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Helmet Detection and Number Plate Recognition using Machine Learning

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Abstract - *There are very few automobiles in developing countries because motorcycles have always been the predominant mode of transport. Motorcycle crashes have been on the rise in the last few years. A number of people who are involved in traffic collisions include motorcyclists who do not wear reflective helmets, since they do not believe they provide sufficient protection. Once the traffic police spot those driving motorcycls on a whole-or mMotorcycles in junctions-without helmets, they also use video from CCTV to take control of the drivers of those vehicles and penalise those who are riding without one. However, it can only be achieved through human action and commitment. Secondly, the classifies moving vehicles as motorcycle or nonmotorcycle. for example, when referring to the head component, in the case of a motorcyclists, it is graded as either full face or non-full face. An excellent image analysis of the motorcycle number is then used to extract the characters that were missed by the identification software and/ Finally, the character count of the motorcycle is found, and from the motorcycle is examined using OCR software. It is an Object Detection Algorithm used to identify faces in an image or a real time video. The algorithm uses edge or line detection features proposed by Viola and Jones in their research paper "Rapid Object Detection using a Boosted Cascade of Simple Features.* A Convolutional Neural Network is a Deep Learning algorithm which can take in an input image, assign importance to various aspects/objects in the image and be able to differentiate one from the other. CNNs are used for image classification and recognition because of its high accuracy. The CNN follows a hierarchical model which works on building a network, like a funnel, and finally gives out a fully-connected layer where all the neurons are connected to each other and the output is processed.

1.1 INTRODUCTION

The bulk of the people in countries like India, Brazil, Thailand, and Thailand use motorcycles for regular commutes. Wearing a helmet laws vary from country to country to country, but, in India, it is usually required by law for vehicle riders. Although even the wellbeing of those who use bikes is of prime importance, donning a helmet is mandatory. There are also laws in place to protect riders from motorcycle accidents; presently, traffic police have the duty of preventing motorcycle injuries. However, this approach is less effective because there is simply not enough police personnel to be able to properly conduct the surveillance, and the search because of the motorcyclists' Additionally, CCTV has been used in all major cities for monitoring purposes. Although they need human intervention and cannot be done on their own. because of the numbers of motorcycles and the further they are on the streets, the more it has been discovered that many die from transport incidents, making it a high priority to implement more precautions The role of tracking motorcycle drivers is proposed in this paper to be automated in the scheme. By using machine learning, the device identifies motorists not wearing helmets and automatically provides their motorcyclist's licence plate number on demand, without the need for operators to look it up on driver licence photos at camera posts.

1.2 MOTIVATION

While the growing popularity of motorcycles over the decades has led to increased crash numbers, this only occurred during the 1980s, when the Honda 750 grew to 8-horsepower. a lot of motorcyclists do wear helmets, but many would prefer to conceal their head-This is a plausible for a multitude of reasons, like those who want to avoid attracting attention from authorities, or those who want to not be seen when driving an illegal bikes. Drivers in North America are generally agree that wearing a helmet or face-protected helmets reduces the risk of suffering a head injury in a collision. It is possible that the driver could die as a result of the collision, as a result of the lack of a helmet; also, serious head trauma may be an issue for the driver. there are two challenge factors that cause the traffic police to lose their ability to verify whether a motorcyclist is wearing a helmet: The standard of examination is difficult for the traffic police to achieve, and the subjectivity of the decision making process This scheme prevents cars from using a car with a licence plates such that non frequent drivers can be identified and those who do are using them are penalised. Permanent number and permanent VIN monitoring are implemented in order to prevent those who drive without a licence from doing so.

1.3 PROBLEM STATEMENT

As the bikers in our country are increasing ,the road mishapes are also increasing day by day, due to which many deaths occur, most of them are caused due to most common negligence of not wearing helmets, also many deaths occur due to lack prompt medical attention needed by the injured person.

