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Platesense: Intelligent License Plate Recognition With Opencv

[1]Shubham M. Gaikwad, [2] Nilesh R. Kumbhare, [3]Deepak C. Chaudhari , [4]Lalit P. Gangurde
[5]Mrs. G. G. Raut (Ass. Prof).
Department of MCA Engineering, GES R. H. Sapat College of Engineering Nashik-3, Maharashtra, India.

Abstract

Automatic Number Plate recognition is one of the techniques used for vehicle identification purpose, focusing on its role in bolstering security and improving operational efficiency. The study delves into the evolution of LPR systems, incorporating state-of-the-art algorithms for accurate and swift license plate identification. Through a comprehensive analysis of existing methodologies, the paper proposes novel approaches to enhance recognition accuracy and adaptability to diverse environments. Additionally, the research discusses the integration of artificial intelligence and deep learning techniques to further optimize license plate recognition systems, making them robust and resilient to real-world challenges. The findings present a valuable contribution to the field, offering practical insights for the development of more reliable and effective LPR solutions in various applications, including law enforcement, parking management, and traffic monitoring.

Keywords OpenCv, Machine Learning.

1. Introduction

System for automatically detecting license plate number of moving cars is known as a real-time embedded automated license plate recognition system Light and speed impacts, among others, contribute to complexity of LNPR's properties[1][3]. Computer vision is certainly one of the most popular applications when we talk about AI. Hype aside, we were ever captivated by it since it is the most significant organ of human sense that concerns the human sight.

The identification of the Licence plate is done via the uploading of photographs from the front or back of a vehicle and then the processing of the image for the iden-tification of the vehicle license plate[5] . This Process Under Four Steps in which Initially The System Takes an video Sream as input in First Step . The second step is to separate the character segmentation characters from the detected numeric plates in order to retain the useful information for future processing . In the third step the text is translated into encoded character data using OCR[4]. The last Step The System generate Owner Details Of Particalar Vehicle

2 . Problem Statement

In an era of burgeoning urbanization and escalating vehicular density, the manual monitoring and management of license plates have become an arduous task for law enforcement agencies. Conventional license plate recognition systems exhibit limitations in accuracy, speed, and adaptability, hindering their efficacy in diverse real-world scenarios. The pressing need for a sophisticated, reliable, and versatile License Plate Recognition (LPR) system is evident to streamline traffic control, enhance security measures, and expedite law enforcement processes.

3. Objective

Develop a robust license plate recognition system utilizing advanced computer vision techniques to accurately and efficiently identify license plate numbers. Implement cutting-edge deep learning algorithms for image processing and character recognition to ensure high accuracy in diverse environmental conditions. Integrate the system with real-time data streams for dynamic license plate tracking and logging. Optimize the solution for scalability, allowing seamless deployment in various scenarios, from traffic management to security surveillance.

4. SCOPE

The scope of a license plate recognition system includes enhancing security through automated vehicle identification, optimizing traffic management, aiding law enforcement in surveillance, facilitating efficient parking management, and enabling access control in restricted areas. Additionally, it can contribute to data analytics for traffic patterns and law enforcement strategies, offering a versatile solution for various applications in both public and private sectors.

5. Review of Existing System

In previous Project The System Involves

1. Camera Placement: - LPR systems use strategically placed cameras, often mounted on poles, traffic lights, or buildings, to capture images of vehicles and their license plate[1][5].
2. Cameras should be positioned to have a clear and unobstructed view of license plates as vehicles approach or pass by.
3. Image Preprocessing: Before analyzing the captured images, preprocessing techniques are applied to enhance image quality and reduces noise.
4. License Plate Localization Algorithms are employed to identify the region of interest within the image where the license plate is located. Techniques like edge detection, contour analysis, or neural networks may be used to identify the rectangular shape of license plates.

6. Proposed System

A License Plate Recognition (LPR) system using OpenCV is a computer vision-based system that is designed to automatically detect and recognize license plates in images or video streams. OpenCV (Open Source Computer Vision Library) is a popular open-source library that provides a wide range of tools and functions for image and video processing[1].

The model of a License Plate Recognition system using OpenCV typically follows a series of steps to perform the license plate detection and recognition[2]:

1.Image/Video Input: The system takes an image or a video stream as input, where the license plates need to be detected and recognized

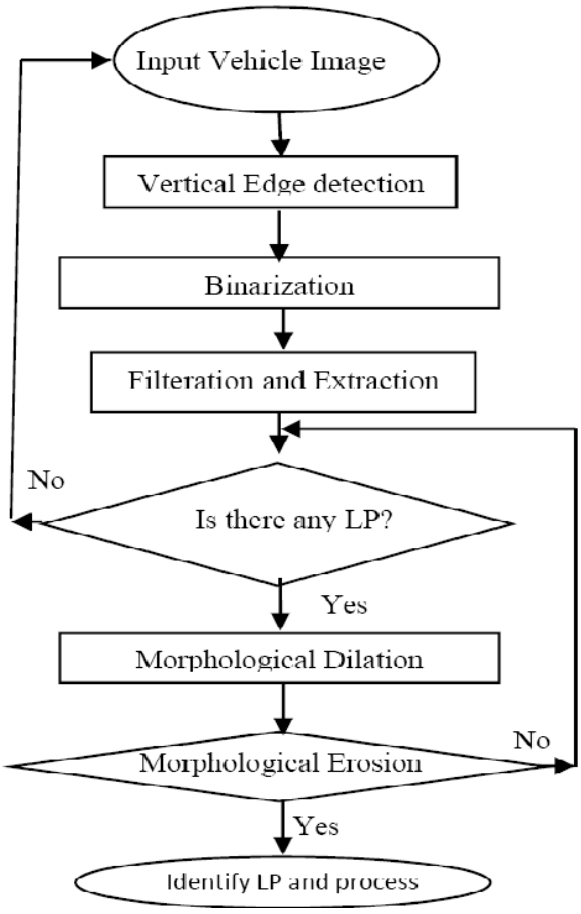

Fig 6.1 System Scenario

2.Preprocessing: The input image is preprocessed to enhance its quality and improve the accuracy of subsequent steps. This may involve operations such as resizing, noise removal, and contrast enhancement

