raspberry pi can handle the computer vision processing work and give inputs to siren and LED lights to function appropriately.

The solution model will consist of two blocks:

• First Block: Intelligence to detect whether there is any vehicle driving in wrong direction using Computer Vision.

• Second Block: Using the output generated from the first block, the second block can be used to ring the siren and glow the red LED light whenever wrong direction driving vehicle is detected on either/both sides of the road.

By implementing the above solution model, we can alert the vehicles on either side of the road to be extra careful. In this project, we will only deal with the first block (computer vision part) of the abovementioned model.

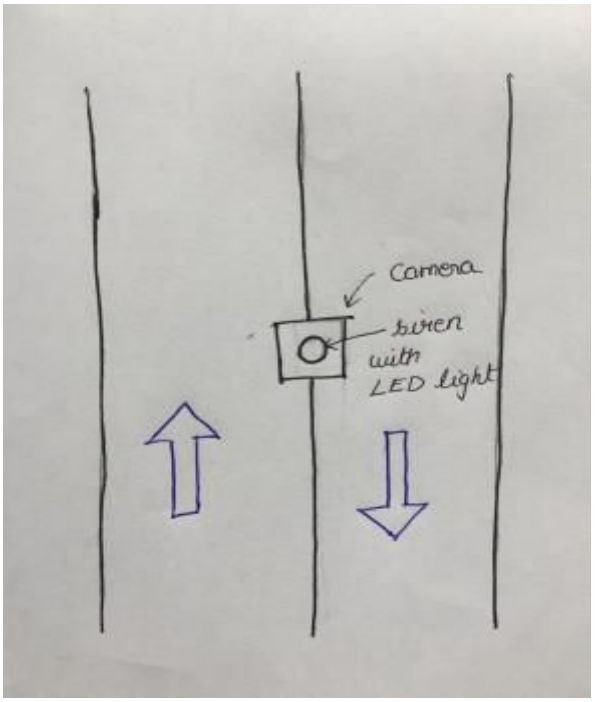

Figure 10(i)

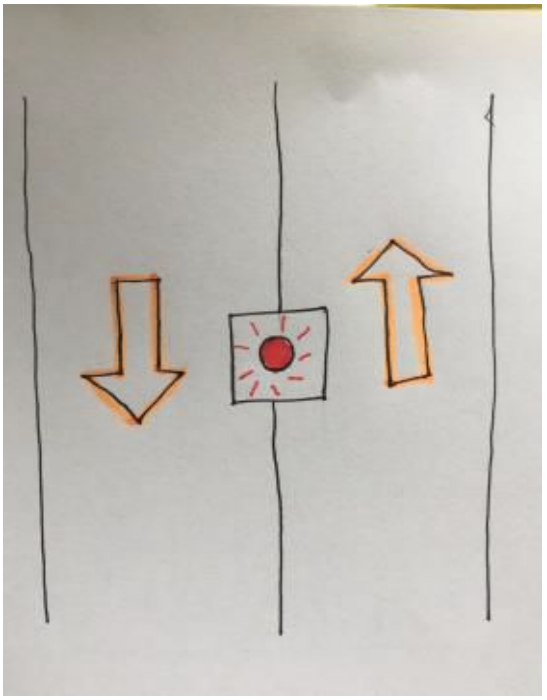

Figure 10 (ii)

d) Module 4:

Accident Detection In this the vehicle is detected by reading frames at multiple instances from webcam to different variable frames using OpenCV and then with the help of the tensorflow detection api these frames are processed and vehicle is detected. After the Vehicle is detected its image is stored in different frame. And reading of frames at multiple instances from camera and then these frames are stored at different variables. The difference in frames is calculated. And calling of the difference function occur with the opening of histogram of the two main images store. When the accident occurs the two-image frame gets overlapped with other rms value of the two images opened before is calculated. If the RMS value of the images is less than 250, then there is a similarity between images. i.e., Scene similar to an accident is found and alert to authorities is send and frame is updated.

