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Vehicle Over Speed Detection Using YOLO Model

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Abstract

Speeding is one of the most common traffic violations. In India millions of people get speeding tickets every year. Existing approaches to speed up detection are not scalable and require manual work. The project uses computer vision and deep learning algorithms to detect speeding violations and report violations to law enforcement officers[3]. When speeding is detected, an image of the offending vehicle is captured and emailed to law enforcement and also, if any animal is detected on the highway,alert will be raised. The system requires little manual effort and can run continuously.Monitoring of such over speeding vehicles especially on highways is of prime importance. Automated tools to monitor such violations can be a hugehelp and can save many lives.

Keywords **- Computer Vision,Automated tools,YOLO.**

1. Introduction

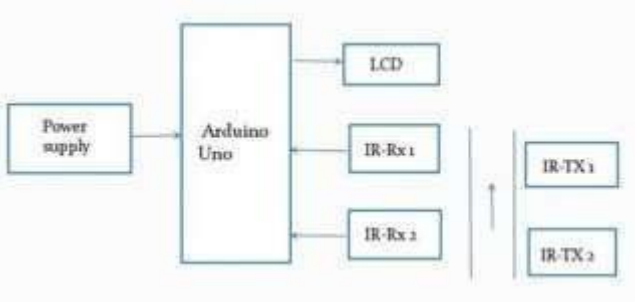
There are several image processing techniques which uses edge detection to detect object and uses simple formula to detect the vehicle and calculate it's speed. These methods are very unreliable and the system works on hard-coded rules. Existing system uses many approaches and needed improvement in performance. Many Systems requires several specialized Hardware's and Sensors which makes it less practical and costly. More sensors increase the overall cost of the operation/ procedure becomes high and dependency of manual workforce is increased[6].In this project, by the use of computer vision and Deep Learning based Object Detection YOLO algorithms, we are trying to detect over speeding of Cars and report the violation to the law enforcement officer. If an over speeding is detected, pictures of the particular car will be taken and sent to Law Enforcement via mail. These System requires almost no manual work and can work continuously.The Final output of the project will be an App like system which can be deployed easily and can be used easily. The system here understands the vehicle and it's type based on the training data provided. Making an Automated System using computer vision and Deep Learning algorithms, to detect over speeding and report the violation to the law enforcement officer.If an over speeding is detected, alert will be sent to Law Enforcement via mail.The System is be deployed at highways or tolls/toll gates where over-speeding is a problem.It be used by government officials.This system also increases safety of the people which in turn helps society. If police officials observe same vehicle being triggered, they send chalan's to those people hoping they would avoid speedy driving.The general idea is to localize, identify each frame using a object detector. YOLO is implemented as a deep convolutional neural network. The open source implementation released along with the paper is built upon a custom Deep Neural Network (DNN) framework.

2. Literature Survey

We have surveyed the existing projects and finally thought of making necessary modifications for getting the latest edition.

Existing System:-

Vehicle speed detection in video image sequences using CSV method project is implemented in the year 2010. Normally vehicle speed detection was obtained using radar technology**.** In this method it has several disadvantages like cosine error and the cost of the equipment is also important reason.



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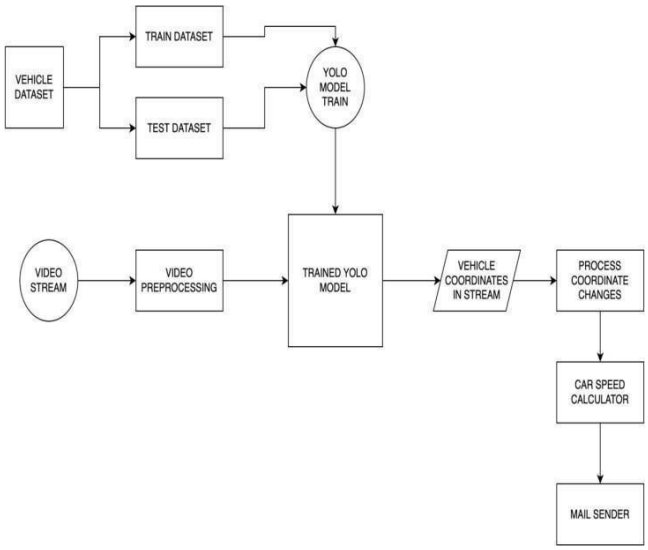
Project developed in 2021 aims is to provide reliable system to detect the speed of vehicle using IR Sensors & displaythe vehicle speed on LCD (Liquid Crystal Display) & also the system gives the alert through Buzzer if the sensor detects over speed of vehicle. So that new algorithm is proposed that uses the digital video,image processing and computer vision to automatically detect vehicle speed in an accurate manner[5]. Automobile Speed Violation Detection System using RFID and GSM technologies project is implemented in the year 2014. By using PIC(18F45K22)micro controller, Radio frequency identification(RFID) and Global System for Mobile Communications(GSM) we can detect speed violations on the road and supports the driver to obey traffic rules while driving by maintaining the speed according to the speed limit prescribed.
Vehicle Detection and Speed Tracking project is implemented in the year 2021. The speed is determined using distance travelled by vehicle over number of frames and frame rate[3]. Vehicle detection is also a part of speed detection where, the vehicle is located using various algorithms and later determination of speed takes place. The process of speed detection is Input video, Pr-processing, Moving vehicle detection, Feature Extraction, Vehicle tracking and Speed detection.[5]