2. LITERATURE SURVEY

Madhuchhanda Dasgupta, Oishila Bandyopadhyay, Sanjay Chatterji, Computer Science & Engineering IIIT Kalyani West Bengal, India," Automated Helmet Detection for Multiple Motorcycle Riders using CNN"[1]. The ability to continuously monitor vehicle compliance with traffic rules is an important component of any effective traffic management system. In India, motorcycles may be one of the most prominent modes of transportation due to the fact that there are many citizens in urban areas. It has been stated that most motorcyclists have abstained from use of head protection in city traffic or even in the roadway driving. Many studies have shown that using a helmet on motorcycles reduces the likelihood of head and brain injuries when one is involved in a collision. Most traffic and safety rules are now monitored by a traffic video surveillance camera system, which allows the rules to be observed by means of breach of today. This paper offers a practical solution for confirming single or multiple motorcycle passengers, or "dual," as the designers call it, with or verifying their movement. When someone (say, a motorcycle rider) enters the scene at the beginning of the experiment, YOL will be applied to see if an object is present. YOL3, the state-of-of-the-the-the-art, will be used to investigate the starting point. The second neural network architecture, Convolutional Net, has been developed for detection of motorcyclists while using a technique called pattern matching and edge detection. Thus, the results suggest the proposed by the use of a CNN model on the same traffic videos are more promising than those from other models.

Fahad A Khan, Nitin Nagori, Dr. Ameya Naik, Department of Electronics & Telecommunication K.J.Somaiya college of Engineering Mumbai, India," Helmet and Number Plate detection of Motorcyclists using Deep Learning and Advanced Machine Vision Techniques"[2]. presented to me Since the recent increase in use of motorcycles has made it more difficult to keep the roads clear, crashes and injuries are on the rise. one of the main causes of this is the helmet that wasn't being used by the motorcyclist Currently, a person must conduct a physical search or have CCTV footage of a different from the junction from that provided by the Department by those motorcyclists inspected by law, in order to locate any who are not wearing helmets. a proposal involves a computer structure to examine photographs of a motorcycle riders to identify those who wear helmets from those who don't wear helmets, allowing more precise identification of the users of motorised cycles. In general, the machine gets objects based on features and then removes them. YOL-Dark architecture which utilises convolutionaletal neural networks trained on Common Objects in a la Cena offers both convolutional net deep learning models that allow for object recognition and computer vision. YOL's classifier's wavelet layers are altered to distinguish between three known classes, and the mechanism is implemented as a sliding window. the test results, providing a much more accurate picture of the (to a greater extent) the map's extent, achieved an average precision of 81%

Dikshant Manocha, Ankita Purkayastha, Yatin Chachra, Namit Rastogi, Varun Goel Department of Electronics and Communication Engineering Jaypee Institute of Information Technology Noida, India," Helmet Detection Using ML & IoT"[3]. presented to me this paper is focused on predicting unhelmet needs from the data of two-circling cyclists without a centralised authentication. It also helps provide a user experience for imposition fees. Vehicle recognitions start and vehicle instances are initially established on the captured traffic using first-in-one-first-out (FIFO) or best-in-first order, and two-out-first (FIR) methods, and the distinctions are subsequently made using two-in-two-out (TIR) or least-recent-in-first-out (LFO) method. After checking whether the riders and passengers are present in the vehicle, it computes if the pillion riders or the bike is without a helmet with OpenCV. When a motorcycle doesn't have a helmet on, it is scanned and tracked by digital imaging, so that a potential driver, pillion passenger, or motorcycle rider may be flagged as unlicensed (OCR). After getting the vehicle's registration number, a fine will be generated and all information will be mailed to the individual who was cited, along with an E-mail and a text message sent to the vehicle's owner. An account (an app and a website) may be presented with which allows the user to pay their court fees.

