Special Speech Synthesis for Social Network Websites

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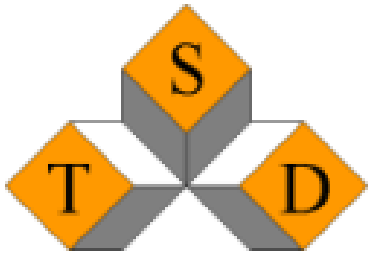

TSD Conference, Brno

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- Diacritics restoration
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Needs / goal of chat / microblog TTS reading

- Microblog websites (e.g. Twitter)
- Chat applications (e.g. MSN, Gtalk)
- Messages not too often
- Mobile environment




Chat / microblog-reading, plan

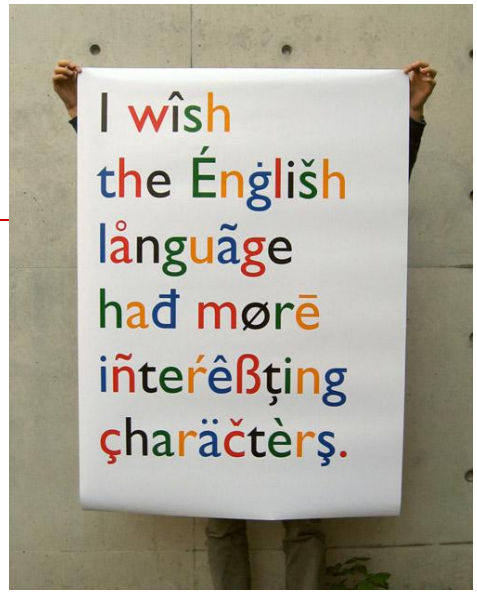




Problems of chat / microblog TTS reading

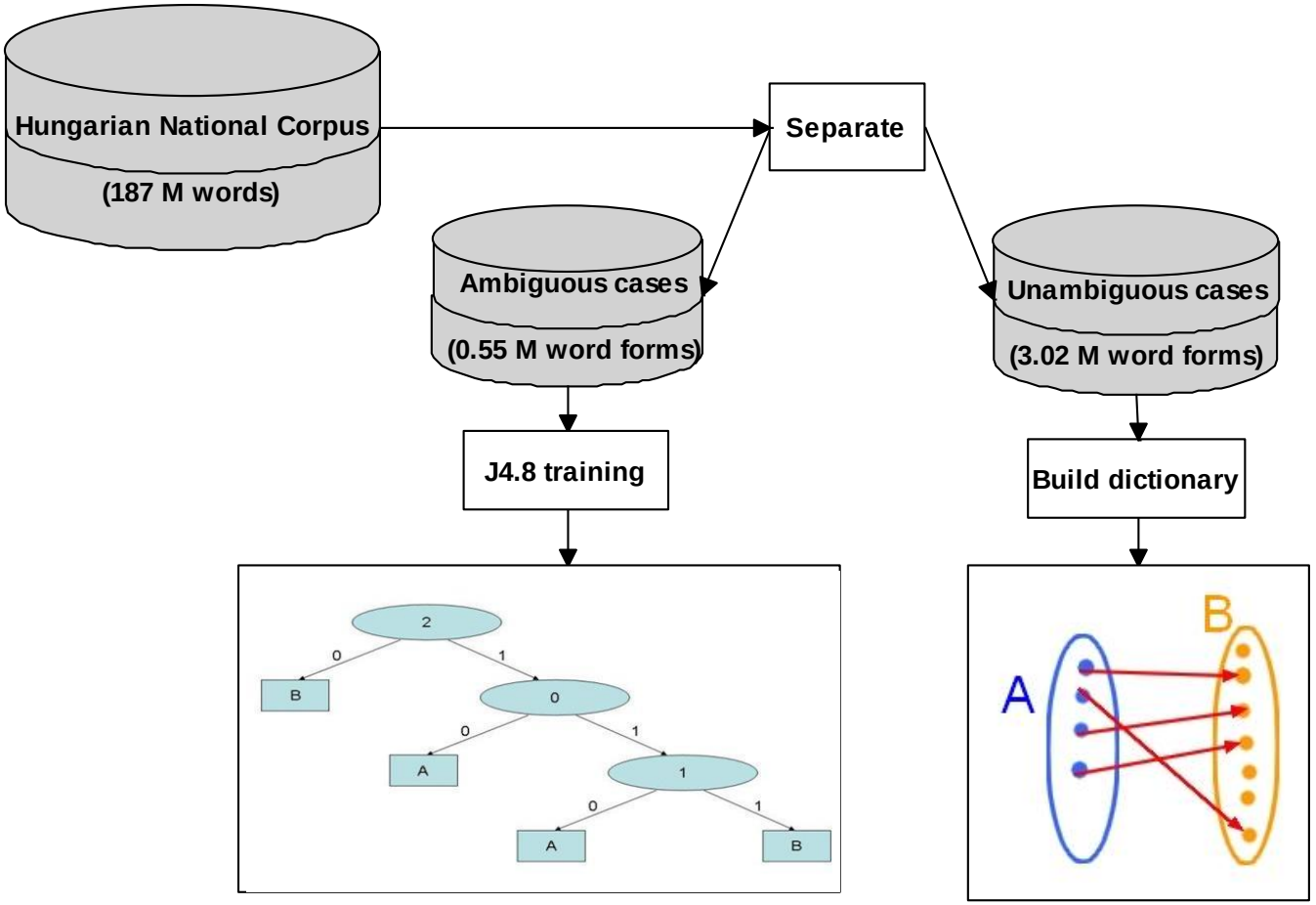
- Letters without diacritics
  - SMS, character encoding
  - Hard / slow to write diacritics (e.g. iPhone, iPad)
  - Diacritics restoration
- Emoticons
  - Spontaneous style
  - Emotional speech

