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Handwritten Text Recognition and Converting in to Digital Format using the CNN

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ABSTRACT: Handwritten word identification is one of the most challenging problems in pattern recognition and image processing. This seems to be a simple task for a human, while analysing messy handwriting is a time-consuming effort for a machine. In the case of a machine, the input must first be scanned from a file, an image, or a real-time device such as a personal computer, digitizer, or tablet. The scanned writing is then converted into digital form text using the Convolutional Neural Network. This technology has a variety of applications, including bank processing, mail sorting, and document reading. Because machine learning is such a buzzword these days, and most real-time applications can be addressed with ease using machine learning models, this study compares several machine learning strategies for recognising handwritten text.

This project aims to categorise each unique handwritten word in order to convert handwritten material to a digital format. To accomplish this challenge, we utilised two different methods: direct word classification and character segmentation.

KEYWORDS: Machine learning, Deep learning, Convolution Neural Networks (CNN),Image recognition, OCR etc.

I. INTRODUCTION

Handwriting recognition is the ability of a machine to receive and interpret handwritten input from multiple sources like paper documents, photographs, touch screen devices etc. Recognition of handwritten and machine characters is an emerging area of research and finds extensive applications in banks, offices and industries. The main aim of this project is to design expert system for, "HCR(English) using Neural Network". that can effectively recognize a particular character of type format using the Artificial Convolutional Neural Network approach. Neural computing Is comparatively new field, and design components are therefore less well specified than those of other architectures. Neural computers implement data parallelism. Neural computer is operated in way which is completely different from the operation of normal computers. Neural computer is trained so that given a certain starting state (data input); they either classify the input data into one of the number of classes or cause the original data to evolve in such a way that a certain desirable property is optimized.

MOTIVATION

Lots of work has been done in the field of character recognition but not much for analyzing a complete document. Recognizing the text of a document would be useful in many diverse applications like reading medical prescriptions, bank cheques and other official documents. It will also find uses in detective or police departments in applications like handwriting-based person identification, identifying real from forged documents, etc.Handwriting recognition can be broken into a number of relatively independent modules. After going through several papers and web pages on handwritten word recognition, we thought of various strategies for each of these modules. We then considered the accuracy and efficiency of these strategies independently and as a whole. Also, we came up with a new idea based on feature extraction and relative position matching with the help of directional graphs. Our project is aimed at implementing this idea keeping in mind the strategies which we considered best for an overall accurate, efficient and scalable handwriting recognition software.

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System Overview:

