A NOVEL METHOD FOR HANDWRITTEN DIGIT RECOGNITION SYSTEM

LITERARURE SURVEY

[1] Nafiz Arica at al. proposed a method which avoids most of the pre-processing operations, which causes loss of important information. One of the major contributions of the method is to development of a powerful segmentation algorithm. Utilization of the character boundaries, local maxima and minima, slant angle, upper and lower baselines, stroke height and width, and ascenders and descenders improve the search algorithm of the optimal segmentation path, applied on a gray-scale image. This approach decreases the over-segmentation. Another contribution is the use of Hidden Markov Models (HMM) training, not only for the estimation of model parameters, but also for the estimation of some global and feature space parameters. Also, HMM probabilities are used to measure the shape information and rank the candidate character. One dimensional representation of a two dimensional character image increases the power of the HMM shape recognizer.

[2] Sushree Sangita Patnaik and Anup Kumar Panda May 2011 et al, this paper proposes the implementation of particle swarm optimization (PSO) and bacterial foraging optimization (BFO) algorithms which are intended for optimal harmonic compensation by minimizing the undesirable losses occurring inside the APF itself. The efficiency and effectiveness of the implementation of two approaches are compared for two different conditions of supply. The total harmonic distortion (THD) in the source current which is a measure of APF performance is reduced drastically to nearly 1% by employing BFO. The results demonstrate that BFO outperforms the conventional and PSO based approaches by ensuring excellent functionality of APF and quick prevail over harmonics in the source current even under unbalanced supply.

[3] G. Pirlo and D. Impedovo in his work on presented a new class of membership functions, which are called Fuzzymembership functions (FMFs), for zoning-based classification. These FMFs can be easily adapted to the specific characteristics of a classification problem in order to maximize classification performance. In this research, a realcoded genetic algorithm is presented to find, in a single optimization procedure, the optimal FMF, together with the optimal zoning described by Voronoi tessellation. The experimental results, which are carried out in the field of handwritten digit and character recognition, indicate that optimal FMF performs better than other membership functions based on abstract level, ranked-level, and measurement-level weighting models, which can be found in the literature.

[4] A. Brakensiek, J. Rottland, A. Kosmala, J. Rigoll et al, in this paper a system for off-line cursive handwriting recognition is described which is based on

Hidden Markov Models (HMM) using discrete and hybrid modelling techniques. Handwriting recognition experiments using a discrete and two different hybrid approaches, which consist of a discrete and semi-continuous structures, are compared. A segmentation free approach is considered to develop the system. It is found that the recognition rate performance can be improved of a hybrid modelling technique for HMMs, which depends on a neural vector quantizer (hybrid MMI), compared to discrete and hybrid HMMs, based on tired mixture structure (hybrid - TP), which may be caused by a relative small data set.

[5] In Renata F. P. Neves have proposed SVM based offline handwritten digit recognition. Authors claim that SVM outperforms the Multilayer perceptron classifier. Experiment is carried out on NIST SD19 standard dataset. Advantage of MLP is that it is able to segment non-linearly separable classes. However, MLP can easily fall into a region of local minimum, where the training will stop assuming it has achieved an optimal point in the error surface. Another hindrance is defining the best network architecture to solve the problem, considering the number of layers and the number of perceptron in each hidden layer. Because of these disadvantages, a digit recognizer using the MLP structure may not produce the desired low error rate.

[1] Nafiz Arica, and Fatos T. Yarman-Vural, ―Optical Character Recognition for Cursive Handwriting,‖ IEEE Transactions on Pattern Analysis and Machine Intelligence, vol.24, no.6, pp. 801-113, June 2002.

[2] Sushree Sangita Patnaik and Anup Kumar Panda, "Particle Swarm Optimization and Bacterial Foraging Optimization Techniques for Optimal Current Harmonic Mitigation by Employing Active Power Filter Applied Computational Intelligence and Soft Computing", Volume 2012, Article ID 897127.

[3] G. Pirlo and D. Impedovo, "Fuzzy Zoning Based Classification for Handwritten Characters", IEEE Transaction on pattern Recognition and Machine Intelligence, vol.19, no. 04, pp.780-785, August 2011.

[4] A. Brakensiek, J. Rottland, A. Kosmala and J. Rigoll, "Offline Handwriting Recognition using various Hybrid Modeling Techniques & Character N-Grams", Available at http://irs.ub.rug.nl/dbi/4357a84695495

[5] Renata F. P. Neves, Alberto N. G. Lopes Filho, Carlos A.B.Mello, CleberZanchettin, "A SVM Based Off-Line Handwritten Digit Recognizer", International conference on Systems, Man and Cybernetics, IEEE Xplore, pp. 510-515, 9-12 Oct, 2011, Brazil