ICFHR 2014 Competition on Handwritten Digit String Recognition in Challenging Datasets (HDSRC 2014)

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Single Digit Competition

HDRC (ICDAR 2013)
21,780 digits - 97.74 %

MNIST
10,000 digits - 99.77 %

Digit String Competition

CVL Database
6,698 digit strings - 85.30 %

CAR Databases
6,720 digit strings - 75.40 %
Databases

• CVL Database (7690 images)
  • Strings written by students
  • Clean background

• CAR-A Database (5793 images)
  • Strings from Uruguayan bank checks
  • Cropped real world data

• CAR-B Database (5936 images)
  • Strings from Chilean bank checks
  • Cropped real world data
Evaluation Setup

- One training set for all databases
  - Reduce overfitting to modalities of the databases
- Executables were submitted which output 1st - 3rd guess
- Evaluation measures
  - Precision of 1st to 3rd guess
  - Normalized Levenshtein Distance (Edit Distance)
Edit Distance

- Tébessa I
  - Car A: 0.27
  - Car B: 0.31
  - CVL: 0.12

- Tébessa II
  - Car A: 0.25
  - Car B: 0.30
  - CVL: 0.11

- Singapore
  - Car A: 0.17
  - Car B: 0.13
  - CVL: 0.12

- Pernambuco
  - Car A: 0.07
  - Car B: 0.06
  - CVL: 0.12

- Beijing
  - Car A: 0.05
  - Car B: 0.08
  - CVL: 0.03

- Shanghai
  - Car A: 0.22
  - Car B: 0.33
  - CVL: 0.16
Precision CAR B Database

- Tébessa I: 26.6%
- Tébessa II: 27.7%
- Singapore: 59.6%
- Pernambuco: 75.4%
- Beijing: 70.1%
- Shanghai: 28.1%
Precision CVL Database

- Tébessa I: 59.3%
- Tébessa II: 61.2%
- Singapore: 50.4%
- Pernambuco: 58.6%
- Beijing: 85.3%
- Shanghai: 48.9%
Average Precision

<table>
<thead>
<tr>
<th>Location</th>
<th>Average Precision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tébessa I</td>
<td>41.0%</td>
</tr>
<tr>
<td>Tébessa II</td>
<td>42.9%</td>
</tr>
<tr>
<td>Singapore</td>
<td>54.1%</td>
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<tr>
<td>Pernambuco</td>
<td>70.8%</td>
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<tr>
<td>Beijing</td>
<td>78.7%</td>
</tr>
<tr>
<td>Shanghai</td>
<td>42.2%</td>
</tr>
</tbody>
</table>
The Winner is...

Yi-Chao Wu, Fei Yin, Chang Zhong, Cheng-Lin Liu

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Precision CAR A Database

- Tébessa I: 37.1%
- Tébessa II: 39.7%
- Singapore: 52.3%
- Pernambuco: 78.3%
- Beijing: 80.7%
- Shanghai: 49.5%