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Automatic helmet detection & license plate recognition using CNN & GAN

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ABSTRACT

Enforcing use of helmet on every bike- rider is mandatory nowadays because of high accident rate and poor road conditions. There are laws regarding safety measures which ensure use of helmet. But for now, they involve manual intervention which is not so effective as of now because bikeriders sometimes tend to escape without any penalty/fine after breaking the safety rules like wearing a helmet while riding. Automation is better way to deal with this problem but automation in this area comes with its own challenges. To name a few, Low quality image frames (low image resolution, pixel density etc.), rain, dew and fog and partly hidden faces. The robustness of detection methodology strongly depends on the strength of extracted features and also the ability to deal with the lower quality of extracted data. The first goal of this project is to boost the potency of helmet detection and then recognizing the license number plate recognition. This model consists of many essential steps developed using today's most advanced amp; optimized CNN, GAN models amp; libraries. It is a classification based model that uses supervised learning approach to train CNN and Character Segmentation algorithm. The proposed helmet detection model can be used to detect helmet and recognizes license plate even in adverse conditions using character segmentation and CNN.

Keywords: *CNN, GNA, Py, Server Handling*

1. INTRODUCTION

According to India Today survey, more than 48,746 bike-riders died in road accidents in 2017. Incidentally, 73.8% of them did not wear a helmet. Statistics are according to[25]. Road accidents lead to a huge number of deaths every year. The reasons behind this are bad road conditions, malfunctioning of vehicles, careless driving or bike riding, not following traffic rules and so on. Of these, some are avoidable. Like, proper safety measures taken ensure reduction in accidents and thereby reduction in death rate. Though there's been helmet compulsion for bike riders, many of those don't use it. This project intends to automate the fine application process by detection of helmet on biker's head. Currently, the traffic police officers manually apply fine for breaking the traffic rules. But, sometimes due to ignorance or due to other factors they manage to escape without fine even after the traffic rule violation. The automation in this process will reduce such cases and hence increase strict acts against them. The accuracy for detection of helmet lies around 90-93% and of license plate recognition lies around 50-60%. This accuracy needs to be increased for efficient implementation of enforcement acts. In recent years, the use of cameras for the security purposes, law enforcement purposes has increased a lot. There are ways to detect helmet using image processing and machine learning. There are the methods like OpenCV method giving 74% accuracy, The Image Descriptors method giving accuracy of 91.37%, and The Local Binary Patterns(LBP)

method giving accuracy of 94%. However these images were not captured in realtime. The proposed system will be able to detect motorcyclists wearing the helmet using CNN. The license plate recognition is done using the character segmentation and CNN algorithm.

2. PROJECT SCOPE

- This system will be useful for government and for bikers (for their safety) as well.
- Right now system works manually, but in future this system can be modified and completely automated with increased accuracy.

