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ICOM'08

Editors

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An Isolated Character Segmentation Approach

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ABSTRACT

Developing an approach for isolated character recognition requires accuracy in the stage of segmentation, while for word recognition, segmentation-free could be more useful, as the error in segmentation misleads the following processes of word recognition. In this paper, a review of the segmentation techniques is conducted. The review is based on the previous work in the field of Handwritten Arabic Word Recognition. Followed by the implementation of the proposed approach of combining the segmentation and segmentation-free techniques to handle Character and Word recognition respectively, the approach is emphasized along with the most recent results obtained.

1. INTRODUCTION

The previous work in the field of Arabic handwritten words recognition suggests that the process must be divided to stages: Preprocessing, segmentation, feature extraction, and finally, classification. Recognition approaches can be either "holistic" or segmentation-based. "Holistic" means that words are processed as a whole without segmenting each word into characters or strokes [1]. In segmentation-based approaches, whole or partial characters are recognized individually after they have been extracted from the text image. Segmentation-free algorithm used in [2] processes the whole line rather than splitting the line into distinct words.

Proposed in this paper is to have the two approaches merged together: to implement a multistage recognizer that is; using holistic and segmentation-based approaches. The holistic technique would be applied on the lines for Word Recognition, and in case the word couldn't be recognized as a whole, there comes the backup stage which is segmentation-based approach, which would segment the words into characters then pass them to a classifier that handles isolated characters. figure 1 demonstrates the algorithm proposed, whereas; word segmentation is the main process and the character segmentation is a backup process, both segmentation steps are part of a whole recognition systems.

What makes segmentation so challenging for handwritten Arabic words and characters is the cursive nature of the Arabic text, as well as the various types of writing styles, such as (Nasakh), (Req'aa). By splitting the segmentation stage -which is a crucial part of the recognition process- into two stages, the whole process of recognition is expected to improve and turn better results, where the words would be guaranteed to be recognized if not as a word, then as separate characters.

The proposed architecture is to recognize the word as a whole and incase the algorithms failed to classify the word, it would be classified as isolated characters. However, the algorithms can't start recognizing words as a whole unless the database in which reference words are saved in order to compare the words to them. The database used is the IFN/ENIT database, which was created by the Institute of Communications Technology (IFN) at Technical University Braunschweig in Germany and the Ecole Nationale d'Inge'nieurs de Tunis (ENIT) in Tunisia, it consists of 26,459 images of the 937 names of cities and towns in Tunisia, written by 411 different writers.