NEURAL NETWORK IN BIOMETRICS: A SURVEY IN FINGERPRINT CLASSIFICATION

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NEURAL NETWORK IN BIOMETRICS: A SURVEY IN FINGERPRINT CLASSIFICATION

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by

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ABSTRACT

(English)

Fingerprint classification has become a popular research topic due to its applicability in authentication and identification. There are several approaches in fingerprint classification systems which are structural, syntactic, statistical and neural networks. The purpose of fingerprint classification is to categorize a fingerprint into certain category based on its global pattern configuration. The analysis of comparisons between neural-network and non-neural network approaches have pointed out the advantages of using neural network in fingerprint classification. The results show that the combination of neural networks with other machine learning approach outperforms the neural networks based alone in terms of classification accuracy. Therefore a combination of neural networks and machine learning approach is suggested in this paper. The clear advantages of supervised and unsupervised learning in neural networks methods support the objective of this study that to suggest the neural network approach for fingerprint classification. A model of neural network combined with machine learning approach (SOM-LVQ and MLP) is proposed at the end of this study. SOM-LVQ is used for pre-classification and MLP classifier is used for classification.
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Chapter 1
Introduction

1.1 Overview of the study

The study of neural networks is an extremely interdisciplinary field, both in its development and its application (Fausett, 1994). There are various points of view as to the nature of neural networks. This paper will describe the area in which neural networks are being applied, the biometrics applications. The breadth of neural network applicability will be discovered in the survey on fingerprint classification. By doing the comparison between non-neural network and neural networks approach, this study will contribute to the use of neural network in fingerprint classification.

An artificial neural network is an information processing system that has certain performance characteristics in common with biological neural networks (Fausett, 1994). According to Fausett (1994), artificial neural networks have been developed as generalizations of mathematical models of human cognition or neural biology.

The characteristics of neural networks make them a useful tool in processing reliable recognition or identification of complex patterns (Gallinari, 1998). Neural information processing has proven to be a very useful and robust technique in such pattern recognition tasks.

Pattern recognition can be defined as a process that leads to a decision. The quality of this decision can only be measured by statistics relating the number of good and bad classifications (Davalo & Naim, 1991).
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REFERENCES


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