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Person without Helmet Investigation of a Bike Rider and Number Plate Extraction through OCR

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Abstract - *Programmed helmet wear investigation of a cruiser rider is a promising image investigation application, as the helmet are crucial for sparing the lives of people from head wounds during road accidents. This paper introduces an insightful image investigation framework for naturally recognizing the motorcyclists with and without wellbeing head protectors. On the off chance that the motorcyclists are found without the helmet, his/her Vehicle Number is perceived to start further activities, for example, finding of punishment sum from one's record connected with the vehicle permit by the traffic police and the lawful power. To begin with, the frontal area objects are divided, utilizing Histogram of gradients (HOG) and afterward marked. A while later, the proposed framework adjusts quicker area based for the discovery of bikes in the named frontal area items to guarantee the nearness of motorcyclists. Along with additionally utilized for the location of the motorcyclists with and without head protector. At long last, the vehicle number of the motorcyclists without the head protector is perceived, utilizing Optical character recognition. The proposed structure is assessed, utilizing the presentation metric and mean normal exactness on the investigation dataset and it head position the cropping edge calculations.*

Index Terms – Helmet; HOG, without helmet, Number pate OCR.

1. INTRODUCTION

The basic aim behind this project is to develop and implement a system which performs real time helmet detection of bike riders using surveillance of the road and hence generates a database of the number plates where a driver without helmet is found. Hence a database will be available for analysis for the police authority.

The paper expects to give all out wellbeing to motorcycle riders. As of helmet have been made compulsory, yet individuals drive without head protectors met with accident the Tamilnadu City has approx. 3 lakh bike riders, which incorporates 500-600 accident consistently out of which 300-400 are deadly. Over the most recent couple of years, there has been fast increment in number of road accident. Because of ascend in road accident; it has now gotten important to produce a framework to constrain unintended passing. India represents in excess of 20,00000 passing as a result of road accident, as indicated by the Global Road Safety Report,2018 "the report expresses that the Indian road security laws don't meet the best practice necessities for four out of five hazard factors: upholding speed limits, counteraction of alcoholic driving, wellbeing of youngsters and utilization of head protectors. As per a report by a Tamil Nadu police, there were an aggregate of 156563 wounds in 145604 accidents. The state likewise bested the rundown of most accident among all states for past ten years even for safety belts, where the Motor Vehicles Act, 1988, is in consonance with the WHO gauges, the implementation is poor and India has a lamentable score of four out 10. Regarding vehicle security, India meets just two out of the seven vehicle wellbeing guidelines by the World Health Organization (WHO). Bikes represent 25% of absolute road crash passing. Almost 75%motorcycle riders associated with accident kept on wearing head protectors, crash records appear. The primary driver of these fatalities is individuals riding bikes affected by liquor results and infringement of traffic rules which later on brings about genuine accident. "The probability of endurance of dead wearing caps is high when contrasted with those not wearing helmet".

The helmet is the primary security gear of motorcyclists, yet numerous drivers don't utilize it. In the event that a motorcyclist is without helmet accident can be lethal right now, clarify and delineate a programmed technique for bikes discovery and arrangement on open roads and a framework for programmed identification of motorcyclists without head protector. For this, a half and half descriptor for highlights extraction is proposed situated in

Local Binary Pattern, Histograms of Oriented Gradients and the Hough Transform descriptors. Traffic pictures caught by cameras were utilized. It is realized that head motion and mind action can mirror some human practices identified with a danger of accident when utilizing machine-devices. The examination introduced right now at decreasing the danger of injury and along these lines increment laborer wellbeing. Rather than utilizing camera, this procedure exhibits a Safety Helmet (SH) so as to follow the head and the mind movement of the laborer to perceive bizarre conduct. Data removed from SH is utilized for registering danger of an accident for prevention and decreasing wounds or accident. A prevention gadget, for example, vehicle without helmet, is punishable offence to the person so as to detect the administrator when registered vehicle details level arrives at an edge. When the danger level of accident breaks the edge, aim age without helmet will be detected through HOG method.

1.1 RELATED WORK

In this section, a review of different techniques and parameter estimation is made so that the image with helmet analysis is calculated.

Prajwal M. J. [1]. The fundamental utilization of head protector discovery is in rush hour gridlock streets where mishaps are more. Despite the fact that different measures are taken by government, it isn't pursued effectively by the motorcyclists, so a few brilliant procedures ought to be utilized. Development industry and power substation endure a ton of fatalities in view of carelessness in wearing wellbeing caps, henceforth there is a need of observation framework that is fit for identifying protective caps and forestalling the passing. An increasingly advanced PC vision model that incorporates picture preparing, AI, Convolution neural networks(CNN), classifiers (SVM), displaying calculation, a significant informational collection containing protective caps; tops; Histogram of Oriented Gradients(HOG) highlights and number of different systems would take care of the issue. Strategies like COCO model, HOG descriptors, Hough changes are utilized to recognize objects. Optical character recognition(OCR), Haar like component is utilized to distinguish number plates.

