Improved VEDA and Unwanted Edge Removal approaches for License Plate Detection

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Abstract **–** Edge detection is probably the most widely used operations in image analysis, and there are probably more algorithms within the literature for enhancing and detecting edges than any other detection approaches. This is due to the fact that edges establish the outline relevant to an object. An edge will be the boundary between a desire and to discover the background, and indicates the boundary between overlapping objects. Recently, license plate edge detection technique is a vital part of vision navigation, which is the key method of intelligent vehicle assistance. The detection outcome is seriously affected through quality of noise and image. This means that in the event the edges in an image can be identified accurately, all of the objects can easily be located and basic properties such as area, perimeter, and shape can easily be measured.
License plate edge detection is assist to analyze the direction of the plate extension and the specific location of obstacles, dimension and speed of obstacles among the road. Within the existing work, several typical edge detection operators like Prewitt, Sobel operators and in digital image processing are theoretically assessed, and are generally made use of for license edge detection. By evaluating the existing simulation results of license edge detection, the higher quality road test results might be gained when using Sobel and Prewitt operator[1].Existing work doesn't support if the input image is noisy image. In our proposed work we implemented Adaptive median filter for edge detection algorithms in order to eliminate the noisy. In our proposed work we also introduce improved edge detection ULEA and VEDA methods which gives the higher quality result in the presence of noise. The effectiveness of the improved process is demonstrated experimentally. The current work mainly concentrates on the study of different edge detection techniques and analysis of there relative performances.

Keywords **– Edge Detection, License Plate, VEDA, Filtering ,Vertical lines,Pixels.**

I. INTRODUCTION

Localization of potential license plate regions(s) from vehicle images serves as a challenging task on account of huge variations of size, shape, colour, texture and spatial orientations of license plate regions in such images. Normally, objective of any Automatic License Plate Recognition (ALPR) system is to localize potential license plate region(s) from the vehicle images captured with a road-side camera and interpret them using an Optical Character Recognition (OCR) system to have the license number of your vehicle.Various techniques has already been developed recently for the exact purpose for efficient detection of license plate regions from offline vehicular images. Normally, most of the functions on ALPR systems [1-4] apply edge based features for localizing standardized license plate regions. Many of these works [2, 5, 6] captures the image associated with a vehicle carefully placed when in front of a camera occupying the complete view of it and having a clear picture of the license plate. However in an unconstrained outdoor environment there may be huge variations in lighting conditions/ wind speed/ pollution levels/ motion etc. that produces localization of true license plate regions difficult. Moreover in the practical scenario you and your neighbors may notice multiple vehicles of different kinds within a scene in addition to partial conclusions of one's vehicles as well as license plates from other objects, exactly where the above methods do not work. In one of the earlier works [1], Rank filter is designed for localization of license plate regions giving unsatisfactory result for skewed license plates.

Some of the images regular license plates, used in developed countries, are shown in Fig 1 (a). However, in India, the license plates aren't yet standardized across different states, making localization and subsequent recognition of license plates extremely difficult. Moreover, in India license plates are often written in multiple scripts. Fig. 1(b) shows some of the typical Indian license plates with number of shape, size, script etc. This large diversity in the features of the license plate makes its localization a challenging problem for the research community.

Figure 1. License Plate images.
(a) Standardized license plates of European vehicles
(b) License plates of Indian vehicles

II. LITERATURE SURVEY

Sobel color edge detector is made for detecting vertical edges with this study [2]. Then, the invalid edge is eliminated. The license plate region was searched by using template matching. Mathematical morphology and connected component analysis was utilized for segmentation. Radial basis function neural network was utilized for character recognition. This strategy is likewise successful in night hours and daytime what is required. Plate location is located by using plate background and the character's color in this research [2]. For segmentation, the column sum vector is obtained. The Artificial Neural Network is designed for character recognition.

