Research Article

Implementing Deep Learning algorithms for Automatic license plate Recognition

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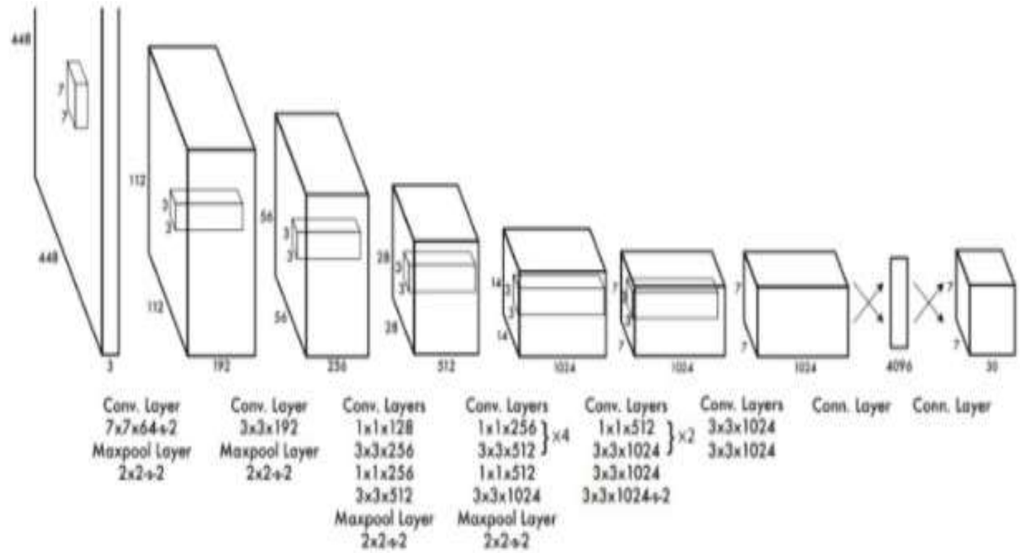
ABSTRACT

There is a great need for safe living and travel in this age of rapidly developing technology. The number of cars on the road has risen steadily during the previous decade. As the number of vehicles on the road continues to soar, keeping tabs on each one becomes an increasingly difficult chore. In this study, we propose using roadside surveillance cameras to implement an automated vehicle tracking system for high-velocity vehicles. Obtaining CCTV video of a live event is a time-consuming operation. You Only Look Once (YOLO), a deep learning model used for object recognition, is utilised to address this issue. There are essentially four stages to the suggested process.

INTRODUCTION

Automatic Number Plate Recognition (ANPR) is a technology that may be used by parking managements at malls, movie theatres, etc., in addition to toll booths on motorways, express routes, etc., to speed up the process of toll collecting. We may utilise this technology to track down criminals who use automobiles as a means of escape and to punish those who disobey traffic laws and regulations. Stolen cars may be found with the use of CCTV feeds equipped with licence plate readers. According to the globe Health Organization's . It's hard to imagine that those on motorcycles, bicycles, and foot have to carry the same load as everyone else. This research suggests that a comprehensive strategy is required to save lives. It's troubling that more people die on India's roads than in any other country. Several authorities say this is due to people's carelessness for their own safety when driving a car as a consequence of rising urbanisation. In 2015, India signed up to the Brasilia Declaration on Road Safety, promising to halve its road fatality rate by 2020. Policymakers in India must first understand the persistent problems if they are to succeed in decreasing road deaths. When a motorcyclist is involved in an accident, the fast deceleration of the bike causes the rider to be thrown off the bike. The brain continues to move after a head injury, while the body stops moving until the object penetrates the skull. There is some evidence to suggest that this form of brain injury may be fatal. Protecting one's head with a helmet is a must in dangerous scenarios like these. A helmet greatly reduces the probability that the skull may decelerate, leading to little head movement. When a collision occurs, the head is cushioned by the helmet and comes to a halt. By spreading the impact's force across a larger area, it helps prevent significant head trauma. In addition, it acts as a mechanical barrier between the rider's head and whatever object he or she comes into contact with, reducing the severity of any potential injuries. The purpose of traffic laws is to keep the roads safe and prevent chaos and injury. However, in actual use, this standard is seldom adhered to. Therefore, it is essential to find workable answers to these problems. Manual traffic monitoring using closed-circuit television cameras is one current option. There are a lot of iterations before success, thus a lot of people will need to be involved. Because of the sheer number of vehicles and pedestrians in major cities, manual helmet recognition is just not feasible. In this work, we show how to do it using yolov2.

