A NOVEL METHOD FOR HANDWRITTEN DIGIT RECOGNITION SYSTEM

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ABSTRACT:

An enormous number of CNN classification algorithms have been proposed in the literature. Nevertheless, in these algorithms, appropriate filter size selection, data preparation, limitations in datasets, and noise have not been taken into consideration. As a consequence, most of the algorithms have failed to make a noticeable improvement in classification accuracy. To address the shortcomings of these algorithms, our paper presents the following contributions: Firstly, after taking the domain knowledge into consideration, the size of the effective receptive field (ERF) is calculated. Calculating the size of the ERF helps us to select a typical filter size which leads to enhancing the classification accuracy of our CNN. Secondly, unnecessary data leads to misleading results and this, in turn, negatively affects classification accuracy. To guarantee the dataset is free from any redundant or irrelevant variables to the target variable, data preparation is applied before implementing the data classification mission. Thirdly, to decrease the errors of training and validation, and avoid the limitation of datasets, data augmentation has been proposed. Fourthly, to simulate the real-world natural influences that can affect image quality, we propose to add an additive white Gaussian noise with s = 0.5 to the MNIST dataset. As a result, our CNN algorithm achieves state-of-the-art results in handwritten digit recognition, with a recognition accuracy of 99.98%, and 99.40% with 50% noise.

LITRATURE REVIEW

AUTHOR / YEAR / PUBLICATION	TITLE	CONCEPT	ISSUES
Aliya Fathima, S. Geethanjali, M. Janani, Dr.R. Geetha /2007	A Survey on Handwritten Text Recognition Using Deep Learning	The various pre-processing techniques involved in the text recognition with a variety of pictures ranging from simple written form-based documents and documents containing coloured and sophisticated background are dealt in this paper.	Lastly, it has been concluded that using a single method for pre-processing, the image cannot be processed completely.
Chirag Dodiya, DR. Gayatri S Pandi / 2013	Handwritten Recognition	In this paper, the offline handwritten recognition will be done using a Convolutional neural network and TensorFlow.	There has been plenty of research done in the field of HCR but still, it is an open problem as we are still lacking in getting the best accuracy.
Yash Pandey,Bhanu Pratap, Sangras Bhargav, J.Shiva Nandhini /2014	Optical Character Recognition	Handwriting recognition has two basic type existing one is online and other is offline. In this project, by using	Less Accuracy and takes more time.

		Linear Support Vector we will present the handwriting recognition system in a very simple and feasible way.	
T. Wakabayashi and F. Kimura /2007	Handwritten Numeric Recognition	Digit recognition is used in post offices, in banks for reading cheques, for license plate recognition. The digit recognition can be divided into two groups, printed digit recognition and handwritten digit recognition. Recognition of printed digits is easier compared to the handwritten digit recognition.	On the other hand, there are numerous handwriting styles for the same digit; hence more effort is required to find the accurate handwritten digit.
J.Pradeep, E.Srinivasan and S.Himavathi /2011	Diagonal based feature extraction for handwritten alphabets recognition system using neural network	An off-line handwritten alphabetical character recognition system using multilayer feed forward neural network is described in the paper.	Extraction process is complicated.

		Diagonal based feature extraction is introduced for extracting the features of the handwritten alphabets. 570 different handwritten alphabetical characters are used for testing.	