HELMET DETECTION USING ARTIFICIAL INTELLIGENT

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Abstract - This is because more people are riding motorcycles on the highways these days, resulting in a rise in the number of accidents and injuries. The motorbike rider's failure to wear a protective helmet was one of the key causes of the accident. You can check whether or not they are wearing helmets now by looking at CCTV footage from surrounding buildings or at a pedestrian crossing. It is critical that people interact with either of these systems in order to locate those who are not wearing helmets. By utilizing a structure similar to that of a computerization machine, the proposed framework, for example, may discriminate between shots of motorcyclists wearing helmets and images of motorcyclists not wearing helmets. A feature of an object is classified by the system based on the information it has gathered about it. The system uses a deep learning architecture based on the You Only Look Once (YOLO)-Darknet principle in its current state. To produce a powerful deep learning system, this deep learning architecture combines computer vision with convolutional neural networks that have been trained on common things in context (COCO). YOLO's convolutional layers were trained to recognize three different types of objects using a sliding window approach, which was made possible by the layers.

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***Key Words*:** Deep Learning, Image Processing, Classification, Conversational Neural Network , COCO model, YOLO-Darknet, Helmet Detection etc.

1.INTRODUCTION

Over the years, motorcycle accidents have increased in various countries. Although many motorcycle riders do not wear a helmet, it is the most critical piece of safety equipment. In the event of an accident, the primary purpose of a helmet is to protect the driver's head. It can be fatal if the rider does not use in the event of an accident. It's also impractical for traffic cops to keep an eye on every motorcycle to see if the rider is wearing a helmet. As a result, an automated system was needed to monitor motorcycles and determine whether or not the rider was wearing a helmet, as well as detect the number plate to penalize those who were not wearing a helmet.

Video surveillance can detect motorcycle helmet wear automatically, enabling for more efficient education and enforcement initiatives to improve road safety. Furthermore, the datasets used to develop techniques are limited in terms of traffic conditions and density changes. The multitask learning (MTL) system described in this paper can recognize and track different motorcycles, as well as register the helmet worn by the rider.

2. Literature survey

Madhuchhanda Dasgupta, Oishila Bandyopadhyay, Sanjay Chatterji, Kalyani [1] Any smart traffic system must include automated detection of traffic rule violations. In a country like India, where population density is high in all major cities, motorcycles are one of the primary ways of transportation. It has been found that the majority of motorcyclists do not wear helmets when riding within cities or on highways. In most motorcycle accident scenarios, the use of a helmet can lower the risk of head and serious brain injury to the motorcyclist. Most traffic and safety rules are now discovered by analysing traffic recordings obtained by surveillance cameras. This research presents a framework for detecting single or many riders on a motorcycle who are not wearing helmets. In the suggested methodology, motorcycle riders are spotted in the first stage using the YOLOv3 model, which is an incremental version of the YOLO model, the state-of-the-art method for object detection. In the second stage, a Convolutional Neural Network (CNN)-based architecture for motorcycle helmet detection was proposed. The suggested model is tested using traffic recordings, and the results show promise when compared to other CNN-based techniques.

Fahad A Khan, Nitin Nagori, Dr. Ameya Naik, K.J.Somaiya, [2] The increased use of motorcycles on the road nowadays has resulted in an increase in traffic accidents and injuries. One of the biggest causes is the motorbike rider's failure to wear a helmet. Currently, one technique is to physically check helmet use at the pavement junction or via CCTV surveillance video, which involves human intervention to discover motorcyclists who are not wearing a helmet. The suggested framework includes a computerization machine structure for distinguishing between photographs of a motorbike rider wearing or not wearing a helmet. Based on the extracted characteristic, the system determines the class of the item.

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The system makes use of the You Only Look Once (YOLO)-Darknet deep learning architecture, which is made up of convolutional Neural Networks trained on Common Objects in Context (COCO) and integrated with computer vision. YOLO's convolutional layers are updated to recognize the three classes indicated, and it employs a sliding window technique. Using training data, the map (Mean Average Precision) on the validation data set obtained 81 percent.

Dikshant Manocha, Ankita Purkayastha, Yatin Chachra, Namit Rastogi, Varun Goel, [3] This work discusses using machine learning to recognize two-wheeler riders who are not wearing helmets and providing them with a user interface to pay challans. The proposed method first collects a real-time image of road traffic before distinguishing two-wheelers from other vehicles on the road. It then uses OpenCV to determine whether the rider and pillion rider are wearing helmets or not. If any of the riders or pillion riders is discovered to be riding without a helmet, their vehicle number plate is evaluated using optical character recognition (OCR). Following the extraction of the vehicle registration number, a challan will be generated against the particular car, and all challan data will be delivered to the concerned individual through E-mail and SMS. To pay their challans, they will also be given a user interface (an app and a website).

