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AUTOMATIC E-CHALLAN GENERATING SYSTEM FOR NOT WEARING HELMET

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ABSTRACT

All bike riders must now wear helmets due to the high accident rate and hazardous road conditions. Nowadays, wearing a helmet is required. Bike riders occasionally disobey safety regulations, such as not donning a helmet while riding, necessitating human intervention, which has not been very successful. Increasing the use of helmets when riding is the goal of our project. This classification-based model has undergone thorough training. Prior to identifying the number plate, the helmet is first recognized. In order to identify whether the rider is wearing a helmet, CNN recognizes the motorcycle. If the rider is not wearing a helmet, Tesseract OCR will find the motorcycle license plate. As a result, the obtained characters will be kept in the Database. Currently, classified automobiles are retrieved from the database and verified against their original identities, which are saved as details about specific vehicles. Now that the information has been matched, it is further contacted via APIs and messages are sent to the appropriate email or phone number.

KEYWORDS: Machine Learning, Object detection, Neural Networks, Database.

1. INTRODUCTION

The main drawback of not wearing a helmet on a motorcycle is the increased risk of serious head injury or death in an accident. Head injuries are one of the leading causes of death in motorcycle accidents, and helmets are your best protection. Other drawbacks of not wearing a helmet include increased risk of neck injuries, decreased vision, and decreased hearing. Bike E-challans can be used as a road safety measure to help enforce motorcycle safety regulations and help reduce the number of accidents and fatalities on the road. By requiring motorcyclists to pay a fine for violating safety regulations, it may help to make them more aware of the dangers of careless riding and encourage them to be more cautious. In addition, the revenue generated from bike E-challans can be used to fund road safety initiatives and education programs.

The rate of motorcycle accidents in India were growing day-by-day rapidly. As many as 90,393 two-wheeler road accidents took place in India in 2021, which caused 39,589 deaths. Over which non-helmet deaths are over 60% of the total deaths. Every year, a large number of people are killed in bike accidents. Bad road conditions, vehicle malfunctions, irresponsible driving or biking, failure to follow traffic laws and other factors all contribute to this. All bike riders must now wear helmets due to the high accident rate and hazardous road conditions. Nowadays, wearing a helmet is required. Bike riders occasionally disobey safety regulations, such as not donning a helmet while riding, necessitating human intervention, which has not been very successful. Increasing the use of helmets when riding is the goal of our project. This classification-based model has undergone thorough training. Prior to identifying the number plate, the helmet is first recognized. In order to identify whether the rider is wearing a helmet, CNN recognizes the motorcycle. If the rider is not wearing a helmet, Tesseract OCR will find the motorcycle license plate. As a result, the obtained characters will be kept in the Database. Currently, classified automobiles are retrieved from the database and verified against their original identities, which are saved as details about specific vehicles. Now that the information has been matched, it is further contacted via APIs and messages are sent to the appropriate email or phone number.

1.1 OBJECTIVE

The main goal of this project is to design and create a system for producing E-challans for not wearing a helmet when driving. A camera is employed in this system to take pictures of motorcyclists who are without wearing helmets. In order to identify the faces of the riders in these photographs, image processing techniques are then applied. If a face is found, the algorithm then determines whether or not the rider is wearing a helmet. An E-challan is issued to the rider if they are found to be without a helmet.

1.2 SCOPE

The scope of this project is to create a system that can automatically determine if a two-wheeler driver is wearing a helmet or not. A challan will be created immediately if the person is not wearing a helmet.

2. RELATED WORK

Si.No	Title	Year of the publication	Author	Description	Uses
1.	Automatic number plate recognition using deep learning [1]	2021	Gnanaprakash, V., N. Kanthimathi, and N.Saranya	There are four basic phases in the implementation. The automobile is identified from each frame of the video in the first stage, which involves turning the video material into pictures. The following stage is identifying the licence plate from the identified autos. The number plate characters are identified from the observed number plates in the last phase.	• Can reduce the physical effort of traffic police. • Can save time since the work is automated.
2.	Traffic Violation Proctoring System: Helmet and Triple Riding Detection **[2]**	2021	M.Jayasree, P.Sai Vamsi Dheeraj, S.Sindhura, K.Lokesh	Three stages of Object Detection using Deep Learning are used in the implementation. On the first level using YOLOv3, the items recognised include people, motorcycles, helmets, and licence plates. In the second level using YOLOv3, licence plates are also detected.	• It would make the jobs of traffic management departments simpler and more effective. • It provides a solution to the inefficient traffic.
3.	Helmet Detection using Machine Learning and Automatic License Plate Recognition **[3]**	2019	Lokesh Allamki, Manjunath Panchakshari, Ashish Sateesha, K S Pratheek	A machine learning-based technique is used to construct a unique object identification model that can recognize motorcycle riders. When a cyclist without a helmet is spotted, the license plate is retrieved, and an optical character reader is used to read the license plate number.	• It brings a solution to the non-efficient traffic. • It would make traffic management departments job easier and more efficient.
4.	Automated Helmet Detection for Multiple Motorcycle Riders using CNN **[4]**	2019	Madhuchhanda Dasgupta, Oishila Bandyopadhyay, Sanjay Chatterji	The state-of-the-art method for object recognition, YOLO model, and its incremental version, YOLOv3, are used in the proposed approach's initial step to detect motorbike riders. A Convolutional Neural Network (CNN) based architecture has been suggested for the second stage of motorbike rider helmet recognition. In compared to existing CNN-based techniques, the suggested model's evaluation on traffic recordings yielded encouraging results.	•It helps to overcome many problems such as cost, security and flexibility, etc. •It will offer many benefits, including lowering our energy expenditures. It improves home security.

