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Helmet And Number Plate Detection Using Deep Learning

Dr. Sivala Vishnu Murthy[1], Nalla Keerthana[2], Chippada Tulasi Ram[3], Jami Anusha[4], Simma Bharath Kumar[5]
[1]Associate Professor, Department of CSE, AITAM, Tekkali, Andhra Pradesh.
[2, 3, 4, 5]B.Tech. students, Department of CSE, AITAM, Tekkali, Andhra Pradesh.
Aditya Institute of Technology and Management, Tekkali. Andhra Pradesh.532201 India

Abstract: In daily life, the role of a helmet is vital for motorists. The human brain is an important organ, which is protected by the skull. So the head is to be protected by a helmet, in case of an accident. From our literature survey we found that in India, the majority of motorists do not wear a helmet. This negligence causes fatal injuries. We want to minimize this risk. So our main motive behind Helmet And Number plate Detection And Recognition were to first detect if someone is wearing a helmet or not, if he or she wearing it no problem, but if not, detect his number. We are using the system YOLO (You Only Look Once)-Darknet deep learning framework to detect bikes and number plates and Convolutional Neural Network model is used to detect helmets**.**

INTRODUCTION

Motorcycle Accidents have been rapidly growing throughout the years in many countries. 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 an accident. In such a case, if the motorcyclist does not use a helmet, it can be fatal. It is not possible for traffic police force to watch every motorcycle and detect the person who is not wearing a helmet. There is a need to propose an automated system that monitors motorcycles and detects the persons wearing helmet or not and a system to detect number plates. In India, road accidents are increasing very rapidly and lots of deaths occur due to head injuries because number of people do not wear helmets. To avoid these issues, there is need for a system that

automatically detects the people who are not wearing a helmet and a system that detects number plates of the motorcycles which would helpful to police. By doing this we propose that rate of accidents will reduce and many lives will be saved. 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'

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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 to be automated in the scheme. The motivation of this work is to enhance the surveillance on the roads in almost all locations where the use of helmets is mandatory. These stats reveal the need for enhancement and enforcement of traffic laws, particularly for offences for which there are very less and low accuracy automatic detection methods. As a result, the increase in the number of two-wheeler riders using helmets causes a drastic decrease in the number of accidents with victims, which is high in those countries. Traditional image processing approaches have been utilised in the past to identify things by extracting features from photos. When it comes to object detection in computer vision, the most sophisticated method is Convolutional Neural Networks (CNNs). In this case, CNN's automated feature extraction with more accuracy is the best option.

LITERATURE REVIEW

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-ofof-the-the-the-art, will be used to investigate the starting point. The second neural network architecture, Convolutional, 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

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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 utilizes convolutional 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.

SYSTEM ARCHITECTURE

1) Input Video - Here we can upload the Input video.
2) Image Pre-processing - In this step we will apply the image pre-processing methods like grey scale conversion, image noise removal.
3) Image Feature Extraction - In this step we will apply the image pixel extraction methods to remove the image features from image.
4) Image Classification - In this stage we will apply the picture classification methods to distinguish the contaminated region and safe area from features.
5) Result - In this step will show the final result detection result.

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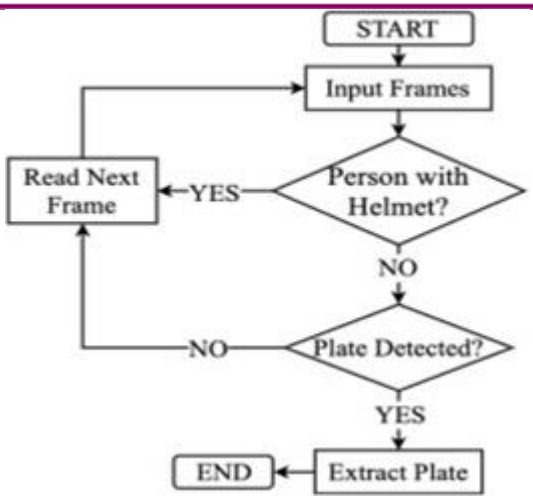