Proposed System:-

In the existing system, due to some drawbacks like accuracy and precision we proposed a new system using Deep learning based object detection YOLO(You Only Look Once) V5 algorithm[10]. YOLOv5 algorithm is an open-source method. It is built upon success of previous versions and adds several new features and improvements. Using a more complex architecture in YOLO V5 allows it to achieve higher accuracy and better generalization to a wider range of object categories. YOLO v5 is trained on a larger and more diverse dataset called D5, which includes a total of 600 object categories.
If an over speeding car is detected, pictures of that particular car will be taken, processed and sent to Law Enforcement via mail after processing.Moreover, if any animal is detected on the highway, it will raise a notification of alert and pictures of it will be shared via mail as-well..These System requires almost no manual work and can work continuously. In this system we are giving the dataset images and labels, both are trained and tested.

4. IMPLEMENTATION-



Initially, the vehicle(speedy vehicles) dataset is splitted into train and test datasets in order to avoid overfitting and for easy evaluation.This trained and tested dataset together will be sent to YOLO model for training the datatset and loading[1].Secondly, the video recorded or captured by the camera will be sent into processing for pixilation and trained YOLO model will be working on by displaying speed via calculating confidence.It also detects animals if any triggered on highways.Added, Detection happens by locating and analyzing coordinates in the video.User requests or user required data will be processed and routes will be accessed.Thirdly, car over speeding will be calculated with the help of bounding boxes and final result will be stored inthe database.Eventually, the stored data will be sent to department officials via mails and this comes into storage layer.

<u>YOLO Working</u>

Initially, YOLO model divides the image into a grid of s x s
For each grid, it analyzes and considers a target vector of size-7. The target vector consists of attributes like probability of class(0,1),centre of bounding box,height and width of the bounding box and class.After training, the whole process happens and prediction takes place.As in single pass, the whole image is detected and it is not repeated.Hence it is known as YOU ONLY LOOK ONCE.Regression plays vital role for continuous outcomes.

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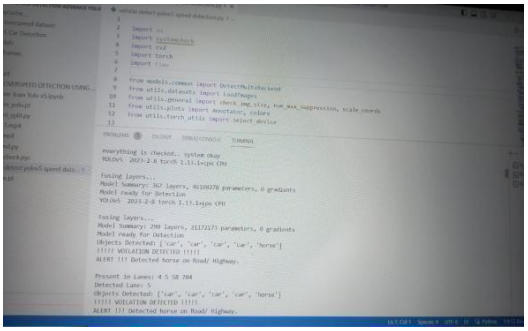
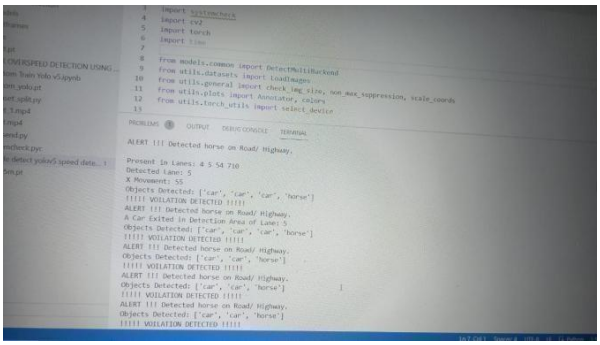
5. *Results-*

The proposed system is successfully implemented by detecting the overspeedy vehicles and animals found on highways[5].We found that accuracy was great and its working was good with no errors and disturbances by using YOLOV5.Eventually,with this we can easily find vehicles that are moving with high speed without anymanual work and sensors.