Finally, the RMS can be computed by:

RMS= math.sqrt(lambda a,b: (a-b)**2, h1, h2))/len(h1))

h1: Image 1st histogram

h2: Image 2nd histogram

a) Car Speed

Speed estimation process will give an idea to build a smart system for traffic monitoring that is capable of detecting, counting, classifying, and estimating speed of vehicle object from video data. This will help us to automatically generate over speeding ticket which will reduces the number of traffic police officers needed to deploy in the real field for checking speeding vehicles.

b) Collision Prevention

The collision Detection system can be used pre-charge the brakes in conjunction with an automatic braking or emergency brake assist system.. That can provide the driver with a substantial amount of braking power the moment he depresses the pedal, which may effectively reduce the severity of an accident. This can helps the driver be more attentive to the road, react sooner to dangerous situations, and have added peace of mind while

operating a vehicle, especially at high speeds. Also, it will function reliably in any weather conditions, making driving in fog or rain less risky.

c) Wrong Way Detection

Upon installation, if a wrong-way vehicle entry is detected, the system would immediately alert the wrong-way driver of the error and notify the Authority. Once the wrong-way entry is confirmed, law enforcement would receive immediate notification of the exact entry point. They then could use their protocols and procedures to stop the wrong- way vehicle prior to a crash. While the system aims to notify a driver of their mistake, the focus is to enable law enforcement and Authority to track a wrong-way vehicle on the highway system in real time. The chances of successfully stopping a wrong-way vehicle before a collision become greater when officers know where the vehicle is and where it might be headed.

d) Accident Detection

Accident Detection can enable us to send alert to the authorities on time so that help can be given to the road accident victim and decrease the death caused due to road accidents. Also this system can be interfaced with vehicle airbag system that prevents vehicle occupants from striking interior objects such as the steering wheel or window. This can be also be developed by interconnecting a camera to the photograph of the accident spot makes the tracking easier.

Road Accidents is a very serious and high priority public health concern as statistics shows more than 1.25 million people die each year as a result of road crashes. Different risk factors such as Speeding, Drunk driving, No safety equipments, Distracted driving, Unsafe Vehicle, Law enforcement and more importantly Inadequate post-crash emergency care. Any delay in detecting and providing emergency care can lead to the increased severity of the accident. With the advancement in the fields of Artificial Intelligence, Machine learning and Deep learning we are able to make our devices smarter and smarter. Traffic surveillance cameras are already installed in almost every part of the city.

4. RESULTS

Whenever accident of vehicle is occurred then the device sends messages to given mobile number. Both the accident and the accident location can be detected using the approach. There is also a method to stop sending the alert message and hence save time of the rescue time.

The use of GPS adds to the advantage of the system being cost-effective, portable and detecting the accurate location and the time taken for the entire detection process and sending of the message is greatly reduced as compared to other methods. Overall the system is portable, has a small size, and is of low cost and expandable. With the increase in number of vehicles in the country vehicle detection is an important in road traffic management system. Different traffic accident causes such as vehicle overspeeding, wrong way driving, collision and accident can be detected by CCTV installed on roads. The results obtained from traffic parameters can be applied for vehicle tracking, vehicle classification, parking area monitoring, road traffic monitoring and management etc. The main objective of this project is to decrease the deaths caused by accident occurring because over speeding, wrong war driving by ensuring public safety and also a building a better system for managing the traffic on the roads. The aim of this paper is to develop a system that can detect the vehicle accident which are caused by overspeeding, wrong way driving and collision detection on city roads. A prototype system is developed and tested.

The system detects different causes of accidents and send alert to the authorities. Apart from this, it also gives an opportunity for transportation engineers and decision makers to plan building of road and can be helpful both in case of personal as well as business purpose. It detects the speed of the car by capturing the image detected by the camera. This system is capable to detect speed of the car, collision prevention, wrong way direction and accident detection together. The main aim of this project is to decrease the chances of loss of lives in accident occurring because over speeding, wrong way detection and collision detection and hence improve public safety and also a better system for the managing the traffic on the roads. The system is cost-effective, scalable, fast, at a distance measuring system that can be easily housed in present live surveillance.

5. Conclusion, Summary and Future Scope

5.1 Conclusion

It is capable to detect speed of the car, collision prevention, wrong way direction and accident detection together. The system detects different causes of accidents and send alert to the authorities. It detects the speed of the car by capturing the image detected by the camera. The main aim of this project is to decrease the chances of loss of lives in accident occurring because over speeding, wrong way detection and collision detection and hence improve public safety and also a better system for the managing the traffic on the roads. The system is cost-effective, scalable, fast, at a distance measuring system that can be easily housed in present live surveillance. Apart from this, it also gives an opportunity for transportation engineers and decision makers to plan building of road and can be helpful both in case of personal as well as business purpose, to improves safety and security of the person on road.