This method [10] is designed for Chine license plate recognition. The plate image turns into a binary image. Then a noise is taken out of the image. The skeleton is designed for generating the feature of it. Then a character is normalized to size 8*16 pixels. The plate image is processed within the Back-Propagation Neuronal Network for recognition after being normalized. Back-Propagation Neuronal Network is made for character recognition.

This method [11] is not made use to preprocess for recognition. Image transformation is applied for original license plate picture. After transformation process, inside the database, how many the input and to discover the data increase. Convolution neural network is made for character recognition. The correction rate in this particular method is 98percent.

This method [12] has two modules: plate locating and plate segmentation modules. Fuzzy geometry is made use of for your first module. Fuzzy C mean is designed clearly as the second module. The correction rate for segmentation is 94.24%.

With this method [9] blob labeling and clustering are used for segmentation. The studies of Kirsch, Sobel, Palladian, Wallis, Prewitt, Frei Chen on edge detectors are compared and contrasted, and Kirsch's edge detector is regarded as by far the most appropriate one amongst others. Doing this is used neural network for classification and recognition character.

In this study [6] Robert edge detector and morphology operator is used for looking for plate edge that is caused by the picture. Horizontal and vertical projections are utilized for rotating plate image once it is needed. Least squares support vector machines are used for character recognition.

III. PROPOSED SYSTEM

1) Preparing the Image for different types of formats
2) Applying Adaptive Median Filter Noise Removal Technique on the Noised Image
3) Applying Edge detection algorithms.
4) Displaying the Results

Preparing the Image for different types of Formats:

In this any type of file formats like jpg, gif, tiff can be used. It could be taken by the command imread and the extension of these file formats that taken are .jpg, .png, .gif etc

Applying Adaptive Median Filter Noise Removal Technique on the Noised Image:

Adaptive Median Filtering

Adaptive median filtering continues to be applied widely since an advanced method in comparison to standard median filtering. The Adaptive Median Filter performs spatial processing to find which pixels with in image have been full of impulse noise. The Adaptive Median Filter classifies pixels as noise by comparing each pixel within the image to its surrounding neighbor pixels. The volume of the neighborhood is adjustable, and also threshold when it comes to the comparison. A pixel that is undoubtedly not the same as several its neighbors, in addition to being not structurally aligned with those pixels to which it is analogous, is tagged impulse noise. These noise pixels afterward substituted with the median pixel value of the pixels on your street which have passed the noise labeling test.

Purpose

1) Remove impulse noise
2) Smoothing of other noise
3) Reduce distortion, like excessive thinning or thickening of object areas

Adaptive Median Filtering Algorithm

Level A: A1 = Zmed – Zmin
A2 = Zmed – Zmax
if A1 > 0 AND A2 < 0, go to level B
else increase the window size
if window size < Smax, repeat level A
else output Zxy
Level B: B1 = Zxy – Zmin
B2 = Zxy – Zmax
if B1 > 0 AND B2 < 0, output Zxy

else output Zmed

Explanation of Algorithm

Level A: IF Zmin < Zmed < Zmax, then
• Zmed is not an impulse
(2) go to level B to test if Zxy is an impulse …
ELSE
• Zmed is an impulse
(1) the size of the window is increased and
(2) level A is repeated until …
(a) Zmed is not an impulse and go to level B or
(b) Smax reached: output is Zxy
Level B: IF Zmin < Zxy < Zmax, then
• Zxy is not an impulse
(2) output is Zxy (distortion reduced)
ELSE
• either Zxy = Zmin or Zxy = Zmax
(2) output is Zmed (standard median filter)
• Zmed is not an impulse (from level A)[3]

PROPOSED ULEA:

The pseudocode for this process can be summarized as illustrated in Algorithm

For every pixel in thresholded image
If(g(x,y)=0)
If[(g(x-1,y)=255 AND g(x+1,y)=255) OR (g(x,y-1)=255 AND g(x,y+1)=255) OR (g(x-1,y+1)=255 AND g(x+1,y-1)=255) OR (g(x-1,y-1)=255 AND g(x+1,y+1)=255)]
O(x,y)=255;