3.License Plate Detection: OpenCV provides various techniques for license plate detection, such as edge detection, contour analysis, and template matching. These techniques help identify regions in the image that are likely to contain license plates.

4.Character Recognition: The segmented characters are passed through a character recognition algorithm or model. This can be done using techniques like Optical Character Recognition (OCR) or machine learning algorithms such as convolutional neural networks (CNNs) trained on character datasets.

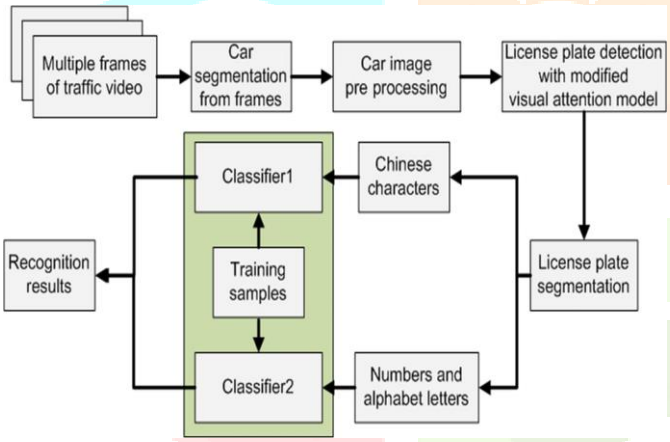

Fig 6.2 Proposed System Architecture

7. Result and Discussion

Whenever the proposed method is performed through the following steps which are discussed below:

Step 1: The system Capture an image or a video stream as input, where the license plates is detected.

Step 2: License plate detection process(Localization) .

Step 3: The License Plate is detected, segmented, and recognized

Step 4: Finally System Generate The Details of this Vehicle owner

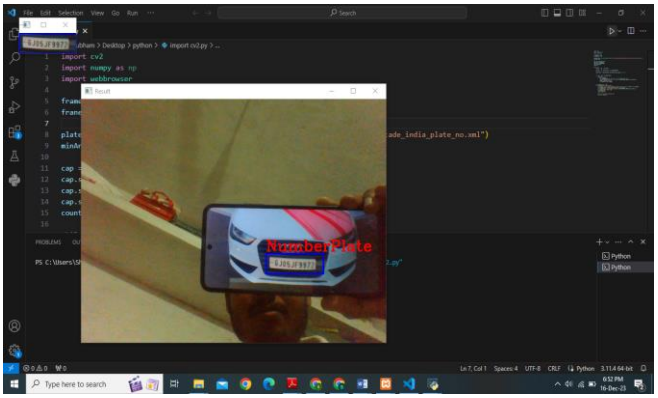

Fig 7.1 Capture Video And Localization Licence Plate

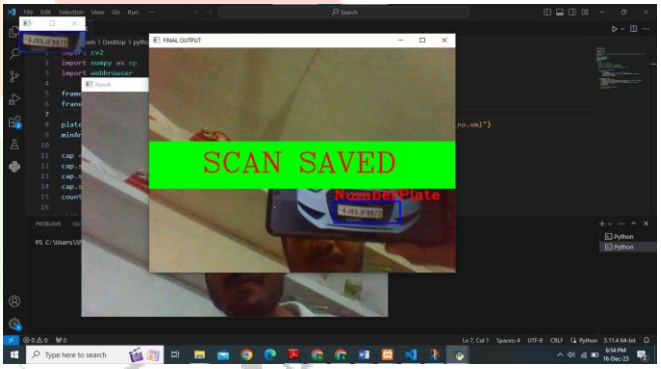

Fig 7.2 Licence Plate Detected

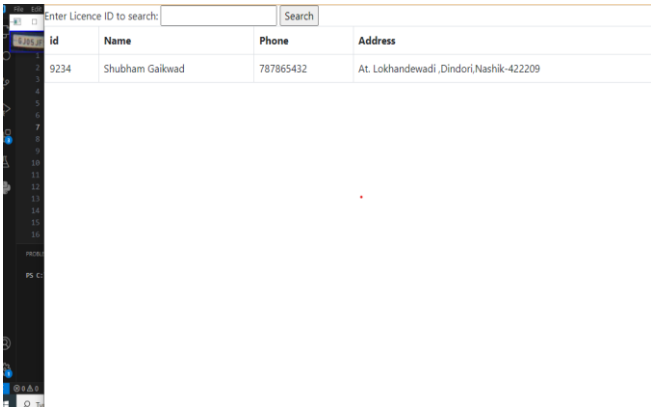

Fig 7.3 Generate Vehicle Owner Detail

Conclusion

In this work, we have presented technique to recognize number plate of vehicles. For this, we introduced Image capture, preprocessing, edge detection, segmentation, character resizing, feature extraction and finally recognized character of number plate using machine learning algorithms. Dataset creation consisted number of images which are collected real times, parking and etc.

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