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NUMBER PLATE DETECTION USING YOLO & TEXT EXTRACTION USING OCR

[1]Vaddi Vamsi Krishna, [2]Uppuluri Renuka Lahari VNS, [3]Upperla Vinay,
[4]Uppalapati Varun Sai, [5]Yellamanchili Vivek Darshan, [6] Dr.S.K. Raghu
[1],[2],[3],[4],[5]Student, [6] Assistant Professor
[1] Department of CSE, Gandhi School of Technology, Visakhapatnam-530045, Andhra Pradesh, India

Abstract: Now a days there is a huge escalation in number of people that violate the traffic rules in India. There is high chance of accidents due to these violations. So, it is necessary to control this number. One way to do this is by rising the challan amount imposed by government. Our project is mainly focused on development of a system that detects a license plate and extracts text from it and feeds it to the system.

The technique used here is YOLO (You Only Look Once) which helps in detecting the number plate from the input image. YOLO is the algorithm that works by the neural networks to identify real-time object detection. YOLO is a technique that uses the methods in the machine learning like Neural networks for the identification of the real time objects detection. With the help of this technique we will get accurate results in less time. This algorithm is used in different applications like text reading, traffic police, people and in share market. Once the number plate detection is done the next task is to extract the registration number of the vehicle. This can be done by using a technique called OCR (Optical Character Recognition). Optical Character Recognition (OCR) is used to convert an image of text into a machine-readable text format. After the both techniques are applied the output would be the registration number of the required vehicle.

With the help of obtained registration number we'll find out the details of the respective owner using a searching technique. The final output of the model will be the details of the vehicle owner details.

Keywords– ML (Machine Learning), YOLO (You Only Look Once), OCR (Optical Character Recognition).

1. INTRODUCTION

Our Goal is to detect the Registration number plate by the technique YOLO and the text from the Registration number plate is extracted by OCR. Using this extracted text we will find out the owner of that particular vehicle.

Figure 1: Overall View of the Model

2. LITERATURE SURVEY

The recognition and extraction of vehicle licence plates using video processing on a Raspberry Pi and OpenCV software is demonstrated as a traffic control system. Only a few locations in India, including college entrances and extremely guarded installations, allow it [1]. It is advised that YOLO be utilised in an automated vehicle tracking system to identify objects, licence plates, and characters from video captured by security cameras. The suggested method finds licence plates, recognises cars, and recognises characters with high accuracy and reliability [2]. The necessity of using an Automated Number Plate Recognition (ANPR) system to identify speeding and infraction-prone drivers is emphasised. A proposed ANPR extension is investigated together with other ANPR methods [3]. In order to recognise different licence plate types in China, the end-to-end licence plate recognition system, or LPR-SSD, described in this paper uses upper and lower categorization networks as part of its network design. The system has achieved great accuracy for character recognition, categorization, and licence plate position identification using both genuine and fake licence plate images for training [4]. This study introduces the Smart Vehicle Screening System, which uses images to automatically recognise information from licence plates on moving objects. Tollbooths that handle the payment of tolls for parking lots, highways, bridges, tunnels, etc. can have the system installed. In the paper, photo fusion, neural networks, and threshold approaches are used to describe auto recognition. The studies' findings demonstrated that these methods could identify licence plates [5]. Preprocessing, filtering, feature extraction, segmentation, and recognition are only a few of the image processing techniques that are specifically covered. The study looks at how licence plate recognition can be accomplished using neural network approaches. A parking management algorithm and a MATLAB experiment using licence plates from Malaysia are also included in the study [6].The application of technologies for automatic licence plate recognition in smart cities for law enforcement and crime prevention is highlighted in the paper. In order to identify genuine and fake number plates, computer vision technology is employed in parking management systems and toll booths on roads. The recognised licence plates are shown on a visible user interface and saved in a database for subsequent use. Machine learning algorithms enhance character recognition skills, which can lower traffic infractions and increase parking lot security [7].The study uses the number plate recognition (NPR) system as an illustration of a particular smart transportation and detection system. Technology has made it possible for the system to automatically recognise and read a vehicle's number plate number from a digitally captured image. The paper offers a method for interpreting licence plates using mathematical morphological processes like erosion and dilatation. Edge detection, template matching, bilateral filtering, grayscale conversion, and picture enhancement are all part of the process. The system can quickly and accurately identify licence plate numbers from images of vehicles [8]. In the context of security checks for restricted places like military bases or government institutions, the study explicitly addresses the implementation of licence plate recognition technology for vehicle identification. The system takes pictures of the licence plate of the car, converts the image to grayscale, and then extracts the plate for KNN algorithm recognition. The technology can offer details on the owner, registration, and address of the vehicle. The Python-based algorithm successfully recognises and detects number plates when tested on real images [9].

