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Accident Detection Systems using Machine Learning

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Abstract: *Population development has resulted in a significant increase in car demand, which has led to an alarming increase in traffic congestion and auto accidents. Both the percentage of traffic deaths and the number of such accidents are rising significantly. However, the delay in emergency assistance is the main reason for the higher risk of fatalities. Effective rescue efforts could save many lives. Traffic jams or erratic contact with the medical units are to blame for the delay. To deliver aid quickly, automatic road accident detection systems must be put in place. The literature contains numerous solutions for automatic accident detection. The methods include machine learning, mobile ad hoc networks, GPS/GSM-based systems, and crash prediction utilising cellphones. Because road accidents cause such high rates of fatalities, road safety is the most important area that needs extensive research. In order to preserve road safety and save precious lives, we give a critical review of the many existing approaches used for forecasting and preventing traffic accidents in this study. We highlight their advantages, drawbacks, and issues that must be resolved. We emphasize their advantages, drawbacks, and issues that must be resolved.*

Keywords: Internet of things (IoT), Predicting and Monitoring, (CNN) Convolutional neural networks..

I. INTRODUCTION

The demand for vehicles has grown significantly as a result of the world population's rapid growth, and as a result, issues with traffic congestion and road accidents have also gotten worse. The lives of the general public are at great risk, and any accidents that do happen have a long reaction time, which increases the number of fatalities. To remedy this, an automatic accident detection system is required.

Road accidents can have many different causes, including driver error brought on by fatigue, drunk driving, speeding, and other factors. According to certain research, factors like fog, rain, and strong winds might affect how serious an accident is. High winds may directly affect a car and cause it to veer off the road, or they may have an indirect effect owing to road hazards like walls, trees, and other obstructions.

The term "road crash" refers to any collision involving a vehicle, an object, or a pedestrian. How quickly an ambulance arrives at the scene of the accident and transports the patient
to the hospital has a significant impact on the victim's chance of survival. In the majority of road accident instances, the injuries are not severe and the victim can be saved, but because the rescue crews arrive late, the injuries become fatal.

II. LITERATURE REVIEW

We examined 10 research papers that discussed IoT-based accident detection systems for smart cars. We thoroughly examined these publications using a number of common areas. We highlighted a few areas, including the datasets utilised, the techniques for gathering data sets, the algorithms used to develop models, the reliability of the corresponding algorithms to forecast outcomes, etc.

For the purpose of detecting vehicles, this research suggests a streamlined, rapid region-based convolutional neural network (R-CNN). Deep convolution networks are used in the well-known approach for object identification called Fast R-CNN. The regional proposal and object recognition are the two discrete components of the original rapid R-CNN. Fast R-object CNN's recognition component may be deleted to expedite training because it is unnecessary for our system. Using the SHRP 2 NDS database [10] provided by the Virginia Tech Transportation Institute (VTTI) to demonstrate the detection accuracy, we evaluate our technique in the trials.

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Population growth also causes a rise in pollution and accidents. The growth of technology makes tremendous efforts to track rising pollution levels and detect accidents. The improvement of the smart car system is the basis for thisarticle. In this study, many units that improve the vehicular system are implemented. The primary goal is to quickly identify incidents and reduce the time it takes for medical assistance to arrive. Tire pressure is monitored for accident prevention, whereas node MCUs are used for accident detection. MQ7 is employed to keep an eye on the pollutants.The suggested method is helpful in lowering auto accidents, and pollution monitoring would assist to understand the stateof the environment.

In recent years, automatic vehicle monitoring has emerged as a highly important scenario. By using the following technologies, it may become a possibility. This project seeks to develop a system that alerts the appropriate authorities the moment a vehicle exceeds a set speed restriction. A technology that identifies an over speeding carmust be developed since the number of traffic accidents has increased recently. The current Smart Vehicle Over speeding Detector uses the Internet of Things to intelligently andautomatically determine all road traffic data. The over speeding detectors that are compatible with smart vehicles may record, store, and share information regarding the vehicle's speed. The system includes IoT, GPS, Radar, and Google Maps modules.

