Building the future of autonomous language learning
LanguageNation project update
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LanguageNation Development Partnership

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**IBM**
Thanks to Salim Roukos, Jiri Navratil, and Todd Ward at IBM for their assistance in obtaining the data from the pilot participants described in this presentation.
LanguageNation Vision

• Anywhere, anytime, any device for professionals
• Target users – USG learners
• Not “canned” lessons, but truly adaptive learning
  o Aptitude Profile
  o Proficiency
  o Performance
  o Topic of interest
  o Mission needs
• Autonomous learning
  (with a human-in-the-loop coach)
INTERNET

HLT Tools

Human curators

Internal database (corpora)

HLT - Automated Materials Generation

Activity Generator

SLA Principles

HLT Tools

Pretesting

Learning Planner

Learner model

SLA Principles

Performance Tracking

Front-end (visible to user)

Learning Activities

SLA – Guided Learner Management System
Minhas obras s** v******* e***********. Mas assim é o mundo das artes um mundo de altos e baixos. De repente você tem muito êxito vende várias peças mas também pode passar vários meses ou anos sem ganhar nada.
Prototype Pilot Study
Proof-of-concept: activity generation for autonomous learning

Context of the Pilot Study

✓ Two waves of pilot participants from IBM workforce used LanguageNation prototype between April 2014 – February 2015.
✓ Participants (n=54) were advanced to native Spanish or English speakers with little Portuguese knowledge reported.
✓ Three CASL researchers with advanced Spanish knowledge also piloted the system.
✓ We analyzed data from those that spent the most time in the system (>7 hours).
User time in prototype system
Most prototype activities targeted vocabulary
Prototype vocabulary activity

- Learners are quizzed on the target words
- Options are given if the learner needs a hint
- Grammatical information is provided with the right answer

This is Marivi.

(Hint)

é a Marivi.
Prototype automatically targeted high frequency vocab
Log Diving
The benefit of online learning: Data capture

<table>
<thead>
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<th>NSECS</th>
<th>CTIME</th>
<th>UNAME</th>
<th>PNAME</th>
<th>ATYPE</th>
<th>AVAL</th>
<th>IVAL</th>
<th>FVAL</th>
<th>SVAL</th>
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<th>PARAM</th>
<th>PARAM_USER_PARAMS</th>
<th>PARAM_USERNAME</th>
<th>PARAM_USER_NAME</th>
<th>PARAM_USER_ID</th>
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Log files can be mined to answer research questions
## Analysis example: Does feedback help?

<table>
<thead>
<tr>
<th>Feedback Given</th>
<th>Failure</th>
<th>Success</th>
<th>Too many attempts</th>
<th>Subsequent success rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is no such word</td>
<td>5</td>
<td>14</td>
<td>0</td>
<td>0.737</td>
</tr>
<tr>
<td>Try a different word</td>
<td>16</td>
<td>23</td>
<td>1</td>
<td>0.575</td>
</tr>
<tr>
<td>Try a word with a different form()</td>
<td>6</td>
<td>15</td>
<td>1</td>
<td>0.682</td>
</tr>
<tr>
<td>Try a word with a different form(gender)</td>
<td>2</td>
<td>8</td>
<td>0</td>
<td>0.8</td>
</tr>
<tr>
<td>Try a word with a different form(person)</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>1.0</td>
</tr>
<tr>
<td>Try a word with a different form(singular/plural)</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1.0</td>
</tr>
<tr>
<td>Try a word with a different form.</td>
<td>4</td>
<td>10</td>
<td>1</td>
<td>0.667</td>
</tr>
<tr>
<td>Was it a typo?</td>
<td>11</td>
<td>22</td>
<td>1</td>
<td>0.629</td>
</tr>
</tbody>
</table>
Work underway
Portuguese Learning Plan (partial)

- Intro T:1
- Pronunciation 1 T:1
- Pronunciation vocab L:42
- Colors T:1
- Articles T:1
- Pronunciation 2 T:1
- Seasons T:1
- Season quiz T:1
- Article quiz L:59
- Family T:1
- Body parts T:1
- Ser T:1
- Prepositions T:1
- Singular plural T:1

Courtesy of IBM
<table>
<thead>
<tr>
<th>ILR Level</th>
<th>ILR Function</th>
<th>Form (Somali)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0+</td>
<td>Recognize and identify letters</td>
<td>Sounds and Orthography</td>
</tr>
<tr>
<td>0+</td>
<td>Understand common personal and place names</td>
<td>Common names, cities, regions, countries</td>
</tr>
<tr>
<td>0+</td>
<td>Understand common words and phrases</td>
<td>Common Greetings and Benedictions</td>
</tr>
<tr>
<td>0+</td>
<td>Understand common words and phrases</td>
<td>Numbers 1-20, dates, months</td>
</tr>
<tr>
<td>0+</td>
<td>Understand common words and phrases</td>
<td>Numbers 20-100</td>
</tr>
<tr>
<td>1</td>
<td>Recognize shared vocabulary</td>
<td>Arabic and English borrowings</td>
</tr>
<tr>
<td>1</td>
<td>Telling time</td>
<td>Telling time</td>
</tr>
<tr>
<td>1</td>
<td>Understand descriptions</td>
<td>Attributive adjectives</td>
</tr>
<tr>
<td>1</td>
<td>Understand descriptions</td>
<td>Nouns pluralized by –o</td>
</tr>
<tr>
<td>1</td>
<td>Understand descriptions</td>
<td>Agreement with definite determiners and demonstratives</td>
</tr>
<tr>
<td>1</td>
<td>Understand simple directions</td>
<td>Cardinal directions and locatives</td>
</tr>
<tr>
<td>1</td>
<td>Understand simple directions</td>
<td>Temporal and locative adverbs</td>
</tr>
<tr>
<td>1</td>
<td>Understand simple directions</td>
<td>Basic adpositions (ku, la, ka, u)</td>
</tr>
<tr>
<td>1</td>
<td>Understand simple directions and statements</td>
<td>Imperative of weak verbs</td>
</tr>
<tr>
<td>1</td>
<td>Understand simple statements</td>
<td>Declarative/equative sentences using waa</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

‘Any language’
Future
‘Any device’

• Proof-of-concept to port platform to mobile device
Directions for future improvements

- Enhance language contextualization
- Advancing intelligent feedback on error in open-ended tasks
- Develop activities appropriate for learners at higher levels of proficiency
- Incorporate more SLA principles in the adaptive learning system:
  - Authentic and rich input (e.g., Lafford et al., 2007)
  - Opportunities to produce the language (e.g., Swain, 1985)
  - Negotiation for meaning in real-time interaction (e.g., Long, 1991)
  - Feedback on error (e.g., Doughty & Long, 2003)
For more information

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