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HELMET DETECTION AND LICENSE PLATE RECOGNITION USING CNN

[1]Dr. Subba Reddy Borra,[2]R. Keerthana,[3]T. Sree Janani,[4]S. Veena Reddy
[1]Professor,[234]Students
Department Of CSE
Malla Reddy Engineering College for Women

ABSTRACT

Right now, we're facing a lot of issues with traffic rules in India that might use some fresh perspectives to fix. There has been a rise in the number of accidents and fatalities in India caused by the traffic offense of riding motorcycles or mopeds without a helmet. The current system mostly relies on CCTV records to track traffic offenses. In such cases, the traffic police have to zoom in on the license plate to identify the offending rider if they aren't wearing a helmet. The traffic offenses are common, and the number of persons riding motorbikes is growing daily, so this takes a lot of time and effort. Imagine a system that could detect whether a motorcyclist or moped rider isn't wearing a helmet and, if found, immediately get the license plate number. Recent studies have effectively accomplished this task using various characteristics such as CNN, R-CNN, LBP, HoG, HaaR, etc. In terms of speed, accuracy, and efficiency, however, these works have their limitations when it comes to object recognition and categorization. To try to automate the process of finding drivers who don't wear helmets and getting their license plate numbers, this study developed a system called Non-Helmet Rider detection. The core idea is based on three-level deep learning for object detection. Using YOLOv2, the first level detects a person and a motorbike or moped; the second level uses YOLOv3, and the third level uses YOLOv2. The items recognized are a helmet and a license plate. After then, Optical Character Recognition is used to obtain the license plate registration number. There are some limitations and requirements placed on all of these methods, particularly the one that extracts license plates. The efficiency of the process is crucial since video is used as an input in this task. We have developed a comprehensive system that can recognize helmets and retrieve license plate numbers using the aforementioned approaches.

I. INTRODUCTION

By preventing the skull from decelerating, a helmet effectively locks the head into an almost motionless position. The impact-absorbing cushion inside the helmet slows the head down after a while. Also, the force is distributed across a wider region, reducing the likelihood of serious head trauma. First and foremost, it prevents the rider's head from coming into touch with whatever it is that they hit. Wearing a high-quality full-face helmet may reduce the likelihood of injuries. A feeling of discipline is brought about by traffic laws in order to drastically reduce the danger of fatalities and injuries.

Nevertheless, in practice, these regulations are seldom followed to the letter. Therefore, methods that are both practical and efficient need to be developed in order to address these issues. An current solution involves manually monitoring traffic using CCTV. On the other hand, a lot of human resources are required to

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complete the several iterations necessary to reach the goal. This insufficient manual approach of helmet identification is therefore unaffordable in cities with millions of inhabitants and a large number of cars on the road. Here, we present a technique that utilizes YOLOv2, YOLOv3, and optical character recognition to recognize complete helmets and extract license plates. The basic phases of a helmet detection system are as follows: gathering datasets, detecting moving objects, removing backgrounds, and classifying objects using neural networks.

II. SYSTEM ANALYSIS

EXISTING SYSTEM

The current system mostly relies on CCTV records to track traffic offenses. In such cases, the traffic police have to zoom in on the license plate to identify the offending rider if they aren't wearing a helmet. The traffic offenses are common, and the number of persons riding motorbikes is growing daily, so this takes a lot of time and effort. Imagine a system that could detect whether a motorcyclist or moped rider isn't wearing a helmet and, if found, immediately get the license plate number. Recent studies have effectively accomplished this task using various characteristics such as CNN, R-CNN, LBP, HoG, HaaR, etc. When it comes to speed, accuracy, and efficiency, however, these works fall short when it comes to object identification and categorization.

PROPOSED SYSTEM

1) As part of our study, we are able to identify two-wheelers whose riders aren't wearing helmets and, in that case, we are able to get their license plates. If you would want us to add more photos to our YOLO CNN model for number plate extraction, just provide us the additional images and we will integrate them in the model with annotation. Currently, we have a small set of train and test images.
2) The following modules were used to execute the aforementioned technique:
3) 1) The first step is to submit the photograph to the program. Then, we'll use YOVOV2 to verify whether the image has a person riding a motorcycle. whether the YOLO model detects both, we'll go on to step 2.
4) 2) In this module, we will use the YOLOV3 model to determine whether an item is wearing a helmet. whether it is, the program will automatically cease playing the sound. The process continues until step 3 if the rider is not wearing a helmet.
5) (3) The python tesseract OCR API will be used to extract data from license plates in this module. One may use optical character recognition to get the license plate number from a picture.

III. IMPLEMENTATION

Modules description

1.Upload Image

2. Detect Motor Bike & Person

The selected frame is sent into the YOLOv2 object identification model, with the classes "Motorbike" and "Person" being the ones to be identified. We get the picture with the necessary class detection, the confidence in the detection via the bounding box, and the probability value at the output.

Using the capabilities provided by the Image AI package, we are able to extract and save just the

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recognized objects as individual pictures. We then assign each image a unique name that corresponds to its class and number. Motorbike-1, Motorcycle-2, etc. are some examples of the possible filename formats. whether the item being removed is a motorbike or an individual (person-1, person-2, etc.), when a person's likeness is removed. Information about these retrieved pictures is entered into a lexicon and may be used for further processing.

3. Detect Helmet

The human photos are fed into the helmet detection algorithm after the person-motorcycle pair is acquired. There were a few false positives when the helmet detection model was being tested. Consequently, the top quarter of the photograph was cropped from the person's original.This eliminates the possibility of false positives and prevents the helmet from being mistakenly detected while the rider is not wearing it, such as when the rider keeps the helmet on the motorbike.

4.Exit

IV. CONCLUSION

Using a video file as input, a method is constructed for non-helmet rider detection. It extracts the license plate number of the motorbike and displays it if the rider in the video is not wearing a helmet. When it comes to identifying motorbikes, people, helmets, and license plates, the YOLO architecture is the way to go. When a cyclist doesn't have a helmet on, optical character recognition (OCR) may be utilized to see license plates. We extract the characters and the frame from which they were retrieved so that we might utilize them for other things. Each and every one of the project's goals has been successfully met.

FUTURE WORK

With a few tweaks, our technology may be used to identify helmets in the real-time system and connected to traffic cameras. Plus, by combining the algorithm for automatic license plate recognition, we may create a system that issues challans to those who choose not to wear helmets.

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