Diacritics restoration /1 Intro



- Problem in most European languages
- Hungarian:
  - a-á, e-é, i-í, o-ó-ö-ő, u-ú-ü-ű
- Solutions for other languages
  - Dictionary-based (word probability)
  - HMM-based
  - Word level vs. Letter level

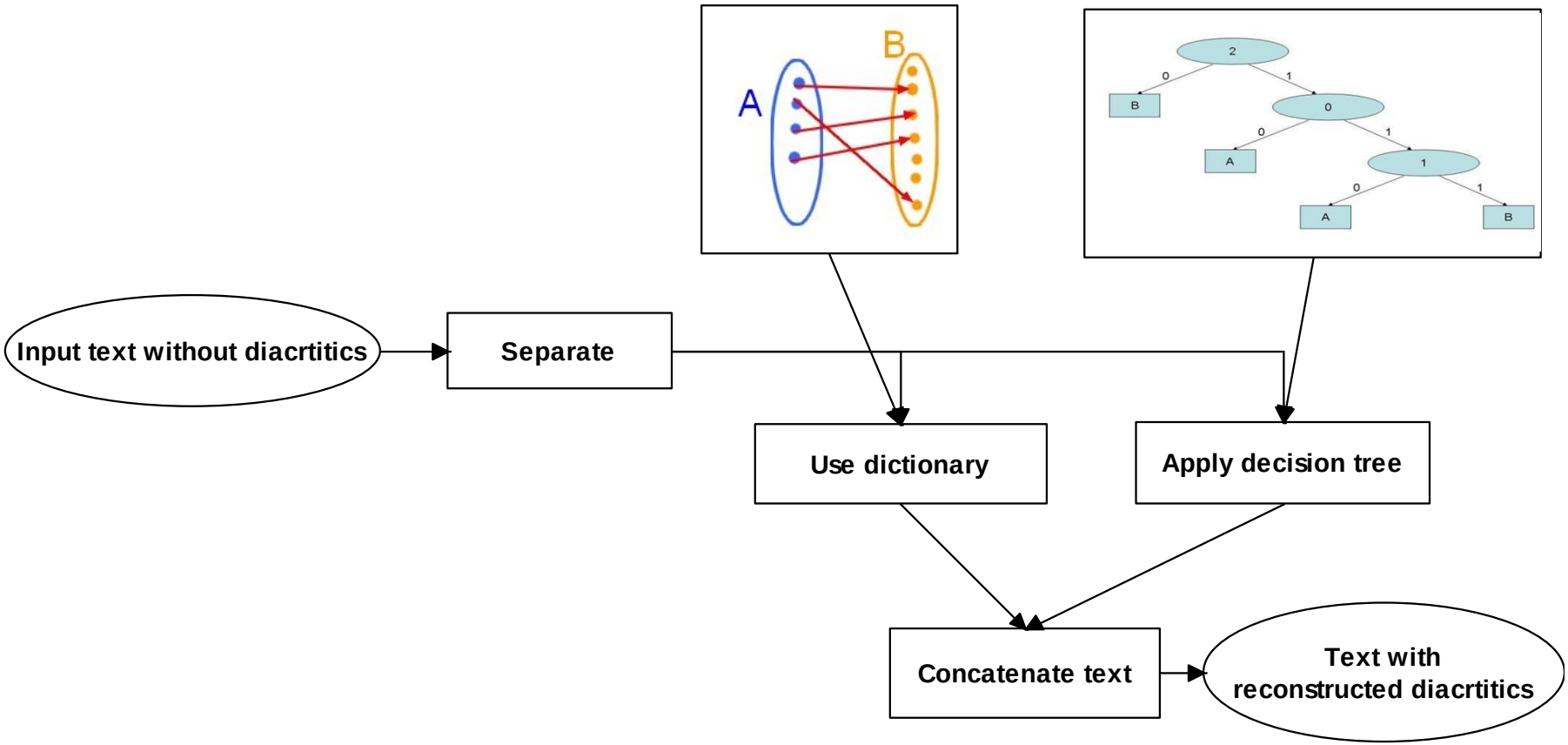
Diacritics restoration /2 Training



Diacritics restoration /3 Training

- HNC: 187 million words
  - 3.02 million unambiguous word forms (84.5%), e.g. „az” (the) ✓ „áz” ✗
    - dictionary
  - 0.55 million ambiguous word forms (15.5%), e.g. „meg” (plus) „még” (still)
    - J4.8 decision tree
    - 100 most frequent words separately
    - 20 letters context