Pradeep Maiya [2] Bicycle setbacks have been developing reliably consistently. In view of various social and money related components, this kind of vehicle is twisting up logically standard. People pick motorbikes over other vehicles as it is essentially more affordable to run, less requesting to leave and versatile in busy time gridlock. In India, more than 118 million people are using bicycles. Since usage is high, disaster level of bicycles are moreover high diverged from various vehicles. So wearing headgear is basic to diminish the threat of wounds in the occasion that incident occurs. In this paper, propose a methodology for modified recognizable proof of bike riders without headgear and who are triple riding using observation recordings continuously. The proposed methodology at first perceives bike riders using foundation subtraction and item division. By then we use object classifier HOG to arrange violators. The vertical projection of twofold picture is used for tallying number of riders.

Kavyashree Devadiga [3] These days bike is the most famous methods of vehicle. In any case, in view of less security there is a high hazard included. As an answer for this, it is exceptionally alluring for bicycle riders to utilize protective cap. Watching the handiness of protective cap, Governments have made it culpable offense to ride a bicycle without cap and have embraced manual procedures to get the violators which has restrictions of speed. Utilizing video observation of the road, the proposed methodology distinguishes if the bicycle rider is wearing a head protector naturally without manual assistance. In the event that a bicycle rider is distinguished not wearing a head protector, the number plate of the vehicle read and noted. A database will be produced with records to distinguish each guilty party precisely. The framework executes unadulterated AI in request to distinguish each kind of head protector that it runs over with least calculation cost.

Yogiraj Kulkarni [4] Bikes have consistently been the essential method of vehicle in creating nations. Lately, there has been an ascent in cruiser mishaps. One of the significant purposes behind fatalities in mishaps is the motorcyclist not wearing a defensive cap. The most predominant technique for guaranteeing that motorcyclists wear cap is traffic police physically observing motorcyclists at street intersections or through CCTV film and punishing those without cap. In any case, it requires human intercession and endeavors. This paper proposes a computerized framework for identifying motorcyclists not wearing head protector and recovering their bike number plates from CCTV film video. The proposed framework initially backgrounds subtraction from video to get going items. At that point, moving items are named motorcyclist or non-motorcyclist. For characterized motorcyclist, head segment is found and it is delegated cap or non-protective cap. At long last, for recognized motorcyclist without head protector, number plate of bike is distinguished and the characters on it are separated. The proposed framework utilizes Convolutional Neural Networks prepared utilizing move learning over pre-prepared model for grouping which has helped in accomplishing more prominent precision.

Maharsh Desai [5] Bicycle riding is a great deal of fun, yet mishaps occur. Individuals pick motorbikes over vehicle as it is a lot less expensive to run, simpler to stop and adaptable in rush hour gridlock. In India in excess of 37 million individuals are utilizing two wheelers. Since utilization is high, mishap level of bikes are likewise high contrasted with four wheelers. Cruisers have high pace of lethal mishaps than four wheelers. The effects of these mishaps are increasingly perilous when the driver includes in a fast mishap without wearing protective cap. It is exceptionally perilous and can cause extreme passing. So wearing a helmetcan diminish this number of mishaps and may spare the life. This paper points for shirking of mishaps and create cap discovery framework. We mean to utilize foundation subtraction and optical character acknowledgment for fall discovery and for cap identification and use foundation subtraction and Hough change descriptor.

The paper is organized as follows; Section 2 shows the helmet detect and Number plateextraction and this section done by different technique and also Section 3 discusses about the results and performance analysis and finally section 4 concludes the project.

2. PORPOSED MODELLING

In before that recognizable proof of bike riders without helmet falls under general class of abnormality acknowledgment in image records. As explained in successful discovery framework structure incorporates after obligations: ecological demonstrating, recognition, following and grouping of moving items. In the current framework a methodology which uses geometrical condition of helmet and brightening contrast at different bits of the head protector. It uses circle bend disclosure methodology taking into account the Hough change. The significant imperative of this methodology is that it attempts to discover head protector in the full edge which is computationally expensive and besides it may as often as possible jumble other practically identical demonstrated articles as cap. It uses Histogram of gradient alongside a framework to refine closer view mass remembering the ultimate objective to evacuate frontal area. In any case, is anything but a capable course of action due to its need of committed equipment. By then it finds the head of bike riders by applying Hough change and after that orders it as head or helmet.