3. ARCHITECTURE OF HELMET DETECTION MODEL

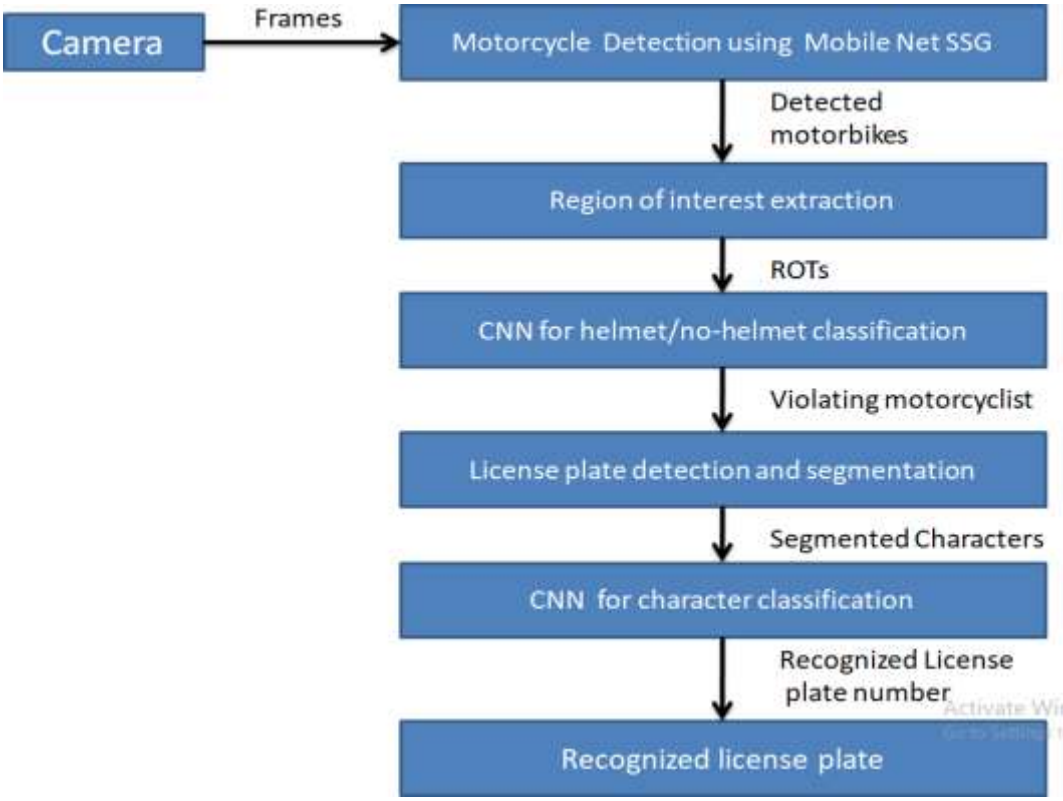

Fig. 1: Architecture of Helmet Detection Model

4. DATA FLOW

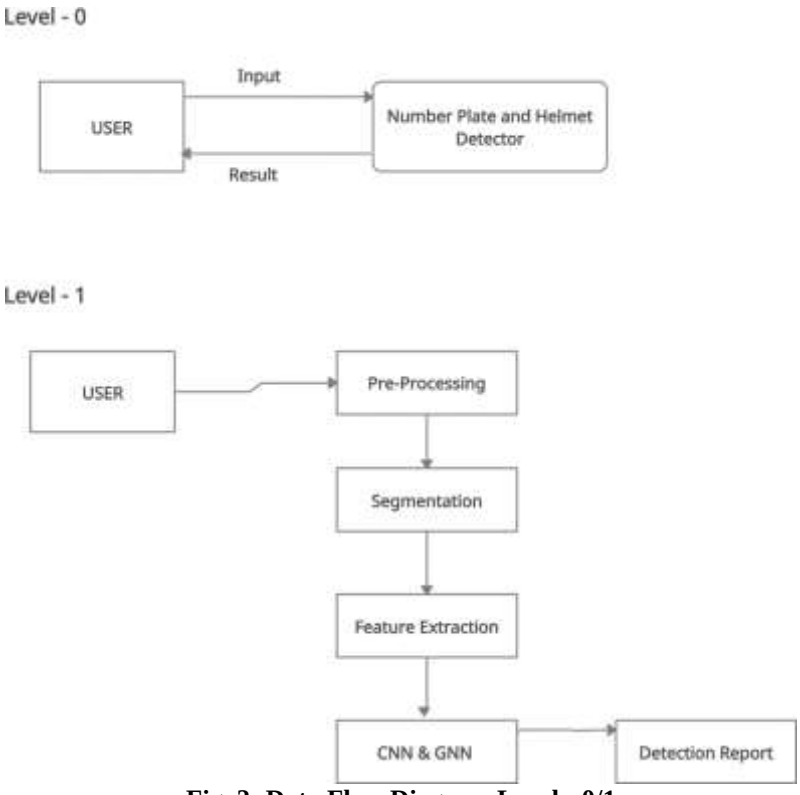

Fig. 2: Data Flow Diagram Level - 0/1

As you can see the data flow diagram shows the way in which the data will flow or pass in the proposed system. First we look at the level 0 data flow diagram in which we just get the system at a glance in which the user and system are passing data to each other, while as the data flow diagram level 1 shows all the steps involved in flow of data passing throughout the system execution.

