



# Supporting Mouthing in Signed Languages: New Innovations and a Proposal for Future Corpus Building

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## What is mouthing?

“...silent articulations of (a part of) a corresponding spoken word of the surrounding language” (Pfau, 2010)

Usage varies by language

- DGS: on virtually every sign (Ebbinghaus & Heßmann, 1996)
- Kata Kolok: virtually none (De Vos & Zeshan, 2012)
- NGT: full or partial (Bank, Crasborn & Van Hout, 2011)
- Partial: can be the stressed syllable or “mere onset consonant of the stressed syllable.” (ibid)

## Portraying legible mouthing is difficult.

Previous avatars suffered from either a lack of realism in their visemes, a lack of realistic timing, or a combination of both.

2001: “The main aspects that need further attention are the mouthing” (Verlinden)

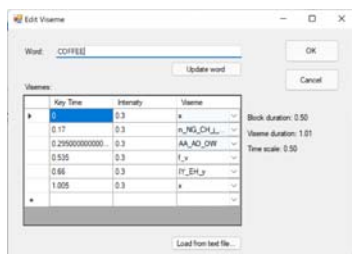
2011: “In many cases, the lack of mouthing simply introduces irritation.” (Kipp, Heloir, Nguyen)

2016: Mouthing still requires improvement (Ebling & Glauert)

2019: Still a problem (Brumm et al.)

Contributing factors

- Manual editing is expensive.
- Previous standards did not afford sufficient precision.
- Previous standards did not adequately specify timing.
- Previous editing tools for animators either did not provide for timing adjustments or were time-consuming and cumbersome to use.



## An improved approach

Combination of automation heuristics with an artist-friendly interface

Initial hyperparameter of

- Complete mouthing
- First syllable
- First consonant
- No mouthing

Minimum duration enforced to avoid “lip snap.”

Better visualization



Width of viseme block corresponds to viseme duration; artists can drag block boundaries to change durations. Minimum width (duration) is enforced.

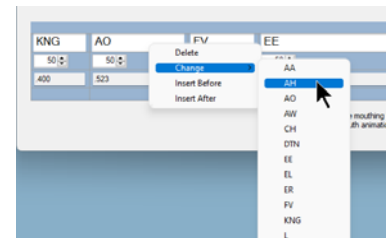
## Quicker editing

All visemes have a context-sensitive menu to

- Add visemes
- Delete visemes
- Change visemes

Language-aware:

- Visemes offered are based on language being mouthed.



## Results

Support for LSF, GSL, DGS, DSGS and ASL

Support for four styles of mouthing

- Full
- Single syllable
- Single consonant
- Absent

## See a video

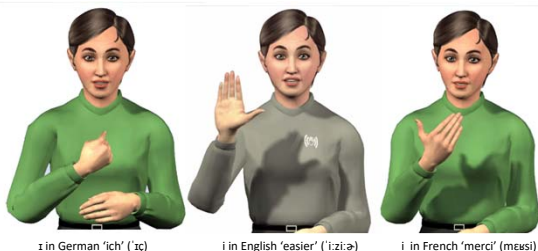


## A proposal

An experiment in corpus acquisition

- Use *automatic* generation of full mouthing for all lexical items.
- Apply the most appropriate hyperparameter.
- In consultation with language communities, *manually* edit as needed.
- Will this be more legible than a purely automatic approach but require fewer resources than a purely manual approach?

## Paper with references



i in German 'ich' ('ɪç)

i in English 'easier' ('i:zi:ə)

i in French 'merci' ('mɛʁsi)