Pronunciation
Lexicon Background

Paolo Baggia
Loquendo

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Outline

• Brief Introduction on Pronunciation Lexicon Specification

• Common Use Cases
  – Homographs solution

• Other relevant issues for the workshop
Why Pronunciation Lexicon Specification?

• Address most common cases of pronunciation customization

• Enrich TTS and ASR with customized pronunciations

• Complete the “Speech Interface Framework”

➤Read the specification at: http://www.w3.org/TR/pronunciation-lexicon/
What PLS 1.0 is Not!

- Multilingual pronunciation lexicon
  ➔ the current specification is mono-lingual!

- Advanced features
  ➔ no syntax, no semantics, no morphology, no compound words

- TTS-internal lexicon
  ➔ too complex and rich of custom knowledge

PLS 1.0 is restricted to the most important and tractable issues.
The PLS 1.0 Language

• PLS is an XML language
  ```xml
  <?xml version="1.0" encoding="UTF-8"?>
  ```

• The root element is `<lexicon>`, with attributes `version`, `xmlns`, `alphabet`, `xml:lang`

• It contains a collection `<lexeme>`s, which are composed of:
  – `<meta>` and `<metadata>` for metadata
  – `<grapheme>`s for orthographies/spellings
  – `<phoneme>`s for pronunciations
  – `<alias>`s for textual substitutions
  – `<example>`s for examples

  ➔ *The order of `<lexeme>`s is relevant to determine the preferred pronunciation for TTS*
PLS Common Use Cases

• **Multiple pronunciations**
  – For ASR: to accommodate speaker/regional variability, not native speakers
  – For TTS: a single preferred pronunciation will be selected

• **Multiple orthographies (with same pronunciations)**
  – Useful for both ASR & TTS

• **Homophones (same pronunciations, different meanings)**
  – Different `<lexeme>`s with same or overlapping `<phoneme>`s

• **Homographs (same spellings, different pronunciations)**
  – This is hard! How to differentiate `<lexeme>`s with same `<grapheme>`s
Homographs Proposed Solution

• New “role” attribute on `<lexeme>` elements
  `<lexeme role="value"/>`

• Values are QNames (qualified names, with a namespace)
  e.g. “myvocabulary:verb”, “wordnet:verb”, “claws:VV1”

• Open to future standardization
  ➔ both proprietary values and if future standard ones

• More than one QName for a single `<lexeme>` entry
  e.g. role=”w:verb w:past-tense”
Example of Homographs in PLS

```
<?xml version="1.0" encoding="UTF-8"?>
<lexicon version="1.0"
  xmlns=http://www.w3.org/2005/pronunciation-lexicon
  xmlns:claws="http://www.example.com/claws7tags"
  alphabet="ipa" xml:lang="en-GB">
  <lexeme role="claws:VVI claws:VV0 claws:NN1">
    <!-- verb infinitive, verb present tense, singular noun -->
    <grapheme>read</grapheme>
    <phoneme>rɪ:d</phoneme>
  </lexeme>
  <lexeme role="claws:VVN claws:VVD">
    <!-- verb past participle, verb past tense -->
    <grapheme>read</grapheme>
    <phoneme>red</phoneme>
  </lexeme>
</lexicon>
```

“Can you read this book to me?”
“I already read it three times!”
SSML 1.1 Includes the role Attribute

<?xml version="1.0" encoding="UTF-8"?>
<speak version="1.1"
xmlns="http://www.w3.org/2001/10/synthesis"
xmlns:claws="http://www.example.com/claws7tags"
xm:lang="en-US">
   <lexicon uri="http://www.example.com/example.pls">
      <voice gender="female" age="3">
         Can you <w role="claws:VVI">read</w> this book to me?
      </voice>
      <voice gender="male" age="44">
         I’ve already <w role="claws:VVN">read</w> it three times!
      </voice>
   </speak>

... SRGS should be extended too!
Another Example from SSML 1.1

- See second example of SSML 1.1 Section 3.1.8

http://www.w3.org/TR/2007/WD-speech-synthesis11-20070110/#S3.1.8
Other Issues for the Workshop

• Lexicon selection criteria in SSML 1.1

• Allow other phonetic alphabets?
  ➔ Current PLS 1.0:
    ➔ mandates the use of IPA (International Pronunciation Alphabet)
      alphabet="ipa"
    ➔ allow proprietary phonetic alphabets)
      alphabet="x-organization-alphabet"
  ➔ SSML 1.1 is proposing a IANA registry for alternate pronunciation alphabets

• Other issues?