Y Mohana Roopa, Sri Harshini Popuri, Gottam Gowtam sai Sankar, Tejesh Chandra Kuppili, [4] Dangerous accidents occur for a variety of reasons. One of the leading causes of mortality in car accidents is a lack of a helmet. People are careless when it comes to wearing helmets. Proper supervision is required to keep this under control. The current traffic control system is primarily based on human labor. A police officer cannot handle all traffic while also keeping an eye out for rule breakers. It would be a difficult task that would necessitate a large number of people to cover all of the places. This may be remedied with our new automated system, in which two-wheelers without helmets are detected by yolov2 and the appropriate frames from the video are retrieved, from which the number plate of the specific vehicle and the penalties for violating traffic laws are extracted. This precise detail will be updated on the server, and a message will be sent to the phone number recorded along with the license plate. This study describes an automated system that scours traffic surveillance footage for automobiles, extracts license plates from vehicles without helmets, and generates an electronic fine management system.

Bhavin V Kakani, Divyang Gandhi, Sagar Jani,[5] In recent years, significant research and development of algorithms in intelligent transportation has gotten increased attention. For traffic control and law enforcement of traffic regulations, an automatic, rapid, accurate, and robust vehicle plate recognition system has become necessary, and ANPR is the solution. This research focuses on an enhanced OCR-based license plate recognition system that employs a neural network-trained data collection of object features. To improve accuracy, a blended algorithm for license plate recognition is developed and compared to existing approaches. License Plate Localization, Plate Character Segmentation, and Plate Character Recognition are the three key components that make up the entire system. The system is tested on 300 national and international LP photos of motor vehicles, and the findings show that the major criteria is met.

3.PROPOSED SYSTEM

In this study, we propose a YOLOv3 Algorithm based on object detection for identifying and monitoring particular motorcycles, as well as registering rider-specific helmet use. Along with the dataset, we present an assessment metric for helmet wear and rider detection accuracy that may be used as a baseline for evaluating future detection algorithms. We show that using YOLOv3 for concurrent visual similarity learning and helmet use categorization enhances the efficiency of our strategy for recognizing the number of riders and helmet use of monitored motorcycles when compared to previous studies.

A. SYSTEM ARCHITECTURE

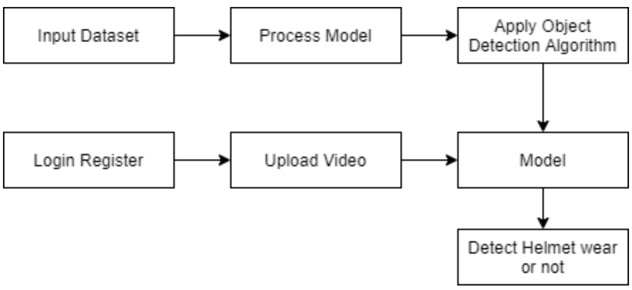

Fig. System Architecture

4. ALGORITHM

Yolo V3 Algorithm:

You Only Look Once, Version 3 (YOLOv3) is a real-time object detection system that detects specific items in films, live feeds, or photographs. To detect an object, YOLO employs features learned by a deep convolutional neural network. Joseph Redmon and Ali Farhadi invented YOLO versions 1-3. The first version of YOLO was released in 2016, and the third edition, which is thoroughly described in this article, was released two years later in 2018. YOLOv3 is an upgraded version of the original YOLO and YOLOv2. YOLO is built with the deep learning packages Keras or OpenCV. YOLOv3 is an upgraded version of the original YOLO and YOLOv2. YOLO is built with the deep learning packages Keras or OpenCV. Artificial Intelligence (AI) algorithms use object classification systems to recognise certain objects in a class as subjects of interest. The systems group things in images into groups where objects with similar qualities are grouped together, while others are ignored until specifically configured.

Fig -1: Helmet Detection

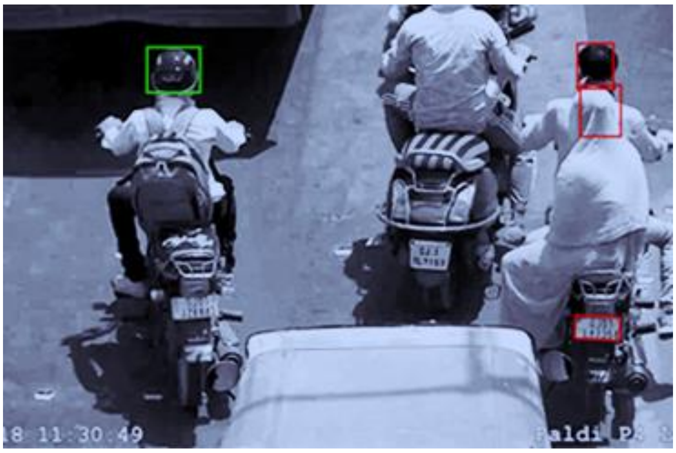

Fig -2: helmet Detection of Motorcycle Rider

3. CONCLUSIONS

In this system, we offer a deep learning-based method for automatically performing three parts of human observer motorcycle helmet use registration: detection and tracking of active motorbikes, identification of rider number per motorcycle, rider position, and rider specific helmet use. Furthermore, we applied our approach to video data from various road conditions, which included negative characteristics such as occlusion, camera angle variances, an uneven number of coded classes, as well as varied rider counts per motorcycle and traffic densities. All of these factors contribute to our technique being more comprehensive than previous efforts for the automated identification of motorcycle helmet use. Our data suggest that our approach is generally very accurate.

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