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A Novel Car Number Plate Recognition Using ANPR

B.Vijaya Lakshmi
M.Tech,
Dept of ECE (DECS),
Dr.K.V.Subba Reddy College of Engineering for Women, Kurnool.

Mohammad Zubair
Assistant Professor,
Dept of ECE,
Dr.K.V.Subba Reddy College of Engineering for Women, Kurnool.

Abstract:

Car Number Plate Recognition (CNPR) is a real time embedded system which identifies the characters directly the image of the license plate. It is an active area of research. CNPR systems are very useful to the law enforcement agencies as the need for Radio Frequency Identification tags and similar equipment's are minimized. Since number plate guidelines are not strictly practiced everywhere, it often becomes difficult to correctly identify the non-standard number plate characters. In this paper we try to address this problem of CNPR by using a pixel based segmentation algorithm of the alphanumeric characters in the license plate.

The non-adherence of the system to any particular country-specific standard & fonts effectively means that this system can be used in many different countries – a feature which can be especially useful for trans-border traffic e.g. use in country borders etc. Additionally, there is an option available to the end-user for retraining the Artificial Neural Network (ANN) by building a new sample font database. This can improve the system performance and make the system more efficient by taking relevant samples.

Keywords:

ANPR, number plate, smart phone, android, image processing.

INTRODUCTION:

The automatic number plate recognition systems (ANPR) occur for a long time, but only in the late 90s it became an important application because of the large expand in the number of vehicles.

The information extracted from the license plates is effectively utilized for monitoring of traffic, access mode of control, parking, motorway road tolling, and border control, making car logs for systems in the parking and measurement of journey in terms of time etc. by the law enforcement agencies. The recognition problem is normally sub-divided into 5 parts:

(1) Image accession i.e. capturing the image of the plate which consist license.
(2) Pre-processing the image i.e. normalization, adjusting the brightness, scenes and contrast of the image.
(3) Localizing the license plate.
(4) Segmentation process in terms of characters i.e. finding and recognizing the individual symbol images on the plate.
(5) Optical character identification. There may be further improvements over these (like matching the vehicle license number with a particular database to route the vehicles which are suspected etc.) but the primary structure remains the same.

A guiding parameter in this estimate is country-distinct norms of traffic and standards. This helps to fine tune the system i.e. number of characters in the plate of the license, text fluorescent level (relative index i.e. dark text on light background or light text on dark background) etc. So the complication can then be limited down for application in a particular country. For example, in India according to the standard the license plate numbers are prepare in the black color print mode on a white background for private vehicles and with a background of an yellow color for commercial vehicles.

The general format for the license plate is two letters (for state code) followed by district code, then a digit code had size as four specific to a particular vehicle.

1. Relegated Work:

Existing Method

OCR based approach for number plate recognition does not work for the variations in painting style of the number plates. In this paper authors have presented an image retrieval based method to recognize the car number plate captured using a smart phone to facilitate the Car management system of a Smart office premise. In the proposed method a Smartphone is used to capture the images and extract features of the car number plate. These features are matched against predefined set of same car number plate images in the database. The character images are matched in an efficient manner to make it a real time solution. The proposed method recognizes the car with almost 93.75% accuracy and is already deployed in our office premise.

Proposed Method:

The building administration usually rents cars for night drops from some car hiring agencies. The agency is thus requested to send the cab details including driver's contact number, car number, and a neatly taken snap of the number plate used to verify it against the number they send as a text. This image and the information are usually stored in a backend machine where the night car management system runs. In the proposed system, the security person is asked to take a snap of the number plate using the smart phone provided to him and also to swipe the card of the employees leaving by that car. The smart phone extracts some features to reduce the spatial requirement and those features are used by the server to recognize which car has left. The proposed method involves the steps described in the next subsections. In lot of cases, characters are segmented using the horizontal projection of a pre-processed number plate, but sometimes these principles can fail, especially if detected number plates are too warped or skewed. Then, more difficult algorithms which are related to segment parts must be used. In Chapter four deals with various methods normalization and identification of characters. At first, character aspects and brightness must be normalized to ensure invariance towards a size and light constrains. Then, an attribute extraction algorithm must be applied on a character to filter irrelevant data. It is necessary to extract attributes, those will be invariant towards character deformations, used font style etc.

2. IMPLEMENTATION:

Browsing for image is the first stage of this process. An image is read from the specified location in memory to the GUI. This image is later processed to recognize the number on the number plate and to authenticate. The processes involved in this stage are shown in the form of flow chart below.