Diacritics restoration /4
Use

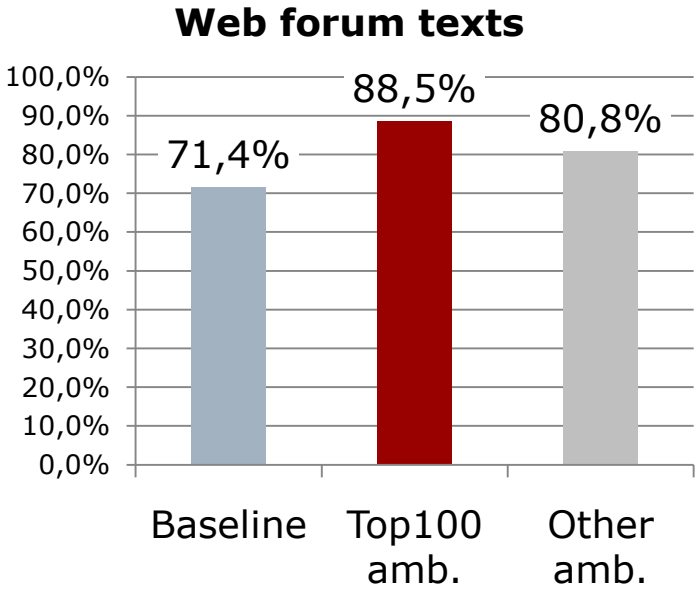


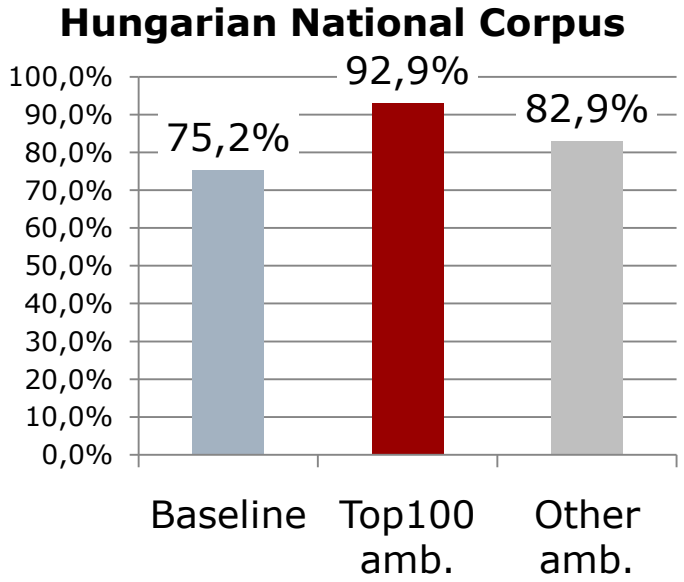
Diacritics restoration /5 Accuracy

- All cases (ambiguous + unambiguous)
- Word accuracies
  - 97.7% for „DIA” (Literature texts)
  - 97.2% for „Personal” (Web forum texts)
  - 98.2% for the whole HNC

Diacritics restoration /6 Accuracy

- Only ambiguous cases
- Word accuracies





Spontaneous speech

Differences compared to read speech

- Intonation contour and its variability
- Breaks, pauses (silent, filled: breathing)
- Less strict relation of prosody and syntax
- Disfluencies
- Lack of exact structure
- Redundancy, repetition of words
- Acoustic vowel reduction
- Final lengthening

Spontaneous-like synthesized speech /1 Method

- Corpus based TTS, read corpora
- Find conversational aspects

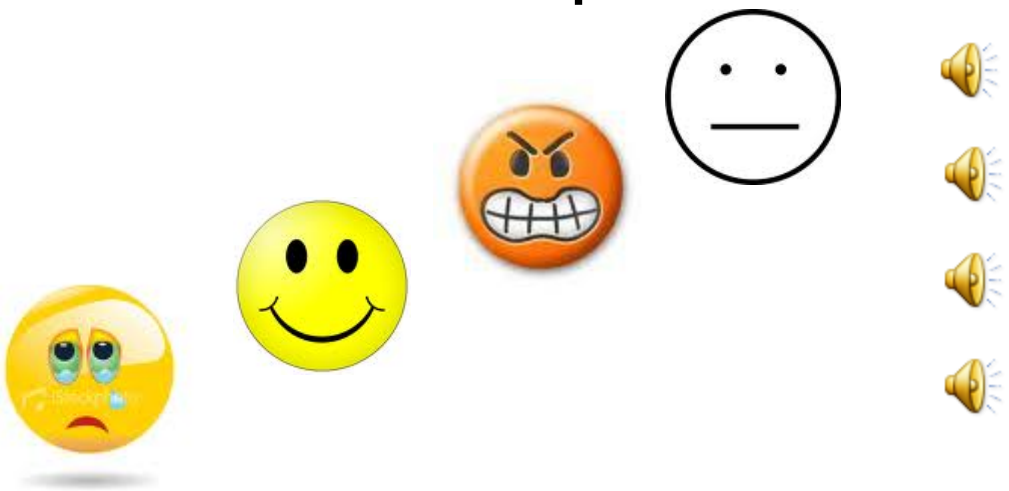
- Insertion of fillers (humming, hesitation, laugther)
  - After conjunctive words
- Insertion of breath
  - At phrase boundaries
  - In-phrase breath
- Pause timing
  - Variable pause lengths
  - More frequent pauses than in read speech

Spontaneous-like synthesized speech /2 Results, experiences

- Output of corpus-based TTS
  - Insert hesitation ✓
    - Disturbs understanding
    - Increased cognitive load
  - Insert breaths ✓
    - Normal human function
    - Weak vs. Loud
  - Insert laughter ✗
  - Pause timing ✓
    - Acceptable if more frequent than in read speech

