Abstract:
- Methods for off-line Uyghur signature recognition are presented in first time.
- Multi-dimensional modified grid information features are extracted after pre-processing Uyghur signature images, then they are classified using three kinds of classifiers.
- 93.53% average correct recognition rate was achieved from 50 different people with 1000 signatures.

Introduction:
- We proposed an off-line Uyghur signature recognition scheme based on modified grid information features.
- The efficiency of modified grid information features are tested on Latin (English) signature dataset.
- Forgery signatures were used to test the performance of the recognition system.

Methods:

Data acquisition:
- The signatures were collected from 195 Uyghur people.
- Each person asked to sign on white A4 sheet of a paper, with 21 signatures per page.
- The signatures are digitized with .bmp format and 300 dpi resolutions in 256 grey levels.

Pre-processing:
- The pre-processing steps included in the scope as the following figure.
- Pre-processing steps include noise reduction, binarization, and size normalization in this paper.

Feature extraction:
- Each signature image is divided into several rectangular segments in horizontal and vertical direction separately. The modified grid information features are extracted from 4 directions in each segments.
- 64 and 96 features are extracted dividing the signature image into 8 × 8 segments and 12 × 12 segments respectively.
- 80 and 120 features are extracted combing with the nature of Uyghur signature with 8 × 8 and 12 × 12 segments respectively.

Example of pre-processing:

Experimental results:
- Three types of classifiers (ED, K-NN and Bayes).
- 1000 Uyghur signatures from 50 persons.
- 1500 Latin signature from 25 persons.

Table: Average recognition rate

<table>
<thead>
<tr>
<th>Classifier</th>
<th>Average recognition rate</th>
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<tbody>
<tr>
<td>ED classifier</td>
<td>78.82%</td>
</tr>
<tr>
<td>Bayes classifier</td>
<td>88.50%</td>
</tr>
<tr>
<td>K-NN classifier</td>
<td>91.65%</td>
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</tbody>
</table>

References:

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