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Automatic Detection of Bike Riders with No Helmet and Detecting Number Plate Using RASPBERRYPI

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ABSTRACT:Motorcycle accidents have been rapidly growing throughout the years in many countries. Due to various social and economic factors, this type of vehicle is becoming increasingly popular. The helmet is the main safety equipment of motorcyclists, however many drivers do not use it. The main goal of helmet is to protect the drivers head in case of accident. In case of accident, if the motorcyclist does not use can be fatal. This paper aims to propose a system for detection of motorcyclist without helmet. For this, we have applied the circular Hough transform and the Histogram of Oriented Gradients descriptor to extract the image attributes. Then, the MultiLayer Perceptron classifier was used and the obtained results were compared with others algorithms. Traffic images were captured by cameras from public roads and constitute a database of 255 images. Indeed, the algorithm step regarding the helmet detection accomplished an accuracy rate of 91.37%.Helmet detection method is a combination of classification and cluster. Helmet detection is an important, yet challenging vision task. It is a critical part in many applications such as traffic surveillance. Our proposed method work is as follows, Pre-processing, Feature Extraction and classification. We demonstrate our proposed work by using surveillance traffic videos. Finally, our method will classify whether the person is wearing helmet or not. As far as the robustness and effectiveness are concerned, our method is better than the existing algorithms. The project presents license plate recognition system using connected component analysis and template matching model for accurate identification. Automatic license plate recognition (ALPR) is the extraction of vehicle license plate information from an image. This system model uses already captured images for this recognition process. First the recognition system starts with character identification based on number plate extraction, Splitting characters and template matching. ALPR as a real life application has to quickly and successfully process license plates under different environmental conditions.

KEYWORDS: RASPBERRYPI, C-NN

I. INTRODUCTION

One of the leading causes of unnatural deaths today is road fatalities, primarily motorcycle accidents. Particularly, among road fatalities, motorcycle accidents accounted for 9% in Europe, 20% in the United States, and 34% in western Pacific and southeast Asian countries.our system uses CNNs for helmet violation and no-violation detection. The system performs well even when there are multiple persons on the motorcycle and one of them is not wearing a helmet.automatic license plate recognition systems use transition detection system for license plate detection, edge finding, contour extraction and validation for segmentation, and structural analysis techniques such as convex hulls, and bays and holes for character classification. In general, such systems are infeasible due to involvement of humans, whose efficiency decreases over long duration . Automation of this process is highly desirable for reliable and robust monitoring of these violations as well as it also significantly reduces the amount of human resources needed. Also, many countries are adopting systems involving surveillance cameras at public places. So, the solution for detecting violators using the existing infrastructure is also cost-effective. However, in order to adopt such automatic solutions certain challenges need to be addressed: 1) Real-time Implementation: Processing significant amount of information in a time manner is a challenging task. As such applications involve tasks like segmentation, feature extraction, classification and tracking, in which a significant amount of information need to be processed in short duration to achieve the goal of real-time implementation. 2) Occlusion: In real life scenarios, the dynamic objects usually occlude each other due to which object of interest may only be partially visible.Segmentation and classification become difficult for these partially visible objects. 3) Direction of Motion: 3-dimensional objects in general have different appearance from different angles. It is well known that accuracy of classifiers depends on features used which in turn depends on angle to some extent. A reasonable example is to consider appearance of a bikerider from front view and

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side view. 4) Temporal Changes in Conditions: Over time, there are many changes in environment conditions such as illumination, shadows, etc. There may be subtle or immediate changes which increase complexity of tasks like background modelling. 5) Quality of Video Feed: Generally, CCTV cameras capture low resolution video. Also, conditions such as low light, bad weather complicate it further. Due to such limitations, tasks such as segmentation, classification and tracking become even more difficult. As stated in, successful framework for surveillance application should have useful properties such as real-time performance, fine tuning, robust to sudden changes and predictive. Keeping these challenges and desired properties in mind, we propose a method for automatic detection of bike-riders without helmet using feed from existing security cameras, which works in real time. The system performs well even when there are multiple persons on the motorcycle and one of them is not wearing a helmet.automatic license plate recognition systems use transition detection system for license plate detection, edge finding, contour extraction and validation for segmentation, and structural analysis techniques such as convex hulls, and bays and holes for character classification. Over the past years many works were carried out in traffic analysis, including vehicle detection and classification, and helmet detection. Intelligent traffic systems was usually implemented using vision computer algorithms, such as: background and foreground image detection to segment moving objects in scene and image descriptors to extract features. Computational intelligence algorithms are used too, like machine learning algorithms to classifier the objects. Next, some related works to helmet detection are presented. As convolutional neural networks (CNNs) have as of late beat custom feature-based strategies in numerous areas, there is proof that the utilization of CNNs could build the precision of headcap helmet /no-head protector characterization. Lately, CNN's doing both programmed highlight mining and characterization have outflanked already prevailing techniques in numerous issues. Upgrades in graphical processing units (GPUs), alongside the accessibility of all the more preparing information for neural organizations to learn, have as of late empowered extraordinary exactness in the fields of gadget vision, normal language handling, and discourse appreciationThey utilize a CNN for tag discovery. They utilize two techniques for division and acknowledgment. The underlying is peculiarity division based acknowledgment utilizing picture binarization, associated part investigation, and character. The extra is a grouping marking based technique utilizing CNNs and recurrent neural networks (RNNs). These days, all cutting edge strategies for object characterization, object identification, character grouping, and article division depend on CNNs. See for instance the strategies utilized in the ImageNet huge scope realistic acknowledgment explore.

