Fancy Number Plate Detection and Recognization

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Abstract: The format and design of the vehicle number plate are to be recognised using fancy number plate detection. The number plate contains the vehicle identification number and passing information. The format of licence plates as specified by the RTO and the government must be recognised by the system we are creating. We snap a picture of the vehicle's number plate and use number plate recognition software to examine it to see if it complies with RTO requirements. It also has a wide range of potential future uses for decreasing criminal activities, like auto theft. Our objective is to produce a reliable, strong product.

Keywords: Character segmentation, fancy number plate recognition, image processing, database comparison and RTO.

I. INTRODUCTION

A sophisticated number plate identification system makes use of optical character recognition technology. The front and back sides of a vehicle are required by law to display the registration number. Latin letters and contemporary Arabic numbers are required on all licence plates. In a nutshell, a vehicle's registration number ought to be clear and readable. On the other hand, Indians enjoy painting whatever we own, including the number plate of a car. Violence-related crimes like kidnapping, murder, molestation, and cell phone or chain snatching regularly include two- and four-wheeled vehicles.

Officials claim that using a car with a conspicuous licence plate to elude the police was a prevalent practise in these crimes. Traffic has become one of the most urgent challenges in any country due to the rise in traffic crimes over the past ten years. Numerous cameras are strategically positioned all over cities and the areas around them to control traffic flow. These cameras record instantaneous photographs of moving traffic, and it takes intelligent software to identify cars and licence plates from those images.

Pieces of the character plate have been detached. The system is made to convert grayscale images so that, regardless of colour, the licence plate can be seen. Using template matching, characters from a licence plate are separated. To eliminate any white borders and gaps, the image has been trimmed. By comparing the results to the numbers in the database, it is possible to determine the type of vehicle number plate. The database not only gives customers passing time and date details, but it also keeps records for the vehicle's history.

LITERATURE REVIEW

A S Mohammed Shariff, Raghav Bhatia, Raghwendra Kumar, Sarthak Jha [1], used OpenCV to create a reliable method for locating the car's licence plate. A bilateral filter was utilised to assess and analyse the image that was provided as input. The cropped image is immediately saved in the cropped licence plate folder after processing, and the image's text is converted to a string there. The text on the image is then read using tesseract, and the results are shown on the Python terminal. The code, according to the author, was successful when the number plate was photographed against a white background but unsuccessful when the background was noisy.

Mahesh Babu K, M V Raghunadh [2], This technique is being thought about for the purpose of locating vehicles with legitimate licence plates. Edge detection is used to determine the location of the licence plate, and then each character is segmented separately. We first select the image, lower the noise level, and identify the image's interesting region. In the end, the correlation method in conjunction with the template matching strategy is used to identify the characters on the number plate.

Amitava Choudhary, Alok Negi [3], The approach for recognising licence plates is zone-based in this study, and it uses an adaptive template matching process to identify the numbers. It is feasible to separate the actual location of the licence plate from other textual effects by using light effects to divide the collected images into several zones. The effects of edge detection and segmentation on each number and letter separately have also been studied for correct recognition. The efficiency of the suggested method is demonstrated by experimental results and a graph.

Prof. M.V. Sadaphule, Kshitij Patil, Aniruddha Patil, Kunal Waghmare, Supriya Nikale [4], This research has numerous applications, including the automatic recognition of vehicles in parking lots, access management to restricted locations, and the detection and authentication of stolen vehicles. The calibre of the algorithms used determines the speed and precision of a licence plate detector. Visual image processing has been used to locate the plate in a number of different ways in the past. The number plate region of the provided image has been identified and isolated. The image must be pre-processed before moving on to this level because image quality is important. As a result, the first image is preprocessed by converting RGB to grayscale, applying Gaussian blur to reduce noise, and detecting edges. The licence plate is then located using a different image processing technique.

Kuntal Bhowmick, Subhojit Roy, Deepak Kumar Jha [5], This study suggests a quick and accurate way for locating vehicle licence plates on intricate photos. The Sobel edge detection technique is utilised in this case to locate edges and only fill in gaps smaller than 8 pixels. We remove any parts that are related to the licence plate that are smaller than 1000 pixels in order to extract it. The majority of our suggested strategy is based on the car number plate system used in India. The extraction of number plates may be more accurate for photos with low ambient light.

Chirag Patel, Dipti Shah, Atul Patel [6], Different ANPR technologies are available today. Even though these systems employ a variety of techniques, the work is still challenging because a variety of factors, including a vehicle's rapid speed, non-uniform number plate, the language of the number, and changing lighting conditions, can significantly affect the overall identification rate. The majority of the systems work within these constraints. This article provides a thorough analysis of recent ANPR research and forecasts for its trends going forward. Scholars working on relevant projects will find this information interesting. Various ANPR methodologies are presented in this work, taking into consideration factors like image size, success rate, and processing time. The study ends with a proposal for an ANPR expansion.

II. METHODOLOGY

There are different blocks in the proposed system to define how the system works.

1. **1. Real-time Image Captured by Camera:** A CCTV or camera captures a picture of the vehicle for later image analysis. The camera is set up to be able to read the car and take a picture of it. To accomplish this, we must designate the image as an input image to the system for processing over an input image.

2. **Identify the Vehicle Number Plate from the Captured Image:** In order to identify the number plate from an image, we need to use an input photo. A number plate function is also assigned for the purpose of recognising number plates.

3. **Character segmentation:** This technique divides each character on a licence plate into its component letters and digits in order to identify the pattern of those characters. Character recognition is also used.