End if End for

IMPROVED VEDA

The advantage of VEDA is usually to distinguish the plate details region, especially, the first moment and the end of each character therefore, the plate details will certainly be easily detected and character recognition process will probably be done faster. VEDA will certainly make the black-white and to discover the white-black regions edges have two as well as one black pixels, respectively. A mask 2X4 is proposed for that process, where (x,y) can be seen as current processed pixel location at point (0,1) as center of our mask as shown in Fig. (a). Basically, the proposed mask involves 3 smaller masks, which happen to be left mask 2X1, center mask 2X2, and right mask 2X1. Fig. 5 shows the style of this very proposed mask, where x can be seen as rows or the height of a given image and y can be seen as columns as well as width of a given image[4].

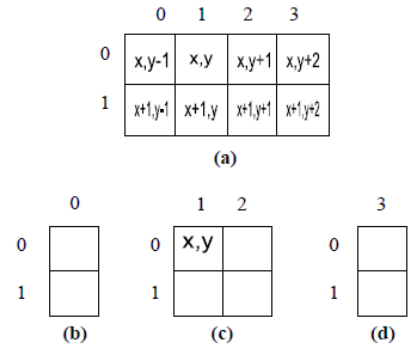


Fig. : The design of the proposed mask:
(a) moving mask, **(b)** left mask (0,0), (1,0), **(c)** center mask (0,1), (0,2), (1,1), (1,2), **(d)** right mask (0,3), (1,3)

IV. RESULTS

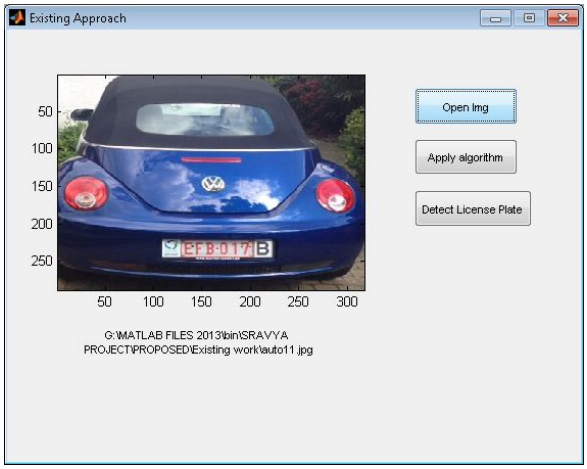


Fig 1: Opening image through open img button

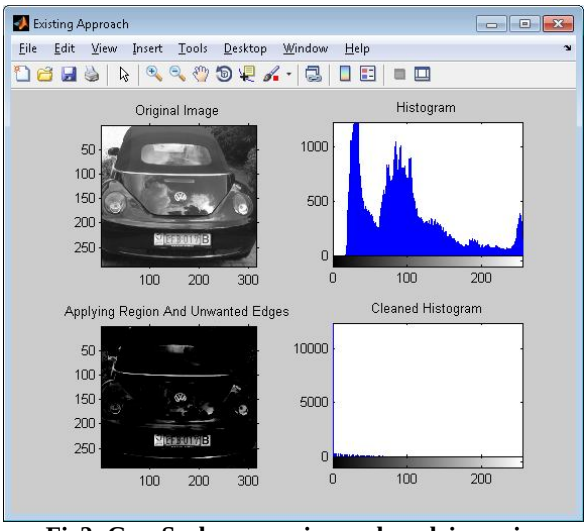


Fig2: GrayScale conversion and applying noise removal through unwanted edge detection approach.