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II. RELATED WORK

In 2018,Aiswarya Menon,BinnyOmman worked on “Detection and Recognition of Multiple License Plate From Still Images”.License Plate recognition is the most efficient and cost-effective technique used for vehicle identification purposes. Automatic license plate recognition (ALPR) is used for finding location of the number plate. These approaches and techniques vary based on conditions like, image quality, car at fixed positions, conditions of lights, single image etc. It should also be able to cope with the variations in license plates from different nations and states. The approach should also be able to work seamlessly with number of characters varying in plates or size of the plates in the captured images. We mainly focus on detection and recognition of multiple cars license plate from a single frame. Proposed system consists of two steps: plate number detection and recognition. In plate detection part we apply both Spanish and Indian license plate. In our test case we will be working with number plates from Spain. Three different license plates which differ from one another in their size and shape. In plate number detection phase the license plate is detected from the captured image and then in second phase segmented plate is passed to plate recognition that makes to determine the characters and numbers. In 2016,RathnaBoliwala, Manish Pawar worked on “Automatic number plate detection for varying illumination conditions”Automatic Number Plate Detection is the technology which is used to read vehicle number plate from an image containing a still or moving photograph of a vehicle. It is a major breakthrough in the technology which is very helpful for the law enforcements and traffic management authorities. The variation of the plate type and some environmental illuminations are considered in this paper. This technology uses special kind of surveillance cameras to track down and record the vehicles registrations and track down their activities easily. Due to rapid increase in vehicles all over the world it is very difficult to keep track of all these vehicles and to figure out the criminal activities. Therefore it is vitally important to keep track of all these vehicles by the respective authorities. To simplify their enormous task this technology is developed which helped them a lot in their management.In 2020, N.Palanivel Ap; T. Vigneshwaran; R. Madhanrajworked on “Automatic Number Plate Detection in Vehicles using Faster R-CNN”.The paper is aimed to identify the number plate in the vehicles during difficult situations like distorted, high/low light and dusty situations. The paper proposes the use of the Faster R-CNN to detect the number plate in the vehicle from the surveillance camera which is placed on the traffic areas etc. The created system is used to capture the video of the vehicle and then detect the number plate from the video using frame

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segmentation and image interpolation for better results. From the resulted image using the technique called optical character recognition is applied on that image for number recognition. These number are given as input to the database to retrieve data like vehicle's name, owner name, address, owner mobile number, etc. The performance of this system is measured using in a graph model. The proposed system is able to achieve a 99.1% accuracy to detect the number plate of the vehicle and show the vehicle's owner information.In 2009, Prathamesh Kulkarni; Ashish Khatri; Prateek Banga; Kushal Shahworked on "Automatic Number Plate Recognition (ANPR) system for Indian conditions" Automatic number plate recognition (ANPR) is a real time embedded system which automatically recognizes the license number of vehicles. In this paper, the task of recognizing number plate for Indian conditions is considered, where number plate standards are rarely followed. The system consists of integration of algorithms like: 'feature-based number plate localization' for locating the number plate, 'image scissoring' for character segmentation and statistical feature extraction for character recognition; which are specifically designed for Indian number plates. The system can recognize single and double line number plates under widely varying illumination conditions with a success rate of about 82%.

III. PROPOSED METHOD

This study proposed a computational vision methodology for the detection of helmet use by motorcyclists on public roads. The study is divided into two stages: vehicle segmentation and classification, and the detection of helmet use. The stage of vehicle segmentation and classification has the following objectives: determining which objects are moving in the scene and classifying these objects. Similar to the majority of computational vision systems, the proposed system requires a calibration stage. In the calibration stage, parameters that are required for the operation of the system are adjusted. In the calibration stage of the proposed system, a cross line (CL) is defined. This line will be marked by the system operator and should cross the public road where the system will be responsible for capturing the vehicles. The moving objects that cross the CL are subsequently extracted from the video frame. The next step involves extracting the features of the segmented objects. The wavelet transform (WT) was employed [10, 18]. The vectors are the input parameters of the classifier. The random forest classifier was employed to classify the vehicles [4]. The images are grouped into two classes: motorcycle or nonmotorcycle. This classification is adopted as it is sufficient for assessing whether an object is a motorcycle in the proposed system. The second stage consists of the detection of helmet use. To reduce the computational cost and to increase the precision, a region of interest (RoI) was defined. The HOG descriptor was employed in this stage. The descriptor obtains different vectors for an image of a motorcyclist with a helmet and without a helmet. The extraction of features for the detection of helmet use is considered as a critical step in this study, as helmet detection is the main objective of the proposed system. The MLP classification algorithm was used to classify the images into two classes: with helmet or without helmet. The diagram of the proposed system shows all of the stages and substages of the problem, as illustrated in. The diagram includes all stages from the capture of images to the detection of a helmet