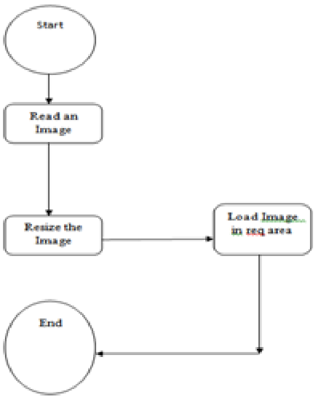


Fig:-1 Browsing and Resizing Process

imread( )

This is a MATLAB function which is used to read an image for processing.

Syntax

- A = imread(filename,*fmt*)

Description:

A = imread(filename,*fmt*) reads a gray scale or true color image named filename into A. If the file contains a gray scale intensity image, A is a two-dimensional array. If the file contains a true color (RGB) image, A is a three-dimensional (m-by-n-by-3) array.

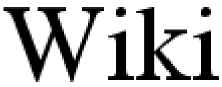
filename is a string that specifies the name of the graphics file, and *fmt* is a string that specifies the format of the file. If the file is not in the current directory or in a directory in the MATLAB path, specify the full pathname of the location on your system. If imread cannot find a file named filename, it looks for a file namedfilename.*fmt*.

Image Resizing:

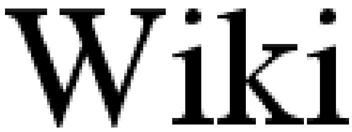
In computer graphics, image scaling or resizing is the process of resizing a digital image. Scaling is a non-trivial process that involves a trade-off between efficiency, smoothness and sharpness. As the size of an image is increased, so the pixels which comprise the image become increasingly visible, making the image appear "soft". Conversely, reducing an image will tend to enhance its smoothness and apparent sharpness. Apart from fitting a smaller display area, image size is most commonly decreased (or sub sampled or down sampled) in order to produce thumbnails. Enlarging an image (up sampling or interpolating) is generally common for making smaller imagery fit a bigger screen in full screen mode, for example. In zooming an image, it is not possible to discover any more information in the image than already exists, and image quality inevitably suffers. However, there are several methods of increasing the number of pixels that an image contains, which evens out the appearance of the original pixels.

Scaling Methods:

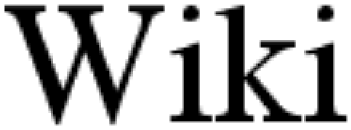
An image size can be changed in several ways. Consider doubling the size of the following image:



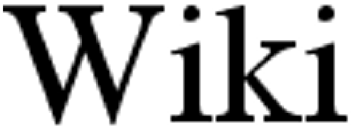
The easiest way of doubling its size is nearest-neighbour interpolation, replacing every pixel with four pixels of the same colour:



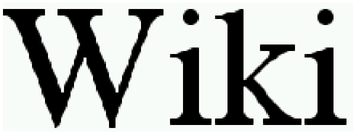
The resulting image is larger than the original, and preserves all the original detail, but has undesirable jaggedness. The diagonal lines of the W, for example, now show the characteristic "stairway" shape. Other scaling methods are better at preserving smooth contours in the image. For example, bilinear interpolation produces the following result:



Linear (or bilinear, in two dimensions) interpolation is typically better than the nearest-neighbour system for changing the size of an image, but causes some undesirable softening of details and can still be somewhat jagged. Better scaling methods include bicubic interpolation (example below) and Lanczos re sampling.



For magnifying computer graphics with low resolution and/or few colours (usually from 2 to 256 colours) the best results will be achieved by hqx or other pixel art scaling algorithms. These produce sharp edges and maintain high level of detail. hq2x:



For scaling photos (and raster images with lots of colours) see also anti-aliasing algorithms called super sampling.

Algorithms:

Two standard scaling algorithms are bilinear and bicubic interpolation. Filters like these work by interpolating pixel colour values, introducing a continuous transition into the output even where the original material has discrete transitions. Although this is desirable for continuous-tone images, some algorithms reduce contrast (sharp edges) in a way that may be undesirable for line art.

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Nearest-neighbour interpolation preserves these sharp edges, but it increases aliasing (or jaggies; where diagonal lines and curves appear pixelated). Several approaches have been developed that attempt to optimize for bitmap art by interpolating areas of continuous tone, preserve the sharpness of horizontal and vertical lines and smooth all other curves.

imresize( )

This function resizes the image i.e changes the resolution of the image to larger or still smaller resolutions.

