A Chinese Tone Learning Platform
Based On
Advanced Speech Technologies

Chung-Hsien Yang,
L Labs Inc.
Chin-Chin Tseng
National Taiwan Normal University
Yi-Jing Lin
L Labs Inc.
I have to Confess…

- I am not a linguist.
- I am not a phonetician.
- I am a software engineer.
Agenda

- Intro and demo
- Challenges and response
- Advantages and potential
MyET-MyCT

- A software for learning to speak English and Chinese
  - Learn to speak English and Chinese beautifully
  - Contents from famous content providers
  - Learn in Web 2.0 communities
<table>
<thead>
<tr>
<th>Expression</th>
<th>Syllable</th>
<th>Key</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>你</td>
<td>nǐ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>真</td>
<td>zhēn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>是</td>
<td>shì</td>
<td></td>
<td></td>
</tr>
<tr>
<td>一个</td>
<td>yī ge</td>
<td>#</td>
<td>Your pitch is too high.</td>
</tr>
<tr>
<td>好</td>
<td>hǎo</td>
<td>!</td>
<td>Your pitch is rising too slowly.</td>
</tr>
<tr>
<td>学生</td>
<td>xué shēng</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Visual Feedback

- Blue Lines: Pitch contour
- Red: Major problem
- Yellow: Minor problem
CHALLENGES AND RESPONSE
Technical Challenges

1. Detect pitch contour correctly
2. Give a “correct” tone score to each word
3. Give a “correct” tone score to a sentence
Detect Pitch Contour Correctly

1. Locate individual words

2. Calculate F0 of finals;
   Ignore F0 of initials;
   Find pitch contour

3. “Smooth” the pitch contour
A Hostile Environment

- 1,100,000+ Registered Users
  - Lousy microphones and lousy sound cards
  - Noisy background
  - Sexy voice
  - Unfriendly native speakers
Give Scores to Individual Words

- Find an algorithm to give “good” scores

Find an algorithm to give "good" scores

Level Difference

Slope Difference

Shape Difference

f

86
Find an algorithm to give “good” sentence scores

你 100
真 100
是 100
一 80
個 100
好 0
學 0
生 100

f → 55
ADVANTAGES AND POTENTIAL
## Diagnosis Reports

### Pitch

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard Value</th>
<th>Your Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Tone Error Rate</td>
<td>&lt;10%</td>
<td>8.3%</td>
</tr>
<tr>
<td>Second Tone Error Rate</td>
<td>&lt;10%</td>
<td>29.5%</td>
</tr>
<tr>
<td>Third Tone Error Rate</td>
<td>&lt;10%</td>
<td>7.7%</td>
</tr>
<tr>
<td>Fourth Tone Error Rate</td>
<td>&lt;10%</td>
<td>7%</td>
</tr>
<tr>
<td>Neutral Tone Error Rate</td>
<td>&lt;10%</td>
<td>17.5%</td>
</tr>
<tr>
<td>Pitch Contrast Level</td>
<td>&gt;0.37</td>
<td>0.536</td>
</tr>
</tbody>
</table>

### Suggestions:

- You don't have a good command of the second tone. Incorrect usage of the tones will communicate different meanings. Remember that the second tone is characterized as a rising pitch. It starts medium in tone, then rises to the top.
- You don't have a good command of the neutral tone. Incorrect usage of the tones will communicate different meanings. Remember that the neutral tone is characterized as flat with no emphasis. Syllables with the neutral tone are short and unstressed.
Tone Training Lessons

Passive Practice

Online test for the pronunciation of the four tones in Mandarin Chinese.
## Online Competition

### MyET-MyCT Speaking Contest

<table>
<thead>
<tr>
<th>畢名</th>
<th>選手</th>
<th>感言</th>
<th>成績</th>
<th>試驗時間</th>
<th>隸屬單位</th>
<th>獎金/獎品</th>
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<td>1</td>
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<td>X</td>
<td>93.50</td>
<td>2012-02-04 05:50</td>
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<td>6</td>
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<td>92.95</td>
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<td>Strohspiration</td>
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</tbody>
</table>
Feedback to Teachers

- e.g. The 3rd tone is usually a “half shang”
Test Bed for Theories and Algorithms

- Deploy new algorithms by online updates
- If an algorithm does not work well
  - We get feedback within days, or even within hours

![Graph showing data growth from 2003 Q1 to 2011 Q4]
Future Work

- Better Algorithms for
  - Detecting pitch contours
  - Giving scores to individual words
  - Giving scores to a sentence

- Find relationship between mother-tongue and error-patterns
  - to design a Chinese course targeting a specific country
Summary

- A Tone Learning Platform Based On Advanced Speech Technologies
  - It is feasible
  - Great help to students and teachers
  - Great potential as a test bed for theories and algorithms

- Free download at:
  - http://www.myet.com