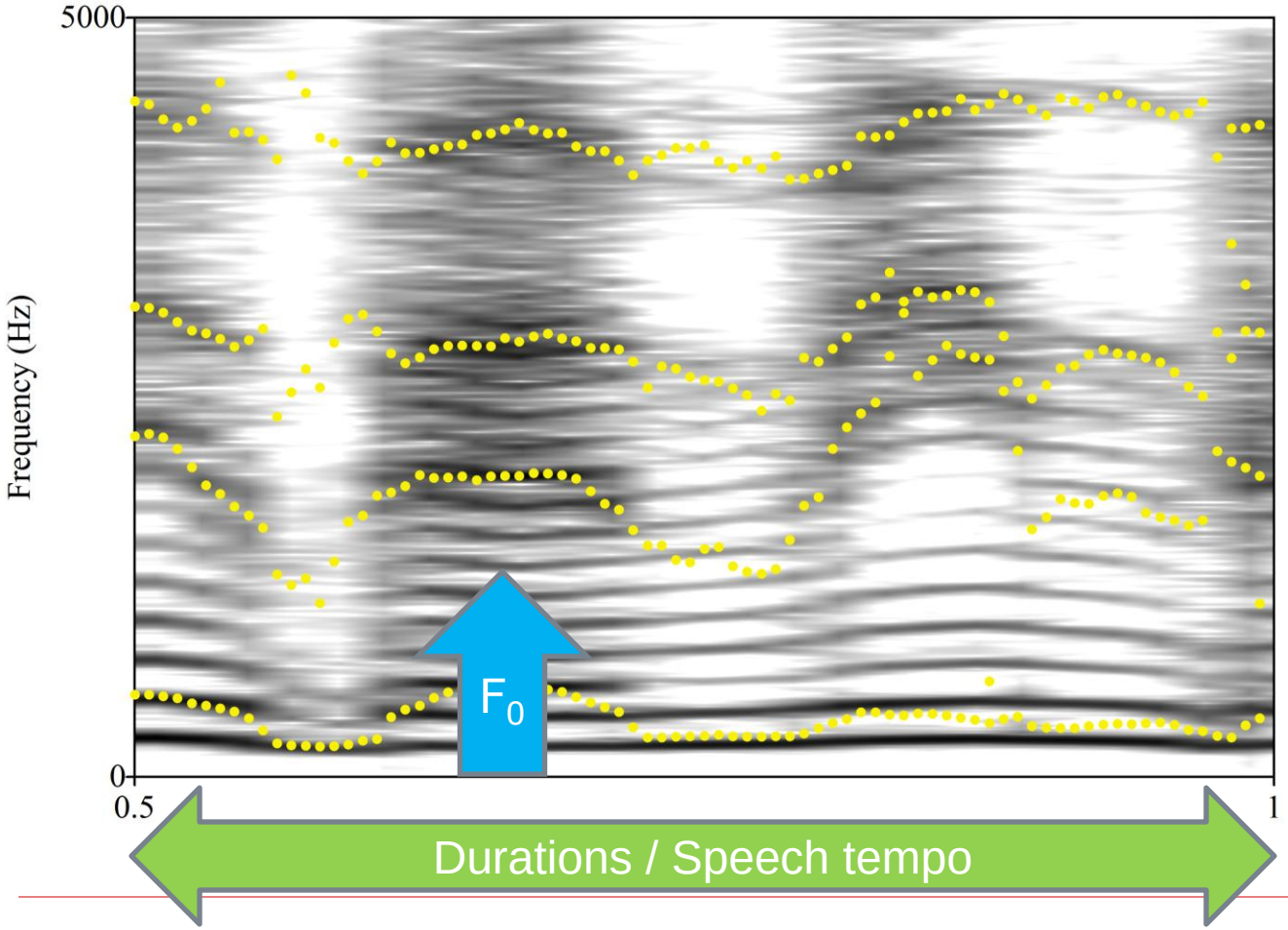
Emotional Synthesized Speech /1 Intro

- „emoticons” ⇨ emotions in speech
  - Neutral
  - Angry :@
  - Happy :)
  - Sad :(