3. PROBLEM IDENTIFICATION AND OBJECTIVES

India is one of the most populated countries in the world. So, it accommodates huge number of vehicles. Current system of traffic control requires a policeman to manually click pictures of vehicles number plates and upload them to the system. But this has a high probability of having errors as it is a manual task and can also lead to loss of data. So, we need a traffic management system that detects vehicles accurately.

3.1 EXISTING SYSTEM

Figure 2: Raising Chalan by stopping the Vehicles

Currently, the vehicle number of a person who is violating the rules is being taken manually but using this model it can be done automatically by first detecting the number plate and then extracting the text from it.

Figure 3: Chalan by Taking a photo

Although it has been shifted from manually noting down the numbers to capturing pics using camera but still only one number plate is being detected here but using our model we could detect both number plates and extract the numbers from both of them.

3.2 PROPOSED SYSTEM

3.2.1 YOLO

YOLO stands for "You Only Look Once"[10]. This algorithm used for real time object detection of various objects. This object detection is done as a regression problem. This algorithm also employees CNN to detect objects. It is used to predict various classes and bounding boxes simultaneously. It has different types such as tiny YOLO and YOLOv3[10].

YOLO is made up of the both the Hardware and Software the hardware part is the image or video was captured by the sensors and that image or video uses machine learning and Artificial Intelligence techniques like Centroid finding and so on to find out the each object in the video or image.

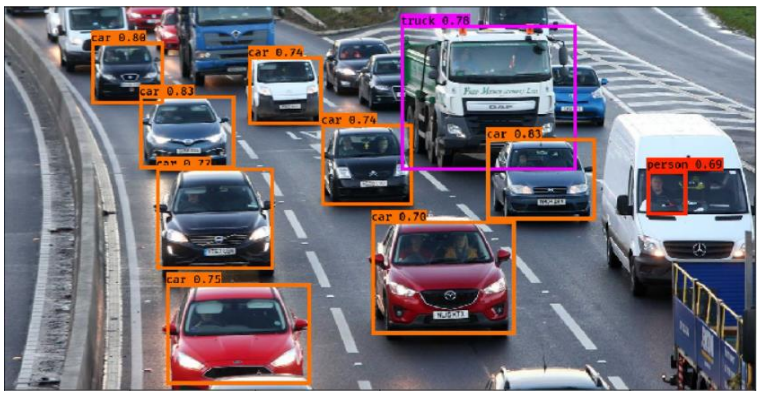

Figure 4: shows that how YOLO work in real time Object Detection [10]