IV. RESULTS

In this section, the results are presented and discussed. In addition, a comparative analysis is performed with other algorithms to describe and classify the images. The results are divided into two groups: – results of the vehicle classifier, and – results of the helmet detector. Information about the image databases, generated from the segmentation of vehicles and the methodology employed for the classification of the results, are also presented in this section.

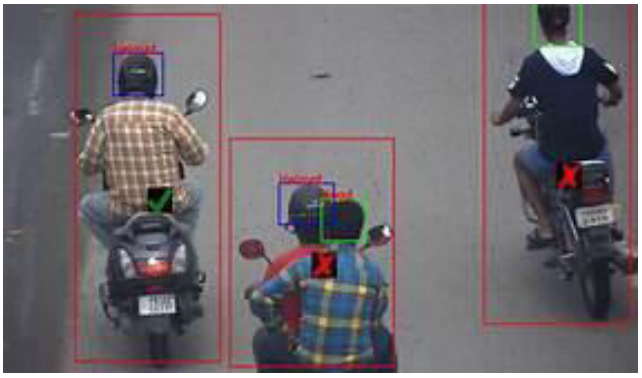

Fig 4.1:HELMET DETECTION

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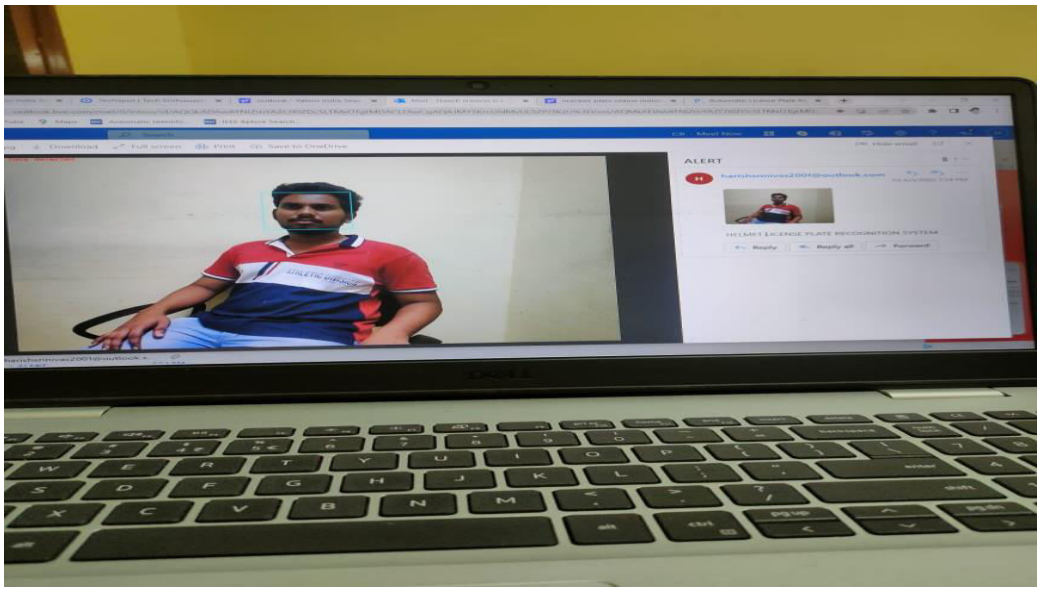

Fig 4.2:OUTPUT OF PERSON WITHOUT WEARING HELMET

V. CONCLUSION AND FUTURE WORK

In this paper proposed a feature based number plate recognition. The feature based number plate recognition improves the performance of number plate recognition. The process of feature extraction performs by wavelet transform function. Wavelet transforms function gives a better texture feature. The extracted texture feature goes through quantization process. The vector quantization gives the binary format of number plate. For the optimsation of vector used BP neural network model. BP neural network is novel algorithm for data optimization. Fitting approach is necessary for template matching. For matching the characters with the database, input images must be equalsized with the database characters. Here the characters are fit to 24x42. The extracted characters cut from plate and the characters on database are now equal-sized. The next step is template matching. Template matching is an effective algorithm for recognition of characters. The character image is compared with the ones in the database and the best similarity is measured. In the final module, each segmented character from the previous module will be matched with the stored templates of the character pixel by pixel. In future reduces the training time and computational time of template generation.

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