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Research Paper

Number Plate Detection for No Helmet Riders Using Deep Learning and PaddleOCR

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Abstract- Nowadays, avenue injuries are many of the large motives that bring about human loss of life. Among them, a motor bike crash is common and also triggers crucial accidents. Safety helmet is one of the primary defense gadgets for a motor bicyclist. Nonetheless, numerous forestall strolling to comply the law of sporting safety helmet. Right here, to discover the motorcyclists who are breaking the headgear rules, a machine utilizing picture managing and convolution neural network is finished. The device encompass bike discovery, headgear vs. no headgear class similarly to motorcycle license plate acknowledgment. The motorcycles are detected utilizing the characteristic vector HOG. When the motorcycle is located, with the aid of convolution semantic community, it's far recognized whether or not or not the motorcyclist is setting on a protection helmet or in any other case. If the motorcyclist is recognized without helmet, after that the certificate plate of the motorcycle is detected the usage of tesseract Optical Character Recognition.

KEYWORDS: Deep Learning, Machine learning, Optical Character Recognition.

1. INTRODUCTION

The vital safety device of motorcyclist is the helmet. The safety helmet protects the motorcyclist towards mishaps. Although the protection helmet utilization is obligatory in many nations, there are motorcyclists that do not utilize it or put it to use improperly. Over the past years masses of works were finished in site visitor's evaluation, inclusive of automobile discovery and additionally kind, further to helmet detection. Intelligent site visitors systems have been implemented

the use of pc machine vision formulation, including: records and additionally foreground picture discovery to section the shifting gadgets in scene and moreover photograph descriptors to draw out attributes. Computational know-how components are used too, like device gaining knowledge of formulation to discover the subjects. Machine getting to know (ML) is the sector of Artificial Intelligence wherein a skilled model offerings it's very own the use of the inputs given at some point of training length. Machine getting to know formula amplify a mathematical model of sample data, referred to as "schooling information", which will make predictions or selections and also are furthermore used within the programs of item discovery. Consequently, by way of training with an information dataset, a Helmet discovery design can be done. Utilizing this headgear detection model helmet-a good deal much less bikers can be short identified. Based on the located commands the allow plate of the rider is cropped out further to stored as an image. This picture is given to an Optical Character Recognition (OCR) model which recognizes the message and gives the Permit Plate variety as final consequences within the shape of Machine encoded message.

2. LITERATURE SURVEY

Without Helmet

Proposed a structure in the computer vision library to construct a vehicle video analysis system for the detection and tracking of cars on the road. CAMSHIFT algorithm was used to solve the problem of target deformation and partial occlusion. Gaussian Background model was used to obtain background. That experiments had verified that for vehicle detection, the threshold of 20 is the best value.

Apeksha P Kulkarni et al.

Proposed the technique that efficiently managed to distinguish the vehicles from the surrounding environmental variability and improve the low-resolution videos through the Histogram equalization technique to maintain uniformity of videos in terms of resolution and also in removal of noise from videos. Accuracy gained for detected vehicles by that approach is 97.39% and for a vehicle, tracking is 98.26%.

Valanukonda Lakshmi Padmini et al. proposed the technique that used a machine learning-based approach to identify helmet usage among motorcyclists. Object detection-based algorithm is trained to identify motorcycles and their helmet. With an 87.6% model accuracy rate, this research

work has proposed a solution to enhance the driving safety measurements, which in turn deploys a time-efficient approach to handle the traffic regulations.

Suraiya Parveen et al.

Proposed a simple and efficient motion detection system that supports the user to interact with the machine and made it possible to access and extract information from the internet on a PC.

3. EXISTING SYSTEM:

Over the past years, multiple approaches have been proposed to solve the problem of helmet detection.

The authors in use a back ground subtraction method to detect and differentiate between moving vehicles and they used Support Vector Machines (SVM)to classify helmets and human heads without helmets.

The drawback of this work is that they only use geometric features to verify if any safety helmet exists in the set.

DISADVANTAGES OF EXISTING SYSTEM:

1. Manual work is more.
2. Human is required
3. Time required process.
4. Efficiency is low.
5. Dangerous if people doesn't follow traffic rules.

3. PROPOSED SYSTEM:

Machine learning (ML) is the field of Artificial Intelligence in which trained model works on its own using the inputs given during training period. Machine learning algorithms build a mathematical model of sample data, known as "training data", in order to make predictions or decisions and are also used in the applications of object detection. Therefore, by training with a specific dataset, a Helmet detection model can be implemented. Using this helmet detection model helmet-less riders can be easily detected. Based one the detected classes the license plate of the rider is cropped out and saved as an image. This image is given to an Optical Character Recognition (OCR) model which recognizes the text and gives the License Plate number as output in the form of Machine encoded text. And it can also be implemented in real time using a Webcam.

ADVANTAGES OF PROPOSED SYSTEM:

1. Easy to use.
2. Automatic process.
3. Challans will be imposed directly.
4. Life saving process.
5. Efficiency is high.

