

A NOVEL METHOD FOR HANDWRITTEN DIGIT RECOGNITION SYSTEM

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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. this image is analyzed by the model and the detected result is returned on to UI

Literature Survey:

1. Hand Written Digit Recognition using Machine Learning

Hand-written character and digit recognition have been one of the most exigent and engrossing field of pattern recognition and image processing. The main aim of this paper is to demonstrate and represent the work which is related to hand-written digit recognition. The hand-written digit recognition is a very exigent task. In this recognition task, the numbers are not accurately written or scripted as they differ in shape or size; due to which the feature extraction and segmentation of hand-written numerical script is arduous. The vertical and horizontal projections methods are used for the purpose of segmentation in the proposed work. SVM is applied for recognition and classification, while Convex hull algorithm is applied for feature extraction.

Advantages: After the completion of pre-processing stage and segmentation stage, the pre-processed images are represented in the form of a matrix which contains pixels of the images that are of very large size

Disadvantage: The generative models can perform recognition driven segmentation. The method involves a relatively

2. Diagonal based feature extraction for handwritten character recognition system using neural network

An off-line handwritten alphabetical character recognition system using multilayer feed forward neural network is described in the paper. A new method, called, diagonal based feature extraction is introduced for extracting the features of the handwritten alphabets. Fifty data sets, each containing 26 alphabets written by various people, are used for training the neural network and twenty different handwritten alphabets characters are used for testing. The proposed recognition system performs quite well yielding higher levels of recognition accuracy compared to the systems employing the conventional horizontal and vertical methods of feature extraction. This system will be suitable for converting handwritten documents into structural text form and recognizing handwritten names.

Advantages: The main aim of feature extraction phase is to extract that pattern which is most pertinent for classification

Disadvantage: Most importantly, it is not possible to speak to a machine in a natural way due to constraints such as out of vocabulary words.

3. Improving Offline Handwritten Text Recognition with Hybrid HMM/ANN Models

The structural part of the optical models has been modeled with Markov chains, and a Multilayer Perceptron is used to estimate the emission probabilities. This paper also presents new techniques to remove slope and slant from handwritten text and to normalize the size of text images with supervised learning methods. Slope correction and size normalization are achieved by classifying local extrema of text contours with Multilayer Perceptrons. Slant is also removed in a nonuniform way by using Artificial Neural Networks. Experiments have been conducted on offline handwritten text lines from the

IAM database, and the recognition rates achieved, in comparison to the ones reported in the literature, are among the best for the same task.

Advantages: The main aim of feature extraction phase is to extract that pattern which is most pertinent for classification.

Disadvantage: As it is noisy to hear someone sitting next to us and talking to his machine. Moreover, anyone who wants to input confidential data to computer is not willing to do it in public places.

4. Recognition of handwritten similar Chinese characters by self-growing probabilistic decision-based neural networks

The self-growing probabilistic decision-based neural network (SPDNN) is a probabilistic type neural networks, which adopts a hierarchical network structure with nonlinear basis functions and a competitive credit-assignment scheme. Based on the SPDNN model, we constructed a three stage recognition system. The prototype system demonstrates a successful utilisation of SPDNN to similar handwritten Chinese recognition on the public database CCL/HCCRI (5401 characters /spl times/200 samples). Regarding the performance, the experiments on the CCL/HCCRI database demonstrated a 90.12% of recognition accuracy with no rejection and 94.11% of accuracy with 6.7% rejection rates, respectively.

Advantages: The difficult task is there are some handwritten digits that often run together or not fully connected. Numeral 5 is an example. But once these tasks have been carried out, the digits are available as individual items. But the digits are still indifferent sizes.

Disadvantages: Background noise, cross-talk, accented speech and so on

References

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