The smart helmet's main purpose is to give people a way to identify and report incidents. The system is built using sensors, Wi-Fi-enabled processors, and cloud computing infrastructures. The CPU receives the accelerometer measurements from the accident detection system and continually checks for irregular changes. When an accident happens, the relevant information is provided via a cloud- based service to the emergency contacts. The global positioning system is used to determine the location of the vehicle. The device, fittingly called Konnect, claims to transmit accurate and timely information on the accident in real time. Thus, a smart helmet for accidents detection may becreated by utilising the pervasive connection that is a key component of smart cities.

In order to not only identify but also report the type of accident, the Internet of Things (IoT)-based automotive accident detection and categorization (ADC) system is combined with on-board and linked sensors from smartphones in this work. The effectiveness of various emergency services, including emergency medical services (EMSs), fire stations, towing services, etc., is increased by this unique approach because it's crucial to identify the type of disaster while organising and carrying out rescue and relief operations. After assuming the victims' injuries and the extent of the car damage, the emergency help providers can better prepare for the circumstance. To determine which machine learning model is the most effective, three models based on the Naive Bayes (NB), Gaussian mixture model (GMM), and decision tree (DT) techniques are examined in this work..

Driver indolence is one of the top causes of caraccidents nowadays. We have discussed detecting snoozes, estimating head position, detecting objects in the hand, and fatigue. The objective of this study is to recognise and evaluate all the different factors that might alert the driver whenoperating a vehicle. We have implemented real-time facial detection using CNN. Since doing so would be straightforward in a real-world situation, we decided to use a light forbearance model. Eye tiredness is assessed using the percentage of eyelid closure over the pupil (PERCLOS), andobjects in the surroundings are recognised using tensor flow.It is regarded as an object when a driver uses a cell phone orhas items connected to drug use while operating a vehicle.

In this study, a paradigm for identifying single or manyriders is proposed.

ride a motorcycle without wearing a helmet. The first phase of the suggested methodology is to identify motorbike riders using the state-of-the-art object recognition technique,the YOLO model, and its incremental version, YOLOv3. Thesecond step of motorcycle rider helmet recognition has been proposed as a Convolutional Neural Network (CNN) based architecture. The suggested model's assessment on traffic recordings produced positive results when compared to previous CNN-based methods.

We examine the behaviour of three different evolutionary multi objective optimization (EMO) strategies on many-objective knapsack problems. They are algorithms built on the principles of hypervolume, scalarizing functions, and Pareto dominance. The NSGA-II, MOEA/D, SMS- EMOA, and HypE are evaluated using knapsack problems with 2–10 objectives. By randomly inserting coefficients— that is, profits—into goals, we generate the test problems. Wemay also create extra test problems by combining two objectives to create a dependent or linked objective. Experiments on randomly generated multi-objective knapsack problems have shown that Pareto dominance-based methods suffer from performance erosion.

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In other words, NSGA-II does not outperform the other algorithms.

For vehicle detection, this study suggests a rapid, straightforward region-based convolutional neural network (R-CNN). Deep convolution networks are used in the well-known Fast R-CNN approach for object detection. Regional proposal and object recognition are the two distinct components of the initial fast R-CNN. Fast R-object CNN's recognition portion is not necessary for our system. We test our method utilising the SHRP 2 NDS database provided by the Virginia Tech Transportation Institute (VTTI) to demonstrate the effectiveness of the detection..

This study presents a neoteric framework for identifying traffic accidents. The proposed system accurately detects objects in surveillance footage using Mask R-CNN, followed by an efficient centroid-based object tracking method. A vehicle's speed and trajectory anomalies are used to calculate the chance of a collision following an overlap with another vehicle. The proposed architecture provides a dependable method for obtaining CCTV surveillance video ofregular road traffic with a high Detection Rate and a low False Alarm Rate. This framework was tested under a number of environments, including direct sunshine, low vision, rain, hail, and snow, using the specified dataset. The effectiveness of thisframework allows for the development of all-purpose real- time vehicle accident detection.

