Helmet Detection and Number Plate Recognition

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Abstract **–Two-wheelers are the preferred mode of transportation today. The bicycle has historically been the primary means of transportation for motorcycles. Accidents involving motorcycles have increased recently. In order to determine whether the person is wearing a helmet or not, we are utilising image processing approach. Traffic police patrol road crossings, look over CCTV footage, or issue fines to riders who are found to be riding motorcycles withouta helmet. We are utilising the OCR (Optical Character Recogniser) Algorithm to read themotorcycle's licence plate and determine the rider's identity.**

Keyword –Helmet detection, number plate recognition, YOLO algorithm, Ocr algorithm

1.INTRODUCTION

The system attempts to provide the most important safety precautions for both the rider and the passenger when operating a two-wheeled vehicle. In many locations where the likelihood of a vehicle being involved in an accident is very high and individuals are least concerned with looking after themselves, this has emerged as a major cause of death. There has been a noticeable increase in motorcycle-related fatalities on major highways and cities in recent years. All of this is a result of deaths brought on by a lack of helmet gear.

Where traffic police cannot be assigned to every street to enforce tougher rules, this automatic helmet recognition method serves a crucial role in maintaining public safety. We are employing detection methods to reduce the causes because finding motorcycles that are not wearing helmets is essential for increasing road safety and reducing the frequency of mishaps. The vehicle's number plate is identified as a string of characters and numbers, and as proof, the information from the number plate is recorded in a database. It is simple to identify the rule breakers thanks to real-time photos and surveillance.

In India road accidents are increasing very rapidly and lots of death occurred due to head injuries as number of people do not wear helmet to avoid theseactions there is a need for system that automatically detect people who are not wearing the helmet and a system detect the number plate of the motorcycle and extract the vehicle number which would help find the motorcyclist to be penalized.

The license plate of the rider is cropped and savedas the image. The image is given to OCR(Optical Character Recognition) model which recognises the text and gives the license plate number as output. This helps to reduce the head injuries during accident.

2.LITERATURE SURVEY

Paper [1] : (Muneshwar R N) In this paper, we have described a framework for automatic detection of motorcycle riders without helmet from CCTV video and automatic retrieval of vehicle license number plate for motorcyclists. The use of convolutional neural network(CNN) and transfer learning will help in achieving good accuracy for detection of motorcyclists not wearing helmet, but only detection of such motorcyclists is not sufficient for taking action against them. So, the system will also recognize the plate of their motorcycles and store them. The stored numberplates can be then used by transport office to get information about the motorcyclist from their databaseof licensed vehicle. Concerned motorcyclist can then be penalised.

Paper [2] : (N Anil Kumar) In this paper, a non-element rider detection system which attempts to satisfy the automation of detecting the traffic violation of not wearing helmet and extracting the vehicles license plate number. The main principle involved is object detection using deep learning at three levels. The objects detected are persons or motorcycle at first level using YOLO v2 helmet at second level using YOLOv3 license plate at the last level using YOLO v2 then the license plate registration number is extracted using OCR. All these techniques are subjected to predefined

conditions and constraints especially the license number extraction part. This work takes video as an input the speed of execution is crucial, we have used above said methodologies to build holistic system for both helmet detection and license plate number extraction.

Paper [3]:(Dishant Padalia) Now a days the motorcycle accidents are common road accidents leading to many deaths. One of the most consequential reasons for death during motorcycle accidents is the rider not wearing the helmet. Many laws are passed making it mandatory for two- w h e e l e r drivers to wear helmets, but still, many motorcyclists do not obey them. The current systems are very inefficient. In this research paper we are proposed a practical framework for detecting non helmeted riders are detected the number plated characters are extracted using optical character recognition and store in database so that the concernedriders can be penalized.

Paper [4]: (Lokesh allamaki) In this paper, we take the annotated images as an input to YOLO v3 model to train for the custom classes, here the weights are generated after training are used to load the model once this is done, an image is given as an input, the model detects all the five classes that are trained from this we obtain the information regarding the person driving motorbike if the person is not wearing the helmet we can easily extract the other class information of the rider. And this can be used to extract the license plate. This is done by finding whether the coordinates of the no element class lie inside the person class or not.

Paper [5]: (Anitha Moses) In this paper we propose a structure for detection of traffic rule violators who ridebike without using helmet. The proposed structure willalso assist the traffic police for detecting such a violator in odd environmental conditions. Experimental results demonstrate the accuracy of detection of bike riders and detection of violators, respectively. Also, the proposed structure automatically adapts to new scenario if required, with slight turning.

Paper [6]: (Dnyaneshwar kokare) In this paper we have taken a hint of framework for automatic detection of motorcycle riders without helmet from CCTV video and automatic retrieval of vehicle licensenumber plate for such motorcyclists. Here the use of Convolutional neural networks(CNN) and transfer learning as helped in achieving good accuracy for detection of motorcyclist for not wearing helmet. Here the accuracy obtained was 96.7 for further improving, but only detection of such motorcyclist is not sufficient for taking action against them. The system also recognises the number plate of the motorcycle and stores them.

