

Handwritten Character Recognition Using Neural Network

Monika¹, Monika Ingole², Khemutai Tighare²

¹M.Tech Scholar, Computer Science and Engineering, RTMNU, Nagpur, Maharashtra, India

²Assistant Professor, Computer Science & Engineering, RTMNU, Nagpur, Maharashtra, India

ABSTRACT

Article Info

Volume 7, Issue 4

Page Number: 203-207

Publication Issue :

July-August-2021

Article History

Accepted : 10 July 2021

Published : 19 July 2021

In this paper, an enterprise is made to perceive manually written characters for English letters so as. The precept point of this mission is to plan a master framework for, "HCR(English) utilizing neural community". That could viably understand a particular individual-of-kind layout making use of the artificial neural community approach. The manually written man or woman acknowledgment trouble has grown to be the maximum famous trouble in ai. Handwritten man or woman acknowledgment has been a difficult space of exam, with the execution of gadgets getting to know we suggest a neural network-based methodology. The development is based totally on neural network, that is a subject of look at in artificial intelligence. Distinct strategies and methods are used to broaden a handwriting person recognition system. Acknowledgment, precision fee, execution, and execution time are massive versions on the way to be met through the technique being applied. The purpose is to illustrate the effectiveness of neural networks for handwriting character recognition.

Keywords : Handwritten Recognition, Neural Network.

I. INTRODUCTION

Handwriting's popularity has been one of the most captivating and challenging study areas in the subject of image processing and sample recognition in the latest years. Several research works had been that specialize in new strategies and techniques that could reduce the processing time at the same time as providing better reputation accuracy. It contributes significantly to the headway of a computerization interaction and can improve the interface among man and machine in various applications. Most of those structures implement gadget learning mechanisms consisting of neural networks. After the

extraction of person characters occurs, a reputation engine is used to discover the corresponding computer character. Several distinctive reputation techniques are currently to be had. Neural network recognizers analyze from an initial picture education set. The educated network then makes the individual identifications. Each neural community uniquely learns the homes that differentiate training photographs. It then seems that comparable properties inside the goal photo can be recognized. Neural networks are quick to install; however, they may be erroneous if they examine properties that aren't critical inside the goal information. There are numerous practical troubles wherein handwriting

reputation device is very beneficial like documentation analysis, mailing cope with interpretation, financial institution takes a look at processing, signature verification, postal addresses. Handwritten popularity may be very useful in the correct global. There are numerous practical problems in which handwriting recognition gadgets could be very useful like documentation analysis, mailing address interpretation, bank taking a look at processing, signature verification, postal addresses. Numerous methods have been used in each online method have been used in each online and offline handwriting popularity fields like statistical methods, structural strategies, neural community, and syntactic methods. A few recognition machines pick out strokes, others the recognition of a single individual or complete phrases. So handwriting popularity gadget works as a verbal exchange medium between humans and machines.

II. II. METHODOLOGY

In this phase, the proposed reputation machine is described. An ordinary handwriting recognition gadget is composed of pre-processing, segmentation, classification, and post-processing levels. The general schematic diagram of the reputation machine is shown in fig. 1. The proposed technique which does not include function extraction level is proven in fig.3.

A. Image Acquisition

In image acquisition, the popularity machine acquires a scanned picture as an input photograph. The photo must have a specific format which includes jpeg, and so on. This photo is obtained via a scanner, digital camera, or some other appropriate digital entry device. The digitization step, on the other hand, entails changing the enter paper into an electronic layout. The conversion is accomplished by way of

first scanning the authentic document and representing it within the shape of a picture that can be saved on a laptop. The digital image is vital for the pre-processing phase.

