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Samples

The Role of Creaky Voice in Turn Taking and the Perception of Speaker Stance: Experiments Using Controllable TTS

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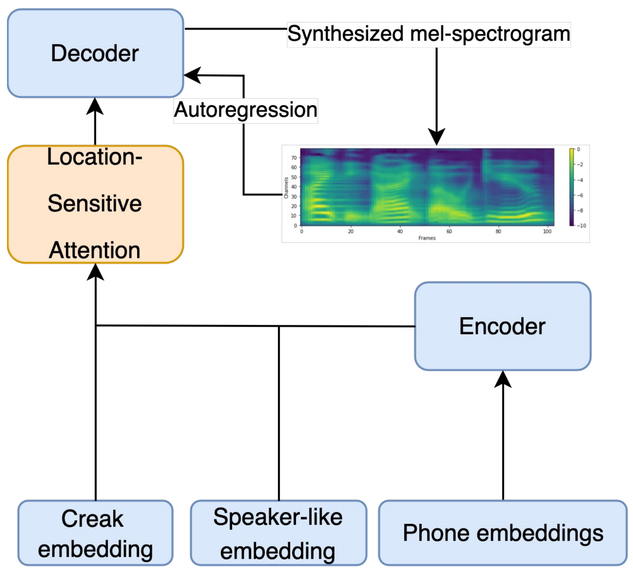
1. **Synthesized creaky voice** for a speech perception study examining **certainty, valence, sarcasm**, and **turn finality**
2. Automatic annotation of a spontaneous speech dataset for creaky voice using CreaPy [1] and DeepFry [2]
3. Added creak conditioning to Tacotron 2 [3] to control presence and duration of creak at synthesis
4. Analysed the presence of creaky voice in the stimuli

Architecture



Properties of creaky voice

- Low F_0 (irregular)
- Articulation
  - Constricted glottis
  - Low glottal airflow
- Positional and non-positional creak

Perception of creaky voice

- Used as a hedge (uncertainty) [4]
- Negative [5]
- Sarcastic [6]
- Turn-yielding [7]

Data and annotation

- AptSpeech [4]
  - 5h40m spontaneous speech
  - 2h26m of read speech (Arctic corpus)
- DeepFry & CreaPy
- creak percentage = $\frac{creak\ duration}{total\ word\ duration}$

Creak annotation	Chosen value
DeepFry>0 & CreaPy>0	Highest value
DeepFry>0 or CreaPy>0	Highest if value>0.1 else 0
DeepFry=0 & CreaPy=0	0

Stimuli creation

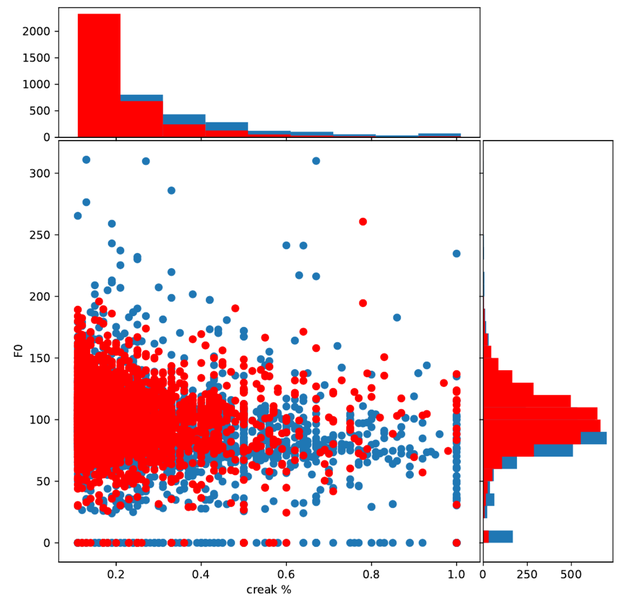
Non-positional

(1) A trip to the desert
(2) 200 ms silence
(3) *isn't endless sand and scorching sun a cool experience?*

Positional

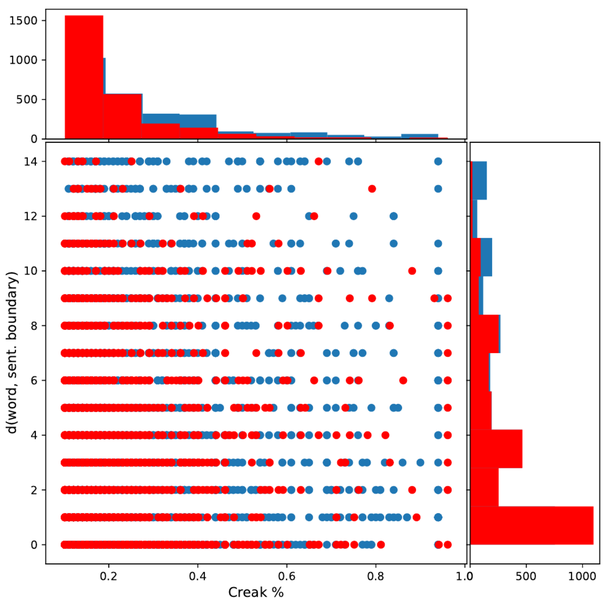
(1) A trip to the desert
(2) 200 ms silence
(3) it's a way to experience *nature's beauty*

Italics indicate creaky phonation



Creak percentage vs F_0

- Spontaneous speech is more varied
  - Creak percentage
  - F_0



Creak percentage vs sent bound

- Spontaneous speech is more varied
  - Creak percentage
  - Creak distribution

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Objective evaluation

- Creak percentage of stimuli

Creak type	Creak percentage
No creak	0.04±0.03
Positional creak	0.09±0.06
Non-positional creak	0.13±0.08

Subjective evaluation

- 25 participants — 1-7 Likert
- Non-positional creak vs modal
- Positional creak vs. modal

- How **certain/positive/sarcastic** does the speaker sound?
- How much does the speaker sound like he is **done talking**?

Results

Non-positional creak

Question	Non-positional	Modal
Certainty	5	**5**
Valence	4	**4**
Sarcasm	4	4
Turn finality	**6**	6

Positional creak

Question	Positional	Modal
Certainty	5	5
Valence	5	4
Sarcasm	2	2
Turn finality	**6**	6

Bold indicates significantly higher rating (Wilcoxon signed-rank)

Non-positional creak

- **Less** certain
- **Less** positive
- **More** turn final

Positional creak

- **More** turn final

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