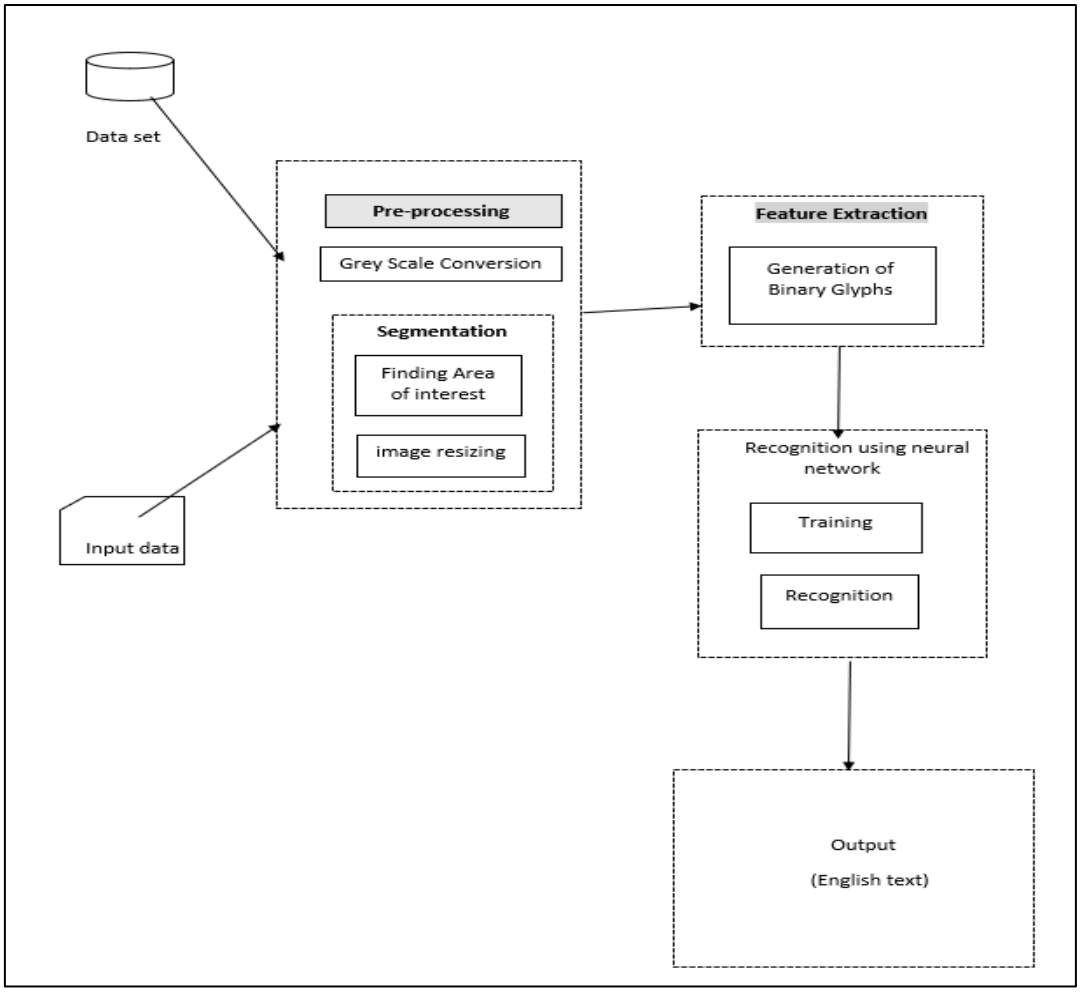

Fig 1. System Architecture

In the given architecture the after logging to the system use will upload the image. Then the 'Pre-processing' module will remove noisy part and unwanteddata from the uploaded image and give the clean image. Data preprocessing is aprocess of preparing the raw data and making it suitable for a machine learningmodel. It is not always a case that we come across the clean and formatted data. Andwhile doing any operation with data, it is mandatory to clean it and put in a formattedway.So, forthis, weusedata preprocessing task. After preprocessing, next is 'CNN classifier', is an algorithm that automaticallyordersorcategorizeddataintoone ormoresetof "classes". And then, the 'analyzing system' will analyze the user's values with values inpredefined dataset. And finally, by comparing both the values give the predictedthe text image to the user.

Convolutional Neural Network (CNN):

CNNortheconvolutionalneuralnetwork(CNN) is a class of deep learning neural networks. In short think of CNN as a ma-chine learning algorithm that can take in an input image, assign importance (learn-able weights and biases) to various aspects/objects in the image, and be able to differentiateonefromtheother.

CNN works by extracting features from the images. Any CNN consists of the following:

1. Theinputlayerwhichisagrayscaleimage
2. TheOutputlayerwhichisabinaryormulti-classlabels
3. Hidden layers consisting of convolution layers, ReLU (Rectified linear unit)layers,the pooling layers,andafully connected Neural Network.

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Convolutional Layer

The Kernel/Filter, K, is a yellow-colored element that performs the convolution operation in the initial half of a Convolutional Layer. As a 3x3x1 matrix, we've chosen K.With a given Stride Value, the filter travels to the right until it parses the entire width. Moving on, it uses the same Stride Value to hop down to the beginning (left) of the image and repeats the process until the full image has been traversed. The Convolution Operation's goal is to extract high-level characteristics from the input image, such as edges. There is no need to limit ConvNets to just one Convolutional Layer. The first ConvLayer is traditionally responsible for capturing Low-Level information such as edges, color, gradient direction, and so on. With the addition of layers, the architecture adjusts to the High-Level characteristics as well, giving us a network that understands the photos in the dataset in the same way that we do.