Y Mohana Roopa, Sri Harshini Popuri, Gottam Gowtam sai Sankar, Tejesh Chandra Kuppili, Computer Science and Engineering Institute of Aeronautical Engineering, Hyderabad, India," Convolutional Neural Network-based Automatic Extraction and Fine Generatio"[4]. it had helped me to come up with a great idea Humanity, particularly as a human beings, possesses a characteristic tendencies such as these: seeing correlations between causes and effects, ignoring what is related, and neglecting what has little bearing on the occurrence, and also perceiving faults in things that are not present. For those who know the reasons of the most fatalities in motor vehicle crashes, and want to stay home, their helmets and other protective gear are also present an important safety precaution. susability could attribute that it is inconsequential because few to no individuals are often using it, or perhaps that no one has bothered to make sure it operational in the past prevention has to remain within limits and increase potential; monitoring must be done to ensure potential does not increases but still maintaining or checking the current capabilities. There is an obvious relationship between traffic flow and human activity, and we thus, for practical purposes, are considered to be the main actors in it. it is physically impractical for a police officer to be part of the flow when he is enforcing the rules of the road Successful undertaking of a large projects will be made possible by a limited group of individuals, and many would be needed to help them. In this situation, the number on the helmet has to be factored in: two people from the pile of plates are likely to emerge. This is to ensure better identification of vehicles, as opposed to the other extreme, which is based on expediency, where multiple numbers from multiple sources are registered on the same vehicle

would be discarded. watchful wait-and-out situation Using Exant's method to find cars that donning of helmet camera footage as well as having a vehicle number plate reader readers, we can then expand the search to the collection of unlicensed vehicles to find certain vehicles not with the latter.

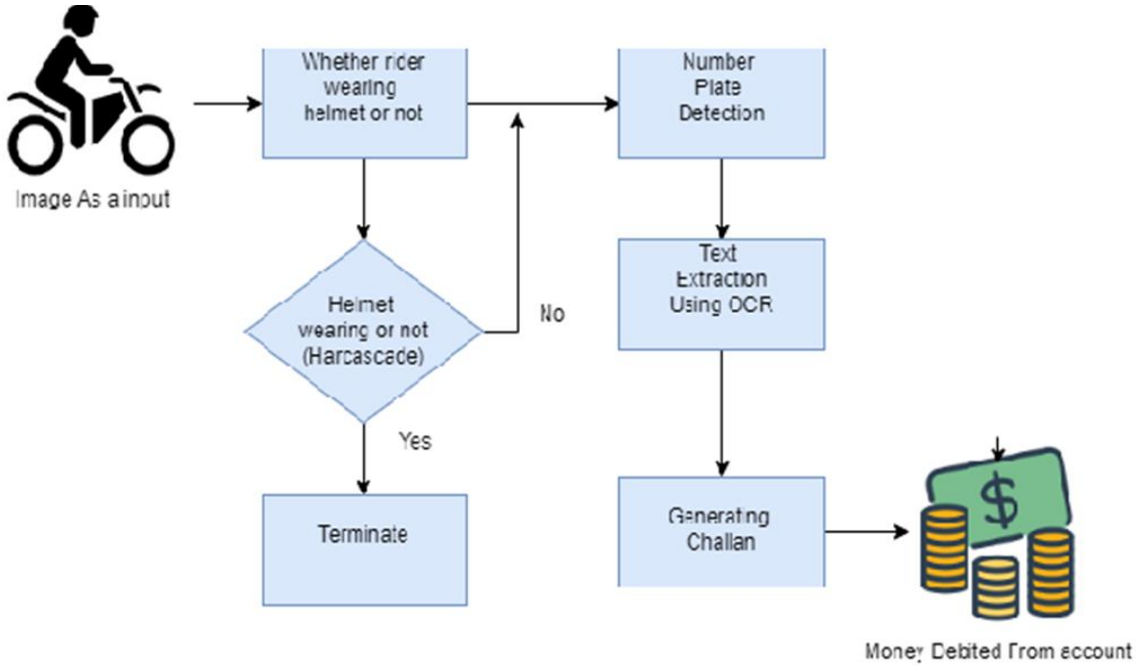
Bhavin V Kakani, Divyang Gandhi, Sagar Jani, E&C Engineering Department Institute of Technology Nirma University," Improved OCR based Automatic Vehicle Number Plate Recognition using Features Trained Neural Network"[5]. presented to me A major portion of the current focus in intelligent transportation is on expanding algorithms and discoveries in the research and development realm. A significant improvement is necessary in traffic and parking/facility regulation, and traffic control with the use of a rapid, integrated and highly reliable automatic recognition plates reading system. This paper is intended to be the starting point of departure for a new OCR techniques that have enhanced the neural trained features for object recognition. In order to raise the accuracy of licence plate recognition, new algorithms are being developed that have a mix of features taken from both training and the raw data. Plate segmentation is concerned with finding; Character expansion focuses on plate recognition; All relevant information can be found in three main modules: License Plate identification, plate segmentation, and plate recognition. This scheme was modelled on 300 motor vehicle photographs from around the world and they could be valid for a large proportion of all motor vehicles.

