Graduate Mechatronics Engineering Program
School of Engineering

Online Video - Based Arabic Handwriting Recognition System

Thesis for Master of Science in Mechatronics Engineering

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ABSTRACT

In the recent years, handwriting recognition systems started to have a major role in the new technology such as computers, mobile phones and hand-held devices to enhance the interaction between humans and these systems. With this in mind, non–Arabic handwriting recognition systems plot far distances compared to their Arabic counterparts. This is surprising given that the Arabic language is spoken by Arabs in over 20 countries and roughly associated with the geographic region of the Middle East and North Africa. Nevertheless it is also spoken as a second language by the people of several Asian countries in which Islam is the principal religion (e.g. Indonesia). Moreover, languages such as Farsi, Urdu, Malay, and some West African languages have adopted the Arabic alphabet for writing.

Another fact is that most of Arabic contributions focused on off-line systems while a few proposed methods were introduced for on-line handwriting recognition in the last two decades. Therefore, on-line Arabic systems still have reduced accuracy and user-friendliness compared to non– Arabic counterparts. Although non–Arabic systems started to include video processing in the recognition process, Arabic ones have not used them yet.

This thesis proposes a unique method that will extract features from live-video frames, which describe the hand movements during writing a letter. The extractraction of the dynamic features from row images is achived by using Temporal and Spatial analysis and classifying the letters using KNN and HMM classifiers.

The experiment results shows a promising recognition rate of 99.11% using KNN classifier and 96.43% using HMM one.

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