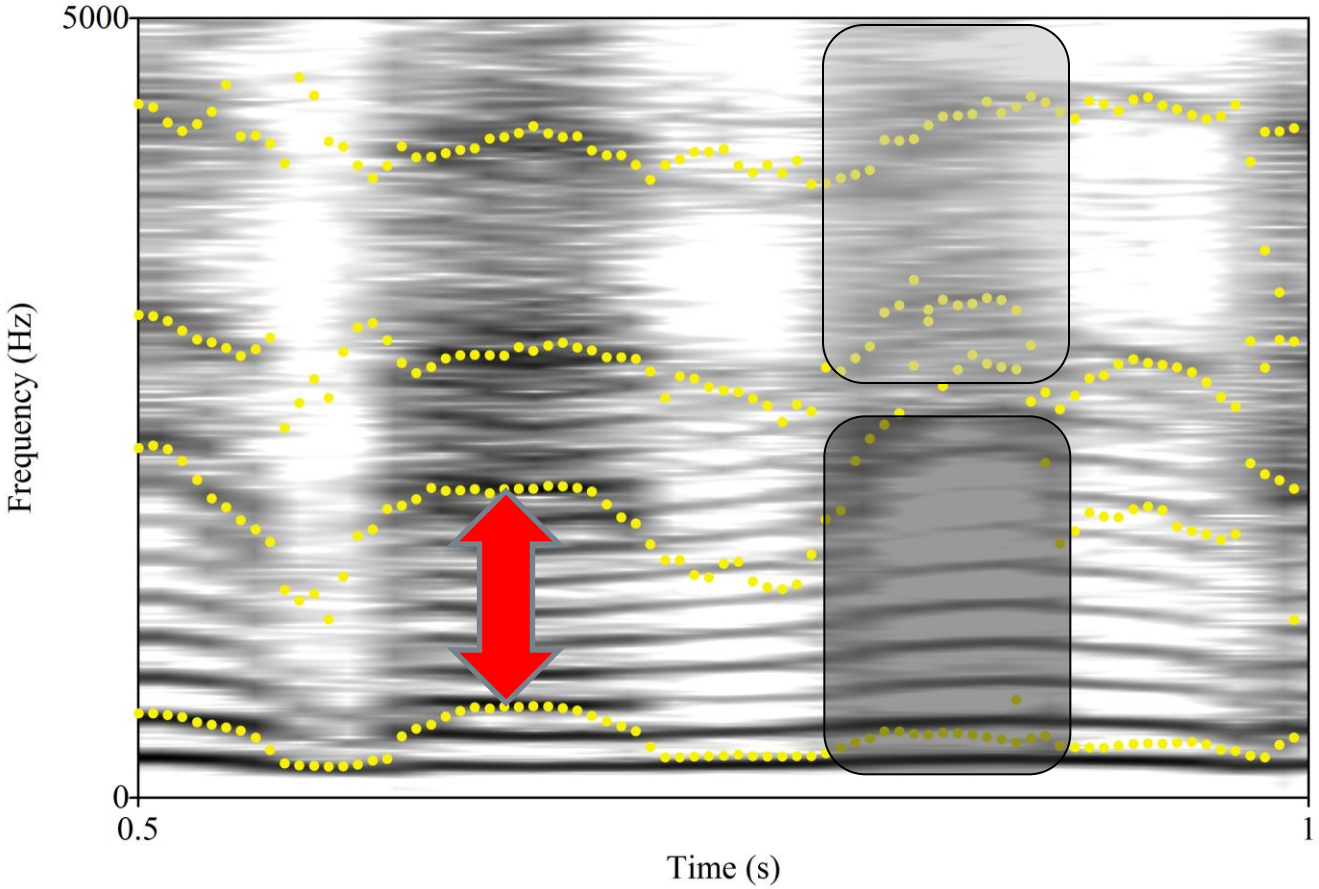
  - „A menüben minden szükséges információ elhangzik.”
  - (All necessary information is mentioned in the menu.)
- Forum texts: 90 thousand emoticons in 1.5 million sentences

