V.S.B ENGINEERING COLLEGE, KARUR

Department of Computer Science and Engineering

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LITERATURE SURVEY

TITLE	A NOVEL METHOD FOR HANDWRITTEN DIGIT RECOGNITION SYSTEM
DOMAIN NAME	ARTIFICIAL INTELLIGENCE
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ABSTRACT :

Handwritten digit recognition has recently been of very interest among the researchers because of the evolution of various Machine Learning, Deep Learning and Computer Vision algorithms. In this report, we compare the results of some of the most widely used Machine Learning Algorithms like CNN- convolution neural networks and with Deep Learning algorithm like multilayer CNN using Keras with Theano and TensorFlow. MNIST is a dataset which is widely used for handwritten digit recognition. The dataset consists of 60,000 training images and 10,000 test images. The artificial neural networks can all most mimic the human brain and are a key ingredient in image processing field. For example, Convolution Neural networks with back propagation for image processing. The applications where these hand written digit recognition can be used in Banking sector where it can be used to maintain the security pin numbers, it can be also used for blind peoples by using sound output.

INTRODUCTION :

Handwriting recognition is one of the compelling research works going on because every individual in this world has their own style of writing. It is the capability of the computer to identify and understand handwritten digits or characters automatically. Because of the progress in the field of science and technology, everything is being digitalized to reduce human effort. Hence, there comes a need for handwritten digit recognition in many real-time applications. MNIST data set is widely used for this recognition process and it has 70000 handwritten digits. We use Artificial neural networks to train these images and build a deep learning model. Web application is created where the user can upload an image of a handwritten digit. his image is analysed by the model and the detected result is returned on to UI

LITERATURE SURVEY

The Author Describes[1]

Character recognition plays an important role in the modern world. It can solve more complex problems and makes humans' job easier. An example is handwritten character recognition. This is a system widely used in the world to recognize zip code or postal code for mail sorting. There are different techniques that can be used to recognize handwritten characters. Two techniques researched in this paper are Pattern Recognition and Artificial Neural Network (ANN). Both techniques are defined and different methods for each technique is also discussed. Bayesian Decision theory, Nearest Neighbour rule, and Linear Classification or Discrimination is types of methods for Pattern Recognition. Shape recognition, Chinese Character and Handwritten Digit recognition uses Neural Network to recognize them. Neural Network is used to train and identify written digits. After training and testing, the accuracy rate reached 99%. This accuracy rate is very high.

The Author Describes[2]

This paper summarizes the top state-of-the-art contributions reported on the MNIST dataset for handwritten digit recognition. This dataset has been extensively used to validate novel techniques in computer vision, and in recent years, many authors have explored the performance of convolutional neural networks (CNNs) and other deep learning techniques over this dataset. To the best of our knowledge, this paper is the first exhaustive and updated review of this dataset; there are some online rankings, but they are outdated, and most published papers survey only closely related works, omitting most of the literature. This paper makes a distinction between those works using some kind of data augmentation and works using the original dataset out-of-the-box. Also, works using CNNs are reported separately; as they are becoming the state-of-the-art approach for solving this problem. Nowadays, a significant amount of works have attained a test error rate smaller than 1% on this dataset; which is becoming non-challenging. By mid-2017, a new dataset was introduced: EMNIST, which involves both digits and letters, with a larger amount of data acquired from a database different than MNIST's. In this paper, EMNIST is explained and some results are surveyed.

REFERENCES:

Nagu, M., Shankar, N. V., & Annapurna, K. (2011). A novel method for handwritten digit recognition with neural networks. *Int. J. Comp. Sci. Inf. Tech*, *2*(4), 1685-1692.[1]

Baldominos, Alejandro, Yago Saez, and Pedro Isasi. "A survey of handwritten character recognition with mnist and emnist." *Applied Sciences* 9.15 (2019): 3169.[2]