Paper [7]: (Bugade amoolya) A non- helmet rider detection system is developed where a video file or image is taken as input. If the motorcycle rider in the video footage or image is not wearing the helmet while riding the motorcycle, and then here we are uploading an image to identify the license plate number of motorcycle is extracted from image and displayed. Object detection principle with the YOLO architecture is used for motorcycle, person , helmet and license plate detection.

Paper [8]: (B Srilekha) At the present circumstance's variety of traffic regulation issues in india this can all be addressed using various approaches and riding motorbicycle or scooter without a helmet is a traffic offense that has increased number of deaths and traffic offense. Here in this paper, we are improvising a device that uses CNN to identify bike riders who are not wearing helmet.

Paper [9] : (Ajith R) Health is the vital need of any person and so injuries during riding the vehicle can lead to serious accident and sometimes it can be fatal resulting in death of people. This paper mainly uses deep neural network for image recognition of the person in the input given in the form of video or image and the system recognises the rider and the pillion for wearing the helmet or not and using optical character recognition the number plate details are read and stored in database which saves the lives of many by forcing rider to wear helmets during travelling on two wheelers.

Paper [10]: (Jaya Simha Reddy pasam) In this paper, taking a goal to develop a method for identifying cyclists without helmets who are breaking traffic laws. Here the traffic police could also benefit from our proposed system. Our model will help them to identify the violators by recognizing the person those who are not wearing helmet. With the little tweaking are proposed or architecture could adopt to any situation.

3.PROPOSED SYSTEM MODULES

In this paper, we develop a system to identify

motorcycle helmets by detecting moving objects with a KNN classifier placed above the rider's head. These models had a cap on the degree of precision that couldbe attained and were based on statistical data from photographs. The accuracy of categorization has continued to increase with the development of neural networks and deep learning models. introduced a technique for object recognition and categorization based on convolutional neural networks (CNN). Use a CNN to categorise bikers who are wearing helmets and those who are not. Despite using CNN, they have poor accuracy in detecting helmets due to restrictions on helmet colour and the presence of several riders on a single biker. Accuracy and speed are essential for real- time helmet detection. As a result, the You Only Look Once (YOLO) DNN model was selected. Modern, real-time object detecting technology is used by YOLO. YOLOv3 is significantly faster and more accurate thanthe previous YOLO versions.
The main advantage is it increases accuracy.

3.1DATA ACQUISITION AND PREPROCESSING

The data acquisition and pre processing will be done in various phases:

1.image procurement: This is the first step of any visual system. Where the images or vedios are taken from the cameras which are captured on the road.
2.premiliminary processing technique: The step is focused on elimination of background noise and enhancement of image.

3.2DATA CLUSTERING / CLASSIFICATION

There were various classification challenges to resolve after the preprocessing outlined in the preceding section. The algorithms applied here are listed below:

- KNN(K- Nearest neighbors)
- K - Means

3.3PREDECTIVE MODELLING

The classification of the data is followed by feeding the kernel. The model is trained using a multi linear regression model. The data is split into training data and testing data, with training data making up 75% of the total data. The MLR algorithm not only shows the safety index for a given location, but also forecasts the crime index for that location. User-supplied location, date, and time data are delivered to the machine learning kernel. Kernel learns and develops a prediction function. The learned function is then applied by the kernel to the input data to make predictions.

3.4DATA FLOW DIAGRAM

A data flow diagram (DFD) maps out the flow of information for any process or system. It uses defined symbols like rectangles, circles and arrows, plus short text labels, to showdata inputs, outputs, storage points and the routes between each destination. They can beused to analyze an existing system or model a new one.

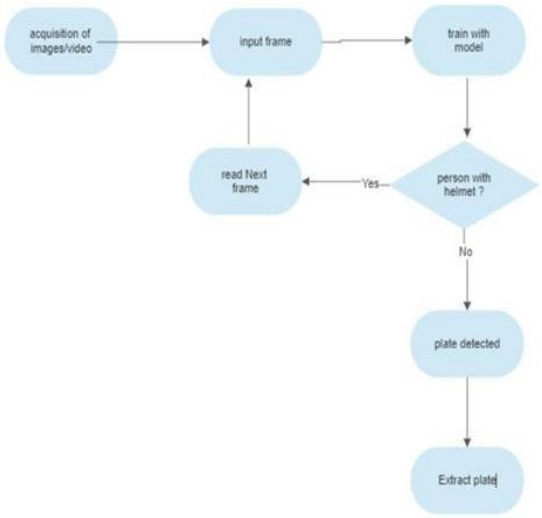

Fig 3.4.1 Data Flow Diagram

4. CONCLUSION

The most frequent type of traffic accident that results in numerous fatalities is a motorcycle accident. The rider not wearing a helmet is one of the leading causes of fatalities in motorcycle accidents. put on a helmet. Despite the fact that several regulations requiring helmet use for two-wheeler drivers have been implemented, many motorcycle riders still disobey them. The existing systems are incredibly ineffective. In this study, we have suggested a real-time, quick, and efficient framework for YOLO-based non-helmeted motorcycle detection from CCTV footage. Following the identification of the non- helmeted motorcyclists, the characters from the licence plate are retrieved using optical character recognition and recorded in a database so that the offenders may be punished.

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