

A Survey on image processing techniques.

¹Kulkarni V. P, ²Chavan A. M. ³Deokate S. T.

^{1,2,3}Dept of Computer Engineering, S. B. Patil COE, Indapur, India.

tejupansarc007@gmail.com

Abstract- Today's world is totally based on automation. Automatic name plate detection of vehicle is possible using some image processing techniques. It can possible using video recording and image capturing methods. In this paper we are going to describe various image processing techniques. These techniques can be used vehicle number plate extraction and verification like applications. This paper contains binarization, filtering, downscaling and segmentation methods.

Keywords: Binarization, Noise, Filter, downscaling segmentation.

1. INTRODUCTION

Image is very vital thing in gaining of knowledge, communication and describing anything in this world. Now a day's image capturing and storing become possible due to enhancement in technology. This stored image can be used for various purposes. But image captured by any device cannot be in proper form so there is need to process this image. In this paper we are discussing various image processing techniques by which we can get proper image for further processing.

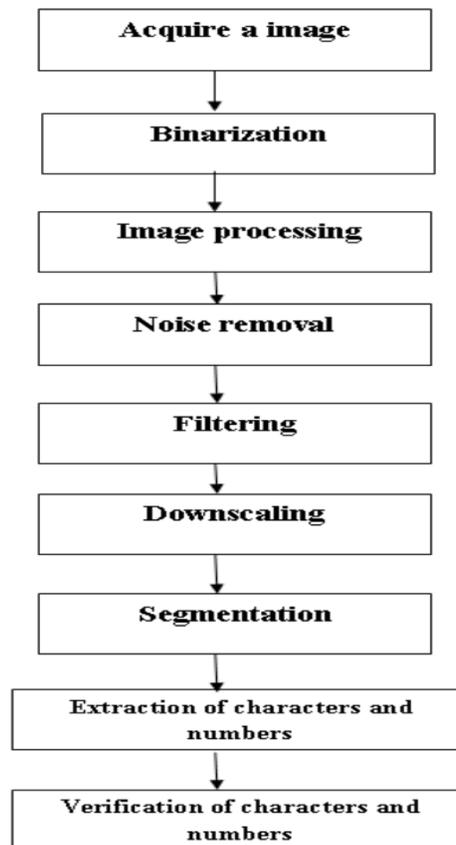


Fig-: Image processing flowchart

2. RELATED WORK

2.1 Binarization-

For better and accurate result all the color or grayscale images are converted to either grayscale or binary form. Main purpose of thresholding is to find out the pixels of interests. The original background pixels (region) will be false or 1 and foreground pixels (region) will be true or 0 are considered in this method. Multi-plane thresholding is one of the technique used for the region matching and segmentation of the object [5].

2.2. Noise-

An arbitrary (not present in the object imaged) variation of luminance or color information in images is nothing but noise. The sensor and circuitry of a scanner or digital camera are used to create noise.

2.2.1 Impulse Noise-

Impulse noise is caused by defective pixels in camera sensors, faulty memory locations in hardware, or communication in a noisy channel.

2.2.2 Gaussian Noise-

Thermal vibrations of atoms and discrete nature of thermal objects cause such type of noise. This type of noise impact on grey value of digital image.

2.2.3 Brownian Noise -

It is also called as colored noise. This noise generally take effect on random movement of fluid particles.

2.3 Filter-

Filters are used in image processing to smoothing or enhancing the image.

2.3.1. Mean Filter-

In mean filter the amount of power variation in each connected pixel value in an image replaced with mean (average) value of its neighbors.

2.3.2. Frequency Filter-

Frequency filters process an image in the rate of repetitions of pixels. The image is Fourier transfigured, multiplied with the filter function and then re- transfigured into the spatial domain.

2.4 Image downscaling-

Image scaling refers to the resizing of a digital image, in computer graphics and digital imaging. When scaling a vector graphic image, the graphic primitives that make up the image can be scaled using geometric transformations, with no loss of image quality. A new image with a higher or lower number of pixels must be generated, when scaling a raster graphics image. Image scaling can be interpreted as a form of image resampling or image reconstruction from the view of the Nyquist sampling theorem. After applying a suitable 2D anti-aliasing filter to prevent aliasing artifacts, according to the theorem, downsampling to a smaller image from a higher-resolution original can only be carried out. The image is reduced to the information that can be carried by the smaller image. A reconstruction filter takes the place of the anti-aliasing filter, in the case of up sampling.

2.4.1 A Novel Image downscaling method-

First, the width of a license plate is obviously greater than its height. Second, the characters on a license plate are printed in the horizontal direction. Thus, we define different scale factors for the vertical and horizontal directions to downscale the original image. First, we can compress more image data in the horizontal direction because the width of a license plate is obviously greater than its height. Second, a larger scale factor in the horizontal direction makes the characters on the license plate more compact, which allows the subsequently applied candidate region extraction method to group all characters into a single region.[1]

2.5 Orientation Features

There is an important role of orientation of the extracting numbers and characters in OCR. In English language curves, lines or different shapes contain numbers and characters. Orientation angle is divided into one range and it is considered as feature value, to achieve this stroke. This type of features is represented by histogram. The different ways to find out the orientation are contour chain code, stroke segment and skeleton orientation [5]

2.6 Segmentation-

Segmentation is nothing but dividing the image in several parts which give more meaningful and easy way for processing of image.