In the current method, the traffic police mostly keep an eye on CCTV footage of traffic offences. If a rider isn't wearing a helmet, they zoom in on the license plate. This is a labor-intensive technique that requires a lot of manpower to complete. Later, studies on CNN, R-CNN, HaaR characteristics, etc. were conducted. But the effectiveness, accuracy, and speed of detection of these works are constrained. Therefore, it takes longer and costs more money.

- It is a time taking process and more expensive.

3. METHODOLOGY

The rate of motorcycle accidents in India were growing day-by-day rapidly. As many as 158,964 two-wheeler road accidents took place in India in 2020, which caused 56,873 deaths. Over which non-helmet deaths are over 75% of the total deaths. Every year, a large number of people are killed in motorcycle accidents. Bad road conditions, vehicle malfunctions, irresponsible driving or biking, failure to follow traffic laws and other factors all contribute to this. Some of these can be avoided. Proper safety measures, for example, ensure a reduction in accidents and, as a result, a drop in the death rate. Despite the fact that bike riders are required to wear helmets, many do not. This idea aims to automate the fine application procedure by detecting the presence of a helmet on the head of a biker.

3.1 ADVANTAGES

- Authorized people get ease of access to generate challans.
- Better GUI for better understanding.
- Automatic challan generation for users.

3.2 ARCHITECTURE

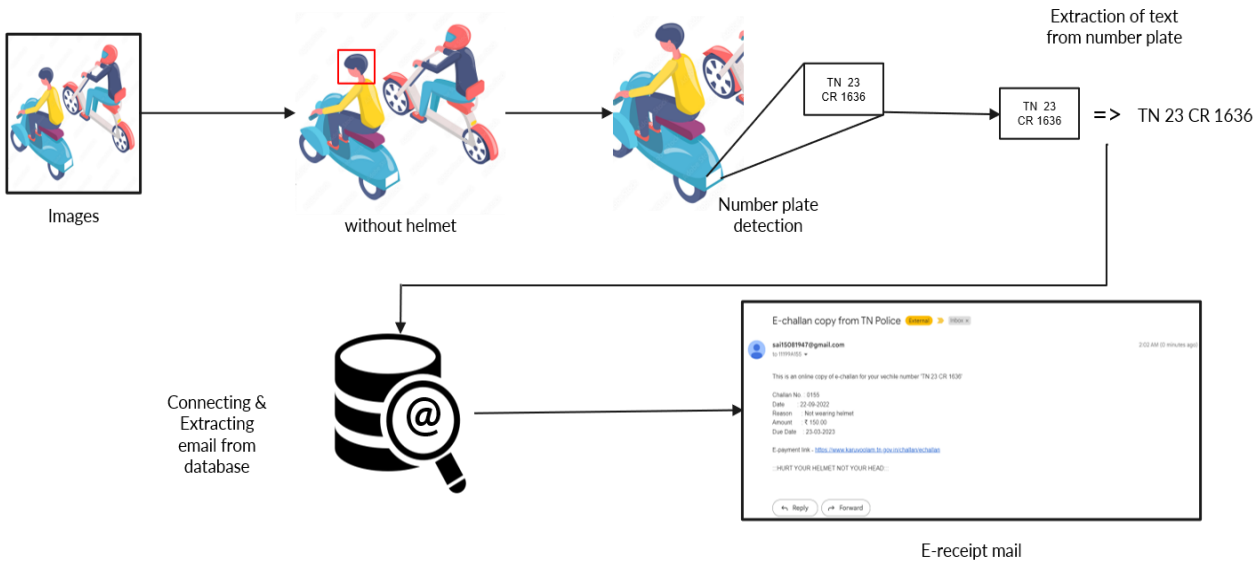

FIG 5.1 ARCHITECTURE OF THE PROPOSED SYSTEM

INPUT MODULE:

The photos are analysed, categorised into the helmet category, and sent to a further step where the text from the vehicle number plate is recovered. The database is then given access, and after extracting the person's email and other information, the whole collection of data is made available for further processing.

PROCESSING MODULE:

The photos are precisely analysed and categorised into the helmet category before being sent through a considerable amount of further processing where the text from the vehicle number plate is carefully removed. The database then gains access, extracts the user's email address and unquestionably other information, and after all of that, pretty much all of the data is basically set out for the next step. This shows how the images essentially are processed, classified into the helmet category, and then sent to the generally next step, where the text from the vehicle number plate is actually being extracted, which is unquestionably fairly significant.

