# Handwritten Character Recognition

The constant development of computer tools leads to a requirement of easier interfaces between the man and the computer. Handwritten Character Recognition may for instance be applied to Zip-Code recognition, automatic printed form acquisition, or checks reading. The importance of these applications has led to intense research for several years in the field of Off-Line handwritten character recognition.

The main structure of such a recognition system is illustrated at the figure below. The first step is the segmentation one, which consist in analyzing the digitalized image provided by a scanning device, so as to localize the limits of each character, and to isolate them one from each others. Despite the constrains of writing that does often exist on the original printed form, the segmentation process is not so easy in practice. Indeed, these constrains are not always respected, and, moreover, they do not encourage people to use automatic character recognition systems.
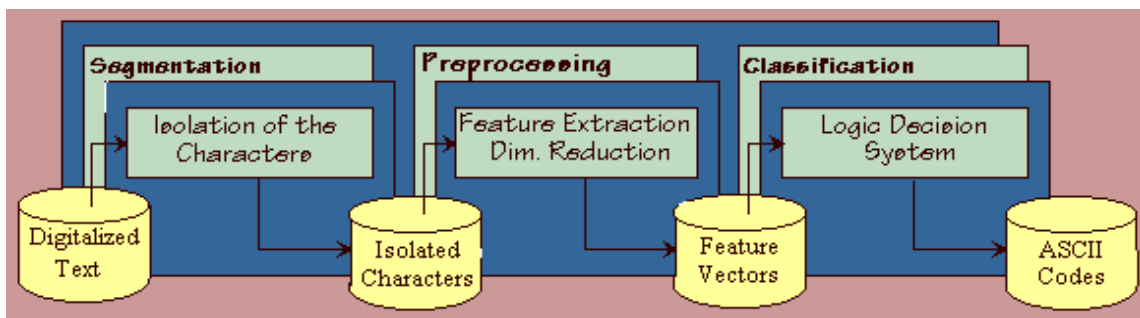
The aim of the second step of the recognition structure is to extract discriminate information from an image of a character, as well as to reduce its dimension of representation. This reduction is required in order to make easier the conception of the classification system, when discriminate feature extraction allows to present competently a character to the classifier. Once discriminate features have been extracted, they are submitted to a logic decision system whose task is to identify the character that they represent and to assign them the corresponding ASCII code. This is the classification step, at last.

For some years, Artificial Neural Networks, and especially Multilayer Perceptions, have shown good capabilities in performing classification tasks. This is due to the non-linearity's that are included in these connectionist systems, and to the discriminate training phase that they are submitted to. However, their performance is strongly affected by the quality of the representation of the characters. This may require a large number of parameters to represent the character, which then results in difficulty in establishing the rules for recognition. In other words the Mops become difficult to train. Moreover, the greater the size of the network, the greater is the computation time. This can greatly restrict their practical use. So, it is necessary to

perform efficient features extraction on the one hand, and to optimize the lay-out of the artificial neural network on the other hand.