

ABSTRACT

Automatic recognition of handwritten characters is a problem that is currently garnering a lot of attention. The ability to efficiently process small handwriting samples, like those found on cheques and envelopes, is one of the major driving forces behind the current research. **Calligrapher** is a computer driven application that converts the photograph of hand written scripts into text documents with minimum effort. The project is based on Pattern recognition techniques using artificial neural networks. In this approach, an artificial neural network is trained to identify similarities and patterns among different handwriting samples. The platform used is MATLAB 7.0.

INTRODUCTION

Everyone knows that reading someone else's handwriting can be a challenge. Characters written by different people are of different styles, different sizes. Many of the characters may be poorly written and are hard to identify even for human. The general rules for distinguishing between characters are neither known nor have they formulated. Not only must handwriting-recognition systems handle many different shapes and styles for each letter, but humans also rarely write technically correct letter shapes. Neat and correct handwriting takes time. Most people reduce their adherence to letters' defined shapes to speed up their writing, producing *sloppy script*.

An Artificial Neural Network (ANN) is an information-processing paradigm that is inspired by the way biological nervous systems, such as the brain, process information. The key element of this paradigm is the novel structure of the information processing system. It is composed of a large number of highly interconnected processing elements (neurons) working in unison to solve specific problems. ANNs, like people, learn by example. An ANN is configured for a specific application, such as pattern recognition or data classification, through a learning process. Learning in biological systems involves adjustments to the synaptic connections that exist between the neurons. This is true of ANNs as well.

It is important to differentiate between off-line and on-line handwriting recognition systems. The fundamental difference is in the nature of the handwriting sample used in each system. In off-line systems, the samples are static. The system analyzes a digital image using either the raw pixel data, or some sort of representation of the pixel data. Only data that can be obtained directly from the image is used, there is no additional information given to it. This differs from an online system, where the samples are analyzed in a dynamic environment. This allows on-line systems to collect detailed real time information. This information may include the pressure and speed that a sample is written with, and the specific order in which the different alphanumeric characters are placed. Here we are using an off-line system for handwriting recognition.

REFERENCE

➤ RESEARCH PAPERS

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- Off-line Handwriting Recognition Using Artificial Neural Networks Andrew T. Wilson University of Minnesota, Morris
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- Towards Neural Network Recognition Of Handwritten Arabic Letters By Tim Klassen Dalhousie University
- Using Neural Networks to Create an Adaptive Character Recognition System Alexander J. Faaborg Cornell University, Ithaca NY
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- NEW METHODS FOR HANDWRITING RECOGNITION USING ARTIFICIAL
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- Handwriting Recognition using MATLAB by Jonathan Terleski
- Analyzing High-Resolution Microscopy Images By Roy Wollman, Ph.D., University of
California, Davis

➤ **OTHER RESOURCES**

- MATLAB Help topics
- MATLAB Digest | Academic Edition - April 2008
- Neural Network Frequently Asked Questions (FAQ) posted to comp.ai.neural-nets
- Introduction to Neural Networks with Java by Jeff Heaton