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Helmet and Number Plate Detection and Recognition

Adarsh Pandey[1], Mahima Shanker[2], Devanshu Rai[3], Farhan Ahmed[4]
[1,3,4] Student, Babu Banarasi Das Institute of Technology and Management, Uttar Pradesh (Lucknow), India.
[2] Assistant Professor, Babu Banarasi Das Institute of Technology and Management, Uttar Pradesh (Lucknow), India.

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Abstract: *Today, motor cycles are the most popular means of transportation. Cyclists and Passengers using helmets. This paper uses image processing techniques that motor cycles use to ride without helmets. Recognized. This project recognizes moving vehicles based on input as images or videos, Categorize motor cyclists and non-motor cyclists based on background removal and image size Recognized. If the vehicle detects that the motor cyclistis not wearing a helmet, the vehicle details the person. Vehicles and license plates are captured in the form of images. Algorithms are designed to recognized ig its A motor cyclist's signature from an image or video captured by a camera. License plate recognition has an algorithm Various steps such as vehicle classification, pre processing, ROI (Region of Interest) selection, and detection Sign the license plate using an image processing algorithm and store the image in a database. Evidence with the date and time recorded. A database is created with the evidences to redin relation to the crime Accurately identify each criminal ,arrest the suspect's vehicle and use it to fine them The system uses pure machine learning to identify different helmet types encountered minimal cost.*

Key Word: *motorcyclists without helmet, number plate recognition, Machine Learning, Artificial Intelligence, image processing.*

I.INTRODUCTION

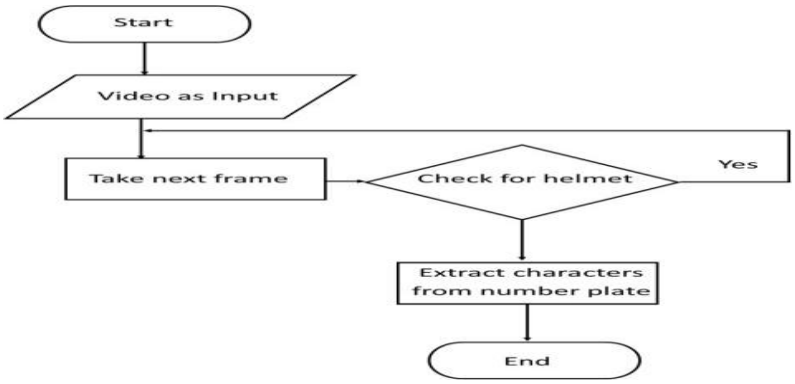
This system aims in bringing the major safety measures while riding at wow heeler both for the rider and the pillion. This has become a major cause of deaths in road accidents in many places where the vehicle density in very high and the people are least bothered to take care of themselves by taking proper precautionary measures while riding motor cycles. Though measures are taken by the government to avoid such problems by mandating the use of helmets for both the rider and the pillion, people are careless which is causing a serious trouble not only for the people without helmets but also for others who drive on the roads. So, keeping public safety as an important measure this mechanism of automated helmet detection plays avital role where traffic police cannot be assigned for each and every street for implementing stricter rules. This project of automated helmet detection uses methods of machine learning to categorize vehicles as two wheelers or not and if it's at wow heeler then recognize the head part as the person wearing the helmet ornot. An image of the person holding the vehicle is captured if the driver or passenger is not wearing a helmet. Recognize the vehicle license plate as a character string by various mechanisms, Number and store license plate details and photographs takens evidence in a database. This data can be used to fine drivers whore peat the mistake of not wearing a helmet.

II. RELATED WORK

Sr .No.	Page Title	Authors	Methodology
1	Automated Helmet Detection for Multiple Motorcycle Riders Using CNN	Madhuchhanda Dasgupta, OishilaBandyopadhyay, SanjayChatterji,Computer Science Engineering IIIT Kalyani West Bengal, India	First detects riders using Y.OLOv3 and then detect sift heride ris wearing helmet or not
2	Helmet and Number Plate detection of Motorcyclists using Deep Learning and Advanced Machine VisionTechniques	FahadAKhan, NitinNagori, Dr.Ameya Naik, Department of Electronics and Tele communication K.J.Somaiya college of Engineering Mumbai, India	The system usesYOLO to detect if theirderis wearing helmet ornot.

3	Helmet Detection Using MLIoT	Dikshant Manocha, AnkitaPurkayastha,YatinChachra, Namit Rastogi,Varun Goel Department of Electronicsand Communication Engineering Jaypee Instituteof Information Technology Noida, India	This system first identifies motor cyclistsandthenchecks whetherridera ndpillionriderarewearinghelmetornot usingOpenCVandextractsnumberplat eusingOCR.
4	Convolutional Neural Network-based	YMohanaRoopa, SriHarshiniPopuri, Gottam GowtamsaiSankar, Tejesh	In this system rider with no helmet is detected thenrespective frame is
	Automatic Extractionand Fine Generation	Chandra Kuppili, Computer Science and Engineering Institute of Aeronautical Engineering, Hyderabad, India	Taken and number from number plate is extracted. Then the challan is sent to vehicle owner's number.
5	Improved OCR based Automatic Vehicle Number Plate Recognition using Features Trained Neural Network	BhavinVKakani,Divyang Gandhi, Sagar Jani, EC Engineering Department Institute of Technology Nirma University	ThissystemisdedicatedonanimproveD techniqueofOCRbasedlicenseplatere cognitionusingneuralnetwork

III.METHODOLOGY



B. Phases of Development

1 Designing a module for functions to detect the helmet in the frame.
2 Designing a module to detect the number plate and extract the vehicle number from frame.
3 Connecting all the modules to gether and testing the integrity and accuracy of the system.