Syntax

B=imresize(A,scale)
B=imresize(A,[num_rowsnum_cols])

Description

B = imresize(A, scale) returns image B that is scale times the size of A. The input image A can be a gray scale, RGB, or binary image. If scale is between 0 and 1.0, B is smaller than A. If scale is greater than 1.0, B is larger than A.

B = im resize(A, [num rows numcols]) returns image B that has the number of rows and columns specified by[num rows num cols]. Either num rows or num cols may be NaN, in which case im resize computes the number of rows or columns automatically to preserve the image aspect ratio. Using these functions the image is modified and loaded into the image area on the GUI, on a click of browse button.Nearest-neighbour interpolation preserves these sharp edges, but it increases aliasing (or jaggies; where diagonal lines and curves appear pixelated). Several approaches have been developed that attempt to optimize for bitmap art by interpolating areas of continuous tone, preserve the sharpness of horizontal and vertical lines and smooth all other curves.Scaling is a non-trivial process that involves a trade-off between efficiency, smoothness and sharpness. As the size of an image is increased, so the pixels which comprise the image become increasingly visible, making the image appears "soft". Conversely, reducing an image will tend to enhance its smoothness and apparent sharpness.

3. EXPERIMENTAL RESULTS:

Fig:-2 Image Loading

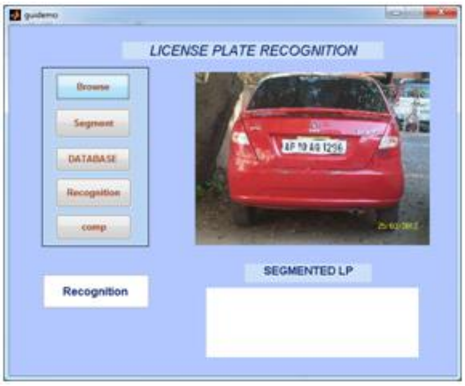

Fig:-3 Browsing Tab of GUI Window

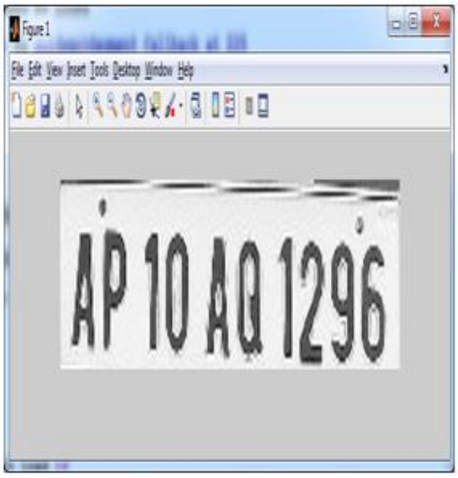

Fig:-4 Segmented Number Plate

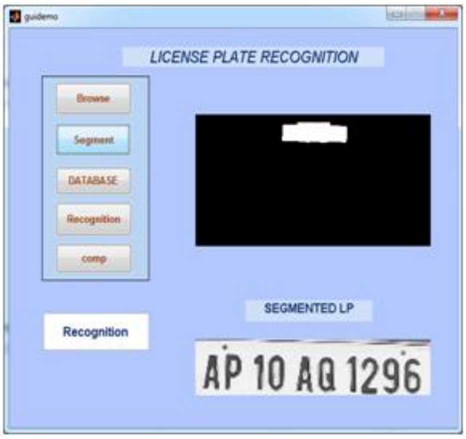

Fig:-5 Window Showing Segmenting Process

4. CONCLUSION:

The number recognition from the number plate of vehicles will definitely prove to be an effective means immigration control, law enforcement on roads. The vehicles breaking the traffic rules also can be recognized and can be warned of such offenses. This provides a better means of control and lessening the burden on traffic police. In today's generation of heavy commutation it is necessary to have such system as it is nearly impossible to have a manual observation and detection of vehicles which are to be tracked or those which create mess on the roads causing. Thus this is a solution for a better and safe tomorrow.

5. FUTURE SCOPE:

In this present project we implemented the car number plate detection by extracting image futures, in segmentation of car number plate can be done with detecting white color pixels and recognition will be done with converting image into black and white image this process will results us to detect the car number plat. With this we can extend the by adding finger print detection module this will provide more security.

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