Fig.1 Data Flow Diagram

Fig.2 Multiple Persons Same Bike without Helmet

ALGORITHM

Step-1: Begin
Step-2: Taking video as input
Step-3: Taking single frame from that input
Step-4: Checking if that frame contains a helmet
Step-5: If the helmet is present then going back to 2nd stage
Step-6: If helmet is not present then giving this frame to the function which detects number plate
Step-7: Repeating this procedure till the input is not empty/null
Step-8: End

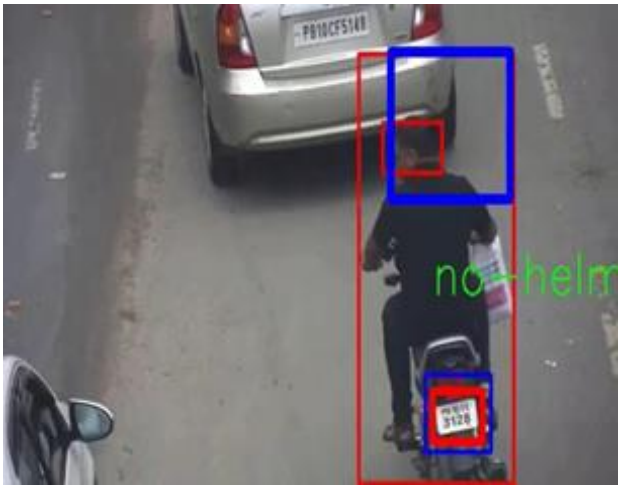

Fig.3 Rider Without Helmet

RESULTS

When we give the input video wearing helmet, it successfully detects the element and also it prints “helmet” detected on the console. When the person is not wearing helmet the system searches for the number plate in the frame and prints “no-helmet” on the console.

Fig.4 Rider With Helmet

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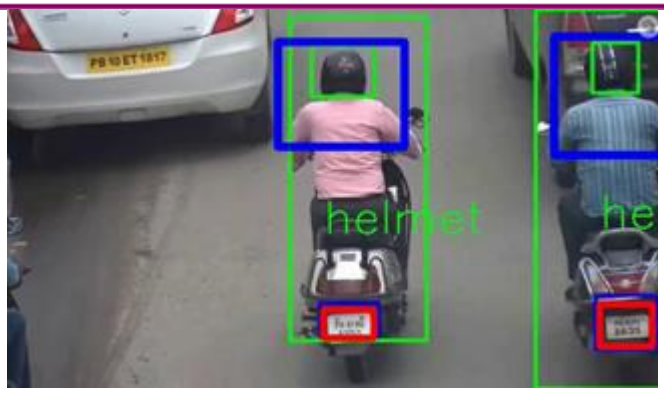

Fig.5 Multiple Riders Detected On a Single Frame

CONCLUSION

Our study proposes a deep learning-based model that can detect bikes, helmets, and number plates from input videos. With our model, there is no need for manual feature extraction since it is fully automated with an end-to-end structure. We are able to detect a bike, a helmet, and a number plate with our model. CNN is used to detect helmets, and YOLO-V3 is used to detect bikes and number plates. It can be used for traffic surveillance in remote areas of countries to detect riders without helmets.

This paper would depend on various factors such as the accuracy of the detection algorithm, the speed and efficiency of the system. The system is effective in detecting helmets and number plates in images or videos with high accuracy. The system is efficient and can process images or videos quickly, allowing for real-time detection in practical applications. The system has the potential to improve safety on roads by detecting whether motorcyclists are wearing helmets and whether vehicles have valid number plates.

In summary, the conclusion of the project would depend on the specific details of the system and its performance, but it has the potential to improve road safety and can be refined further for better accuracy and efficiency.

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