4. **Character recognition:** These methods identify each character using the number plate we have gotten from the image and number plate. We use each character from an image using OpenCV and optical character recognition.

5. **Comparing from Trained Model:** Using these techniques, we may determine whether a number plate complies with RTO standards. We can compare learnt data to input data and decide whether it is authentic or not by assigning learned data attributes, such as text size, font colour, and background colour. We also check to see if the licence plate is already in our database.

6. **RTO fine:** If the licence plate does not adhere to RTO rules, we apply a fine in this way. A challan will be sent to the owner of a fancy number plate at the address or phone number they provided when registering their vehicle. The owner then has seven days to pay the challan and modify the vehicle's number plate in compliance with RTO guidelines.
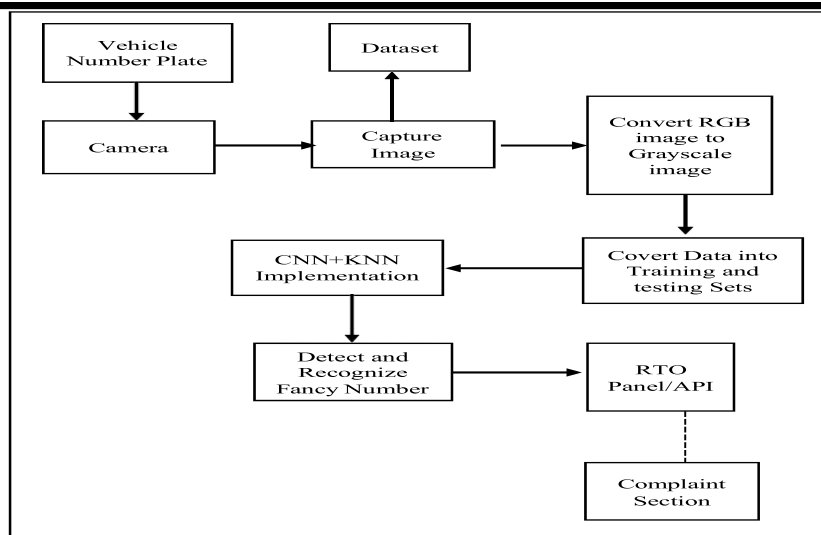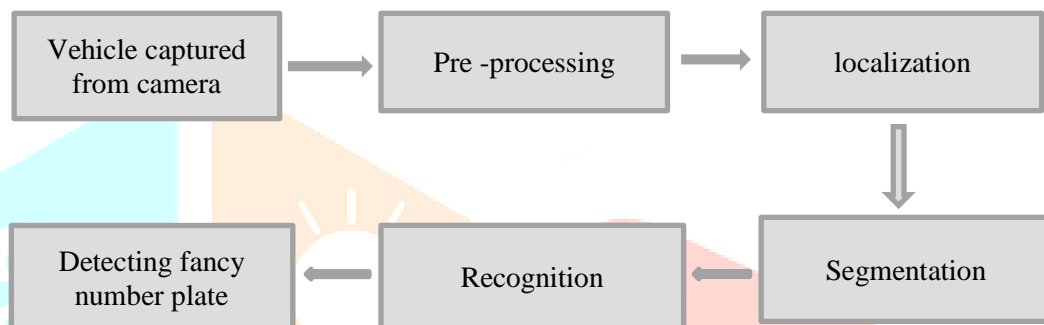
Fig 1: Basic Working Model

Fig 2: Block Diagram

· **Camera:** A camera is crucial for recognising any real-time image. In order to capture the car and determine its number through implementation, a camera will be fixed to the road.
· **Vehicle Number Plate:** As a result, many citizens are unaware of the prohibition on fancy or customised licence plates. Our project will initially identify the number plate that the camera has captured in order to inform them of the law.
· **Dataset:** Within the two sets known as the training set and testing set, all information pertaining to automobiles and licence plates is uploaded. As the characters on the number plate and the design of the number plate with the legitimate and legal number plate are what matter most.
· To extract the unstructured values from the image frames that were collected, all datasets were used.
· **RGB to Grayscale:** Each image that is captured by the camera will be cropped and shrunk for processing. The image containing RGB features will then be turned into a grayscale image to enable the recognition of its edges and contours using the clever edge technique.
· **CNN:** The CNN algorithm will be used to compare and process each recognised character and image.
· **KNN:** To increase accuracy, the KNN algorithm is employed to anticipate the closest predictions of letters and images.
· It is in charge of turning each bound frame into its corresponding character.
· **RTO Panel:** The RTO Fancy number will be recognised by the API and will automatically suspect the challan on the registered phone number or email as convenient.

III. FACILITIES REQUIRED FOR PROPOSED WORK

1) Software:

Operating System: Windows 11
Programming language: Python
Tool: Jupyter Notebook
Technology: Natural Language Processing

2) Hardware:

Processor: Ryzen 7th Generation
RAM: 8GB or more
Hard disk: 512 GB (minimum)

IV. APPLICATIONS

A new technique for detection of the number plate with various designs and illegal format used by RTO. The decorative licence number plates for automobiles are not permitted under Indian motor vehicle legislation. It is illegal to use any elaborate designs, fonts, symbols, names, or images.

V. CONCLUSION

The system's capacity to recognise unusual number plates will result in a reduction in the number of police officers needed. It can potentially reveal information about the owner by using the licence plate. This device includes a camera designed specifically for ANPR. If the pricey licence plate is discovered, the owner will be issued a challan and given seven days to make payment. We presented a continuous and effective approach for vehicle number plate identification for programme cost charge assortment.

VII. REFERENCES

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