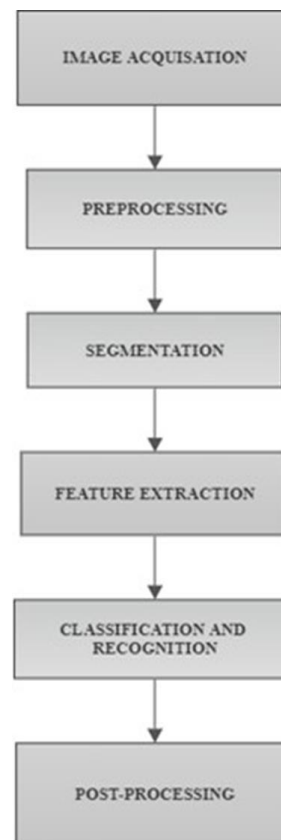


Fig.1 General off-line character recognition system

B. Preprocessing

The preprocessing is an arrangement of tasks performed on the filtered input photograph. It supplements the picture delivering it appropriate for division. The different assignments done at the photo in pre-handling level are displayed in fig. 2. Binarization way changes a dim scale picture into a double picture utilizing the global thresholding method. Enlargement of edges inside the binarized photo played out the utilization of a well-known strategy, widening the picture and filling the openings present in it are the activities accomplished inside the last two degrees to produce the pre-prepared photograph appropriate for division.

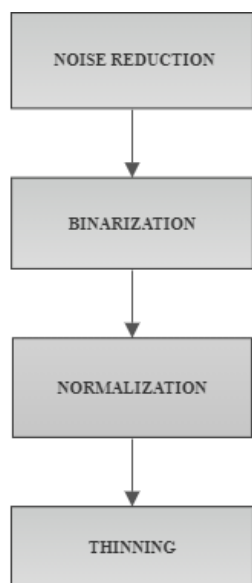


Fig.2 Schematic diagram of the proposed off-line recognition system

- 1) Noise reduction: Addictive noises of different sorts can contaminate pictures. Hence, there is a want to get rid of noise to enhance the great of the photo.
- 2) Binarization: This approach is used to transform the grayscale image and change it to black and white, significantly lowering the facts contained inside the photo from exceptional shapes of grey right into a binary picture.
- 3) Normalization: This procedure in photo processing changes the variety of pixel depth values. It is an unusual reason for converting an entry image into a range of pixel values that are extra acquainted with the senses. Normalization includes changing images into a popular size.
- 4) Thinning: This is one of the first operations to be implemented to scanned documents while converting data to a virtual format. This system allows getting a single-pixel width to allow clean character recognition.

C. Segmentation

Segmentation can be argued to be the most critical method in character reputation strategies. Segmentation of photos is performed in the checking

out stage most effectively. It tests for any errors point inclusion through checking all factors towards the average distance among segmentation factors incomplete picture. The method involves setting apart person characters from an image, the procedure consequences in a couple of segments of the picture known as awesome pixels. The principle intention of segmentation is to simplify the illustration of an image into something that may be analyzed effortlessly. For this reason, it has a wonderful impact on the recognition price of the script. In the proposed gadget, the pre-processed input picture is segmented into remoted characters by way of assigning more than a few to each man or woman the usage of a labeling system. This labeling affords facts approximately a variety of characters within the image.

D. Classification and Recognition

The classification stage is the dynamic piece of the acknowledgment framework. A feed-forward back engendering neural organization is utilized in this work for arranging and perceiving the written characters. The 600 pixels gotten from the resized character in the division stage structure the contribution to the classifier.

E. Post-processing

The post-processing level is the very last stage of the proposed reputation gadget. It prints the corresponding recognized characters in the based textual content shape through calculating equivalent ASCII cost using recognition index of the take a look at samples.

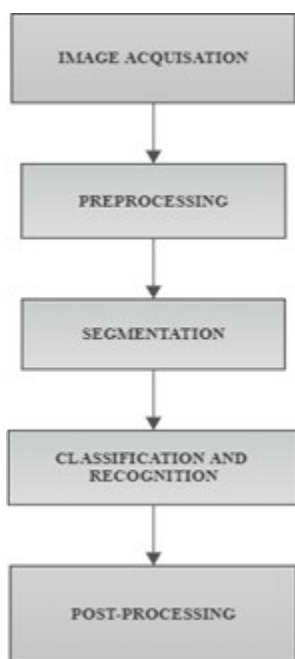


Fig.3 Pre-processing of handwritten character of image.

