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Helmet and Vehicle Number Detection by Smart Surveillance System

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ABSTRACT:

In the ongoing situation, we are addressing different difficulties connected with traffic guidelines in India, especially zeroing in on the issue of cruiser or sulked riders not wearing caps. This infringement has prompted an expansion in mishaps and fatalities. The ongoing framework screens traffic offenses principally through CCTV film, where traffic police should physically survey accounts, focus in on the tag on the off chance that the rider isn't wearing a head protector, and make a proper move. Nonetheless, this interaction is work escalated and tedious because of incessant criminal traffic offenses and the developing number of bike clients. Envision on the off chance that there was a framework that could naturally distinguish infringement like not wearing a head protector while riding a cruiser or sulked, and consequently extricate the vehicle's tag number. Ongoing examination has taken huge steps in this space utilizing progressed strategies like CNN, R-CNN, LBP, Hoard, and Haar highlights. Notwithstanding, these techniques frequently face difficulties connected with effectiveness, exactness, and the speed of item discovery and arrangement. In this review, we propose a Non-Protective cap Rider Recognition Framework intended to mechanize the discovery of traffic offenses connected with head protector resistance and concentrate the vehicle's tag number. The framework works on the rule of Article Recognition utilizing Profound Advancing across three levels: at first distinguishing people and cruisers/mopeds utilizing YOLOv2, identifying caps at the powerful utilizing YOLOv3, lastly perceiving tags utilizing YOLOv2. The removed tag number is then handled utilizing Optical Person Acknowledgment (OCR). This multitude of strategies are custom-made to predefined conditions and requirements, especially zeroing in on the exactness and proficiency of tag extraction. Considering that the framework processes video information, execution speed is critical, and we have carried out these techniques to foster an extensive framework for both cap location and tag extraction.

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INTRODUCTION:

Caps diminish the gamble of head wounds by forestalling fast deceleration of the skull, in this manner nearly halting the movement of the head. The cushioning inside the cap ingests the effect of an accident and bit by bit halts the head. It likewise spreads the effect over a bigger region, in this way shielding the head from serious wounds. Critically, a cap goes about as a mechanical hindrance between the head and any item the rider could slam into. Wounds can be limited on the off chance that a top notch full-face cap is utilized. Traffic rules are planned to impart discipline and fundamentally decrease the gamble of passings and wounds. In any case, severe adherence to these standards is frequently deficient. Hence, proficient and down to earth techniques should be created to defeat these issues. The ongoing strategy for traffic checking through manual observation utilizing CCTV is insufficient. This approach requires various emphasess to accomplish the ideal outcomes and requests significant HR. Urban communities with enormous populaces and large quantities of vehicles can't depend on this wasteful manual strategy for cap location. Thus, we propose a philosophy for head protector identification and tag extraction utilizing YOLOv2, YOLOv3, and OCR. The head protector discovery framework includes a few stages, including dataset assortment, moving item identification, foundation deduction, and item grouping utilizing brain organizations. This approach expects to robotize the discovery cycle, making it more effective and versatile for enormous populaces and high-traffic regions.

EXISTING SYSTEM:

The current framework screens traffic offenses basically through CCTV accounts, where traffic police need to survey film, focus in on the tag in the event that the rider isn't wearing a cap, and make an essential move. In any case, this cycle requires significant labor and time because of the recurrence of traffic offenses and the rising number of cruiser clients. Envision a framework that could naturally identify the offense of not wearing a protective cap while riding a bike or sulked and afterward consequently extricate the vehicle's tag number. Late exploration has effectively resolved this issue utilizing procedures like CNN, R-CNN, LBP, Hoard, and Haar highlights. Notwithstanding, these methodologies have restrictions in regards to effectiveness, precision, and the speed of item location and characterization.

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PROPOSED SYSTEM:

In this undertaking & Utilizing YOLOV8 we expect to identify whether a bike rider is wearing a head protector. In the event that the rider isn't wearing a protective cap, we will extricate the bike's tag number. To accomplish this, we utilize a CNN model with prepared and tried pictures. On the off chance that extra pictures are required, they can be shipped off us for consideration in the model to further develop tag extraction. To execute this system, we follow these means:

1. The main picture is transferred to the application. Utilizing the YOLOv2 model, we check whether the picture contains an individual and a cruiser. In the event that both are identified, we continue to the following stage.
2. In this module, we utilize the YOLOv3 model to decide whether the recognized individual is wearing a head protector. In the event that the rider is wearing a cap, the application stops here. On the off chance that the rider isn't wearing a cap, the application continues to the following stage.
3. In this module, we separate the tag data utilizing the Python Tesseract OCR Programming interface. The OCR takes the info picture and concentrates the vehicle number from it.