Licence plates may be read using yolov3 and OCR to decode them and remove them from helmets.In the absence of a helmet, a helmet detection system will typically include the steps of gathering datasets, identifying moving objects, removing the background, and categorising items using neural networks. Extracting and labelling moving objects was the focus of Rattapoom Waranusast et al. [2], who used a KNN classifier.The status of a helmet is assigned to a head based on a number of features extracted from the divided crown. Objects in motion may be picked out using adaptive background subtraction .The vibe technique, originally developed for simulating static backgrounds, might also be used to spot in-the-wild movers. The Canny edge detection approach (Ref. 21) is used to create a segmentation of the moving objects. Romuere Silva et al. Introduced a method for feature extraction using LBP-based hybrid descriptors, HOG, and Hough transform descriptors. In Xinhua Jiang the authors extract features using a grey level co-occurrence matrix and LBP. Objects may be identified and placed into relevant categories with the use of datasets like yolov2 and COCO. The intended viewers include bikers, bicyclists, pedestrians, and workers. There are distinguishing characteristics between the colours of a motorbike helmet and a tyre Kunal Dahiya et al. Used techniques like background removal and object segmentation to single out the cyclist. Also restricted their CNN search to motorcyclists. Wearing helmets is a crucial measure for protection on building sites. HOG might be used here. Accidents might be avoided with the use of technologies like fall detection, backdrop removal, and optical character recognition (OCR) . Two-wheeler collisions may be detected with the use of an accelerometer approach developed by Shoeb Ahmed Shabbeer et al. , which makes use of a microcontroller. Most people hurt in automobile accidents are pedestrians, therefore protecting them is paramount. An SVM method (HOG) for categorising pedestrians was developed by Jie Li et al. Using histograms of directed gradient data. The last step is headgear recognition. Colour and circular Hough transforms are used for helmet recognition. It is possible to identify helmets using HOG descriptors . Another possibility is feature-based colour recognition. Kang Li et al. Employed color-space transformation and color-feature discrimination to recognise a helmet. Back-Propagation artificial neural network and GLCM statistical features are utilised to improve helmet identification . A multi-layer perception classifier developed by Romuere Silva et al. Was used to identify motorcyclists without helmets. Pathasu Doungmala et al. Employed Haar-like properties to differentiate between a full and no helmet, and between a half and no helmet.Hough transformations that are circular. To further improve helmet identification, the PCA technique [14] is used. Open Automatic Licence Plate Reader (ALPR)[20], [18], [16] has been used to read licence plates and extract their contents. Other methods include Optical Character Recognition, mobilenets, and Inception-v3.



Yolo Building, Fig.1

Existing System

Image processing technique known as "number plate recognition" utilises a car's number plate number as a means of identification. Using the licence plate, the goal is to create an automated authorised vehicle identification system. The technology may be used to monitor entry to restricted areas, such as military bases or the area surrounding the nation's highest court, parliament, or other government buildings. The designed method begins with vehicle detection, then proceeds to take a picture of the vehicle. The zone around the vehicle's plates is then grayscaled. The licence plate is then taken from the vehicle. A KNN (K-Nearest Neighbours) method is then employed to decipher the numbers and letters.

Drawbacks

Vehicle identification numbers may be obtained in a wide variety of designs, including hand-painted plates, plates with elegant text, and plates made from other materials. This is a time-consuming and difficult process with the current system.

PROPOSED SYSTEM

YOLO, SSD with resnet, Faster-RCNN, and many other state-of-the-art convolution neural networks may be used for number plate identification thanks to deep learning. There is a compromise between speed and map that is inherent to each model. The pytorch library, on which yolov5 is built, was utilised for this project. YOLO is lightning quick and pinpoint precise. Compared to Focal Loss in map at.5 IOU, YOLO is around 4x quicker. In addition, you can quickly adjust the model's size to strike a balance between speed and precision.