TABLE I: SUMMARY OF LITERATURE REVIEW

Paper Name	Author	Technology Used
An IOT Based Smart System for Accident Prevention and Detection	sayanee nanda ,Samita khairnar	IoT module.
Vehicle Collision Detection and Avoidance with Pollution Monitoring System Using IoT	S.A.Khoje ,Mahesh A.Rakhonde	Node MCU, MQ7.
IoT based framework for Vehicle Over-speed detection	Sarfraz Favaz khan ,Mohammad Ahmar Khan	IoT module, GPS, Gmapsand.Radar
An Internet of Things(IoT) based smart helmet for accident detection and notification	Sneha chandrashekar	cloud infrastructures.Sensors, Wi-Fi enabled processor, andSensor
An IoT-Based Vehicle Accident Detection and Classification System Using Sensor Fusion	Devya lohani ,Nikhil kumar	Decision tree (DT) techniques, (GMM) and Naive Bayes (NB).
Real Time Safety Alert System for Car	Dharmveer , Sanket Anand Himanshu Arora, Samyak Jain	DNN,CNN.
Automated Helmet Detection for Multiple Motorcycle Riders using CNN	Madhuchhanda dasgupta	CNN,YOLOOV3 model.
Behavior of Multiobjective Evolutionary Algorithms on ManyObjective Knapsack Problems	Fellow, Hisao Ishibuchi, Naoya Akedo, IEEE	scalarizing function-based, Pareto dominance-based, and hypervolume-based algorithms.
Vehicle Detection using Simplified Fast R-CNN	Shih-Chung Hsu	RCNN
Computer Vision-based Accident Detection in Traffic Surveillance	Savyasachi Gupta ,Dhananjai Chand	RCNN

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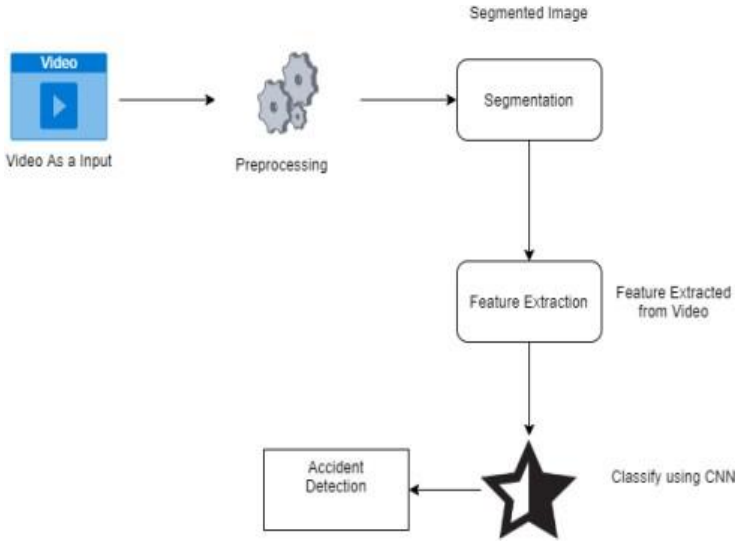
III. METHODOLOGY

System Architecture.



Module.

View and Authorize Users

In The list of people who have registered can be seen by the administrator in this module. The admin can examine the user's information in this, including user name, email address, and address, and admin can also authorise users..

Admin

The administrator has to input a valid user name and password to access this module. He can complete a number of actions after successfully logging in, including Authorize, View Every User View all websites for online shopping and authorise View All Product Reviews, View all early reviews for all products, all keyword search details, all product search ratios, and all product review results.

End User

There are n numbers of users present in this module. Before doing any activities, the user should register. After a user registers, their information is added to the database. After successfully registering, he must log in using an approved username and password. Once logged in, the user may perform a number of operations, including managing their account, searching for products using keywords, making purchases, seeing their search history, and viewing.

Ecommerce User

In this module, there are n numbers of users. The user should sign up before engaging in any activities. The database will save the user's information after registration. Before engaging in any activities, including adding products, viewing all products with reviews, viewing all early product reviews, and viewing all transactions for purchases that have already been completed, the user must first log in using an authenticated username and password..

