D03: Credibility Through Non-native Language Varieties in Conversational Pedagogical Agents

Spotlight Progress Update

Sven Albrecht

TU Chemnitz

02.02.2021

Table of Contents

Goal

RQ1 Which specific non-native linguistic cues of CPAs influence the learning performance of non-native human learners?

RQ2 Which specific non-native linguistic cues influence attributed credibility and acceptance of CPAs by non-native human learners?

RQ3 How much does a linguistically credible CPA influence the learning performance in non-native educational contexts?

Pilot Study

Sociolinguistic interview with
Chinese PhD student at TUC

- ▶ reading passages
- ▶ wordlist
- ▶ interview questions based on
  Tagliamonte (2006, Appendix B)
  supplemented with target group
  specific questions

Transcription of data

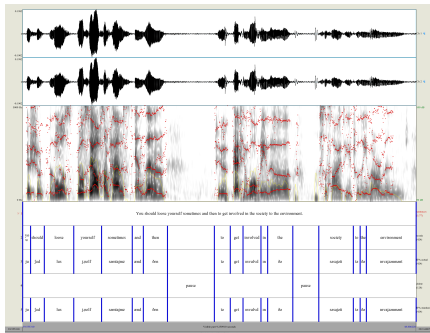- ▶ orthographic (sentences,
  words)
- ▶ IPA (phonemes)

Figure 1: Transcription Screenshot

TTS System

Goal

A TTS synthesis system that can synthesize English text in different Chinese accents.

In the synthesized speech we want to control the following features:
- ► morphosyntactic cues e.g. syntax, grammar
- ► phonetic cues e.g. pronunciation of phonemes
- ► prosodic cues e.g. stress, intonation

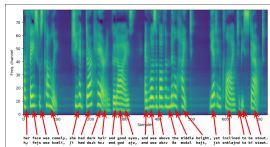Our TTS system is based on two different models and uses transfer learning.

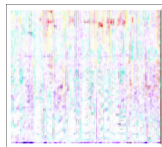

Figure 2: Example output mel-spectrogram

Figure 3: Difference original and synthesized audio

TTS System

Currently we are able to control:

- ► morphosyntactic cues with a rule based approach
- ► phonetic cues with a phone-based TTS (based on Tacotron2 by Shen et al., 2018)

We developed some helpful tools for speech synthesis:

- ► for recordings: e.g. resampling, automatic detection of silence
- ► for text: e.g. G2P conversion, symbol mapping

Audio Examples

```
https://stefantaubert.github.io/tacotron2/
```

Preparation of Data Collection

Challenge

Copus linguistic literatur (e.g. Love, Dembry, Hardie, Brezina, & McEnery, 2017) and computer science literature (e.g. Bozkurt, Ozturk, & Dutoit, 2003) propose different corpus creation criteria.

Sociolinguistic methodology has to be adapted to TTS application:

▶ previous TTS systems trained on reading passages
▶ selection of reading passages
  ▶ random selection of sentences
  ▶ selection according to phoneme coverage
  ▶ phonemes vs. diphones vs. triphones?
▶ supplementary wordlist (i.e. missing phonemes/diphones)
▶ interview questions
  ▶ many questions from Tagliamonte (2006) not relevant
  ▶ add questions about high school and university life

Preparation of Publications

Mostly theorethical work and literature review:

► Linguistic Credibility as a Key Issue in the Communication of Humans and Humanoids in a Hybrid Society

► Chinese English Literature Review

► Methodological Considerations - Comparison of online/distance vs. fieldworks/interviews

Next Steps

► baseline psychological experiments
► running TTS system with very limited input data
► developing a linguistic TTS quality metric
► data collection
► testing the significance of intercultural factors influencing credibility and learning
► exploring methods of measuring credibility and learning performance

References I

Bozkurt, B., Ozturk, O., & Dutoit, T. (2003). Text design for TTS speech corpus building using a modified greedy selection. In *Eighth european conference on speech communication and technology*.

Love, R., Dembry, C., Hardie, A., Brezina, V., & McEnery, T. (2017). The Spoken BNC2014: Designing and building a spoken corpus of everyday conversations. *International Journal of Corpus Linguistics*, *22*(3), 319–344.

Shen, J., Pang, R., Weiss, R. J., Schuster, M., Jaitly, N., Yang, Z., … others (2018). Natural tts synthesis by conditioning wavenet on mel spectrogram predictions. In *2018 IEEE international conference on acoustics, speech and signal processing (ICASSP)* (pp. 4779–4783).

Tagliamonte, S. A. (2006). *Analysing sociolinguistic variation*. Cambridge University Press.

D03: Credibility Through Non-native Language Varieties in Conversational Pedagogical Agents

Spotlight Progress Update

Sven Albrecht

TU Chemnitz

02.02.2021