UI Design	*Design Description(functions,operations…)*
	The above screen appears when we run the YOLOV5 module and it gives assurance to the user that everything is checked and correct to proceed further. **1**
	The above screen appears when an animal is detected on a highway and sends an alert message furtherly to the enforcement team via mail. **2**
	The above screen appears i.e we get this mail when an animal is detected as said above. **3**

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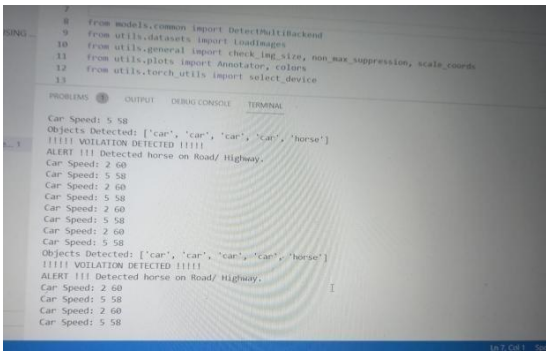
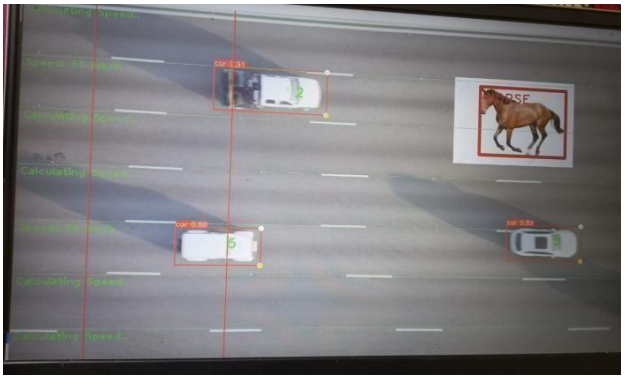
	The above screen appears when camera detects a vehicle say car and displays the car number as well as the speed with which it is moving on the console. **4**
	This screen appears when we click run and side-arrow button wherein output appears in the mentioned manner. **5**

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6. Conclusion-

In this paper,we proposed a system which detects vehicles travelling with high speed and animals provided threshold speed can be of our wish which will be mentioned in the code. Whenever an animal is detected by the camera, an alert will be sent to the enforcement team / police officials via a mail and they can take necessary action needed.The detection process needs no human or manual work,sensors or Arduino devices[7].We only use a high quality edition camera for good accuracy and precision.Hence, in this manner this system works successfully and is the latest edition of all according to the surveythat we have made.

Future Scope-

It is not possible to use the same camera because updated versions with different features comes into limelight.Added, future work includes adding another camera probably downwards a pole so as to detect the vehicle number plate so that chalaan canbe sent to that vehicle if seen speed is crossed frequently.With this, the whole system of speed detection and number plate detection completes successfully.

7. References -

[1] Arash Gholami Rad,Abbas Dehghani and Mohammed Rehan Karim - "Vehicle speed detection in video image sequences using cvs method",International Journal of the Physical Sciences Vol.5(17),18 December 2010.

[2] LujainaAL-Shabibi,N.Jayaraman,J.Vrindavan- "Automobile Speed Violation Detection System using RFIDand GSM Technologies",International Journal of Applied Information Systems,4 July 2014.

[3] Mohit Chandorkar,,Shivam Pednekar-"Vehicle Detection and Speed Tracking",International Journal of Engineering Research and Technology", Vol.10,5 May 2021.

[4] Azeh Gerald,Innocent Ndoh Mbue,Ayissi Zacherie Merlin,Awa Terence Achiri - "A Systematic Review of Excessive Speed Monitoring and Control System for Accident Prevention on Cameroon Highways",World Journal of Engineering anf Technology,Feb 11 2022.

[5] Chaitanya Aher Parth Jadhav,Dnyaneshwar Galphade,Ritesh Bansod,More S.S - "Car Overspeed Detection Using Arduino Uno and IR Sensor",International Journal for Scientific Research and Development,Vol 9,Issue 10 2021.

[6] Deepshika Yadav,Puneet Azad - "Low-cost triboelectric sensor for speed measurement and weight estimation of vehicles",IET Intelligent Transport Systems,17 August.

[7] Dr.Suwarna Gothane- "A Practice for Object Detection Using YOLO Algorithm,International Journal of Scientific Research in Computer Science, Engineeringand InformationTechnology ISSN:2456-3307,13 April 2021.

[8] Alexei Bochkovskiy, Chien-Yao Wang, Hong-YuanMarkLiao – "Optimal Speed and Accuracy of Object Detection,Institute of Information Science Academia Sinica, arXiv:2004.10934v1,23 April 2020.

[9] H. Xie, Q. Wu, B. Chen, Vehicle detection in open parks using a convolutional neural network. in 6th International Conference on Intelligent Systems Design and Engineering Applications (ISDEA) (IEEE, Guiyang,China, August 2015)

[10] Asif Hummam Rais, R.Muir- "Vechile Speed EstimationUsing YOLO, Kalman Filter and Frame Sampling, International Conference on Advanced Informatics:Concepts, Theory and Applications (ICAICTA), 29 September2021.

8.Appendix-

YOLO - You Only Look Once
RCNN - Regions with Convolutional Neural Networks
DOI - Digital Object Identifier