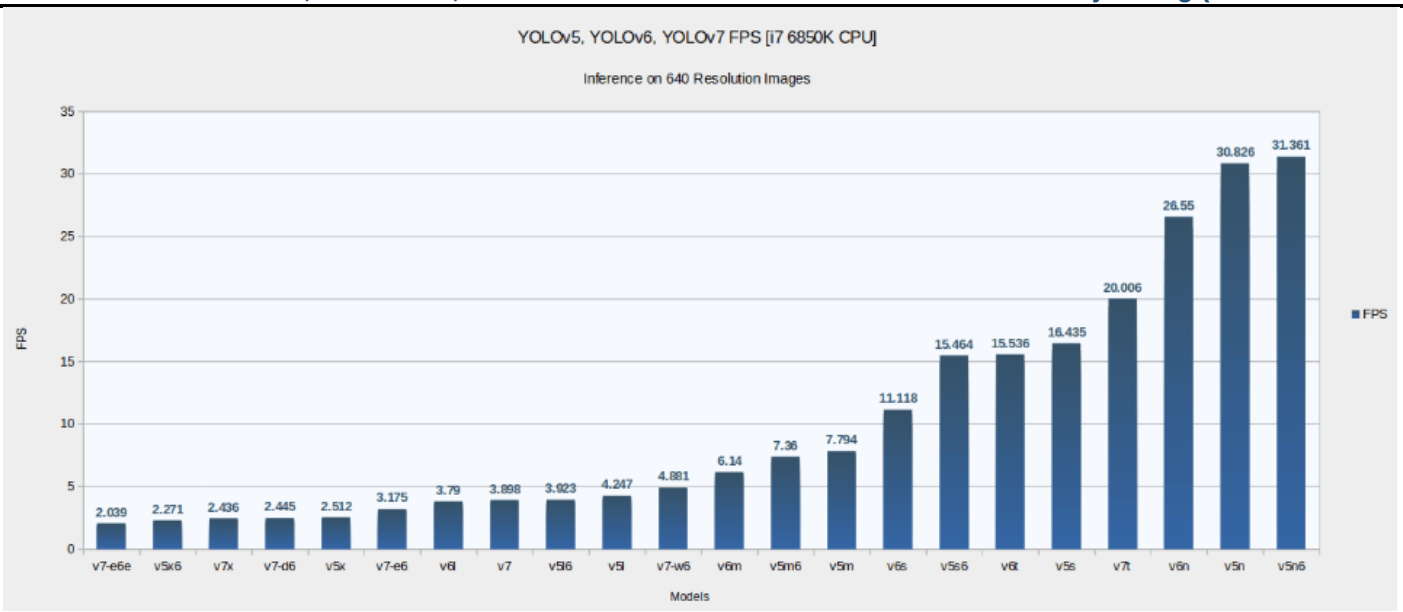

Figure 5: Comparison of YOLO versions based on CPU Performance [10]

3.2.2 OCR

OCR(Optical Character Recognition)[10] is a technique used for Extracting of Text from the Image to Text which is used in extraction from images, Papers, Boardings, Advertisements, Medicines and so on from any where to the text format. Especially it is used in a way such that the text Extracted will be further Data Processed before the out of text.

Figure 6: Optical Character Recognition Process [10]

OCR is made up of the both the Hardware and Software the hardware part is the image was captured by the sensors or the document is scanned by the sensors and from that the text will be extracted by using techniques like Artificial Intelligence and Machine Learning Techniques for the Extraction of the text.

4. PROPOSED MODEL

The figure 1 shows the complete workflow, an image is captured and uploaded into website. Using YOLO , we will extract the number plate frame. This frame is then converted to grayscale. With the help of threshold values that we obtain from OCR technique we predict the numbers using pixels . Lastly ,we use minimum searching algorithm to fetch owner details from the database.

