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Helmet and Number Plate Detection using Python and Open CV

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Abstract: *Due to the high accident rate and bad road conditions, it is now essential for all bike riders to wear a helmet. There are laws in place that require the wearing of a helmet. However, they now entail human intervention, which has not been demonstrated to be very effective because bike riders occasionally get away with disregarding safety standards such as not wearing a helmet when riding. Automation is both efficient and a superior approach to deal with this issue, but it comes with its own set of problems. To name a few examples, Rain, moisture, and fog, as well as partially covered faces, make for low-quality image frames (low image resolution, pixel density, and so on). As a result, the detection methodology's robustness is greatly influenced by the strength of extracted characteristics as well as the ability to cope with the extracted data. The project's first goal is to improve the effectiveness of helmet detection before moving on to license number plate identification. This model is made up of a number of key phases that were created most modern and optimal image processing techniques available today. This model is a classification-based model that is trained using a supervised learning approach. Even in poor settings, the proposed helmet identification model can identify helmets and recognize license plates.*

Keywords: Helmet Detection, Number Plate Detection, Image Processing, etc

I. INTRODUCTION

In 2017, more than 48,746 bike riders died in road accidents, according to an India Today poll. 73.8 percent of them, by the way, did not wear a helmet. The data comes from the India Environment Portal. Every year, a large number of people are killed in car accidents. Bad road condition, 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. Currently, traffic police personnel issue fines to violators of traffic laws by hand. However, due to ignorance or other considerations, they are occasionally able to avoid paying a fee even after breaking a traffic rule. The automation of this procedure will reduce such instances and, as a result, raise the severity of actions taken against them. Helmet detection accuracy is around 90-93 percent, and license plate identification accuracy is around 50- 60 percent. For the efficient implementation of enforcement acts, this accuracy must be improved. The usage of cameras for security and law enforcement purposes has expanded dramatically in recent years. Image processing and machine learning can be used to detect helmets. There are approaches such as Open CV, which has a 74 percent accuracy, Image Descriptors, which has a 91.37 percent accuracy, and Local Binary Patterns (LBP), which has a 94 percent accuracy. These photographs, however, were not shot in real time. Using YOLO, the suggested system will be able to recognize riders who are wearing helmets. The OCR is used for license plate recognition.

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II. LITERATURE SURVEY

Table 1: Literature Survey

Year	Author	Title	Approach	Reference
2018	C. Vishnu Et Al.	Detection of Motorcyclists without helmet in videos using CNN	A CNN approach to detect helmet	2017 International Joint Conference on Neural Networks (IJCNN)
2017	Kunal Dahiya Li Et Al.	Automatic Detection of Bike Riders without Helmet using Surveillance Videos in Real time.	Helmet detection using feature extraction and SVM classifier	International Joint Conference on Neural Networks (IJCNN)
2016	Kang Li Et. Al	Automatic Safety Helmet Wearing Detection	Uses the Technique of K mean neighbor to detect helmet	IEEE 7th Annual International Conference on Cyber Technology in Automation Control and Intelligent System

III. PROPOSED SYSTEM

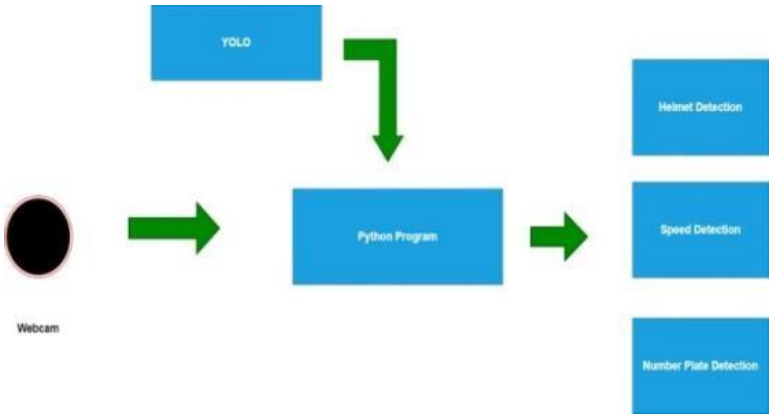

Fig: Proposed System

Our proposed system is , CCTV cameras present at traffic signals should detect helmet, and if any person found without helmet, his number plate will be recognized and should checked into the database of RTO and a mail should be sent to him/her regarding fine of travelling without helmet. Also there should be cameras in the city at fixed distance which will continuously capture images of the vehicles and speed should be detected as per their time interval between the two cameras. If any person found to be travelling with over speed, a mail should be sent to him/her regarding fine. Now as this is a proposed system we will develop a prototype model for this to prove the concept.

As we have no access to the RTO database we will create one database with some demo person names with their email ids. We will use laptop web cam. We will develop a windows based application where there will be a user interface with which we can access the system. There if we click on live video cam button, a laptop web cam will get opened and it will be continuously focused in which if any person will appear without helmet , it will display in the camera box as helmet not detected and vice versa. It can also display the percentage of probability that is helmet detected or not. Second thing, to detect and recognize number, we will upload a standard Indian number plate image which will be processed and will extract the number from it. Last one is for speed detection we will assume one distance as for example 1000 m , and we will capture the two images within a time interval of 20 seconds. So speed will be 50 m/s (velocity = distance/time). So if a vehicle will appear in both the cameras then its speed is 50 m/s or more else speed is less than 50 m/s. So if 50 m/s is a threshold value then in first case person is exceeding the speed limit and in second case person is travelling with normal speed. So we have

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detected a speed. Whenever we upload any image of a number plate a mail will be sent to corresponding email that you have a fine for violations of traffic rules.

IV. ALGORITHM: YOLO

On the other hand, the YOLO framework (You Only Look Once) approaches object identification in a unique way. It predicts the bounding box coordinates and class probabilities for these boxes using the full image as a single instance. The most significant benefit of adopting YOLO is its incredible speed; it can process 45 frames per second. YOLO is also aware of the concept of generic object representation. This is one of the best object detection algorithms, with a performance that is comparable to the R-CNN algorithms.

IV. CONCLUSION:

Thus we are going to develop a system for automatic helmet detection using image processing using python. The project will be developed as a prototype model for helmet detection using python.

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