- Helmet is seen as a deterioration issue, where the information is a distorted position and the give up is the indirect field.
- They can't recognize individual head pictures in existing human databases.
- However, permitting bigger distortion in coordinating will bring about higher false match rate.
- In round bend to distinguish helmet in a video feed, it has low precision.

Right now proposed approach for constant discovery of motorcycle riders without helmet. To begin with recognize a motorbike-rider in the information picture at that point discover the leader of the motorcycle rider and after that recognize whether the rider is using a defensive helmet or not. To start with, apply Sharpen channel on input picture after that convert into dim scale picture, after to apply supplement in the information objects from static items. Next, separate head in the information picture steps related with crop the info picture. From the outset, the helmet recognizable proof strategy is utilized to confine the articles in input picture from static items. Next stage remembers acknowledgment of motorcycle riders for the picture. This sequence utilizes the items, potential bike riders returned by foundation displaying step and gathering them as bike rider without protective helmet, dependent upon their visual perspectives. This stage incorporates two phases: Feature extraction and Classification. Highlight Extraction is done utilizing Histogram of Oriented Gradients (HOG) strategy. These descriptors get neighborhood shapes through angles. The part vectors in a way that is able to the movement and contain discriminative information, which also gives trust in incredible gathering accuracy. After component extraction, consequent stage is to characterize them as bike riders without helmet number plate to be distinguished. Right now, requires a twofold classifier. Any double classifier can be utilized here, in any case pick mean value in light of its capacity in arrangement or execution in any event, when arranged from less number of highlight vectors. When the bike rider number plate is recognized at that point state will be recovered.

- The proposed helmet identification by performs well matching experiments on various images.
- The proposed algorithm can improve recognition rate of vehicle number plate evidently.

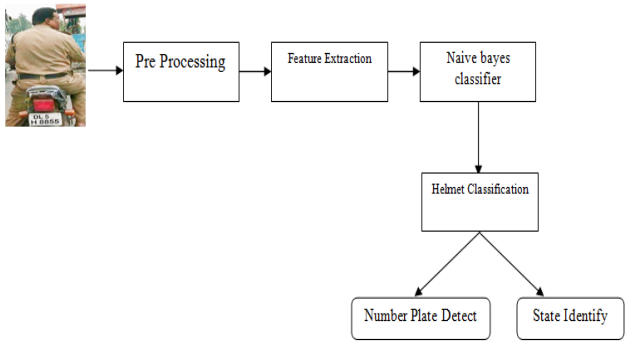

Figure 1 – Architecture diagram

Figure 1 portrays the architecture diagram of the Human image without helmet detection method and with number plate extract respectively. The proposed system methodology is described as follows.

3. METHODOLOGY

The proposed system helps to estimate the parameters and measure the accuracies by feature technique using helmet detection methods.

The first proposed and tried robotized framework for location of bike riders not wearing helmet was done .The framework utilizes bayes classifier prepared on highlights got from picture information close to head district of motorcyclists. The highlights chosen catch the shape and intelligent property of helmet where the top portion of head surface is seen as more splendid than the base portion of the head. It likewise considers the round circular segment state of head protector. The framework utilizes round curve discovery method dependent on Hough change. The principle weakness of this methodology is that it prompts a great deal of mis-characterization, as certain items which seem to be like helmet get give head protectors and a few helmet which are characteristic don't get named helmet. Another control is that it doesn't initially recognize motorcyclists in the top, which ought to have been done, since helmet is just important if there should be an occurrence of motorcyclists.

To overcome the issue of misclassification in the framework which initially distinguishes motorcyclists in the edge utilizing naivebayes classifier prepared on highlights removed by LBP descriptor. From that point forward, helmetgrouping is finished utilizing guileless bayes on highlights removed by a half and half descriptor, which is made by consolidating Circular Hough change, HOG and LBP descriptors.

In corresponding with built up a framework that utilizes classifier on highlights removed from locale properties in a picture. For naive Bayes classifier for police characterization, the highlights considered are zone of bouncing square shape and perspective proportion of the jumping square shape. For naive Bayes classifier for helmet order highlights like bend circularity (closeness between a circle and a curve) and normal force of pixel are considered. Be that as it may, the pictures caught right now not include any impediment as the pictures were opposite to the camera. Along these lines, this framework didn't think about taking care of issue of impediment.

The proposed a framework for helmet location utilizing haar includes for face identification for grouping between without helmet and with helmet. At that point, it utilizes circle hough change for arranging between without helmet. This framework has constrained degree as it includes picture with exceptionally very little traffic. Additionally, it doesn't consider scheme of recognizing bikes first, rather lawfully attempts to distinguish helmet.

