



License Plate Recognition System

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Abstract: The LPR system deals with matching a license plate image from a pool of available images. For this the image of the car with the plate is taken. Then the license plate is extracted. This is followed by searching for the license plate in the database of images. An example of the application of this project would be the toll gates, where the car needs to be registered to get inside. One way of checking for this is as follows. The image of the car is taken and the license plate (extracted from the car image) is matched with the database. If there is a match then car is allowed else it is stopped. The images stored in the database are images of the car with the plate at the time of registering. So any time the car comes to the toll gate, its picture is taken. That is used to get the license plate and this plate image is matched with the database. The example given above explains that the output of the project will not be an image as such but will only tell the user if the license plate is available in the database. The problem is then divided into three stages:

1. License plate location and extraction.
2. Matching license plate with images in the database.

I. INTRODUCTION

License Plate Recognition (LPR) is an image processing technology used to identify vehicles by their license plates. LPR is one form of Intelligent Transport Systems (ITS) technology that not only recognizes and counts vehicles but distinguishes each as unique. A LPR system can be conceptually considered as containing two separate processing stages:

- a. License Plate Localization (LPL);
- b. License Plate Character Recognition (LPCR).

License plate localization is an important phase in vehicle license plate recognition of intelligent transport systems. It can be used in many applications such as entrance check, security, and parking control, airport or harbor cargo control, road traffic control, and speed control and so on. A number of commercial software is developed in this area. Due to the rapidly increase in number of vehicles across the world's big cities, vehicle number plate recognition system has become one of the most important digital image processing systems to be used. This system will solve so many problems for these city facilities which is hard to be controlled by human 24 hours. However, this system is still facing a lot of difficulties to be able to recognize license plates and one of these difficulties is the large variety of plate's layouts between the different countries and even across the same country cities. This work tends to find an integrated System which can recognize these license plates automatically in real-time applications.

II. LICENSE PLATE CAPTURE CAMERA

CCTV Camera Pros License Plate Recognition (LPR) System. Provides High Resolution Video, Monitoring And Recording. Our License Plate Recognition (LPR) System Is An Effective video surveillance and parking lot monitoring solution .Many parking lots Have A High Security Risk Rating.

A. Aim:

- a. To Reduce Crime.
- b. Reduce Burglaries.
- c. Reduce Vehicle Crime.
- d. Reduce Shop Theft.

B. Algorithms:

There are six primary algorithms that the software requires for identifying a license plate:

- a. Plate localization – responsible for finding and isolating the plate on the picture.
- b. Plate orientation and sizing – compensates for the skew of the plate and adjusts the dimensions to the required size.
- c. Normalization – adjusts the brightness and contrast of the image.
- d. Character segmentation – finds the individual characters on the plates.
- e. Optical character recognition.
- f. Syntactical/Geometrical analysis – check characters and positions against country-specific rules.



Figure(2.2) License Plate

III. SYSTEM APPLICATION

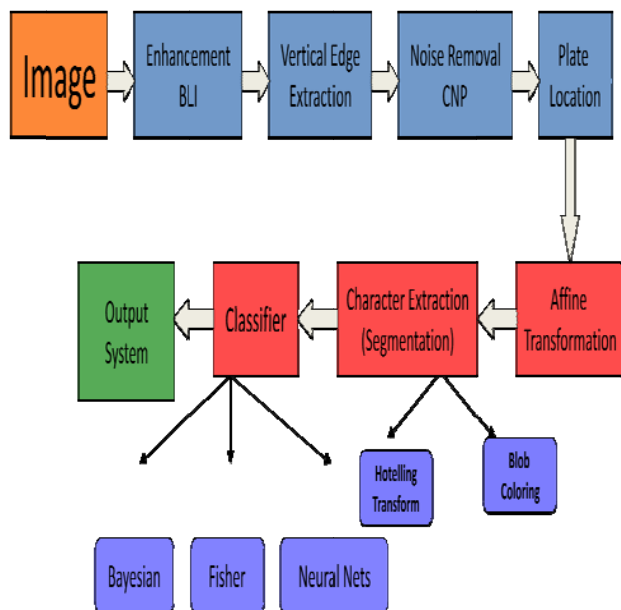


Figure.(3.1) LPR System

A. Edge Information:

Number plate area contains rich edge information. Background areas around the plate mainly include horizontal edges. Background areas have long curves and random noises. If only the vertical edges are extracted from the car image and most of the background is removed, the plate area can be isolated.

B. Image Enhancement:

The input image is converted to a gray scale image of size 384 X 288.

Due to the radiant's in the image due to improper lighting conditions

There are few vertical edges in the plate area. For gray scale image Enhancement is necessary

C. Edge Extraction And Noise Removal:

The Vertical edge extraction is done by using Sobel Operator. Background curve and noise removal is done using the Concerned Neighborhood Pixel (CNP).