OUTPUT MODULE:

When the extracted data has been created and the e-challan copy has been sent to the appropriate members via email using SMTP, a thorough report about the challan generating process is then often provided to the user using an extremely prominent GUI window.

6. RESULT AND DISCUSSION

Fig-4.1 Application window

Fig-4.2 Upload images

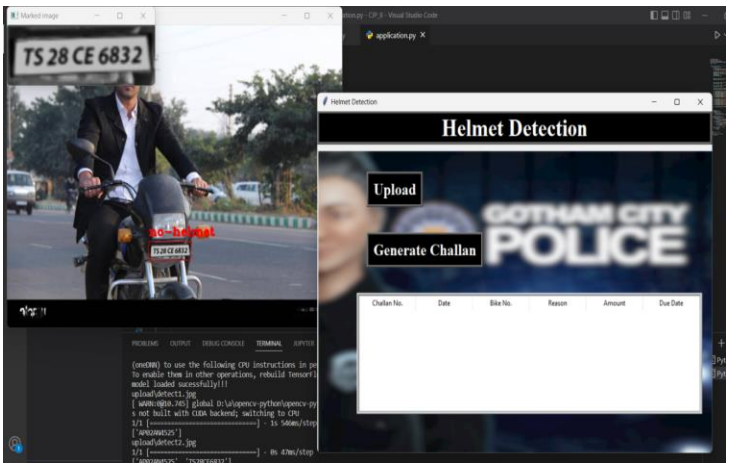

Fig-6 Generating challans data

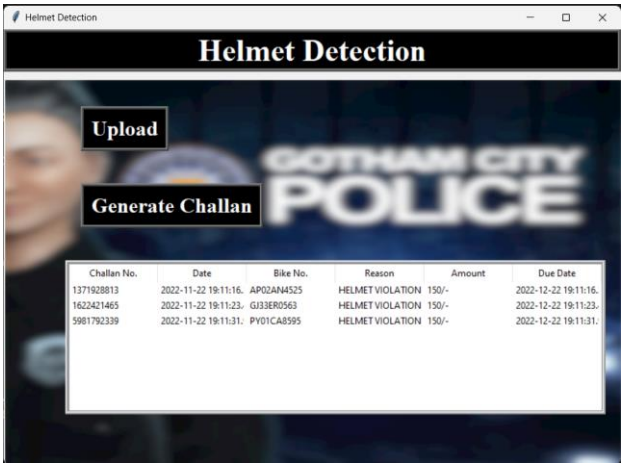

Fig-7 Challan Report

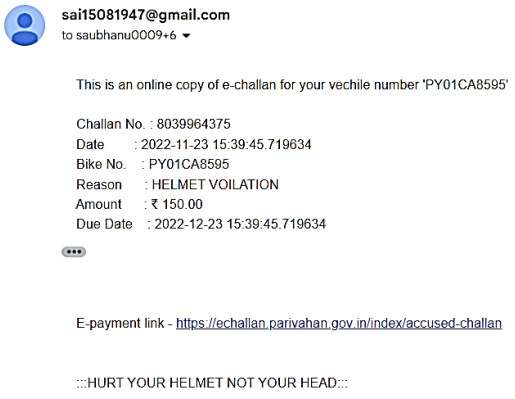

Fig-8 Email copy

Contrary to common assumption, the GUI kind of (Graphical User Interface) is typically employed to create a far better interaction between the authorized user and the system. The algorithm receives a series of photos from the user, which are primarily divided into groups for helmets and non-helmets. Then, an OCR is used to extract the text from the number plate in particular, which is actually rather crucial. Further demonstrating how the user submits a collection of photographs into the algorithm, the extracted text is now really searched to the database to kind of acquire the bike owner details to contact them. The submitted photographs are generally divided into groups for helmets and non-helmets, and then the text, namely from the number plate, is retrieved using an OCR, which is actually very substantial. The e-challan will mostly be created and distributed to the riders who are not wearing helmets via the SMTP protocol, which is actually rather significant. Also, they kind of assumed that a thorough report would typically be prepared and displayed to the authorized user in the GUI.

5. CONCLUSION AND FUTURE ENHANCEMENT

A Non-Helmet Rider Detection system is developed where an image file is taken as input. If the motor rider in the image is not wearing helmet while riding the motorcycle, and then here we are uploading image to identify license plate number of that motorcycle is extracted from image and displayed. Object detection principle with YOLO architecture is used for motorcycle, person, helmet and license plate detection. OCR is used for license plate number extraction if rider is not wearing helmet. Not only the characters are extracted, but also the frame from which it is also extracted so that it can be used for other purposes.

We have found that our model does a very good job of identifying helmets and license plates in images. The model can be both high precision and memory aware. However, the model has some limitations. First, the model only works with images taken with good lighting. Second, the model cannot recognize helmets and license plates in real time.

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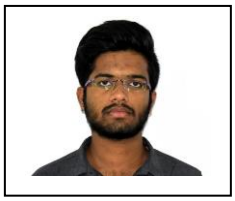

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