3.1PROPOSED NAIVE BAYES CLASSIFIER

Naive Bayes classifier calculates the probability of an event in the following steps:

- Step 1: Calculate the prior probability for given class labels
- Step 2: Find Likelihood probability with each attribute for each class
- Step 3: Put these value in Bayes Formula and calculate posterior probability.
- Step 4: See which class has a higher probability, given the input belongs to the higher probability class.

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3.2 PERFORMANCE EVALUATION

The performance of the process is measured by measuring the accuracy of the process. Performance of each classifier is measure in terms of confusion matrix, sensitivity, specificity and accuracy.

Sensitivity is a measure which determines the probability of the results that are true positive such that helmet has identified.

Specificity is a measure which determines the probability of the results that are true negative such that helmet does not have identified person.

Accuracy is a measure which determines the probability that how much results are accurately classified.

ACCURACY = (TP + TN) /(FP + TN) + (TP +FN)

SENSITIVITY = TP / (TP + FN)

SPECIFICITY = TN / (FP +TN)

4. RESULTS AND DISCUSSIONS

Image Pre-processing Stage

A poor quality human with two wheeler image is typically noisy, exhibits smudged line and has low contrasts between human CCTV images. Since the image acquisition stage is not always monitored for accepting only high quality images, human with two wheeler image enhancement and noise reduction are, therefore, important pre-processing factors in accurately detecting human with two wheeler and the quality of the human image by first cropping the human with two wheeler region in image performing histogram equalization to increase the perception information. Specifically, remove the non-relevant white region found in the borders prior to cropping the region of interest. In order to remove noise captured during image acquisition, median filtering is then applied on the cropped images without reducing the sharpness of the input image. Finally, histogram equalization is performed to improve the contrast in the image by diversifying the intensity range over the whole cropped image. The output achieved after this stage is an image with a reduced noise and improved definition of the ridge structure.

Head Extraction Stage

In human with two wheeler authentication systems, the human with two wheeler image is usually from multiple subjects using different database. Therefore, human with two wheeler images are typically found to be of different scales and rotations. In certain scenarios, the human with two wheeler images are partially captured due to human errors. In order to obtain features that are invariant to these problems, use various features that capture properties of live human with two wheeler images from CCTV. In work, to extract local shape information to obtain more discriminative features and also incorporated for texture analysis. Details of the above features are provided in the following content.

Head localization for detected motorcyclist

Once a human with two wheeler object is classified as motorcyclist, image of the head portion is extracted by taking upper one-third portion of the original image. The extracted head portion is then fed to helmet vs non-helmet classifier.

Helmet vs Non-helmet classifier

This classifier was built similar to the helmets and non-helmet classifier. If this classifier classifies the head portion image as helmet, then the original motorcyclist image is forwarded for number plate detection; otherwise the image is discarded.

Number plate detection (localization) for target motorcycle

Number plates have high contrast between foreground and background that is designed for humans so that they can read easily. This is a blessing for a computer vision problem.

Input motorcyclist image is first converted to grayscale. Then, it is threshold. After this, the binary image obtained is inverted. Now, the contours are found out. Minimum area rectangles are generated around the contours. At this point, not only the number plate is detected, but there might be few other parts of motorcycle detected too. These are filtered out based on their orientation, height, width, aspect ratio. After this step, many of the candidates get filtered out (in most cases, all except the number plate gets filtered).

The remaining candidates are de-skewed, threshold, eroded and contours are generated for each. Rectangles are then obtained for the contours. Image of number plate has numbers and letters on it which are separated by white colored area. Therefore, more rectangles get produced for a number plate image than other images. Thus, the image with number plate is successfully identified.

State Detection

Different state estimation strategies are possible, such as number plate estimation using machine-learning based classification. Their results can be compared using first two letter of the number plate and the state will be identified.

5. CONCLUSION

In this proposed described a framework for automatic detection of motorcycle riders without helmet from CCTV image and automatic retrieval of vehicle license number plate for such motorcyclists. The use of Naïve bayes and transfer learning has helped in achieving good accuracy for detection of motorcyclists not wearing helmets. The stored number plates can be then used by Transport Office to get information about the motorcyclists from their database of licensed vehicles. Concerned motorcyclists can then be penalized for breach of law. In this proposed a framework for real-time detection of traffic rule violators who ride motorbikes without using helmet and a computer

vision system that is divided into modules such as input image segmentation, image classification and helmet use detection will assist the traffic the authorities to take action against rule violators.

However, future advances in with two wheeler analysis and recognition of without helmet an open, challenging research area are expected to result in wide deployment of with two wheeler technologies not only in surveillance, but in many other applications as well. Future aims to give an idea about the number of traffic offenders in an area. It generates a database of all the bike rides driving without wearing a helmet along with identified the car driver without seat belt to be identified future system.

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