A Review Paper on Automatic Number Plate Recognition System using Machine Learning Algorithms

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Abstract— **The number of cars on the road has increased significantly in recent years, resulting in traffic congestion and infractions. Automatic License Plate Recognition Systems (ALPRS) may be utilized to automate the traffic management process, improving traffic flow and bolstering access control systems. Automatic number plate recognition (ANPR) is a tool used in smart cities for reducing crime and investigation. It's commonly utilized in parking management systems and toll booths on roads with a fixed shooting angle and illumination environment. If the automobile is not legitimate, searching for it becomes a highly time-consuming and difficult operation. In this project for moving vehicle plate character detection, computer vision technology plays a critical role.**

Index Terms: **Automatic number plate recognition; Image Processing; Machine learning; Computer Vision;**

I.INTRODUCTION

Automatic license plate identification has become an advantage of intelligent transportation and monitoring systems in recent years [1]. This is owing to the benefits technology has brought in our everyday lives through its varied uses. Traffic violators can be tracked in real time, stolen vehicles can be recovered, vehicle movements can be recorded automatically, and parking citations may be issued.

Vehicle and transportation maintenance are time-consuming and difficult chores. If it's controlled by hand, it might reveal a lot of flaws and challenges. As a result, a Recognition System for Automatic Vehicle Number Plate Detection is required. Residential parking spots are in high demand, which necessitates a competent management-driven strategy. A major portion of the world's population lives in cities, necessitating the usage of safe and convenient parking places on a regular basis. This system keeps track of all allowed vehicles registered with in parking system, as well as their owners' information.

It will trigger real-time data representing the ingression of such automobiles each time vehicles enter or exit the parking lot.

II.LITERATURE REVIEW

This study [1] demonstrates the execution and efficiency of the Otsu technique as well as the K closest neighbors' approach (KNN). The Otsu technique is used to transform RGB images to binary images and extract picture attributes as in fig.1.

Fig 1: System Extracting Number from Number Plate

For classification, the KNN Algorithm is employed, and it is noise-resistant in pattern recognition, feature extraction is employed to transform images into binary form. The Otsu technique is used to extract features, and KNN classifies data by comparing local test results to classification model. Learning algorithms are used to identify test data, and classification techniques are used to categorize the data.

III.RELATED WORK

Many strategies for building the ALPR system have been proposed in prior articles. Because these papers have several advantages and downsides, we attempted to create our system using all of the finest strategies found in various articles, hence making it more dependable and time efficient. Reference

[2][3][4] describes some of the rudimentary approaches utilized inside the domain of character recognition, which resulted in a system that was unstable and time consuming.fig.2 shows the functioning of image processing algorithm.
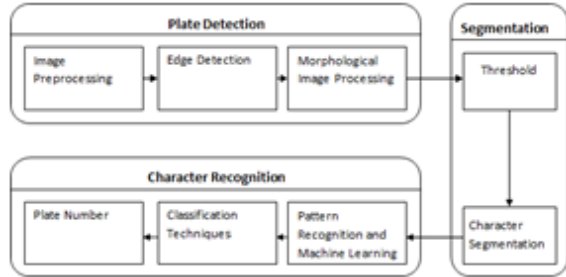

Fig 2: Image Processing Algorithm

IV. PROPOSED SYSTEM

The primary steps in the suggested system's flowchart are as in fig.3.

A. Acquiring Input Images

The very first step is to obtain a picture of the car with the license plate, which in our instance is retrieved from a previously collected series of photographs obtained using different devices (such as high-speed cameras).

B. RGB to GrayScale Conversion

The RGB format is used to enter the image. The main goal of the conversion would be to lower the amount of colors by providing fewer data per pixel.

C. Image Binarization

Binarization is accomplished by deciding on a value for the threshold. We examine the image pixels with in image after picking the value. If the value exceeds the threshold, the pixel will be entirely white or black. This is really a simple thresholding procedure that may not produce accurate results if a global limit is used.

D. License Plate Recognition

It's crucial to remember the limits of a plate inside the photo while extracting license plates [10]. Many methods exist for doing so, including Sobel's Edge Detection Method & Hough's Line Detection Method.

E. Character Segmentation

The binary image of the retrieved license plate is used to segment the characters. Horizontal scanning is the algorithm used here, which uses a scanning line to identify the circumstances that fulfil the character's start and end positions [11].

F. Character Recognition using CNN

A CNN with two convolution operation at the start and two completely linked levels at the conclusion was employed. As mentioned in [15] [16] [17], we utilized a dataset for training the CNN. TensorFlow has been used to train and validate our model. With such a learning rate of 0.5, we employed a steepest descent approach to decrease cross-entropy.
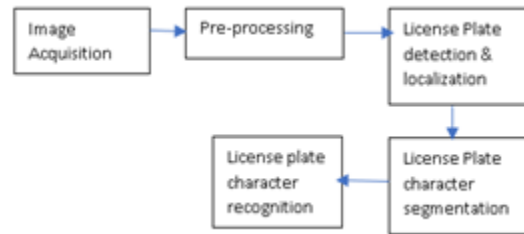

Fig 3: Flowchart of LPR Systems

V. CONCLUSION AND FUTURE SCOPE

An overview of some achievements in CNN on License Plate Recognition Systems is offered in this study. The research looked at each level of the license plate recognition system as it was presented in related papers. A few of the chosen CNN-methods were examined in terms of their strengths and potential areas for development. Despite current progress, more advancement is possible, including Wider Knowledge and Information An overview of some achievements in CNN on License Plate Recognition Systems is offered in this study. The research looked at each level of the license plate recognition system as it was presented in related papers.

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