View Charts Results

View All Product Review Rank Results, All Keyword Search Results, and All Product Search Ratio

DFD - In a data flow diagram, we demonstrate how data moves through our system in DFD0, where a rectangle represents input and output while a circle represents our system. In DFD1, we demonstrate how data actually enters and leaves our system—in this case, text or an image—and how rumor detection occurs. Similarly, in DFD 2, we demonstrate how users and administrators operate Input to our system is text or an image, and the output is rumour detection. In DFD 2, we demonstrate both user and admin operations.

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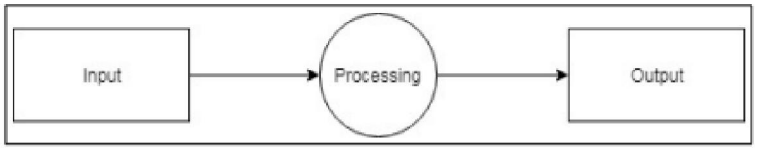

IV. CONCLUSION

There will be less need for human involvement and greater security thanks to a system that analyses CCTV footage in real-time to find any anomalous behaviour. Human anomaly Activity has made significant advancements, allowing us to improve service the countless applications that are feasible with it. Additionally, research in adjacent domains, like activity tracking, can significantly improve its beneficial use in other fields.

V. ACKNOWLEDGMENT

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REFERENCES

[1]. In International Journal of Science and Research College Short Form Name, Department of Computer Engineering 2021 42 (IJSR), Snehal S. bharambe, and P.M Mahajan. Implementation Of Real Time DriverDrowsiness Detection System.

[2]. In 2017 International Conference on Machine Vision and Information Technology .Fang Zhang, Fang Zhang , Lei Geng , and Zhitao Xiao. Driver Fatigue Detection based on Eye State Recog- nition.

[3]. In arXiv:1412.1441v3 [cs.CV] , 9 Dec 2015 Christian Szegedy, Scott Reed, Dumitru Erhan, Dragomir Anguelov, and Sergey loffe. Scalable High Quality Object Detection.

[4]. In IEEE conference. Dinalankara. Face Detection Face Recogni- tion using Open Computer Vision Classifires.

[5]. In IEEE conference Thomas Brandt, Ralf Stemmer, and Germany Andry Rakotonirainy. Affordable Visual Driver Monitoring System for Fatigue and Monotony.

[6]. In International Journal of Scientific Engineering Research.AsadUllah, Sameed Ahmed, Lubna Siddiqui, and Nabiha Faisal. Real Time Driver's Drowsiness Detection System Based on Eye Conditions.

[7]. In International Re- search Journal of Engineering and Technology (IRJET) Prakash Choudhary, Rahul Sharma, Gautam Singh, and Smarjeet Das. A Survey Paper On Drowsiness Detection And Alarm Ssystem for Drivers.

[8]. In 2011 IEEE conference M. Omidyeganeh, A. Javadtalab

[9]. , and S. Shirmohammadi . Intelligent Driver Drowsiness Detection through Fusion of Yawning and Eye Closure ..

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[10]. In IEEE Int. Workshop VLSI Design Video Tech. Suzhou, China, May 28-30 , 2005. Tiesheng Wang, Pendeli Shi, and Huashan Rd . Yawning Detection For Determining Driver Drowsiness .

[11]. In 2011 IEEE conference Shabnam Abtahi, Behnoosh Hariri, and Shervin Shirmohammadi . Driver Drowsiness Monitoring Based on Yawning Detection .

[12]. In IEEE Int. Workshop VLSI Design Video Tech. Suzhou, China, May 28-30 , 2005. Tiesheng Wang, Pendeli Shi, and Huashan Rd . Yawning Detection For Determining Driver Drowsiness .

[13]. In 2011 IEEE conference Shabnam Abtahi, Behnoosh Hariri, and Shervin Shirmohammadi . Driver Drowsiness Monitoring Based on Yawning Detection .