

# CHARACTER RECOGNITION USING NEURAL NETWORK WITHOUT FEATURE EXTRACTION FOR KANNADA CHARACTERS

Nikhil Inamdar<sup>1</sup> Gurupriy Inamdar<sup>2</sup> Subrahmanya K N

<sup>1&3</sup> KLS GIT Belgaum <sup>2</sup> NIE Mysore

---

**Abstract-** Handwriting recognition has been one of the active and challenging research areas in the field of pattern recognition. It has numerous applications which include, reading aid for blind, bank cheques and conversion of any hand written document into structural text form[1]. As there are no sufficient number of works on Indian language character recognition especially Kannada script among 15 major scripts in India[2]. In this paper an attempt is made to recognize handwritten Kannada characters using Feed Forward neural networks. A handwritten kannada character is resized into 60x40 pixel. The resized character is used for training the neural network. Once the training process is completed the same character is given as input to the neural network with different set of neurons in hidden layer and their recognition accuracy rate for different kannada characters has been calculated and compared. The results show that the proposed system yields good recognition accuracy rates comparable to that of other handwritten character recognition systems.

---

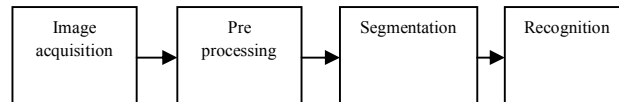
## I. INTRODUCTION

Character recognition is one of the most challenging and fascinating area in the field of image processing. It has got numerous applications in banks to read the checks, aid for blind and for machine reading etc. many techniques are proposed to reduce the processing time and to reduce the complication. The neural networks are used in this work. Recently the neural networks are used in many types pattern recognition. Hand written recognition is difficult task as the hand written text differs from person to person. Many reports of character recognition for English have been published but still high recognition efficiency and minimum training time are still an open challenge.

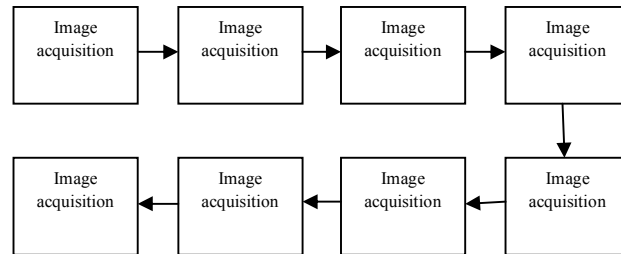
There are two types of character recognition off line and on line, in off line image is captured by an scanner or camera and in on line character recognition the two dimensional coordinates of successive points are represented as a function of time and the order of strokes made by the writer are also available. In the off line character recognition the neural the networks plays an important role. Off line methods has got much application like mail sorting document reading and etc so off line methods are still an important area for research.

In this paper the neural network is used to recognize character for vehicle number plate. The number plate recognition is also one of the most important applications for security. This application is very useful for police department and high way security.

## II. PROPOSED SYSTEM



**Fig. 1 Basic Block Diagram**



**Fig. 2 Block Diagram for Pre Processing**

In the section below, the proposed recognition system is described. A typical handwriting recognition system for number plate applications includes pre-processing, segmentation, recognition. The proposed method shown in figure 1 does not include feature extraction. The detailed blocks of Pre processing are included in the Figure 2.

### A. Image acquisition

*In this the input image is read through a scanner or digital camera or some other equipment. The input image should be in specific format like JPEG or BMT.*

### B. Preprocessing

Many operations are performed in this stage as shown in fig 2 like resizing the image and cropping the image and conversion to grey level and binarizing the grey level image by using some threshold value dilation of the image and filling the holes.

### C. Segmentation

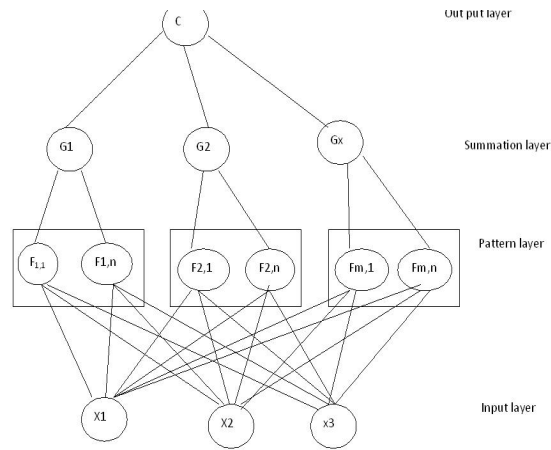
In this stage the image of sequence of characters are decomposed into individual character by just finding the region of interest by just comparing the subsequent pixels.

