Evaluation for Pattern Matching and Analysis of Car's Number Plate Recognition Using Template Matching

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Abstract— **in this paper main aim is to focus on to pattern matching and analysis of image for vehicle's number plate recognition using template matching. In this research work car images was tested by applying template matching algorithm and out of many images of vehicle's number plate recognition done correctly. Some of images are wrong result due to distance, image size, angle of view, condition of weather or illumination condition etc. Pattern matching and analysis traffic monitoring system; border security system; signal system etc.**

Keywords: -Introduction, Proposed system, Experimental result and analysis

I INTRODUCTION

Pattern matching and analysis of Number plates is for recognition of vehicles all worlds. Vehicles have been identifying either not only manually but also automatically. Vehicle number plate pattern recognition is pattern matching technique of identify vehicles by their number plates. Vehicle number plate recognition of number pattern are used not only cars identification but also accident performed vehicles at various place. The pattern matching and analysis of number plate task is challenging because of the nature of the light. Experimentation of pattern matching and analysis of number plate detection has been conducted from last seen year; it is still a challenging task. Number plate detection system passes an input image to identify some local patches of images containing license plates. Since a plate can present anywhere in an image with various sizes, it is used to check every pixel of the image to locate it. In parking area, input number plates pattern are used to perform duration at various places across world.

II LETURATURE SURVAY

There are various methods to pattern matching and analysis of image for number plate recognition system as Shan Du. [1] proposed a various number plate of pattern recognition method. This system uses edge detection technique to detect the „region of interest‟, where the number plate can be occurred. Then some morphological operators are applied to detect the number plate.

Chengpu Yu [2] presents input as vehicle license plate extraction algorithm on basis improved Roberts's detector and morphological operation. In Roberts's operator added two direction template was compensate not only the breaks of the edge but also make it fully connected together. Then detect edge by using selecting the appropriate threshold for Roberts's operator was utilize morphological analysis of input image to obtain candidate regions of license plate, performed analyze candidate regions on connected component, finally position plate region. The experimental results was that algorithm can well suppress the impact of noise on the detection of the target

area in the image, but also required shorten the time of license plate location, valid license plate positioning along with valid output.

III PROPOSED SYSTEM

Pattern matching and analysis of image for Indian vehicle's number plate recognition using template matching method. Template matching is a method that compares portions of images to one other image. Sample of image may be used to recognize similar objects in the source image. The matching process moves the template image to all possible position in a larger source image to all possible positions in a larger source image. Matching is done on a pixel by pixel basis. Template size is fixed and it leads to inaccurate recognition. The ALPR system that extracts a license plate number from input given image has been composed of four stages [7]. The first stage is to acquire the car image using a camera. The parameters of the camera, such as the type of camera, camera resolution, shutter speed, orientation, and light. The second stage of proposed research work to extract the license plate from the image based on some features like boundary, different color, and the existence of the characters. The third stage is to segment the license plate and extract the characters by using their color information, labeling them, or matching their positions with templates. The fourth stage is to recognize the extracted characters by template matching or using different classifiers, such as neural networks, fuzzy classifiers.etc. Fig. 1 shows the structure of the ALPR process. The performance of an ALPR system depends on each individual stage. The purpose of this paper is to provide researchers with a systematic survey of last work done by other people ALPR research by categorizing existing methods according to the features they used, analyzing not only pros but also cons of these features, and comparing them in terms of recognition performance and processing speed.

Input Image (Image acquisition): Image acquisition is the process of obtaining an image from the mobile camera or scanner.

This is the first step of any vision based systems. In my research i acquire the images using a digital camera. my aim is to get the frontal input image of vehicles which presents license plate.

The remaining stages of the system works in offline mode. Gray scale image: After acquiring the image, the very next step is to derive the gray scale image. Binary image code to convert

an image to a gray scale:

STEP1: Load input images vehicle number plate

STEP2: Retrieve the properties of image

STEP3: Get access image data of vehicle number plate

STEP4: For each height and for each width of the image, convert image to gray scale by using average of r,g,b values of the image convert to gray scale manually

STEP5: Display output image after converting to gray scale.

STEP6: gray scale converted image passes for dilation.

STEP7: For structuring element above using dilate.

STEP8: Display of image by applying morphological operation.

STEP9: Binarization for obtaining threshold level

STEP10: Segmentation

Proposed Algorithm:

Input: Vehicle number plate image

Output: Recognition of vehicle number plate

Step1: Input vehicle number plate image in RGB

Step2: Convert RGB to Binary image

Step3: Convert Binary image to Gray scale

Step4: Extraction

Step5: Segmentation

Step6: Template matching method

Step7: Recognition of vehicle number plate

Comparison and Recognition

Pattern matching and analysis of number plate recognition system in which the segmented number or characters will recognize and converted into text for further processing. Pattern matching and analysis of number plate recognition involves different process like image as i/p, feature extraction, segmentation and template matching algorithm. Here the numbers or characters are normalized to as per standard number plate. Templates for numbers and characters are not only prepared but also normalized into blocks with no borders or white spaces that surround the characters as per standard template of English alphabets and numerals. Similar process was used to segmentation the characters from i/p image. Each character OR number is matched with the according standard template using

Pr Preprocessing: Preprocessing is one of the most fundamental steps to carry out on the image preorder to develop higher order algorithms.