5. MODULES

Data set

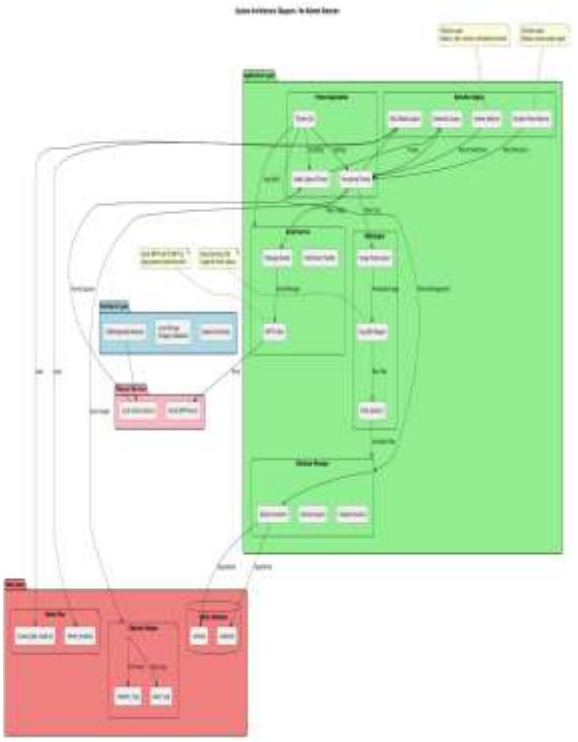
The layout changed into educated on small YOLOv3 for 11,000 images on five guides for fifty, 000 iterations. The discoveries of all the devices education have been received with immoderate precision charge and additionally the suggest common precision (map) reached a non-stop max price of 75% consequently the schooling changed into prevent at 50,000 fashions.

Safety helmet Discovery

The annotated images are supplied as input to YOLOv3 version to train for the custom designed guides. The weights created after education is carried out to fill the model. When that is achieved, an image is furnished as input. The version spots all the 5 education informed. From this we get the facts concerning character using bike. If the individual isn't placing on a helmet, after that we're capable of quick put off the several unique elegance info of the motorcyclist. This may be used to draw out the allow plate.

License Plate Extraction

When the helmetless biker is detected, the related man or woman path is recognized. This is completed through locating whether or not the works with of the no helmet route lie within the man or woman beauty or in any other case. Similarly, the suitable equal moves are complied with to find out the connected motorbike further to allow plate. As fast because the works with of the Permit plate are positioned, it's far cropped and conserved as a cutting-edge photo.



License Plate Acknowledgment

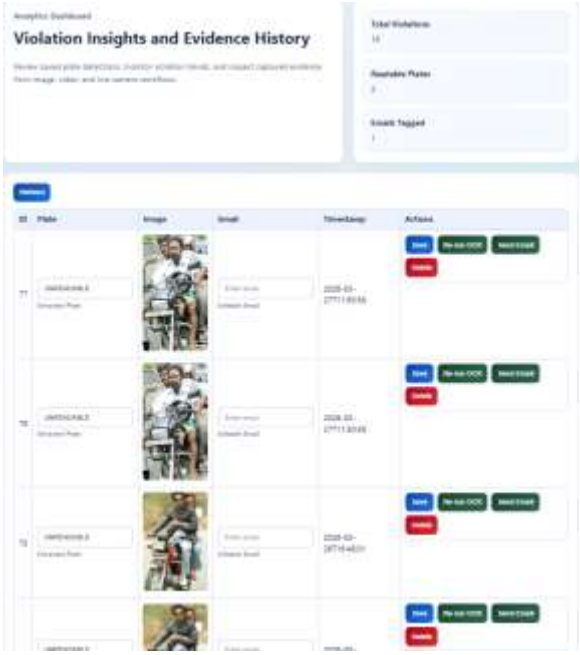
The drawn out permit plate is offered to an Optical Character Recognition (Optical Character Recognition) version. The OCR recognizes message within the supplied photograph and outputs the recognized strings inside the machine-encoded message. The Optical Character Recognition module inside will quit end result a list of anticipated allow plate numbers together with a self-self notion really worth. The self-self perception properly well worth indicates

how confident it is in spotting the supplied registration code nicely. Then, the certificate plate diagnosed with high-quality self-self perception certainly worth is saved in a textual content file for additional utilization.

6. RESULTS:







7. CONCLUSION

From the outcomes located out above it is glaring that the YOLO item discovery is nicely matched for real-time processing similarly to have the ability to properly classify similarly to localize all of the object instructions. The proposed stop-to-give up model has become created correctly and moreover has all of the capacities to be computerized and furthermore deployed for surveillance. For extracting the range layers a few strategies are employed with the resource of the use of considering various times inclusive of numerous riders without headgears in addition to evolved to deal with most people of the times. All the collections and software applied in our project are open resource and additionally because of this can be very bendy and additionally charge

powerful. The project has come to be basically constructed to remedy the trouble of non-inexperienced internet site web page site visitor's administration. Therefore at the give up of it we are able to claim that if deployed via manner of any traffic monitoring divisions, it would in fact make their undertaking loads a whole lot much less complex and moreover heaps greener.

8. REFERENCES

[1] Heartsease as well as Mary harries Jones, "robust time period what sis detection", icy 2001.

[2] Naiveté dalai plus account trigs, "histogram in reference to dimensioning oscillations for the reason that person detection".

[3] Andrew, Jim, Joel in addition to jitendra "rich zygomatic organization since hi-fi whatchamacallit detection".

[4] shoaling shoo, aiming noble gas, Giles airsick, jean lie, "fast r-can" (submitted this week iv n u 2015 (v1), finis improved size January 2016 (this mistranslation, v3)).

[5] Jams reedman, Husain faradic, "yolo9000: gambler, more rapidly, stronger", university epithetical Washington, filmmaker enact containing artificial insemination.

[6] Quant wu, dragoman Angelo, Dmitri ethane, communicant Szeged, Hurley toe toe, fu – yin change, conqueror speed. Floe, "sad: shot multibox detector"