Implementation

Pre-Processing

The quality of the gray-to-binary picture conversion may be improved by applying a series of techniques known as "pre-processing" to the image. Noise in the original picture is removed by smoothing the image before it is converted to binary. The threshold algorithm may do preliminary processing.

Location of Licence Plates

Both colour analysis and shape analysis may be used to retrieve the licence plate. The shape of the General Licence Panel is square. As a result, algorithms favour squares, rectangles, and other square-like forms. Most Indian licence plates are either white or yellow, making colour analysis a viable option in that country as well. The picture must be in binary or the edges must be identified before the rectangle can be located. The next step is to locate the appropriate square corners and establish links to them. Finally, all rectangular regions of interest are retrieved by connecting their associated areas to the box.

Analysis of Linked Components

The algorithm of the component linked to the binary filter is initially used in order to get rid of the extra space in the picture. The associated component is parsed to extract text from the picture. The central idea is to traverse the picture in search of a related pixel. The individual parts (the dots) are identified and removed.

Segmentation

After the licence number is taken, the individual characters must be broken apart. The computer can be given the component label for a binary digital picture in order to find the related regions. A pixel-by-pixel picture is scanned from top to bottom using the label of connecting components to identify connected pixels and associated pixel cards.

Identification Of Characters

The licence panel's segmented characters must be a perfect match with the preexisting templates in order to be used for character identification. The licence number is returned in ASCII format and stored in a text file throughout the recognition procedure. There are two parallel paths to this awareness. At first, we tried to pick out individual words one by one. The adaptive notebook learns new words as they are input. The adaptive workbook is given a chance to effectively learn the content.

Result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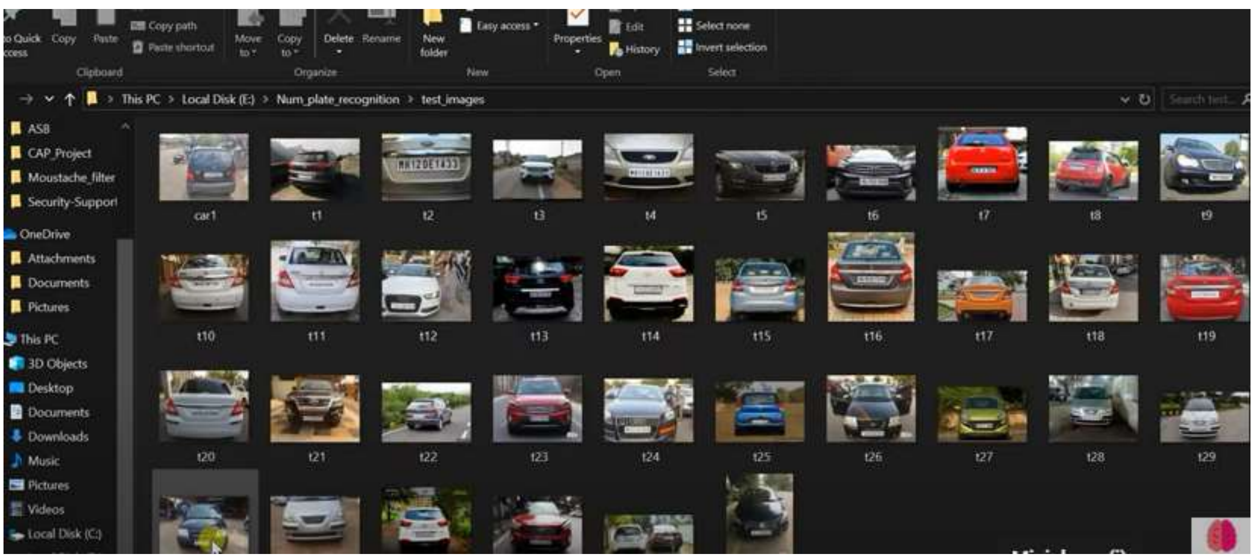
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CONCLUSION