5. IMPLEMENTATION RESULT

•Using mobile net SSD motorcycle has been detected

•Using CNN license has been detected

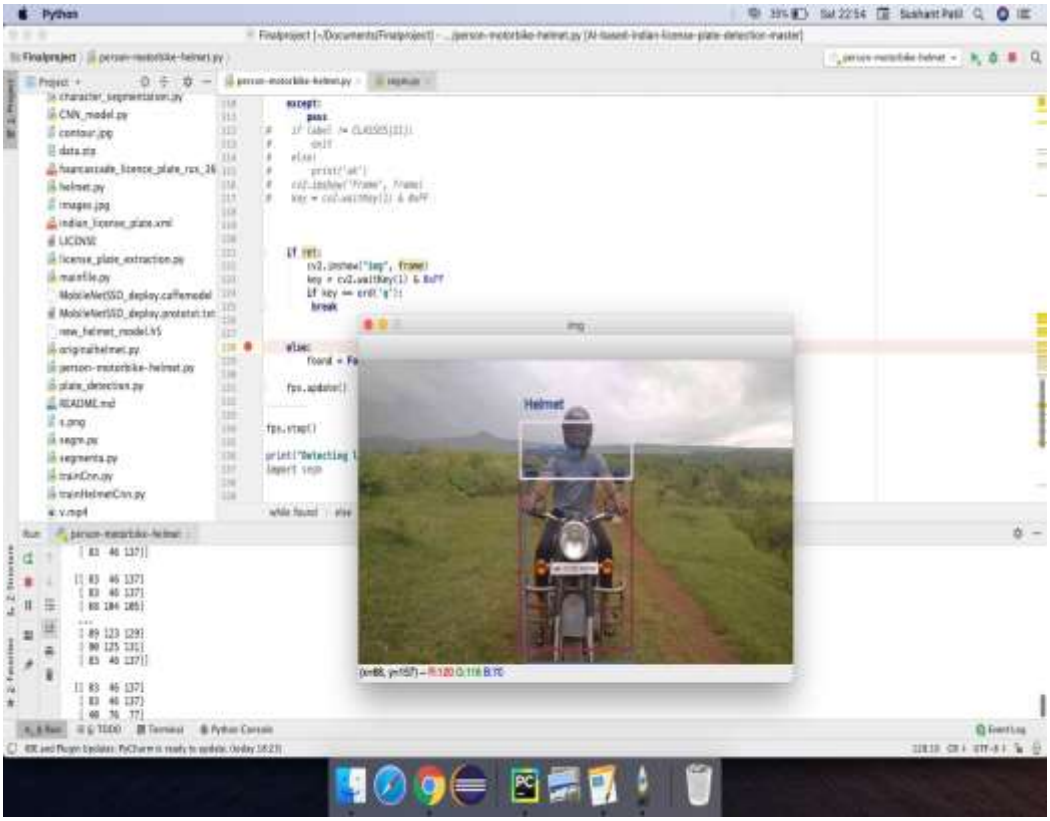

Fig. 3: Helmet Detected

- OpenCV has been used for detecting license plate

Fig. 4: License plated detected

- Using character segmentation the character have been segmneted from the de- tected license plate.

Fig. 5: Character segmentation

- The segmented characters are sed to CNN model for recognizing the characters in the license plate
- In the output the characters of the recognized license plate are generated

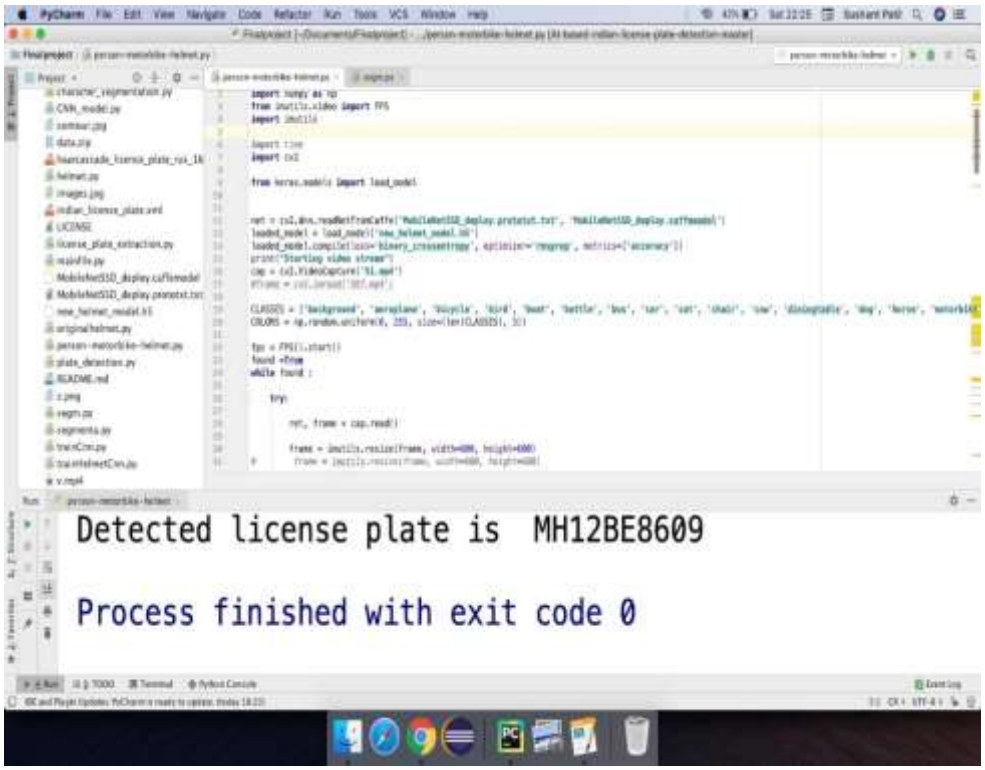

Fig. 6: Detected license plate character

6. CONCLUSION

- The system being used here provide comprehensive and accurate helmet de- tection and recognition of license plate against the given dataset for a given stream of video as well as image input.
- Though there are various similar projects proposed with the help of different combinations of machine learning algorithms, the accuracy differs in almost all of them. Some are better for some specific tasks and that makes the sys- tem inefficient. Here, we have tried CNN for Helmet Detection and combina- tion of Character Segmentation and CNN for License Plate Recognition which balances the accuracy for both these tasks and gives better results. The video quality, day and night light effects like factors affect the License Plate Recog- nition (which lacks in accuracy in most of the proposed models) so the camera angles, positions have to

be most efficiently used for the proposed system to work as intended

- In Feature this system could be modified for helmet detection and licence plate recognition using better equipments and advance deep learning algorithm.
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- The accuracy of the system could be include.

7. ACKNOWLEDGMENT

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