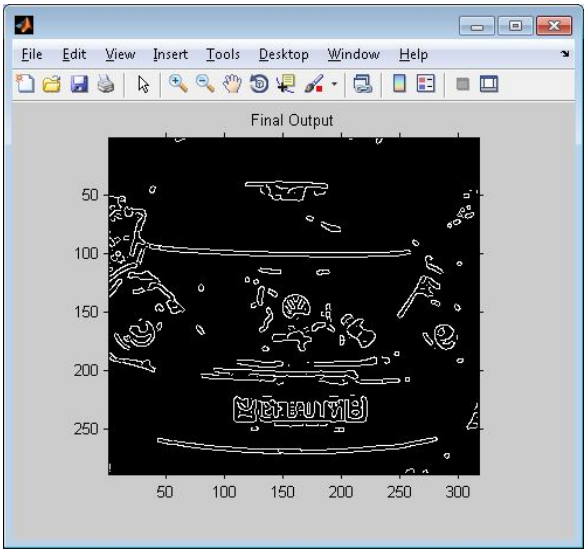
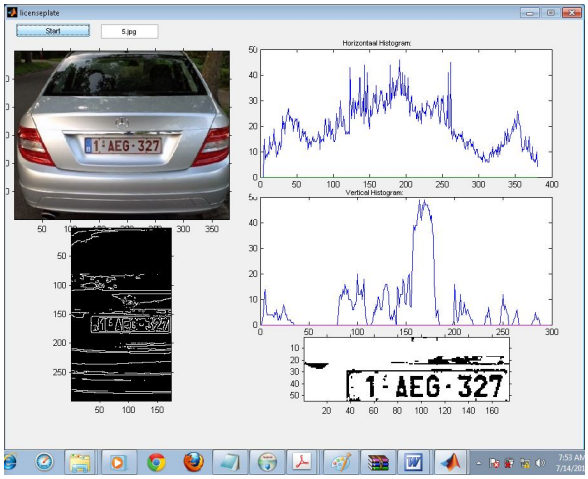


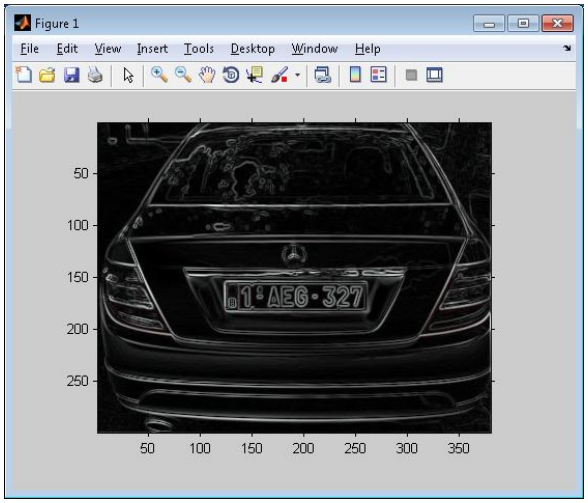
Fig 3: License plate edge detection approach

Problem statement:

The license plate recognition is accepted mandatory resulting from too often variety of cars. Active systems are easier to process the license plate recognition. Daylight, shadow, mud as well as other factors among the plate image confound your efforts to recognize at passive plate recognition systems. A portion of these very license plate characters which is certainly deleted inside the plate can make it difficult to recognize it in the passive recognition system. The plate image is not just applied to the active systems. Thus, these characteristics tend not to affect the license plate recognition.

Proposed Approach Results:





Above two figures shows the proposed approach results by applying filtering ,Improved VEDA and ULAE algorithms

V. CONCLUSION AND FUTURE SCOPE

A robust technique for license plate detection is presented within the paper. It exploits the fact that the license plate area contains rich edge and texture information. First, the vertical edges are extracted and the edge map is adaptively binarized. Then, the license plate candidates

are detected using the two-stage detection method The proposed way is tested on various images. It produced fairly and stable results. Consistent acceptable outputs over the various kinds of real life images have proved robustness of th proposed scheme. Thus, the proposed method could be handy for any computer vision task where extraction of edge maps is necessary to produce a large set of images for feature extraction .

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