Pooling Layer

Feature maps' dimensions are reduced by using pooling layers. As a result, the number of parameters to learn and the amount of processing in the network are both reduced. The characteristics contained in an area of the feature map created by a convolution layer are summarized by the pooling layer. As a result, rather than precisely positioned features created by the convolution layer, following actions are conducted on summarized features. As a result, the model is more resistant to changes in the location of features in the input picture.

Average pooling computes the average of the elements present in the region of feature map covered by the filter. Thus, while max pooling gives the most prominent feature in a particular patch of the feature map, average pooling gives the average of features present in a patch.

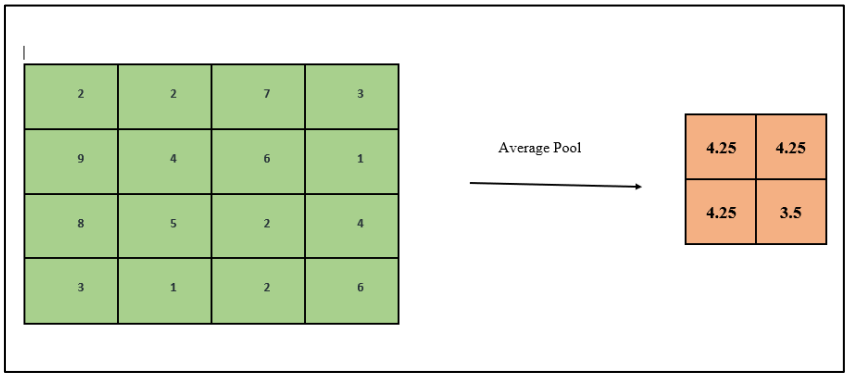

Fig 2. Average Pooling

Fully Connected Layer

Adding a Fully-Connected layer is a (typically) low-cost approach of learning non-linear combinations of high-level information represented by the convolutional layer's output. In such area, the Fully-Connected layer is learning a possibly non-linear function.

We'll flatten the image into a column vector now that we've turned it into a format suited for our Multi-Level Perceptron. Every round of training uses backpropagation to send the flattened output to a feed-forward neural network. The model can discriminate between dominant and certain low-level characteristics in pictures across a number of epochs and categorize them using the SoftMax Classification approach.

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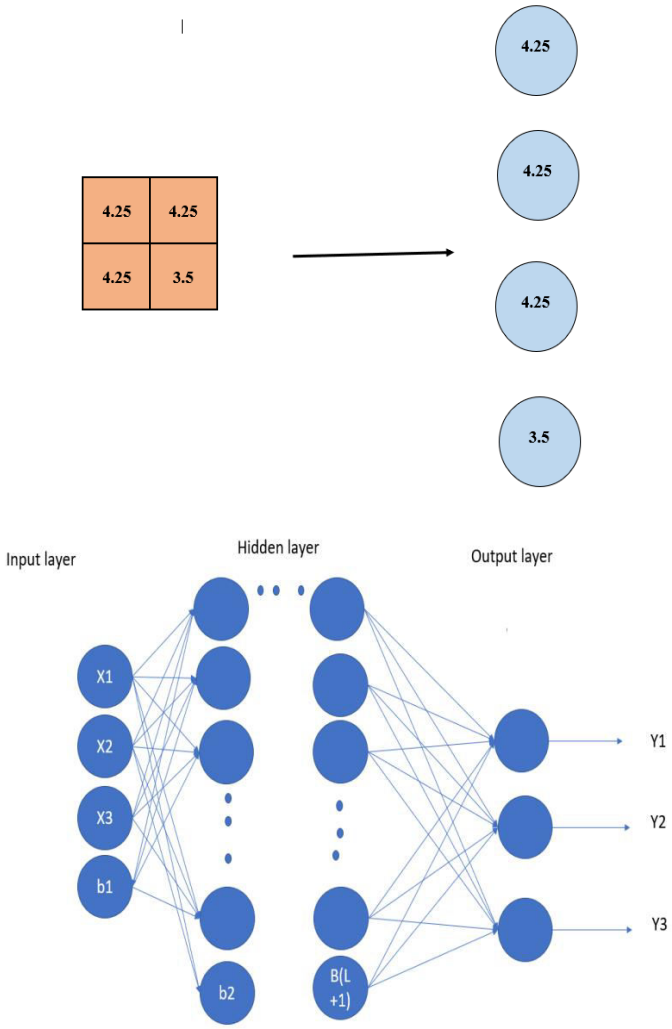