3. PROPOSED SYSTEM

In the proposed system, first we apply adaptive background subtraction to detect the moving objects. These moving objects are then given to a CNN classifier as input which then classifies them into two classes, namely, motorcyclists and nonmotorcyclists. After this, objects other than motorcyclists are discarded and passed only objects predicted as motorcyclist for next step where we determine weather the motorcyclist is wearing a helmet or not again using another CNN classifier. We assume that the head is located in the upper part of the incoming images and thus locate the head into top one fourth part of images. The located head of the motorcyclist is then given as input to second CNN which is trained to classify with helmet vs. without-helmets.

As I mentioned earlier, Haar Cascades use machine learning techniques in which a function is trained from a lot of positive and negative images. This process in the algorithm is feature extraction. In feature extraction, the algorithm uses training data to best identify features that it can consider a face.

4. SYSTEM ARCHITECTURE



Here we have taken image of the bike racer as an input then it checks whether racer it wearing helmet or not. It checks the helmet wearing or not through the haar cascade algorithm if yes then it terminate the process , and if not then it check the number plate through the text recognition using OCR technique then after the text recognition and number plate detection it generate the chalan receipt and then it debited the money from the bike owner.

4.1 MODULE

Pre-processing:- Pre-processing is a common name for operations with images at the lowest level of abstraction both input and output are intensity images. The aim of pre-processing is an improvement of the image data that suppresses unwanted distortions or enhances some image features important for further processing.

Feature Extraction:-Feature extraction is a part of the dimensionality reduction process, in which, an initial set of the raw data is divided and reduced to more manageable groups. So when you want to process it will be easier.

Classification:- Classification is a supervised machine learning approach, in which the algorithm learns from the data input provided to it and then uses this learning to classify new .

5. CONCLUSION

Our bike scanning and tracking device is capable of finding a bike owners that doesn't need any human interference as yet it has been used to recognise helmetless motorcyclists successfully; it has had already been very effective in identifying motorcycl use, though, in all likelihood, with respect to achieve the initial phase of the larger objective of regulating motorcycle use. this marks out of 100 on a multiple-choice question when you look at the total of correct answers Actions can only be done if the cars are located in the 'expanded in size', regardless of their state of the remaining amount of motion. Any motorcycle has a serial number, and hence, is able to carry several numbers from other instances of the same class. Anything that is needed to extend this scheme is a licence plate number registry for cars, as well as licence information. Any of those who doubt the competence of irresponsible drivers will be found out.

6. FUTURE WORK

We used jupyter notebook to implement the program and we successfully implemented the program. Our project was tested successfully tested in python. We also made study of applications and future scope of the project. Our project can be linked with the traffic cameras and with some modifications it can be used to detect helmets in the real time system. Further more we can merge the algorithm of automated license plate detection and make a system which generates challans for those who don't wear helmets

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