A Novel Method for Handwritten Digit Recognition System

Domain: Artificial Intelligence

Team Members: Boomiga M

Kamaleshwari V

Reshma M

Saranya E

Suriya A

Paper 1: Pre-processing techniques involved in the character recognition

Publication Year: 2013

Author: K. Gaurav, Bhatia P. K

This paper deals with the Various pre-processing techniques involved in the character Recognition with different kind of images ranges from a Simple handwritten form based documents and documents Containing colored and complex background and varied Intensities. In this, different preprocessing techniques like Skew detection and correction, image enhancement techniques Of contrast stretching, binarization, noise removal techniques, Normalization and segmentation, morphological processing Techniques are discussed. It was concluded that using a single Technique for preprocessing, we can't completely process the Image. However, even after applying all the said techniques Might not possible to achieve the full accuracy in a Preprocessing system.

Paper 2: Improving Offline Handwritten Text Recognition With Hybrid HMM/ANN Model

Publication Year: 2011

Author: Salvador Espana-Boquera

In this paper hybrid Hidden Markov Model (HMM) model is proposed for recognizing unconstrained offline handwritten texts. In this, the structural part of the optical model has been modelled with Markov chains, and a Multilayer Perceptron is used to estimate the emission probabilities. In this paper, different techniques are applied to remove slope and slant from handwritten text and to normalize the size of text images with supervised learning methods. The key features of this recognition system were to develop a system having high accuracy in preprocessing and recognition, which are both based on anns.

Paper 3: Optimizing Feature Selection For Recognizing Handwritten Arabic Characters

Publication Year: 2005

Author: Mohammed Z. Khedher, Gheith A. Abandah, and Ahmed M. Al Khawaldeh

This paper describes that Recognition of characters greatly depends upon the features used. Several features of the handwritten Arabic characters are selected and discussed. An off-line recognition system based on the selected features was built. The system was trained and tested with realistic samples of handwritten Arabic characters. Evaluation of the importance and accuracy of the selected features is made. The recognition based on the selected features give average accuracies of 88% and 70% for the numbers and letters, respectively. Further improvements are achieved by using feature weights based on insights gained from the accuracies of individual features.

Paper 4: Fuzzy-Zoning-Based Classification For Handwritten Characters

Publication Year: 2011

Author: G. Pirlo and D. Impedovo

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.

Paper 5: Feature Selection Using Genetic Algorithm

Publication Year: 2018

Author: Yoshimasa Kimura

Presented a work on how to select features for Character Recognition Using Genetic Algorithm. The author proposes a novel method of feature selection for character recognition using genetic algorithms (GA). The proposed method selects only the genes for which the recognition rate of training samples exceeds than the predetermined threshold as a candidate of the parent gene and adopts a reduction ratio in the number of features used for recognition as the fitness value.