Types of segmentation-

2.6.1 Region Based:

It is also called Similarity Based Segmentation in this regions are constructed by associating or dissociating neighbor pixels. It works on the principle of homogeneity.

2.6.2 Edge Based:

In this calculate an edge image, containing all edges of an native image, process the edge image so that only closed object boundaries remain, and change the result to an ordinary partitioned image by filling in the object boundaries.

Edge Detection-

The boundaries of objects within images finding is nothing but edge detection technique. Image segmentation and data extraction can be done using edge detection.

Types of edge detection –

Canny Edge Detection-

A technique which finds the function which modify a given function is called John F. Canny's computation of variation method. It is adjustable to various environments, and its parameters allow it to be altered to identification of edges of differing characteristics depending on the particular requirements of a given implementation.

Sobel Edge Detection-

The Sobel operator is based on structuring the image with a small, divisible, and integer valued filter in horizontal and vertical direction and is therefore relatively not costly in terms of calculations.

2.6.3 Clustering Based Segmentation:

In this partition method, data is collected into groups such that the data with alike features will come in one group whereas the data clusters are being different from each other. Example is- K-means algorithm.

2.6.4 Adaptive thresholding:

To further enhance the estimated edges and generate a binary edge image we perform adaptive thresholding (AT) on the previously generated grayscale edge image. Given the AT method generates an integral image by summing all pixel values from the upper left corner for each pixel in image. Then, a binary edge image is generated by thresholding each pixel in the integral image using a threshold that is adaptively computed from a local window in image.[2]

Local Thresholding-

In this a different threshold for each pixel according to the grayscale information of the neighboring pixels is used.

Global Thresholding-

A single threshold value for the whole document can be find in this method. Then each pixel value of foreground or background is replaced with the threshold value which is compared with its grey value.

3. CONCLUSION

There are various techniques which can be used to enhance the image quality and converting the image in proper form. In this paper, techniques like segmentation, noise removal, thresholding, filtering are described by which a captured image should be preprocessed and used for various applications. In automatic extraction and verification vehicle name plate this techniques can be used for extraction and verification of numbers and characters.

References

- [1] *A Robust and Efficient Approach to License Plate Detection* Yule Yuan, Member, IEEE, Wenbin Zou, Yong Zhao, Xinan Wang, Xuefeng Hu, and Nikos Komodakis.
- [2] *An Iranian License Plate Recognition System Based on Color Features* Amir Hossein Ashtari, Graduate Student Member, IEEE, Md. Jan Nordin, and Mahmood Fathy.
- [3] *A vehicle license plate detection method using region and edge based methods* Mahmood Ashoori Lalimi , Sedigheh Ghojrani , Des McLernon.
- [4] *Automatic Vehicle Number Plate Detection And Recognition* Priyanka Prabhakar, Anupama P, Resmi S R.
- [5] *Various Traditional and Nature Inspired Approaches Used in Image Preprocessing* Sarika Deokate and Nilesb Uke.
- [6] *Application-Oriented License Plate Recognition* Gee-Sern Hsu, Member, IEEE, Jiun-Chang Chen, and Yu-Zu Chung.
- [7] *A vehicle license plate detection method using region and edge based methods* Mahmood Ashoori Lalimi a, Sedigheh Ghojrani a, Des McLernon a *Electrical Engineering Department, Islamic Azad University, South Tehran Branch Tehran, Iran School of Electronic and Electrical Engineering, The University of Leeds, Leeds, UK.*
- [8] *Principal Visual Word Discovery for Automatic License Plate Detection* Wengang Zhou, Houqiang Li, Yijuan Lu, Member, IEEE, and Qi Tian, Senior Member, IEEE.
- [9] *License Plate Recognition From Still Images and Video Sequences: A Survey* Christos-Nikolaos E. nagnostopoulos, Member, IEEE, Ioannis E. Anagnostopoulos, Member, IEEE, Ioannis D. Psoroulas, Vassili Loumos, Member, IEEE, and Eleftherios Kayafas, Member, IEEE.
- [10] *A hybrid License Plate Extraction Method Based On Edge Statistics and Morphology* Bai Hongliang and Liu Changping.
- [11] *Detection and Recognition of License Plate Characters with Different Appearances* SherrZheng Wang and HsMian Lee *Department of Science and Information Engineering, National ChimTung Uninvity 1001 Ta Hsueh Road, Hsinchu, Taiwan 300, R.O.C.*
- [12] *Color Texture-Based Object Detection:An Application to License Plate Localization* Kwang In Kim, Keechul Jung and Jin Hyung Kim *Artificial Intelligence Lab CS Department, Korea Advanced Institute of Science and Technology Taejon, 305-701, Korea Pattern Recognition and Image Processing Lab CS and Engineering Department, Michigan State University East Lansing, MI 48824-1226, USA.*
- [13] *Morphology-based License Plate Detection from Complex Scenes* Jun-Wei Hsieh, Shib-Hao Yu , and Yung-Sheng Chen *Department of Electrical Engineering, Yuan Ze University, Taiwan*
- [14] *AUTOMATIC RECOGNITION OF A CAR LICENSE PLATE USING COLOR IMAGE PROCESSING* Eun Ryung Lee, Pyeoung Kee Kim, and Hang Joon Kim *Department of Computer Engineering, KyungPook National Univ.Taegu, 702-701, Korea.*
- [15] *A REVIEW PAPER: NOISE MODELS IN DIGITAL IMAGE PROCESSING* Ajay Kumar Boyat and Brijendra Kumar Joshi.