ONLINE CHINESE CHARACTER RECOGNITION

HMM VS BAYES NET
CHINESE CHARACTER RECOGNITION

- Number of strokes
- Stroke order
- Stroke direction
- Stroke shape
- Stroke length
- Stroke position
PRIOR WORK

- Hidden Markov Model with character strokes as the hidden variables
SIMPLIFICATIONS

• Online, not OCR
• Small subset of dictionary
• User inputs strokes in the correct order
• User lifts pen after every stroke
• Training data is fully labeled
NEW APPROACH

• Improve recognition on poorly recognized strokes
• Test tolerance of model to removing simplification (stroke order correctness)
• Naïve (hybrid) Bayes classifier to recognize the strokes
• Same variables: length, directionality, number of turns
## Initial Results

<table>
<thead>
<tr>
<th>Stroke</th>
<th># Correct</th>
<th>Wrong Length/Other</th>
<th>Percent Correct</th>
<th># Correct</th>
<th>Wrong Length/Other</th>
<th>Percent Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long L-to-R</td>
<td>85</td>
<td>5/10</td>
<td>85%</td>
<td>83</td>
<td>17/0</td>
<td>83%</td>
</tr>
<tr>
<td>Short L-to-R</td>
<td>33</td>
<td>9/8</td>
<td>66%</td>
<td>49</td>
<td>1/0</td>
<td>98%</td>
</tr>
<tr>
<td>Short T-to-B</td>
<td>9</td>
<td>1/5</td>
<td>60%</td>
<td>14</td>
<td>0/1</td>
<td>93%</td>
</tr>
<tr>
<td>Short TL-to-BR</td>
<td>25</td>
<td>0/0</td>
<td>100%</td>
<td>24</td>
<td>0/1</td>
<td>96%</td>
</tr>
<tr>
<td>Long T-to-B</td>
<td>70</td>
<td>0/0</td>
<td>100%</td>
<td>69</td>
<td>0/1</td>
<td>99%</td>
</tr>
</tbody>
</table>
ASPIRATIONS VS REALITY & LIMITATIONS

• What I actually wanted to do is really big!
• Changing simplifications like whether or not the user picks up the pen makes labeling much harder
• Ideal model is probably a hybrid of the two approaches
• With a more complex dictionary, relative stroke positioning/points of intersection become very important, eg:

石 右
QUESTIONS?
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