Literature Survey:

Kunal Dahiya, Dinesh Singh, C. Krishna Mohan:

In this paper, we propose a procedure for the programmed location of bike riders without caps utilizing continuous reconnaissance recordings. The proposed approach first recognizes bike riders from observation video utilizing foundation deduction and article division. Then, at that point, it decides if the rider is wearing a head protector utilizing visual elements and a parallel classifier. Moreover, we present an agreement approach for infringement detailing, which works on the unwavering quality of the proposed technique. To assess our methodology, we give an exhibition examination of three broadly utilized include descriptors: Histogram of Situated Inclinations (Hoard), Scale-Invariant Element Change (Filter), and Nearby Double Examples (LBP) for order. The trial results show an identification precision of 93.80% on genuine observation information. It has likewise been exhibited that the proposed approach is computationally proficient and works progressively with a handling season of 11.58 ms per outline.

Maharsh Desai, Shubham Khandelwal, Lokneesh Singh, Prof. Shilpa Gite:

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Cruiser riding is exceptionally pleasant, however mishaps are a reality. Many individuals favor cruisers over vehicles because of their moderateness, simplicity of leaving, and mobility in rush hour gridlock. In India, in excess of 37 million individuals depend on cruisers for transportation. In any case, because of their far and wide use, cruisers have a higher mishap rate contrasted with four-wheelers, and they are associated with additional lethal mishaps. The outcomes of these mishaps are especially extreme when riders are engaged with high velocity crashes without wearing protective caps, prompting possibly deadly wounds. Wearing a head protector essentially diminishes the endanger of injury and can save lives. This paper means to relieve these dangers by fostering a head protector location framework. Our methodology includes utilizing foundation deduction and optical person acknowledgment (OCR) for fall identification. For head protector location, we utilize foundation deduction and the Hough change descriptor. By carrying out these advancements, we mean to upgrade security for cruiser riders by guaranteeing consistence with head protector guidelines through mechanized location frameworks.

XINHUA JIANG:

In light of the examination of passage and leave observation video film, this paper tends to the technique for perceiving wellbeing head protectors in low-goal pictures caught from video. It assesses the adequacy of various elements and their effect on acknowledgment rates for distinguishing security head protectors over significant distances utilizing low-goal pictures. The methodology at first recognizes heads in reconnaissance recordings and afterward separates factual highlights utilizing Neighborhood Paired Examples and dark level co-event lattice (GLCM) frameworks. At long last, the acknowledgment exactness of the test tests is determined utilizing a Back-Engendering counterfeit brain organization (BP ANN). Exploratory discoveries show that consolidating GLCM measurable highlights with BP ANN empowers exact acknowledgment of security caps, accomplishing an acknowledgment pace of 94%. Hence, the system proposed in this paper is both quick and attainable for actually distinguishing security protective caps in reconnaissance video film under low-goal conditions.

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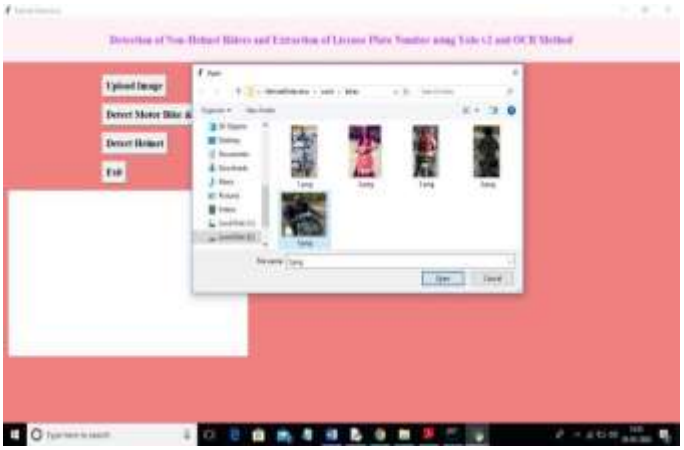
Rattapoom Waranusast, Nannaphat Bundon, Vasan Timtong and Chainarong Tangnoi:

In spite of the demonstrated viability of bike caps in forestalling head wounds, their use stays low in numerous nations because of lacking implementation of cap guidelines by policing. This paper proposes a framework intended to naturally identify cruiser riders and decide if they are wearing security caps. The framework first recognizes moving items and characterizes them as bikes or different items in light of elements removed from their spatial properties utilizing a K-Closest Neighbor (KNN) classifier. Then, it finds the heads of riders on distinguished cruisers and sections them utilizing projection profiling. The framework then sorts regardless of whether the rider's head is wearing a cap utilizing a KNN classifier in view of elements extricated from four districts of the portioned head region. Exploratory outcomes exhibit a palatable recognition rate for close to path, far path, and the two paths consolidated, accomplishing 84%, 68%, and 74% individually. This approach means to upgrade implementation of head protector guidelines via computerizing the recognition interaction, accordingly advancing more secure bike riding rehearses.

