A NOVEL METHOD FOR HANDWRITTEN DIGIT RECOGNITION SYSTEM

DOMAIN: ARTIFICIAL INTELLIGENCE

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PROBLEM STATEMENT:

Handwritten digit recognition is the ability of computers to recognize digits handwritten by humans. The problem is challenging because of unique handwritings possessed by every individual - which means any given digit can be written in somewhat different shapes and sizes. A model powerful enough to generalize the core characteristics of each digit can be used to tackle this problem. MNIST Dataset contains images of over 10000 digits written by many different people. A Convolutional Neural Network trained on this dataset can be used to recognize handwritten digits.

LITERATURE SURVEY:

Paper 1:

ARTIFICIAL NEURAL NETWORK CLASSIFICATION FOR HANDWRITTEN DIGITS RECOGNITION

Mohammed Hussein Naji Jabardi, Harleen Kaur

International journal of advanced research in computer science 5 (3), 2014

Handwritten recognition is extremely powerful technology to support many applications comes within the forefront of automated sorting of letters and bank checks, and help the blind and Who have difficulty to read books and magazines, and therefore the translation of books from one language to a different, and converted to texts can store and processed within the computer. This paper is present two artificial neural network classification for handwritten digit recognition (from 0 to 9) with accuracy over 98% by using an application of feed-forward multilayer neural network with two different classifiers (Forward Multilayer Neural Network FMNN and Binary Coding Neural Network BCNN). the very best recognition reliability and minimal error rate for the popularity of handwritten digits are achieved. the rear propagation algorithm minimizing the whole error of the network over a group of coaching by searching of the burden value that achieves the target. Binary coding approach is employed to reducing the amount of output that it ends up in reducing the time that require for processing and saving the resources and eventually reduce the network.

Paper 2:

CHARACTER RECOGNITION USING ARTIFICIAL NEURAL NETWORK

Pranjali Pohankar, Namrata Taralkar, Snehalata Karmare, Smita Kulkarni

International Journal of Electronics Communication and Computer Engineering 5 (4), 2014

A neural network could be a machine designed to model the way during which the brain performs a selected task. Character recognition techniques help in recognizing the characters

written on paper documents and converting it in digital form. Handwritten character recognition may be a very difficult problem thanks to great variation of genre, different size and shape of the character. Neural network may be a technique accustomed improve the accuracy and efficiency of the handwritten character recognition system. The error back propagation algorithm is employed to coach the MLP networks. the most advantage of back propagation neural network (BPN) method is that it can fairly approximate an oversized class of functions. The aim of the paper is to use the improved neural network technique to acknowledge the offline handwritten characters.

Paper 3:

OFFLINE HANDWRITTEN DIGIT RECOGNITION USING NEURAL NETWORK

Sumedha B Hallale, Geeta D Salunke

International Journal of Advanced Research in Electrical, Electronics and InstrumentationEngineering 2 (9), 4373-4377, 2013

Optical character recognition may be a typical field of application of automatic classification methods. during this paper, we've introduced an entire new idea of recognition of isolated handwritten digits which is thought to be a difficult task and still lacks a satisfactory technical solution. the current paper proposes a completely unique approach for recognition of handwritten digits ie neural network classification. Back propagation neural network is one amongst the only methods for training multilayer neural networks. during this paper, we designed a back propagated neural network and trained it with a group of handwritten digits. the common success rates of recognition of all digits are 91.2%.

Paper 4:

RECOGNITION OF HANDWRITTEN TEXT: ARTIFICIAL NEURAL NETWORKAPPROACH

Apash Roy, NR Manna

International Journal of Advanced and Innovative Research (2278-7844) 2 (9), 2013

Due to its wide application area and inherent complexity, handwritten character recognition grabs great interest of varied researchers since long. The task is way tougher when it comes within the kind of handwritten text document. This work is an approach towards recognition of handwritten texts through competitive neural network. a technique of segmenting texts into individual character is additionally revealed here. Text inputs are converted into binary matrices and are segmented into small pieces to search out out probable individual characters from the text. Identified character matrices are normalized into standard sizes, and recognized using a man-made neural network and eventually displayed them into an appropriate text editor with some font.

Paper 5:

OFFLINE HANDWRITTEN CHARACTER RECOGNITION TECHNIQUES USINGNEURAL NETWORK: A REVIEW

Vijay Laxmi Sahu, Babita Kubde

International journal of science and Research (IJSR) 2 (1), 87-94, 2013

This paper presents detailed review within the field of Off-line Handwritten Character Recognition. Various methods are analyzed that are proposed to comprehend the core of character recognition in an optical character recognition system. the popularity of handwriting can, however, still is taken into account an open research problem thanks to its substantial variation in appearance. while, sufficient studies have performed from history to the current era, paper describes the techniques for converting textual content from a paper document into computer code form. Offline handwritten character recognition may be a process where the pc understands automatically the image of handwritten script. This material is a guide and update for readers working within the Character Recognition area. Selection of a relevant feature extraction method is maybe the one most significant think about achieving high recognition performance with far better accuracy in character recognition system.

