HUMAN BEHAVIOUR RECOGNITION, IDENTIFICATION, AND COMPUTER INTERACTION

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Handwritten Arabic Word/Character Recognition: Common approaches

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29.1 INTRODUCTION

Offline handwriting word recognition is the automatic transcription by computer, where only the image of the handwriting is available. The recognition operation includes many steps, the segmentation step and the recognition step of offline handwritten Arabic words are suggested to be implemented using different techniques, since off-line Arabic character recognition operations involves many inter-related steps that can't be separated from each other, as a simple genes of operations, the two steps has to be discussed together. What makes Arabic handwriting words recognition so challenging is that unlike Latin, Arabic is written right to left and is always cursive. Letters are joined together along the writing line to form words or sub-words. The Arabic Alphabet has 28 letters, each with two to four shapes. The shape of a letter is determined by its position within the word: Initial, medial, or final, if we included character recognition as well as the word recognition, there would be another shape for each character, which is the isolated character. The researchers in this field have proposed many techniques to solve the problems; such as cursiveness of the Arabic handwritten words, in this paper a review of the used techniques, followed by a comparison to show the pros and cons of each technique are conducted.

29.2 BACKGROUND

HMM and Neural Network are commonly used approaches in the Arabic Handwritten Word Recognition different stages. In this section, a demonstration of the two approaches is conducted. i) Hidden Markov Models (HMM), Hidden Markov models are based on doubly stochastic processes whose underlying random process is not directly observable (i.e. it is hidden). The transition of the system from the current state to the next state is done based on this underlying process. Observable outputs or observations are produced by another stochastic process, which is determined by symbol probabilities. In word recognition problems, there are two main approaches to model the observation sequence (pseudo