Fig 3. Fully connected layer

Steps to implement CNN

- Importthedataset
- Explorethe data tofigure out whatthey look like
- Pre-processthedata
- Splitthedataintoattributesandlabels
- Dividethedataintotraining andtesting sets
- TraintheCNNalgorithm
- Makesomepredictions
- Evaluatetheresults ofthealgorithm

II. CONCLUSIONS

Although machine learning is a field within computer science, it differs from traditionalcomputational approaches. Many regional languages throughout world havedifferent writing styles which can be recognized with HCR systems using properalgorithm and strategies. We have learning for recognition of English characters. Ithas been found that recognition of handwritten character becomes difficult due topresence of oddcharacters or similarity in shapes for multiple characters. Scannedimage is pre-processed to get a cleaned image and the characters are isolated intoindividual characters. Preprocessing work is done in which normalization, filtrationis performed using processing steps which produce noise free and clean output.Managing ourevolution algorithm with proper training, evaluation other step wiseprocess will lead to successful output of system with better efficiency

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III. FUTURE WORK

The scope of this study is make the system accurate and efficient. We make the model to user friendly and we can add the many things in the system such as like we added the more languages like French, Spanish etc. We can add the option to save the document which is recognized We convert the system in to the web application and app format we give the many facilities like storage and backup option of the documents which converted. And we add option to save the documents to the cloud like platform.

REFERENCES

1. Patil, P., and B. Kaur (2020), "Handwritten Text Recognition Using Various Machine Learning Algorithms and Models", International Journal of Innovative Research in Computer Science & Technology (IJIRCST), July 2020, Volume 08, Issue 04, ISSN: 2347-5552, 337-340
2. Saritha, S. J., G. H. Kumar, K. R. G. D. Teja, and S. J. Sharief (2020), "Handwritten Text Detection using Open CV and CNN", International Journal of Engineering Research & Technology (IJERT), April-2020, Volume 09, Issue 04, ISSN: 2278-0181
3. Manchala, Y., J. Kinthali, K. Kotha, K. S. Kumar, and J. Jayalaxmi (2020), "Handwritten Text Recognition using Deep Learning with TensorFlow", International Journal of Engineering Research & Technology (IJERT), May-2020, Volume 09, Issue 05, ISSN: 2278-0181
4. Vinjit, B. M., M. K. Bhojak, S. Kumar, and G. Chalak (2020), "A Review on Handwritten Character Recognition Methods and Techniques", International Conference on Communication and Signal Processing, July 28 - 30, 2020, India 1224-1228
5. Zhang C., Z. Zhou, and L. Lin (2020), "Handwritten Text Recognition Based on Convolutional Neural Network", Chinese Automation Congress (CAC) | 978-1-7281-7687-1/20/$31.00 ©2020 IEEE | DOI: 10.1109/CAC51589.2020.9326781 7384-7388
6. Vaibhav, V. Mainkar, A. B. Upade, and P. R. Pednekar (2020), "Handwritten Character Recognition to obtain Editable Text", Proceedings of the International Conference on Electronics and Sustainable Communication Systems (ICESC)
7. Ahlawat, S., A. Choudhary, A. Nayyar, S. Singh, and B. Yoon (2020), "Improved Handwritten Digit Recognition Using Convolutional Neural Networks (CNN)", Sensors 20, no. 12: 3344. https://doi.org/10.3390/s20123344
8. Weibo, Yu., C. Guo, and K. Liu(2020), "Handwritten Digital Recognition Optimization Method based on Deep Learning", Chinese Automation Congress (CAC) | 978-1-7281-7687-1/20/$31.00 ©2020 IEEE | DOI: 10.1109/CAC51589.2020.9327647

- https://towardsdatascience.com/
- https://monkeylearn.com/
- https://www.geeksforgeeks.org
- https://www.quora.com

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