$$\nabla f = [G_x / G_y] = [(\delta f / \delta x) / (\delta f / \delta y)] \quad (1)$$

$$\alpha(x, y) = \tan^{-1} \{G_y / G_x\} \quad f = \sqrt{G_x^2 + G_y^2}$$

### D. Recognition

A feed forward neural network is used for recognition purpose a resized image 90x40 is segmented into individual character and feed to neural network which will do recognition part it will display the total number of the vehicle.



### III. RESULTS

Net	Accuracy Rate in %			
	1	2	3	4
1	100	100	100	100
2	96.83	99.86	99.66	99.50
3	100	100	100	100
4	100	100	100	100
5	96	97.83	97.50	98.33
6	96.17	98.66	98.16	97.16
7	98.5	100	100	100
8	98.66	97	99.16	96.33
9	99.16	100	100	100
10	98.60	99.66	100	100
11	97.16	99.83	98.66	99.33
12	99	100	100	100
13	98.33	98	99.50	98.33
14	98	99	100	99.50
15	99.50	99.66	100	99.33
16	99.17	100	100	100
17	99.16	99.66	99.66	99.33
18	99	98.33	99.50	97.50
19	98.50	99.50	100	99.56
20	98	99.16	99.50	97.33
21	99.50	100	100	100
<b>Over all %</b>	<b>98.54</b>	<b>99.33</b>	<b>99.58</b>	<b>99.17</b>

#### IV. CONCLUSION

The edge segmentation for kannada characters with probabilistic neural network can give very high efficiency than other existing Methods . The proposed approach is efficient in classifying different sizes of Characters and fonts. In Future the approach can be applied to real time recognition of Characters. The pixel values derived from the resized characters using image processing techniques have been directly used for training the neural network

#### REFERENCES

- [1] J pradeep, E srinivasan, S himavathi — Nural network based hand written character recognition without feature exactionl *International conference on computer communication and electrical technology* , proc IEEE,vol 80,pp 978-1-4244.march 2011.
- [2] Vu Nguyen Michel blumenstein —Compact size feature set for the off line signature verification problem,l *IEEE* 978-0-6795-4661-2012.
- [3] M. Nasiri and A. Javaheri —A Fuzzy Approach for the Automatic Off-line Persian Signature Verification Problem *IEEE* 978-1-4577-1535-8/11/\$26.00.
- [4] Saulo Henrique leoncio de Medeiros napoles and Clevar zanchettin —Offline hand written character signature verification through network radial basis function optimized by differential evolutionl *IEEE* 978-146731490-9-122012.
- [5] Md. Asraful Haque, Tofik Ali [5] —Improved Offline Signature Verification Method Using Parallel Block Analysisl *IEEE* 978-1-4673-0255-5/12/\$31.00\_c 2012
- [6] Mustafa Berkay Yilmaz, Berrin Yanikoglu, Alisher Kholmatov —Offline Signature Verification Using Classifier Combination of HOG and LBP Features — *IEEE* 978-1-4577-1359-0/11/\$26.00 ©2011
- [7] Yazan M. Al-Omari and Siti Norul Huda Sheikh Abdullah2, Khairuddin Omar —State-of-the-Art in Offline Signature Verification Systeml 2011 International Conference on Pattern Analysis and Intelligent Robotics 28-29 June 2011, Putrajaya, Malaysia *IEEE* 978-1-61284-406-0/11/\$26.00 ©2011
- [8] Nassim Abbas and Youcef Chibani —SVM-DSmT Combination for Off-Line Signature Verificationl *IEEE* 978-1-4673-1550-0/12/\$31.00 ©2012
- [9] Vinita Dutt, Sunil Dutt —Hand Written Character Recognition Using Artificial Neural Networkl *Advances in Computing: 2011; 1(1): 18-23 and 2011 Scientific & Academic Publishing*
- [10] Suresh Kumar D S, Ajay Kumar B R & K Srinivasa Kalyan —Kannada Character Recognition SYSTEM Using Neural Networkl *International Journal of Internet Computing* ISSN No: 2231 – 6965, VOL- 1, ISS- 3 2012.