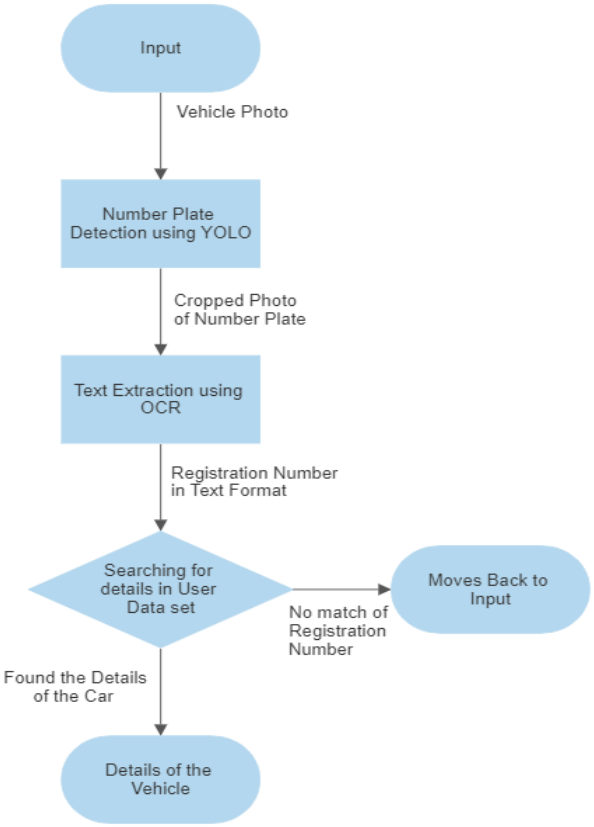

Figure 7: Workflow of the model

5. OVER VIEW OF TECHNOLOGIES

5.1 PYTHON

Python[10] is a high-level programming language. It is employed because it is easy for the users to understand the written code and make modifications if necessary. It supports structured programming, object oriented programming etc and codes written in python can be executed anywhere because python is platform independent.

5.2 MACHINE LEARNING

Machine Learning[10] is subset of AI. It is defined as the capability of a machine or system to behave as a human. It is used in search engines, recommendation systems, voice or text recognition etc. Since our project is a recommendation system the domain we will be dealing with will be Machine Learning.

5.3 MODULES USED IN PYTHON

5.3.1 PIL(Python Image Library)

Pil[10] is an open-source Library used to manipulate and save an image in different formats

5.3.2 NUMPY

Numpy[10] is a module used to perform mathematical operations on a arrays

5.3.3 CV2(Computer Vision Version 2)

Cv2[10] is a module used to perform image processing tasks that include object detections, recognitions etc

5.3.4 STREAMLIT

A open source framework that helps in building websites that are required by ML engineers and it is so useful as it reduces thousands of lines of code that should be written using HTML in order to build a website[10].

5.3.5 PYTESSERACT

Pytesseract[10] is an OCR tool that is used to extract text from images.

5.3.6 SYS

Sys[10] provides detailed information about interpreter and function.

5. CONCLUSION AND FUTURE SCOPE

5.1 CONCLUSION

Figure 8: Output of the model

Hence the outcome of this project is the registration number and owner details of a particular vehicle

5.2 FUTURE SCOPE

Figure 9: Future Scope of the model

This project can be further improved by Integrating it with the "Parking Space Allocator" which takes details of the owner and only if the details of the owner match with the details given by this project, only then parking space will be allocated to that person.

6. REFERENCES:

1. Chinmayi Gurav, Vedika Kamble, Rupali Gurav and Prof. Neha S. Sakhalkar "A Review Paper on Vehicle Number Plate Recognition" year of Publishing 2019.

2. Li Yao, Yingbin Zhao, Jinghua Fan, Min Liu, Jianpeng Jiang and Yan Wan "Research and Application of License Plate Recognition Technology Based on Deep Learning" year of Publishing 2019.

3. Shraddha S. Ghadage, Sagar R. Khedkar "A Review Paper on Automatic Number Plate Recognition System using Machine Learning Algorithms"year of Publishing 2019.

4. Nuzulha Khilwani Ibrahim, Emaliana Kasmuri, Norazira A Jalil, Mohd Adili Norasikin, Sazilah Salam, Mohamad Riduwan Md Nawawi "License Plate Recognition (LPR): A Review with Experiments for Malaysia Case Study" year of publishing 2013.

5. J M S V Ravi Kumar , B Sujatha and N Leelavathi "Automatic Vehicle Number Plate Recognition System Using Machine Learning" year of Publishing 2020.

6. Prasad Molawade, Shruti Shanbhag, Rushabh Rale and Prof Manasi Choche "Number Plate Recognition using Machine Learning" year of Publishing 2018.

7. V Gnanaprakash, N Kanthimathi, N Saranya "Automatic number plate recognition using deep learning" year of Publishing 2020.

8. Chirag Patel, Dipti Shah and Atul Patel "Automatic Number Plate Recognition System (ANPR): A Survey" year of Publishing 2013.

9. V. Koval, V. Turchenko, V. Kochan, A. Sachenko , G. Markowsky "Smart License Plate Recognition System Based on Image Processing Using Neural Network" year of Publishing 2014.

10. Algorithms knowledge (https://www.javatpoint.com), (www.geeksforgeeks.com).