RESULT:

In above screen click on ‘Upload Image’ button and upload image



In above screen I selected one image as ‘5.png’ and click on ‘Open’ button to load image. Now click on ‘Detect Motor Bike & Person’ button to detect whether image contains person with motor bike or not

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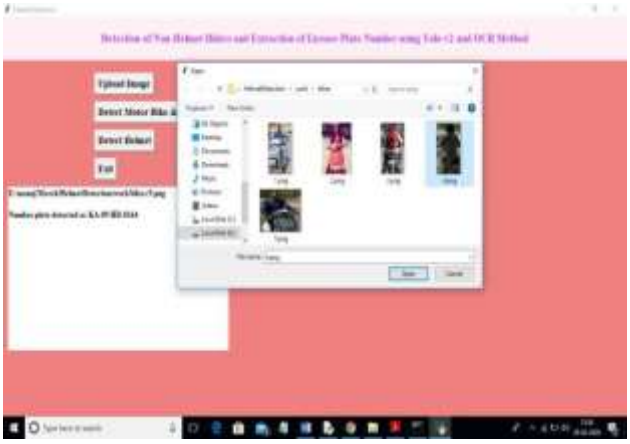
In above screen yolo detected image contains person and bike and now click on ‘Detect Helmet’ button to detect whether he is wearing helmet or not



In above screen I am uploading 4.png which is wearing helmet and now click on ‘Detect Motor Bike & Person’ button to get below result

In above screen application detected that person is not wearing helmet and its extracted number from vehicle and display in beside text area. Now we will check with helmet image

In above screen yolo detected person with motor bike and now click on ‘Detect Helmet’ button to get below result

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In above screen application detected person is wearing helmet and that label is displaying around his head and application stop there itself and not scanning number plate.

Note: To implement this project and to extract number plate we have trained few images and if u want to extract for new images, then send those new images to us, so we include those images in yolo model to extract new images number plate also.

Output after applying OCR

Before applying OCR directly to extracted license plate image, pre-processing as to be done to get output of better accuracy. Hence the image was rotated. Fig. 7 shows how the license plate image will be once it is extracted and rotated. Since the camera will be fixed position with respect to motorcycle, the angle to which the extracted license plate image has to be rotated, has to be found once by trial-and-error method and that value remains same for all the other cases. In this case, it was found to be 6 degrees. The rotated image was rescaled so that OCR can detect the strings with good accuracy. The rescaled image size was determined by choosing a scaling ratio, i.e., ratio of size of rescaled image to the size of original image, width wise and height wise. Let w, h be the width and height of original image, w`, h` e the width and height of rescaled image. r be the ratio. Then the rescaled image size is obtained by:

w` = w * r.....(1)

h` = h * r.....(2)

where r, the ratio is a variable and depends on the frame chosen during frame extraction. For this case, it was found to be lying between 1.4 to 1.47. Then the brightness of the image is increased, to ensure that black plate numbers against white background is clearer. The h,s,v (Hue, Saturation, Value)values of the image was obtained. As it is known, v(Value)describes the brightness or intensity of the color. A limit was chosen, such that if the „v" value is greater than that limit for a particular pixel, then 255 is assigned as „v" for that case. If the „v" value is lesser than the limit, then a constant value was added to the „v" value of that pixel. In this case, the constant value chosen was 30, and the limit is 225.

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value = 30

limit = 255 – value

if v ≥ limit:

v = 255

else:

v = v + value

Result & Discussion:

Details of Threshold value with model

Sl. No	Detection model	Number Plate Detection	Threshold value
1	YOLO v2(Without Helmet)	Yes	0.5
2	YOLO v2(With Helmet)	No	0..87

Results obtained are discussed here for two cases. They are,
Case 1: When the motorcycle/moped rider is wearing helmet as shown in fig.5.
Case 2: When the motorcycle/moped rider is not wearing helmet and License plate is detected as shown in fig 6.

CONCLUSION:

A Non-Cap Rider Discovery framework has been created involving video film as information. The framework recognizes occasions where cruiser riders in the video are not wearing head protectors and concentrates the tag number of the bike. Object identification standards with the Only let it all out engineering are utilized for recognizing bikes, people, head protectors, and tags. At the point when the framework distinguishes a rider without a head protector, it utilizes Optical Person Acknowledgment (OCR) to extricate the tag number. This OCR removes the characters as well as catches the casing from which the extraction is made, considering extra applications. In general, the targets of the undertaking have been effectively accomplished, really resolving the issue of protective cap resistance among bike riders and giving a way to extricate vital ID data for implementation or further examination.

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