

An Efficient Technique for CHARACTER RECOGNITION Using Neural Network & Surf Feature Extraction

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Abstract- Character Recognition has been one of the active and challenging areas of research in the field of image processing and pattern recognition. Recognition of English alphabet in a given scanned text document with the help of using Matlab Neural Network toolbox. Neural network and Surf Feature has demonstrated its capability for solving complex character recognition problems. Commonly solved problems of characters have limited scope. Noise reduction plays an important role in Character Recognition. The proposed research work use neural network algorithm and surf feature extraction with their implementation details for solving character recognition problems. This algorithms has been performed based on Noise in input image provide promising results in terms of PSNR and MSE.

Keywords- Character Recognition, Neural Network, Back Propagation, Surf Feature Extraction.

I. INTRODUCTION

A Neural Network is an information processing paradigm that is inspired by the way biological nervous systems, such as the brain, process information. The key element of the NN paradigm is the novel structure of the information processing system. It is composed of a large number of highly interconnected processing elements (neurons) working in unison to solve specific problems. A NN is configured for a specific application, such as character recognition or data classification, through a learning process. Neural Network exhibits characteristics such as mapping capabilities or pattern association, generalization, robustness, fault tolerance, and parallel and high speed information processing. NN Architecture has been broadly classified as single layer feed forward networks, multilayer feed forward networks. Neural Network has been successfully applied to problem in the field of pattern recognition [1].

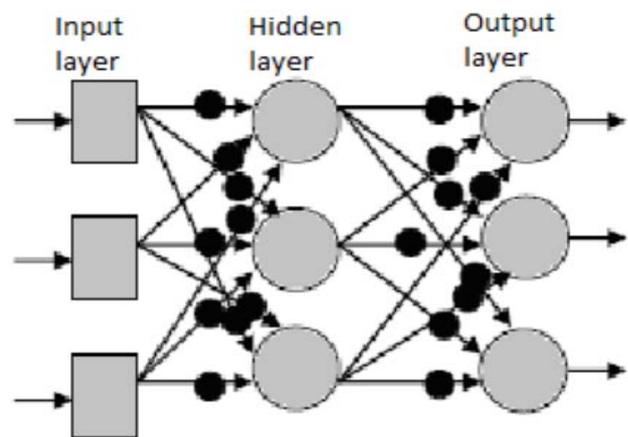


Fig: 1

II. REVIEW OF LITERATURE

The basic idea behind doing a literature survey is to gain knowledge regarding the related work. As was in our case, a lot of research paper were taken into consideration and studied. Stress has been laid to summarize the concept of different authors who has worked in this field.

Ivan Kastelan [4]: In this paper, proposed a system for text extraction based on the open-source OCR algorithm. Preparation steps for OCR were developed which detected text regions in the image, and OCR was run on detected regions to read the text. The system is used for functional verification of TV sets. Text on the grabbed image is read in order to verify whether the TV responds to remote control commands successfully.

Kauleshwar Prasad [5]: In this paper, focus on recognition of English alphabet in a given scanned text document with the help of Neural Networks. This paper carries out a study of various feature based classification techniques for offline handwritten character recognition.

The feature extraction step of optical character recognition is the most important. At the current stage of development, the software does not perform well either in terms of speed or accuracy but not better. It is unlikely to replace existing OCR methods, especially for English text. A simplistic approach for recognition of Optical characters using artificial neural networks has been described.

Anita Pal1 [8]: Neural network is playing an important role in handwritten character recognition. Many reports of character recognition in English have been published but still high recognition accuracy and minimum training time of handwritten English characters using neural network is an open problem. Therefore, it is a great important to develop an automatic handwritten character recognition system for English language. In this paper, efforts have been made to develop automatic handwritten character recognition system for English language with high recognition accuracy and minimum training and classification time.

Sumedha B. Hallalel [9]: In this paper, Optical character recognition is a typical field of application of automatic classification methods. In this paper, we have introduced a whole new idea of recognition of isolated handwritten digits which is known to be a difficult task and still lacks a satisfactory technical solution. Handwritten character recognition is a field of image processing as well as pattern recognition. There are two approaches for the pattern recognition such as statistical and structural. In statistical approach, the series of characteristic measurements of the input data is generated on the statistical basis and is assigned to one of the n classes. The structural description of the object is based on the interconnections and interrelationships of features of input data. In general, both approaches are widely used in the pattern recognition.

Rakesh Kumar Mandal [10]: In this paper, to improve the performance of the previously applied methods. The input image matrix is compressed into a lower dimension matrix in order to reduce non-significant elements of the image matrix. Compared to the previously tried methods of segmentation Column-wise segmentation is a better approach than the row-wise segmentation as segmentation of the matrix column-wise produces more variation in the patterns and helps to obtain a sharp eye in the identification of the pattern.

S.P.Kosbatwa [11]: In this paper, use of artificial neural network in applications can dramatically simplify the code and improve quality of recognition while achieving good performance. Another benefit of using neural network in application is extensibility of the system – ability to recognize more character sets than initially defined. Pattern association using back propagation algorithm is essential and helpful to optimize the association of input pattern to output pattern in the neural network. This approach can be used for pattern classification.

Muhammad Naeem Ayyaz1 [12]: Proposed a handwritten character recognition system based on a hybrid feature extraction technique has been presented. The system comprised three main stages, i.e. pre-processing, feature extraction technique, and SVM based training/classification. The proposed hybrid feature extraction technique, as experiments revealed, proved to capture local and global variations in handwritten character styles. The extracted feature vector was a combination of correlation function based features and some statistical/structural features.

Yusuf Perweji [13]: This paper demonstrates the use of neural networks for developing a system that can recognize hand-written English alphabets. In this system, each English alphabet is represented by binary values that are used as input to a simple feature extraction system, whose output is fed to our neural network system. In this paper, developed a scheme for recognizing hand written English alphabets. We have tested our experiment over all English alphabets with several Hand writing styles. Experimental results shown that the machine has successfully recognized the alphabets with the average accuracy of 82.5%, which significant and may be acceptable in some applications. The machine found less accurate to classify similar alphabets and in future this misclassification of the similar patterns may improve and further a similar experiment can be tested over a large data set and with some other optimized networks parameters to improve the accuracy of the machine.

Gazal Munjal [14]: In this paper, Character Recognition maps a matrix of pixels into characters and words. Recently, artificial neural network theories have shown good capabilities in performing character recognition. Neural Networks in recognizing characters from a handwritten Devanagari script is explored errors in recognizing Handwritten Devanagari characters are mainly due to incorrect character segmentation of touching or broken characters. Because of upper and lower modifiers of Devanagari text, many portions of two consecutive lines may also overlap and proper segmentation of such overlapped portions are needed to get higher accuracy.

III. PROPOSED WORK

1. Design and develop an improved algorithm for Character recognition using Neural Network and surf feature extraction.
2. To remove the noise and enhance the image using the proposed method.
3. Our enhanced Character recognition technique algorithm at low cost and more accurate.
4. Neural network and surf feature technique assures quality of result.
5. Our enhanced Character Recognition technique is fast and thus saves time.

IV. CONCLUSION

In this paper, we propose the neural networks and Surf Feature Extraction technique for Character Recognition and enhancement. BPNN and Surf Feature technique will be used. The evaluation will be based on the PSNR, MSE. The proposed approach i.e., improved technique for Character Recognition using Neural Network will exhibit outcomes of noise reduction and image quality improvements, with different noise levels, which will qualify it to be suitable for image processing and Pattern matching.

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