This research shows that bicyclists, with or without helmets, may be identified using their licence plates. Average accuracy for identifying helmets is 85.77%, while for licence plates it is 77.33%, and for recognising triple riding it is 67.11%. The model uses the convolutional neural network-based yolov4 to recognise helmets and licence plates. Yolov4 has respectable sensitivity and accuracy in its detecting capabilities. The biker's licence plate was found who wasn't wearing a helmet. Increasing the size of the dataset will make the algorithm more precise. More photographs taken in a variety of conditions should be added to the archive to boost the recognition rate. One possible cause of incorrect licence plate recognition is that the relevant data set contains both bicycle and automotive plates. The accuracy of licence plate readers might be enhanced by including more images of motorbike plates. Using and contrasting several approaches may provide the best results.

REFERENCES

1. J. Chiverton published "Helmet Presence Classification with Motorcycle Detection and Tracking
2. The article was titled "Helmet Presence Classification with Motorcycle Detection and Tracking."
3. "Machine Vision techniques for Motorcycle Safety Helmet Detection" by Rattapoom

Waranusast, Nannaphat Bundon, Vasan Timtong,.

4. "Automatic Detection Of Motorcyclists without Helmet" by Romuere Silva, Kelson Aires, Thiago Santos, Kalyf Abdala, Rodrigo Vera
5. 27th SIBGRAPI Conference on Graphics, Patterns, and Images, Romuere Silva, "Helmet Detection on Motorcyclists Using Image Descriptors and Classifiers
6. Motorcycle Helmet Wearing Detection Using Image Processing, Thepnimit Marayatr, Pinit Kumhom,
7. Vision-based Motorcycle Detection using HOG features, Amir Mukhtar, and Tong Boon Tang.
8. Abu Authors H. M. Rubaiyat, Tanjin T. Toma, and Masoumeh Kalantari-Khandani presented "Automatic Detection of Helmet Uses for Construction Safety"
9. Defence in Depth in the Internet of Things: A Research Study. Gao XZ, Kapoor R.K., and Satyanarayana C. (eds.) Supercomputers and fast connections.
10. "Automatic Detection of Bikers without Helmet and Number Plate Detection Computing Communication and Networking For more information, see "Detection of Licence Plate Numbers and Identification of Non-Helmet Riders using Yolo v2 and OCR Method
11. In "Helmet Detection and Number Plate Extraction using Machine Learning
12. "Helmet Detection and Number Plate Recognition Using Deep Learning
13. Khan, N. Nagori, and A. Naik, "Helmet and Number Plate detection of Motorcyclists using Deep Learning and Advanced Machine Vision Techniques,"
14. Second International Conference on Innovative Research in Computing Applications (ICIRCA), Coimbatore, India.
15. "Identifying Bikers Without Helmets Using Deep Learning Models," 2021 Digital Image Computing: Techniques and Applications (DICTA).
16. Y. Kulkarni, S. Bodkhe, A. Kamthe, and A. Patil, "Automatic Number Plate Recognition for Motorcyclists Riding Without Helmet," and it will be presented at the 13th International Conference on Computing, Communication, and Networking Technologies
17. "Deep Learning Algorithm based Licence Plate Detection for Traffic Control," 2021 Innovations in Power and Advanced Computing Technologies (i-PACT).
18. Research by P. G. And S. P., "Detection of Helmetless Riders and Automatic Number Plate

Recognition Using Machine Learning,"

19. , R. S. Charran and R. K. Dubey, "Two-Wheeler Vehicle Traffic Violations Detection and Automated Ticketing for Indian Road Scenario,"

20. To cite this paper: R. Ferdian and T. P. Sari, "Identification of Motorcycle Traffic Violations with Deep Learning Method

21. XINHUA JIANG's "A Study of Low-resolution Safety Helmet Image Recognition Combining Statistical Features.

22. Automatic Detection of Bike-riders without Helmet Using Surveillance Videos in Real-time. Kunal Dahiya, Dinesh Singh, and C. Krishna Mohan. International joint conference on neural network (IJCNN).