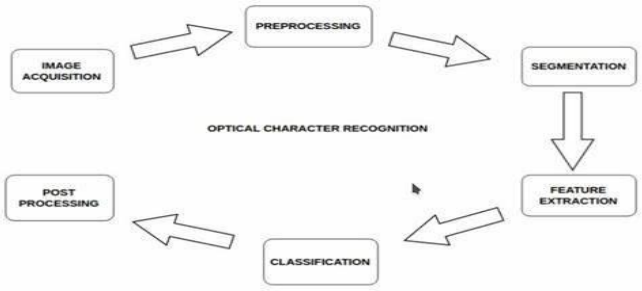
C. Implementation

1. Taking video or camera as input.
2. Taking single frame from that input.
3. Checking if that frame contains a helmet.
4. If the helmet is present then going back to 2nd stage
5. If helmet is not present then giving this frame to the function which detects number plate and extracts character from it.
6. Repeating this procedure till the input is not empty/null.

D.Impletation Using YOLOv3

The YOLOv3 algorithm first separates a fame into a grid. Each grid cell predicts some number of boundary boxes (sometimes referred to as anchor boxes) around objects that's core highly with the a fore mentioned predefined classes. Each boundary box has a respective confidence score of how accurate it assumes that prediction should be and detects only one object per bounding box. The boundary boxes are generated by clustering the dimensions of the ground truth boxes from the original dataset to find the most common shapes and sizes. The object detection problem is treated as aregression problem in the YOLO algorithm and the image is divided into an S × S grid. If the centre of a target falls into a grid, the gridis responsible for detecting the target. Each grid will output a bounding box, confidence, and class probability map. Among them. The bounding box contains four values:x,y,w, h, (x, y) represents the centre of the box. (W, h)defines the width and height of the box. Confidence indicates the probability of containing objects in this prediction box, which is the IoU value between the prediction box and the actual box. The class probability indicates the class probability of the object, and theYOLOv3 uses a two-class method.

E.OCR



Optical character recognition or optical character reader is that the electronic or mechanical conversion of pictures of written, handwritten, or printed text into machine-encoded text, whether ornot fromas canned document, a photograph of a document, a scene photograph, or subtitle text superimposed on a picture.

1: Acquisition

Obtaining non-editable text content froms canned documents of all types, from flat bed scans of corporate archival material through to live surveillance footage and mobile imaging data.

2: Pre-processing

Cleaning up the source imagery at an aggregate levels o that the textis easier to discern, and noiseis reduced or eliminated. OCR software often"pre-process"images to boost the chances of recognition.

3: Segmentation and feature extraction

Scanning of the image content for groups of pixels that are likely to constitute single characters, and assignment of each of them to their own class. The machine learning frame work will then attempt to derive features for the recurring pixel groups that itfinds, based on generalized OCR templates or prior models. However, human verification will be needed later. There are two main methods for extracting features in OCR:

- In the first method, the algorithm for feature detection defines a character by evaluating its lines and strokes.
- In the second method, pattern recognition works by identifying the entire character.

We can recognize a line of text by searching for white pixel rows that have black pixels in between. Similarly, we can recognize where a character starts and finishes.

4: Training

Once all features are defined, the data can be processed in a neural network training session, where a model will attempt to develop a generalized image> text mapping for the data.

5: Verificationand re-training

After processing, humans evaluate the results, with corrections fedback into subsequent training sessions. At this point, data quality may need to be reviewed. Data cleaning is time-consuming and expensive, and while initial training runs will perform de-skewing, high contrast processing, and other helpful methods to obtaina good algorithm with minimal pre-processing, further arduous refinement of the data may be necessary.OCR accuracy can be improved if the output is limited by alexicon (a list of words permitted in a document). For instance, this could be all the words in English, or a more technical lexicon for a particular field. This method can be less efficient if the document contains words that are not in the lexicon, like proper nouns. Fortunately, to improve accuracy, there are OCR libraries available online for free. The Tes seract library is using its dictionary to control the segmentation of characters.

IV.RESULT

When we give the input video wearing helmet, it successfully detects the helmet and shows the confidence score and also it prints "Helmet Detected!" on the console. When the person is not wearing helmet the system searches for the number plate in the frame. Once detected it extracts characters and prints on the console.

V.CONCLUSION

Thus this system is very effective for the safety purpose of the user. User has to wear helmet to ride a bike and hence traffic rules will be followed by the rider. This system is under pocket control i.e. Riding the two wheeler vehicle having safety in hand and in budget. This system has easy functionalities. It provides a better security to the biker indicator of real estate prices and that Linear Regression is the most effective model of our Dataset with RMSE School.

This study helps us to discover assets and liabilities of different machine learning models. As we know machine learning has plenty of algorithms that can be used for house price prediction. The existing systems focuses on single models only. We proposed to use multiple different model which can be used for prediction and focuses on more accurate results. We proposed to use ensemble learning method as it has capability of combining multiple ml models will help us discover

different aspects of data. Hence, this methodology is anticipated to give higher accuracy compared to other single models.

VI.FUTURE ENCHANCEMENT

Our model had a good accuracy score, but there is still room for improvement. In real world scenario, we can use such a model to predict house prices. This model should check for new data, once in a month, and incorporate them to expand the dataset and produce better result.

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