A CAPT tool for training and research on lexical stress errors in German

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Overview

This poster presents the prototype Computer-Assisted Pronunciation Training (CAPT) tool de-stress: the German (de) System for Training and Research on Errors in Second-language Stress [1].

de-stress targets lexical stress errors by non-native (L2) German speakers with French as their native language (L1). Its modular design incorporates various methods for diagnosing and presenting feedback on these errors. Both instructional and research applications have motivated its development:

- Learners can interact with the system independently (i.e. without assistance from human instructor)
- Teachers can create bespoke exercises for students
- Researchers can study effects of various diagnois/feedback types
- Tool could become useful component of intelligent CAPT system (see fig. 1)

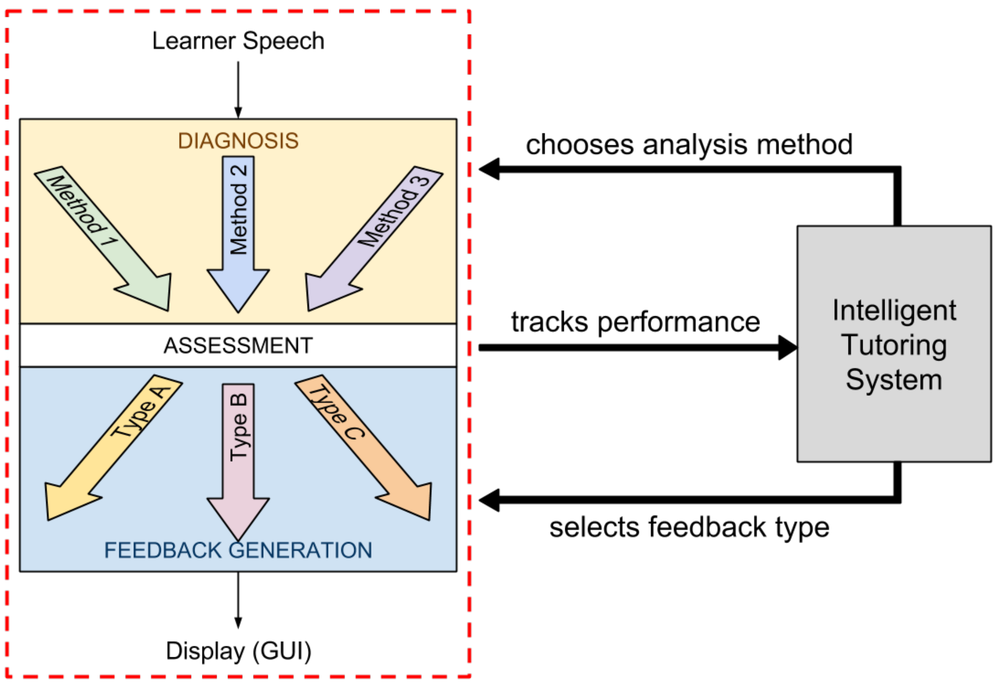

Figure 1: Conceptual diagram of de-stress (demarcated by dashed line) and its possible function in the context of an Intelligent Tutoring System (ITS).

Error diagnosis

A simple web interface presents a learner with a German sentence to read aloud, with one word highlighted as the target for that exercise. The learner submits an utterance of the sentence for assessment. The learner's realization of the target word's lexical stress pattern is diagnosed via one of the following options:

- Classification using machine learning [3]. Possible feature sets:
  - Syllable-level prosodic features (extracted with JSnoori [2]):
    - Duration
    - Fundamental frequency (F0)
    - Intensity
  - Word uttered
  - Speaker age/gender/proficiency
- Comparison to reference (native-speaker) utterance(s). Options:
  - One-to-one learner-to-reference comparison using JSnoori [2]
  - One-to-many comparison (averaging one-to-one results)
  - Manual reference selection by either instructor or student
  - Automatic reference selection based on F0 mean and range

Feedback delivery

Based on the error diagnosis, one or more of the following types of feedback are presented to the learner via the web interface (see fig. 2).

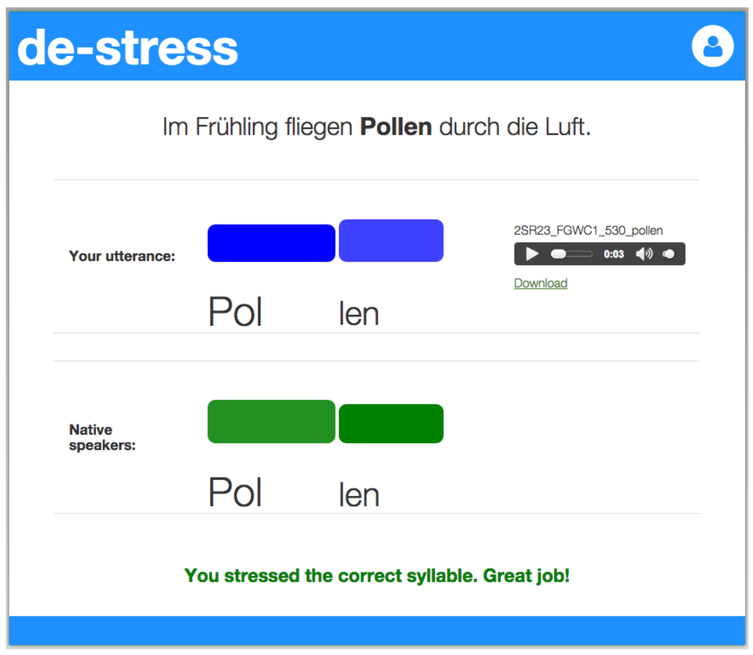

Figure 2: **[TODO caption]**

- Explicit feedback:
  - Verbal error/success messages (see fig. 2)
  - Graphical "skill bars"
- Implicit feedback:
  - Visual:
    - Graphical visualizations of prosody (see fig. 2)
    - Text stylization (see fig. 2)
  - Auditory:
    - Original learner and reference utterances
    - Prosodically modified learner utterance (using JSnoori [2])
- Self-assessment - learner must complete questionnaire before receiving other feedback

Administrative interface for teachers/researchers

A simple graphical administrative interface allows a language teacher or CAPT researcher to create new exercises for students to complete, where each exercise features a specific combination of the various diagnostic methods and feedback types available in the system.

By allowing straightforward (graphical) yet fine-grained control over these features, de-stress:

- enables researchers to create different CAPT exercises for comparative in vivo studies
- allows teachers to create exercises matching the individual needs of their students (e.g. proficiency, learning style)

References

[1] A. S. Vakil, "de-stress," `http://github.com/vakila/de-stress`.

[2] LORIA Speech Team, "JSnoori," `http://jsnoori.loria.fr`.

[3] A. S. Vakil and J. Trouvain, "Automatic classification of lexical stress errors for German CAPT," in *SLaTE*, 2015.