LITERATURE SURVEY

Date	29 August 2022
Team ID	PNT2022TMID32288
Project Name	A Novel Method for Handwritten Digit Recognition System
Maximum Marks	2 Marks

NO: 1
TITLE: Neural Network Based Handwritten Digit Recognition for Managing Examination Score in Paper Based Test
AUTHORS: Ankit Sharma1 , Yogiraj Barole , Kaustubh Kerhalkar , Dr. Prabhu K.R.
PUBLISHING YEAR: 2016
CONTENT:

Recognition of handwritten character is a difficult task in the field of image processing, artificial intelligence since the handwriting varies from person to person. In proposed paper, we are training the neural network to recognize the off-line strategies for the isolated handwritten character (0 to 9). This work improves the character recognition and pre-processing of the Character is done by image rendering, character extraction and training and testing steps. The proposed method is based on the use of linear regression algorithm to classify the characters and is used to train the given dataset. After training a network performance curve is generated along with the individual required characters. In given system, numerical character is represented by binary numbers that are used as input then they are fed to an ANN. Neural network followed by the linear regression Algorithm which compromises Training.

NO: 2
TITLE: Handwritten digit recognition by combined classifiers
AUTHORS: M. Breukelen; Robert P. W. Duin; David M. J. Tax; J. E. den Hartog.
PUBLISHING YEAR: 1998
CONTENT:

In practical pattern recognition problems one often tries a number of classifiers and a number of feature sets in order to find the best combination. As soon as this combination is found the other classifiers and features are no longer used. Methods for combining classifiers to reduce the number of classification errors are described in recent literature. In this paper the usefulness of combining classifiers was tested on a real data set consisting of several sets of features of handwritten digits. The questions we would like to answer are: "When does combining classifiers result in a reduction of classification errors and why?" and "If we have a large set of features, how do we divide this set into subsets in order to get the best results?" Section 2 this paper describes how classifiers can be combined, Section 3 how our classifiers

estimate posterior probabilities and Section 4 describes our data. In Section 5 we describe the experiments we did and in Section 6 our conclusions.

NO: 3
TITLE: A hybrid recognition system for off-line handwritten characters
AUTHORS: Gauri Katiyar and Shabana Mehfuz
PUBLISHING YEAR: **2016**
CONTENT:

Computer based pattern recognition is a process that involves several sub-processes, including pre-processing, feature extraction, feature selection, and classification. Feature extraction is the estimation of certain attributes of the target patterns. Selection of the right set of features is the most crucial and complex part of building a pattern recognition system. In this work we have combined multiple features extracted using seven different approaches. The novelty of this approach is to achieve better accuracy and reduced computational time for recognition of handwritten characters using Genetic Algorithm which optimizes the number of features along with a simple and adaptive Multi Layer Perceptron classifier. Experiments have been performed using standard database of CEDAR (Centre of Excellence for Document Analysis and Recognition) for English alphabet.

NO: 4
TITLE: Analytical Review of Preprocessing Techniques for Offline Handwritten Character Recognition
AUTHORS: Gaurav Kumar and Pradeep Kumar Bhatia
PUBLISHING YEAR: 2013
CONTENT:

Preprocessing techniques are the first step in a character recognition system. This paper deals with the various preprocessing techniques involved in character recognition system with different kind of images ranges from simple handwritten form based documents and documents containing colored and complex background and varied intensities. Here, we are going to discuss all important preprocessing techniques like skew detection and correction, image enhancement techniques of contrast stretching, binarization, noise removal techniques, normalization and segmentation, morphological processing techniques.

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[2] K. Gaurav and Bhatia P. K., "Analytical Review of Preprocessing Techniques for Offline Handwritten Character Recognition", 2nd International Conference on Emerging Trends in Engineering & Management, ICETEM, 2014.

[3] Salvador España-Boquera, Maria J. C. B., Jorge G. M. and Francisco Z. M., "Improving Offline Handwritten Text Recognition with Hybrid HMM/ANN Models", IEEE Transactions on Pattern Analysis and Machine Intelligence, Vol. 33, No. 4, April 2014

[4] Reena Bajaj, Lipika Dey, and S. Chaudhury, "Devnagari numeral recognition combining decision of multiple connectionist classifiers", Sadhana, Vol.27, part. 1, pp.-59-72, 2011.

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[7] Bharatratna P. Gaikwad, Ramesh R. Manza, Ganesh R. Manza, "Automatic Video Scene Segmentation to Separate Script and Recognition", Advances in Intelligent Systems and Computing Volume 328, pp 225-235, (2015).

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