III. RESULT



The framework was used to see Handwriting Characters. As shown previously, it was completed using neural networks. The dataset contains 372450 pictures of letter sets of 28x2. Transcribed characters have been perceived with over 97% test precision.

IV. CONCLUSION

The primary purpose of these studies changed into developing a system to assist in the classification and popularity of handwriting characters and digits. The reputation of characters and digits is vital in today's

digitized global, particularly in agencies that deal with handwriting files that they want to investigate the use of laptop structures. Structures that are used for the type and reputation of handwriting help agencies and people to remedy complicated obligations. Handwriting characters and digits based totally on the facts saved in the device's database. The levels of handwriting reputation included photo acquisition, digitization, preprocessing, segmentation, function extraction, and reputation. The very last machine meets the required necessities of accuracy as well as popularity. The work of modern studies can be extended for character recognition in different languages.

V. REFERENCES

- [1]. S. Mori, C.Y. Suen and K. Kamamoto, "Historical review of OCR research and development," Proc. of IEEE, vol. 80, pp. 1029-1058, July 1992.
- [2]. S. Impedovo, L. Ottaviano and S. Occhinegro, "Optical character recognition", International Journal Pattern Recognition and Artificial Intelligence, Vol. 5(1-2), pp. 1-24, 1991.
- [3]. V.K. Govindan and A.P. Shivaprasad, "Character Recognition – A review," Pattern Recognition, vol. 23, no. 7, pp. 671- 683, 1990
- [4]. R. Plamondon and S. N. Srihari, "On-line and off- line handwritten character recognition: A comprehensive survey,"IEEE. Transactions on Pattern Analysis and Machine Intelligence, Vol. 22, no. 1, pp. 63-84, 2000.
- [5]. U. Bhattacharya, and B. B. Chaudhuri, "Handwritten numeral databases of Indian scripts and multistage recognition of mixed
- [6]. 978-1-4244-9391-3/11/426.00© 2011 IEEE 45
- [7]. Abdulllah, M., Agal, A., Alharthi, M., & Alrashidi, M. (2018). Retracted: Arabic handwriting recognition using neural network

- classifier. Journal of Fundamental and Applied Sciences, 10(4S), 265-270.
- [8]. Abe, S. (2010). Support Vector Machines for Pattern Classification. Berlin, Germany: Springer Science & Business Media.
- [9]. Aggarwal, C. C. (2018). Neural Networks and Deep Learning: A Textbook. Basingstoke, England: Springer.
- [10]. Balas, V. E., Roy, S. S., Sharma, D., & Samui, P. (2019). Handbook of Deep Learning Applications. Basingstoke, England: Springer.
- [11]. Boukharouba, A., & Bennia, A. (2017). Novel feature extraction technique for the recognition of handwritten digits. Applied Computing and Informatics, 13(1), 19- 26. doi:10.1016/j.aci.2015.05.001
- [12]. Buckland, M. K. (2006). Emanuel Goldberg and His Knowledge Machine: Information, Invention, and Political Forces. Santa Barbara, CA: Greenwood Publishing Group.

Cite this article as :

Monika, Monika Ingole, Khemutai Tighare, "Handwritten Character Recognition Using Neural Network", International Journal of Scientific Research in Computer Science, Engineering and Information Technology (IJSRCSEIT), ISSN : 2456-3307, Volume 7 Issue 4, pp. 203-207, July-August 2021. Available at doi : <https://doi.org/10.32628/CSEIT217460>
Journal URL : <https://ijsrcseit.com/CSEIT217460>