5.2 Summary

VAHAN (Vehicle Accident Hazard Notifier) is a web app that notifies the driver whenever there is an accident on the road. Along with that it also sends a message to the nearest police station and hospital with an accurate location of the accident.We aim to deploy our model using cameras on highways in a smart city.Bird's eye view of the traffic is considered while predicting the collision of vehicles but still our model works well enough on different views as well. With the increase in number of vehicles in the country vehicle detection is an important in road traffic management system. Different traffic accident causes such as vehicle overspeeding, wrong way driving, collision and accident can be detected by CCTV installed on roads. The results obtained from traffic parameters can be applied for vehicle tracking, vehicle classification, parking area monitoring, road traffic monitoring and management etc. The main objective of this project is to decrease the deaths caused by accident occurring because over speeding, wrong war driving by ensuring public safety and also a building a better system for managing the traffic on the roads. The aim of this project is to develop a system that can detect the vehicle accident which are caused by overspeeding, wrong way driving and collision detection on city

roads. Many other systems have been proposed to reduce the accident. Our system deals with two techniques where one is Object Detection API using Tensor place and other sensor is used to detect the angle and vibration sensor is used for detection the change in the vehicle The notification system is implemented using web sockets i.e., socket.io. Current study shows that frequency of providing aid during an accidents tend to be as is or is lowering. Also one real life example given in show as, “the victim has met with an accident and is severely injured, but no one among 45-50 people present near to that, did not tried to provide either aid or a help even after a 45 minutes after the accident”, this happens majorly because people tend to be threaten by the police issues involved in this type of situations.Whereas our System is independent of any, & is able to provide notification of an accident to the victim"s relatives & to the emergency services.

5.3 Future Scope

Speed estimation process will give an idea to build a smart system for traffic monitoring that is capable of detecting, counting, classifying, and estimating speed of vehicle object from video data. This will help us to automatically generate over speeding objects which will reduces the number of traffic police officers needed to deploy in the real field for checking speeding vehicles.The collision Detection system can be used pre-charge the brakes in conjunction with an automatic braking or emergency brake assist system.. That can provide the driver with a substantial amount of braking power the moment he depresses the pedal, which may effectively reduce the severity of an accident.

This can helps the driver be more attentive to the road, react sooner to dangerous situations, and have added peace of mind while operating a vehicle, especially at high speeds. Also, it will function reliably in any weather conditions, making driving in fog or rain less risky.Upon installation, if a wrong-way vehicle entry is detected, the system would immediately alert the wrong-way driver of the error and notify the Authority. Once the wrong-way entry is confirmed, law enforcement would receive immediate notification of the exact entry point. They then could use their protocols and procedures to stop the wrong- way vehicle prior to a crash. While the system aims to notify a driver of their mistake, the focus is to enable law enforcement and Authority to track a wrong-way vehicle on the highway system in real time. The chances of successfully stopping a

wrong-way vehicle before a collision become greater when officers know where the vehicle is and where it might be headed.Accident Detection can enable us to send alert to the authorities on time so that help can be given to the road accident victim and decrease the death caused due to road accidents. Also this system can be interfaced with vehicle airbag system that prevents vehicle occupants from striking interior objects such as the steering wheel or window. This can be also be developed by interconnecting a camera to the photograph of the accident spot makes the tracking easier.

In this paper, a noble idea is presented about accident detection in road and immediate rescue of the victims. This paper also contains an important strategy about vehicle theft controlling system. The proposed system will help the vehicle owners to monitor their vehicles through a mobile application and will provide help as soon as possible in case of any major accident. As smart phone has become an essential part in our daily life, we are planning to make this system fully mobile based in future. Now-a-days smart phones have fingerprint sensor and touch screen. The system can use Bluetooth module or wifi module so that smart phone will be connected to the system through this and from the smart phone's fingerprint sensor the fingerprint will be taken to start the engine. Pattern password and keypad password will also be taken from the mobile phone. This process will diminish the cost of this system as no separate fingerprint sensor, touch pad and keypad will be needed as proposed in this system. This is a prototype model for now and it is not implemented for real life use yet. We are desirous to implement this system for real life use in near future.

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