HUMAN BEHAVIOUR RECOGNITION, IDENTIFICATION, AND COMPUTER INTERACTION

Edited by

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Chapter 27

Signature Recognition Using Artificial Neural Network

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27.1 INTRODUCTION

Nowadays, there are many applications required the user to confirm his identity. It might be done by asking a secret question that the user will answer to get into that application, and it might be a password or a pin code, face, eye, fingerprint or signature. Automatic signature verification is an active field of research with many practical applications. Automatic handwritten signature verification is divided into two approaches: off-line and on-line. In the off-line signature verification approach, the data of the signature is obtained from a static image utilizing a scanning device [1]. For our application, off-line approach will be utilized.

Neural Networks (NN) also known as Artificial Neural Networks (ANN) belong to the artificial intelligence approaches, which attempt to mechanize the recognition procedure according to the way a person applies intelligence in visualizing and analyzing[2]. Neural Networks' structure is inspired by biological models of the nervous system proposed as a model of the human brain's activities aiming to mimic certain processing capabilities of the human brain.

Kasabov [3] stated that NN is a computational model defined by four main parameters, which include: first the types of neurons or nodes that can either be fully or partially connected. The second parameter is connectionist architecture, which is classified into autoassociative such as Hopfield network or heteroassociative such as Multilayer Perceptron (MLP), which can be distinguished according to the number of input and output sets of neurons and the layers of neurons used. The third parameter is the learning algorithm that makes possible modification of behavior in response to the environment. Learning algorithm is classified into supervised, unsupervised and reinforcement learning. Learning is considered as the most attractive characteristic of neural networks, which are a collective process of the whole neural network and a result of a training procedure. The role of the learning is to adjust the interconnection weights between nodes of the different layers of the networks [4]. The