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Paper 6:

A NOVEL METHOD FOR HANDWRITTEN DIGIT RECOGNITION WITH NEURAL NETWORKS

Malothu Nagu, N Vijay Shankar, K. Annapurna

International Journal of Computer Science and Information Technologies (IJCSIT), Vol. 2 (4) 1685-1692, 2011

Character recognition plays an important role in the modern world. You can solve more complex problems and make people's work easier. One example is handwriting recognition. It is a postal code or zip code recognition system that is widely used for mail sorting worldwide. There are several techniques that can be used for handwriting recognition. The two techniques that were covered in this article are pattern recognition and artificial neural networks (ANNs). Both techniques are defined, and the different methods of each technique are also described. Bayesian decision theory, nearest neighbor rule, and linear classification or identification are types of pattern recognition methods. Shape recognition, kanji recognition, and handwritten digit recognition use neural networks. Neural networks are used for training and identifying written digits. After training and testing, the accuracy rate reached 99%. This accuracy rate is very high.

Paper 7:

HANDWRITTEN DIGITS RECOGNITION WITH ARTIFICIAL NEURAL NETWORK

K. Islam, G. Mujtaba, R.G. Raj, H.F. Nweke

2017 International Conference on Engineering Technology and Technopreneurship (ICE2T)

For computer vision systems, recognizing handwritten digits is a complex task central to a variety of new applications. It is widely used by machine learning and computer vision researchers to implement practical applications such as computer-aided reading of bank check numbers. In this study, we implemented a multilayer fully connected neural network with hidden layers for handwritten digit recognition. Testing was performed using the public MNIST handwriting database. From the MNIST database, we extracted 28,000 digit images for training and 14,000 digit images for testing. Our multilayer artificial neural network achieves 99.60% accuracy in test performance.

Paper 8:

CHARACTER RECOGNITION TECHNIQUE USING NEURAL NETWORK

Harshal Bodade, Amit Sahu

International Journal of Engineering Research and Applications 3 (2), 1778-1783, 2013

Character recognition (CR) has been extensively researched and developed over the past half century. At a level sufficient to create technology-driven applications. Character preprocessing includes character limits for translation invariance and character normalization size constancy. Today, with rapidly growing computing power, current CR methodology and increasing demand in many emerging markets. Application domains that require more advanced methods. This paper is an attempt made to develop neural network strategies for quarantined people. Character preprocessing includes delimiters for translation, size-invariant sign invariance and normalization.

First, an overview of the CR system and its development over time are presented. Next, available CR techniques, your strengths and weaknesses will be checked. Finally, let's talk about the current status of the CR. And the direction of future research is proposed. Character diversity introduced by rotation and deformation are the main concerns of this work. It is taken into account by developing an approach based on neural logic and using normalized angular functions. Now, rapidly growing computing power enables current CR implementations. It is also in high demand in many emerging application areas. A more advanced method is required.

Paper 9:

HANDWRITTEN CHARACTER RECOGNITION USING NEURAL NETWORK

Chirag I Patel, Ripal Patel, Palak Patel

International Journal of Scientific & Engineering Research 2 (5), 1-6, 2011

Currently, neural networks are mainly used for pattern recognition tasks. This paper describes the behavior of various neural network models used in OCR. OCR makes extensive use of neural networks. We considered parameters such as the number of hidden layers, hidden layer size, and epochs. We used a multilayer feedforward network with backpropagation. In preprocessing, we applied some basic character segmentation, character normalization, and deskewing algorithms. We used different neural network models and applied a test set to each to determine the accuracy of each neural network.

Paper 10:

RECOGNITION OF HANDWRITTEN TEXT: ARTIFICIAL NEURAL NETWORK APPROACH

Apash Roy, NR Manna

International Journal of Advanced and Innovative Research (2278-7844) 2 (9), 2013

Due to its wide scope and inherent complexity, handwriting recognition has long attracted the interest of various researchers. This task becomes even more difficult in the form of handwritten text documents. This work is an approach to handwritten text recognition using competitive neural networks. Again there is the possibility of splitting the text into individual characters. A text input is converted to a binary matrix, split into small chunks, and possible single characters are detected from the text. The identified character matrices are normalized to a standard size, recognized using an artificial neural network, and finally displayed in font in a suitable text editor.