

Vehicle Number Plate Detection System For Indian Vehicles Using OCR

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ABSTRACT

Vehicle Number Plate Recognition (VNPR) is an important application in intelligent transportation systems, traffic monitoring, and automated toll collection. This paper presents an efficient approach for detecting and recognizing vehicle number plates using Haar Cascade classifiers and Optical Character Recognition (OCR). The system captures vehicle images, detects the number plate region, extracts characters, and converts them into editable text using Tesseract OCR. The proposed method improves automation in vehicle identification and enhances accuracy under real-time conditions.

Index Terms— Vehicle Number Plate Recognition, Haar Cascade, OCR, Tesseract, Image Processing, Intelligent Transport System.

I. INTRODUCTION

With the increasing number of vehicles, automated systems are required for vehicle identification in traffic surveillance, law enforcement, and parking management. Manual vehicle plate inspection is time-consuming and error-prone. Therefore, automatic number plate detection and recognition has gained significant importance.

Vehicle Number Plate Recognition (VNPR) involves:

- Capturing the vehicle image
- Detecting the plate region
- Extracting characters
- Recognizing the text using OCR

This paper proposes a reliable method using Haar Cascade for detection and Tesseract OCR for recognition campus.

II. LITERATURE SURVEY

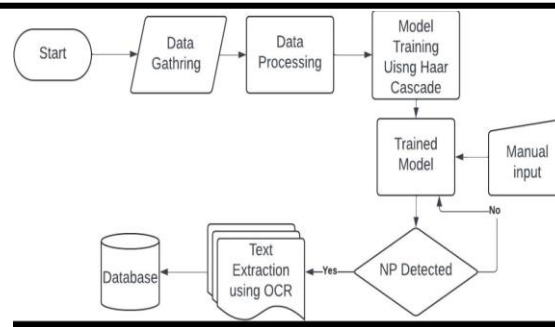
Several techniques have been developed for license plate recognition:

- Edge detection and segmentation-based methods
- Machinelearning classifiers
- Deep learning-based object detection models
- OCR-based recognition systems

Haar Cascade classifiers are widely used due to their speed and suitability for real-time applications. OCR engines like Tesseract provide accurate character recognition for structured text.

III. PROPOSED METHODOLOGY

The proposed system consists of four main stages:



1 Image Acquisition

A vehicle image is captured using a camera or dataset input.

2 Preprocessing

The captured image is converted into grayscale and filtered to remove noise.

3 Number Plate Detection

Haar Cascade classifier is applied to detect the rectangular region of the number plate.

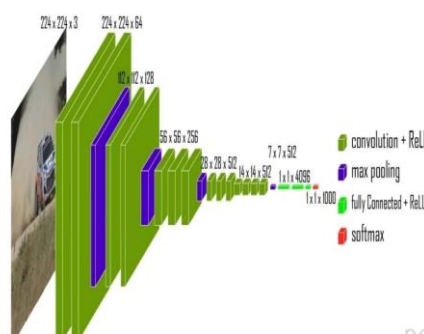
4 Character Recognition

The extracted plate region is processed through Tesseract OCR to recognize alphanumeric characters.

IV.SYSTEM ARCHITECTURE

The complete workflow is shown below:

1. Input Vehicle Image
2. Preprocessing
3. Plate Detection (Haar Cascade)
4. Plate Cropping
5. OCR Recognition (Tesseract)
6. Output Text Display



V.RESULTS AND DISCUSSION

The system successfully detects vehicle number plates and converts the extracted plate characters into text format. The approach provides good accuracy for clear images and standard plate formats.



VI. ADVANTAGES

- Fast detection suitable for real-time use
- Simple implementation using
- OpenCVOCR provides direct text conversion

VII.CONCLUSION AND FUTURE WORK

This paper presented a vehicle number plate detection and recognition system using Haar Cascade classifiers and Optical Character Recognition. The system automates vehicle identification efficiently and can be applied in smart traffic systems, parking automation, and surveillance applications. Future work includes improving accuracy using deep learning-based detection methods

VIII.FUTURE SCOPE

- Integration with Deep Learning (YOLO, CNN)
- Handling tilted and blurred plates
- Support for multilingual number plates
- Real-time deployment with IoT surveillance systems.

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