A) The image was transformed to gray scale and resized to 480 x 640 pixels to increase the speed of execution.

B) **Gray scale Conversion:**

For every (i,j)th 24 bit RGB pixel, 8 bit Grayscale pixel is calculated by using R,G and B values and using the formula:

$$gray(i,j)=0.59*R(i,j)+0.30*G(i,j)+0.11*B(i,j)$$

Median Filter: Median filter is a non-linear digital filter used for removing salt and pepper noise from an image. It replaces the gray value of a pixel by using median of the gray values of its neighbors. We have used a 4x4 mask
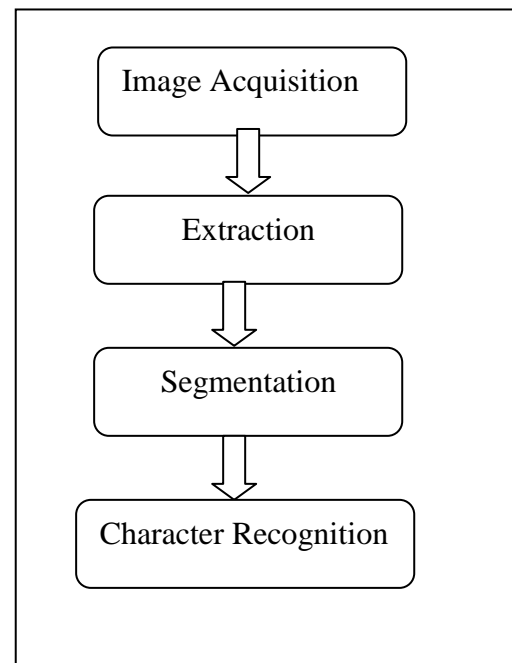
Figure 1 :Flow of Character Recognition

correlation method to measure the equality between images. Correlation coefficient value ranges from 0 to 1. The value 0 says minimum match and value 1 says maximum match. Feature extraction is the key step in ANPR system, which includes the correctness of the system significantly. The aim of in this phase, given an input image, is to produce a number of present regions, with high correct output of containing number plate and validate for true number plate.

Image Acquisition and Pre-processing In this system a high resolution of digital camera images are used to acquire an image. Images are resized to (648X 486). All the processing steps are executed on gray scale image. Pre-processing is mainly used to enhance to reduce the noise in the image. In order to solve the problem of input image as low quality but also low contrast in car images. Images of number plate as input are converted by using method gray scale image.

As given input of vertical edge detection the numbers or characters on given number plate region contain

abundant edges as compared to background area of image. This feature is given for locating the plate area from the input image. Sobel vertical edge detection is used to find out the regions of image which have may present high pixel variance value [8]. To extract candidate number plate area from the entire image, threshold has been used to select rows which are having particular white pixel density.

Plate Area selection morphological operations used to remove unrelated objects in the image. Dilation and morphological are used to extract given plate areas from the total image. Many times background areas of number plate may also get declared as plate for recognition. So to remove the fake number plate validation is done using the aspect ratio of the plate and horizontal cuts [09] in the number plate.

Given number plate extraction after the detection of candidate number plate area, Bounding Box used to extract input plate area from the original image. From the Bounding Box analysis, respective row and column represents of plate area are found out. Once the indices of number plate are seen, the given number plate is extracted from original gray scale image.

The aim of feature vector of image is to define compare features of the characters or numbers. taking the most correct feature of each character can not only facilitate data visualization and data knowing, reduce the measurement of value , storage requirements for image, training, method and utilization time, particularly when the features of image are redundant.

Initially stage, the centroid of the character image is determined. With respect to centroid, number of operations along the axes, 0 to 1 and 1 to 0, up to the boundary of character or number have been counted. Transitions are specified according to axes with predetermined angles.

Character Segmentation: Segmentation is most important processes in the given input number plate recognition, so all further steps rely on it. If the segmentation fails, a character may be incorrectly divided into two pieces, or two characters can be improperly merged together. We can use a horizontal forecast of a number plate for the segmentation, or one of the more sophisticated methods, such as segmentation using the template matching. In this segmentation i use two types of segmentation: a. Horizontal segmentation b. Vertical segmentation. First I have been performed vertical segmentation on the number plate then the characters or numbers are vertically segmented. After performing vertical segmentation we have to perform horizontal segmentation by performing this i get character from the number plate.

Template matching algorithm: Template matching method block is used for matching the template image for process performed on with given image as input. The template image and the input image for pattern matching and analysis of number plate recognition for images are of same orientation and resolution. Size of template image must smaller than the input image. Template matching method belongs to Computer Vision System Toolbox, from analysis and enhancement library stored in disk. Port one of is used to input the input image and port two is used to input the template image. Output port deals the output as best not only match location but also template metric value.