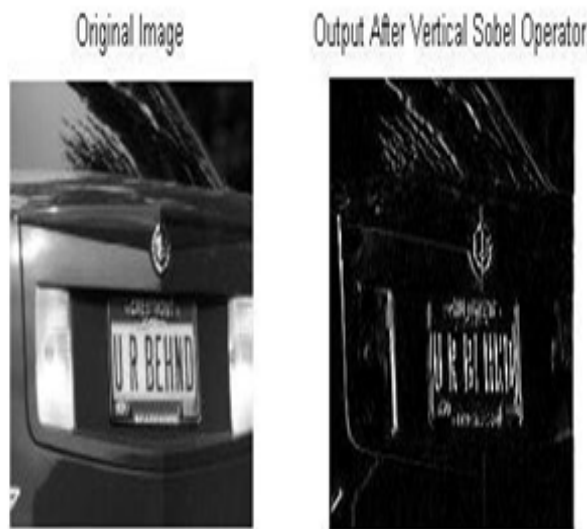


Figure.(3.2) Edge Extraction Process



Figure.(3.3)Random noise pixel

IV. METHODS AND IMPLEMENTATION

The implementation takes place following the sequence of steps listed below:

The recognition system has a PC which captures the vehicle license plate.

Under adverse environmental conditions which refer to the following point below which make vehicle license plate images unclear when it is captured by the system.

- Poor Lighting and low contrast due to overexpose, reflection or shadows
- Unforeseen weather like raining or haze;
- Blurry images;
- Dimming the lighting of the image;
- Adding Salt and Pepper to the image.

The system will identify the vehicle license plate and convert the images to grayscale images.

Following by converting the grayscale images to binary images which consist of only '0' and '1'

After binary images, the system will do a character segmentation of the vehicle license plate. It will segment the character and number to each individual figure.

All the character and number will then be change to binary form in terms of matrix and been recognize by neural network.

A Graphical User Interface (GUI) will be use to display the process of the vehicle license plate been capture. Following by image cropping and recognition.

The objective of second stage is to convert the input image in to gray scale image using rgb2gray conversion. Then the wiener2 filter issued to remove the noise from grayscale image. Wiener 2 low pass filter demises a grayscale image that has been degraded by constant power additive noise.

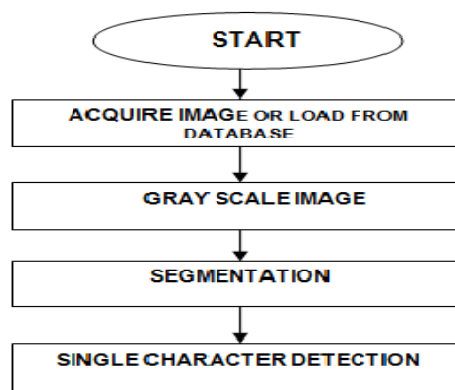


Figure. (4.1) The flow diagram for proposed system

In this method is proposed for detecting the license plate form a gray scale image and segment the characters contained by the License plate of a car. For real time application, the system requires a video camera which acquires the image of vehicles from rear or front but for the present work, due to unavailability of there required hardware, we have used mobile camera. The image of various parked vehicle have been acquired manually thereafter fed to the software where they are first converted into gray scale image and then the gray scale image is segmented from gray scale image and then the region with highest probability of number plate ,the single character is detected. This efficient method is used to capture characteristics of License plate in the image regions

A. Segmentation And Result

For the segmentation and detection of characters for recognition, we used Sobel filter to find the edges. Typically, a segmentation method is used to separate the pixels constituting the LPR character from the background pixels. The result of segmentation is shown in Fig.



Figure. (4.4) Segmented image

After vehicle features have been extracted from the input images, feature segmentation is performed to separate individual elements according to the type of part or feature. In the case of vehicle number plates, the Chinese and English characters, numbers are separated to form a single character, alphabet or number . Now this set is ready to be presented to the neural network recognizing the characters, alphabets, and numbers. Single character detection has been shown in Fig. shown below.



Figure.(4.5) Single character detection

The main objective of this is to provide an input image of license plate that has been extracted from an image of real scene using mobile camera. Then the characters and numbers are segmented and recognized. This process has covered all forms of Indian license plates.

Most of the effort was spent on image processing methods like thresholding, segmentation and feature

extraction which are crucial for the recognition system. Great amount of time were spent on training the correlation in two dimensions and building up the templates for the classification

Overall the vehicle license plate recognition software has been successfully designed and developed to recognize the 38 different characters using correlation in two dimensions. As results achieved are not 100% accurate, there are some methods that would enhance efficiency and reliability of the program for future work.

V. ANPR



Figure. (5.1) ANPR

ANPR (various other terms)

- Automatic license plate recognition (ALPR)
- Automatic vehicle identification (AVI)
- Car plate recognition (CPR)

ANPR can be used to store the images captured by the cameras as well as the text from the license plate, with some configurable to store a photograph of the driver. Systems commonly use infrared lighting to allow the camera to take the picture at any time of the day. ANPR technology tends to be region-specific, owing to plate variation from place to place.

VI. CONCLUSIONS

The purpose of this seminar is Automatic recognition of number plates using an Artificial Neural Network. The operation of an License plate recognition system can be used by the police force to catch traffic law violators instead of employing manual labor. In this project we use edge density technique proposed by to improve image quality and also applied their proposed method for number plate region detection and plate extraction because in the perspective of the background scenes are more complex and also the weather of this country is always changing. After the plate extraction we apply the segmentation process to isolate the characters and words from the plate. Then we applied a feature extraction technique which is rotation invariant to extract the features of the isolated characters and words after that this pattern pass through the MLP network to recognize each characters and words to identify the number plate. In future, the proposed approach is applied in service and also is extended the work for measuring the speed of vehicles.

VII. REFERENCES

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