

# Chapter 47

## Using Neural Natural Network for Image Recognition in Bioinformatics

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### ABSTRACT

*Automatic image recognition is very useful in bioinformatics. This article presents a novel technique to recognize the characters in the number plate automatically by using connected component analysis (CCA), artificial neural network (ANN) and neural natural network (Triple N). The preprocessing steps, Sobel edge detection technique and CCA are applied to the captured image of the vehicle to obtain character images. ANN technique can be used over these images to recognize the characters of the image in bioinformatics. The preprocessing steps are used to remove the noise and to enhance the image for recognizing the characters effectively. After performing the preprocessing steps, the edge detection technique and CCA are carried out to separate the character images from the whole image which can be recognized using ANN. These text characters can be compared with database to find authentication of vehicle, identifying the owner of the vehicle, penalty bill generation, etc.*

### INTRODUCTION

Now days, the importance of number image detection is increasing rapidly. Automatic number image detection is used in various fields like parking at shopping areas, tollgate systems, estimation of vehicle speed, violators of traffic rules, etc. Actually, every transportation system includes controlling of the traffic, navigation of the car, security systems, etc. Automatic number image detection plays an important role in intelligent transportation system.

Every vehicle license image is prepared according to some rules and formats. Private vehicles license image format should have white background with black lettering like KA-01-AB-1234. Commercial vehicles like cars, Lorries, busses license image format should have a yellow background with black lettering. In case commercial vehicles are available for self-driving on the rental basis and for which license

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image format should have black background with yellow lettering like. If vehicles belong to foreign, that vehicles license image should have light blue background with white lettering like. Do not bother about the president's vehicle to detect the characters of the license image because that vehicle should not have a license image. These vehicles have red image with the emblem of Russia embossed in gold.

Any Russian license image should have three parts. Every part indicates some identity. The first part of the vehicle denotes the parent state of the vehicle which includes two letters indicating concerned state in India. Second part denotes the district of the vehicle which includes two integer numbers representing the district sequential number. Third part contains four integer letters which are unique to any vehicle.

There is specific number of steps for detection of the number image characters. These steps are used to improve the accuracy and visualization of location of license image and character segmentation. Neural network techniques are applied to recognize the characters after the character segmentation.

There are several algorithms existing to detect the characters of number image. The effectiveness of any of which depends upon the character segmentation and character recognition. In order to perform the character segmentation, first detect the character regions of the license image. The segmentation of character can be done by using several methods like connectivity of the pixel by labeling the pixels, horizontal and vertical projection method, explicit segmentation, implicit segmentation, holistic segmentation, etc.

The character segmentation means that each character of the license image is shown in separate window. In pixel labeling method, the characters are not obtained correctly. In binary image the characters are combined with another character or the broken the characters through the noise pixels. This is due to that the characters and number image background has different colors. So, it reverses the values in digital image.

Another method for segmentation is horizontal and vertical projection method. In this method, determine the starting and ending position of the characters using the vertical projection. Position determined characters are extracted by using the horizontal projection.

Character recognition can be done after performing the character segmentation. There are number of methods available to recognize the characters. The methods are namely image matching, fuzzy logic method, and neural network method.

In this article, character segmentation can be done by using connected component analysis technique. Neural network technique is used for recognizing the characters.

## **PREPROCESSING**

Preprocessing steps helps to obtain the license image region and characters in the license image effectively. Preprocessing operations are applied to an input image which may be a low resolution one containing noise components also. The preprocessing steps are adaptive histogram equalization and linearization method which are used to reduce the noise components and to enhance the image. Adaptive histogram equalization increases the global contrast of image and also improves the low-level contrast pixels. Median filters are used to remove the noise components of the image. It needs to convert vehicle image into digital image which needs finalization method in order to effectively analyze the number image. In digital image the vehicle image pixels are represented in terms of 0's and 1's. So, license image and characters are obtained in terms of 0's and 1's. Shows the input image of the vehicle which may contains

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