Emotional Synthesized Speech /2 Algorithm



based on Přibilová & Přibil (2009)

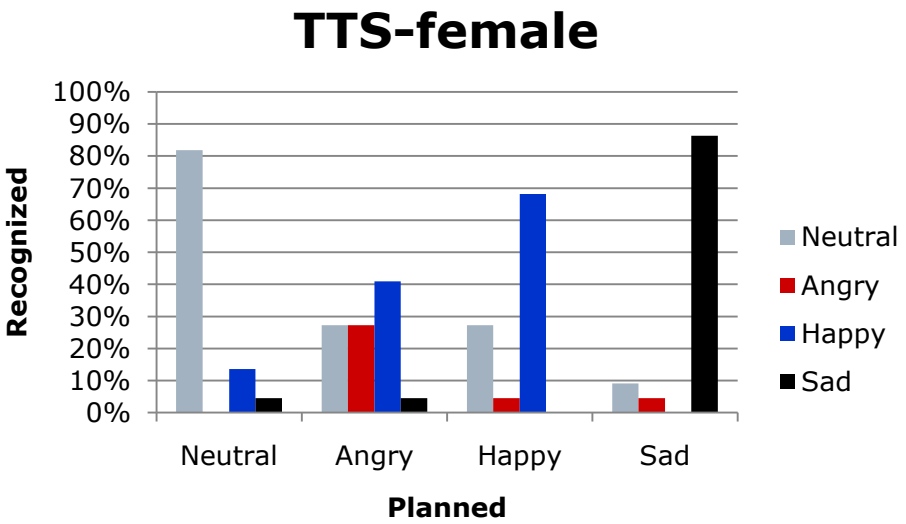
Emotional Synthesized Speech /3 Algorithm



based on Přibilová & Přibil (2009)

Emotional Synthesized Speech /4 Experiment+Results

- 3 sentences; Angry Sad Happy
  - „A menüben minden szükséges információ elhangzik.”
  - (All necessary information is mentioned in the menu.)
- 3 voices
  - Natural speech
    - professional female
  - TTS speech
    - female, male



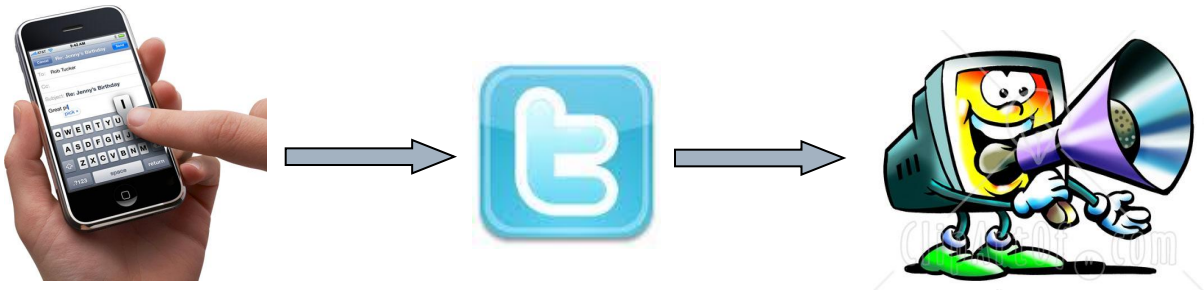
Emotional Synthesized Speech /5 Conclusions

- Female ✓ (natural / TTS)
- (this) Male TTS ✗

- Neutral, happy, sad ✓
- Angry ✗
  - confused with happy
  - (human emotion recognition: average 60-75%, Tóth et al. 2007; Scherer 2003)

Chat / microblog-reading, summary

- Diacritic restoration
- Spontaneous-like speech
- Emotional synthesized speech
- Other subproblems
  - language identification
  - spelling correction



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