V EXPERIMENTAL RESULTS AND ANALYSIS
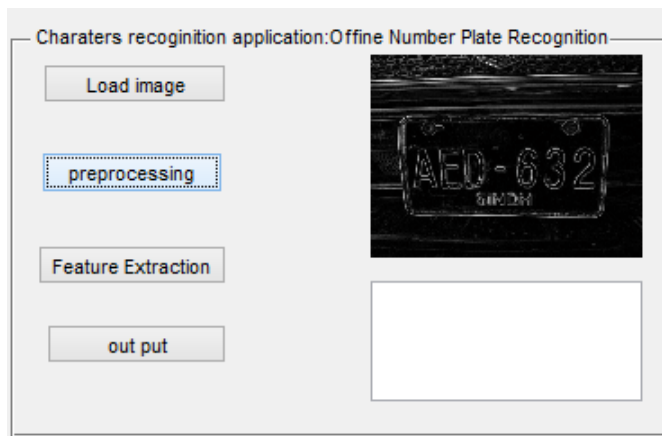

Figure 2 Load image

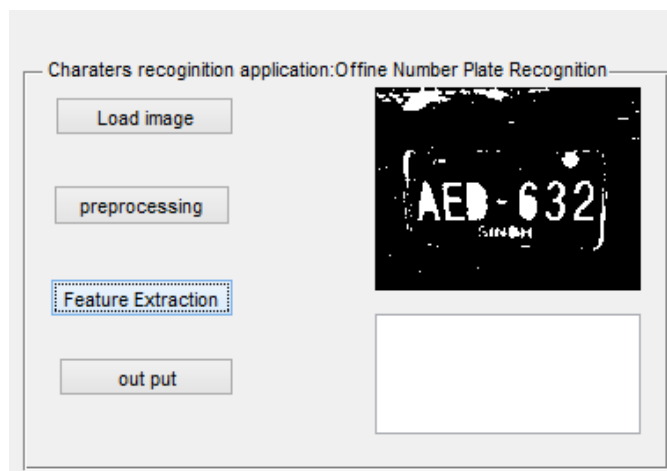

Figure .3 Pre-processing on load image of output

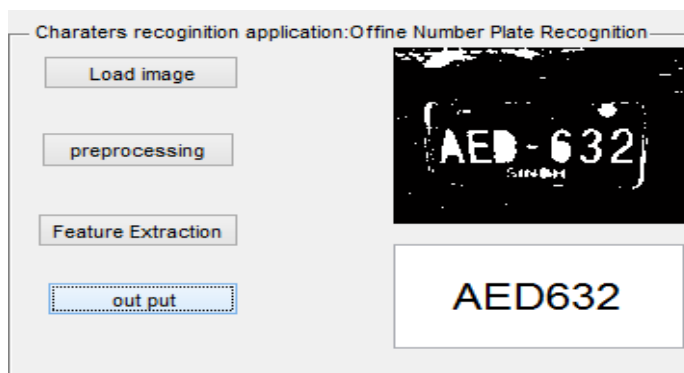Figure 4 Feature extraction of number plate

Figure 5 recognition of vehicle number plate.

As shown above figures pattern matching and analysis of vehicle plates recognition performed on various images and successfully recognition this system performed using template matching method.
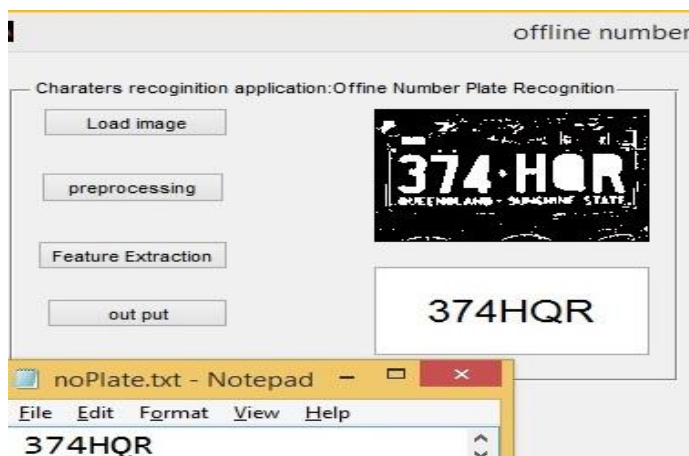

Figure .6 Load image for another number plate recognition and performed all process like pre-processing, feature extraction and output as number plate recognition.

VI CONCLUSION

I have implemented number plate recognition. Our algorithm successfully detects the number plate region from the image which consists of vehicle number & then character segmentation, recognition .I have applied our algorithm on many images and found that it successfully recognition. The false recognition of evolution for pattern matching and analysis of number plates are due to size, character shape, distance, camera angle etc.

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