



From gestures to kinesthetic modality: how to express epistemicity in a haptic device for human-machine interaction

Fanny Catteau, Aliyah Morgenstern, Claudia S. Bianchini

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Introduction

Aim of the LexiKHuM project

- Explore human gestural communication (Sign Language and co-speech gestures) to extract articulatory traits conveying Kinesthetic Meaning Units, then implement these units in a haptic HCI device (helicopter piloting device)
- Our experimental unit: **epistemicity** (certainty/uncertainty)

State of the art on epistemic gestures

- Epistemicity is often associated with specific head gestures

	Certainty	Uncertainty
SL	Rapid head nods	Slow head tilts and nods
G	Clear and strong head nods	Head tilt

→ Usually, SL and G are analyzed in a holistic way: there is no detailed **articulatory description** of head gestures

Our hypothesis

- Sub-parametric features of the gesture mark epistemicity, and not the gesture as a whole
- We test our hypothesis on **head movements**

Corpus

3 hearing dyades (French co-speech gestures - 39'56")

3 deaf dyades (French Sign Language - 36'00")



6 conversations about...



Best things to do in Marseille

Methodology

Grid of analysis

- Based on kinesiological studies and analyses of movement in SL prosody
- Transcribed with Typannot, a transcription system developed for kinesiological studies
- If you are interested in Typannot, come to C. Danet conference (Jul 14, 3:15 PM, Corboy 209)

Annotation methodology

Points of interest (POI) identification:

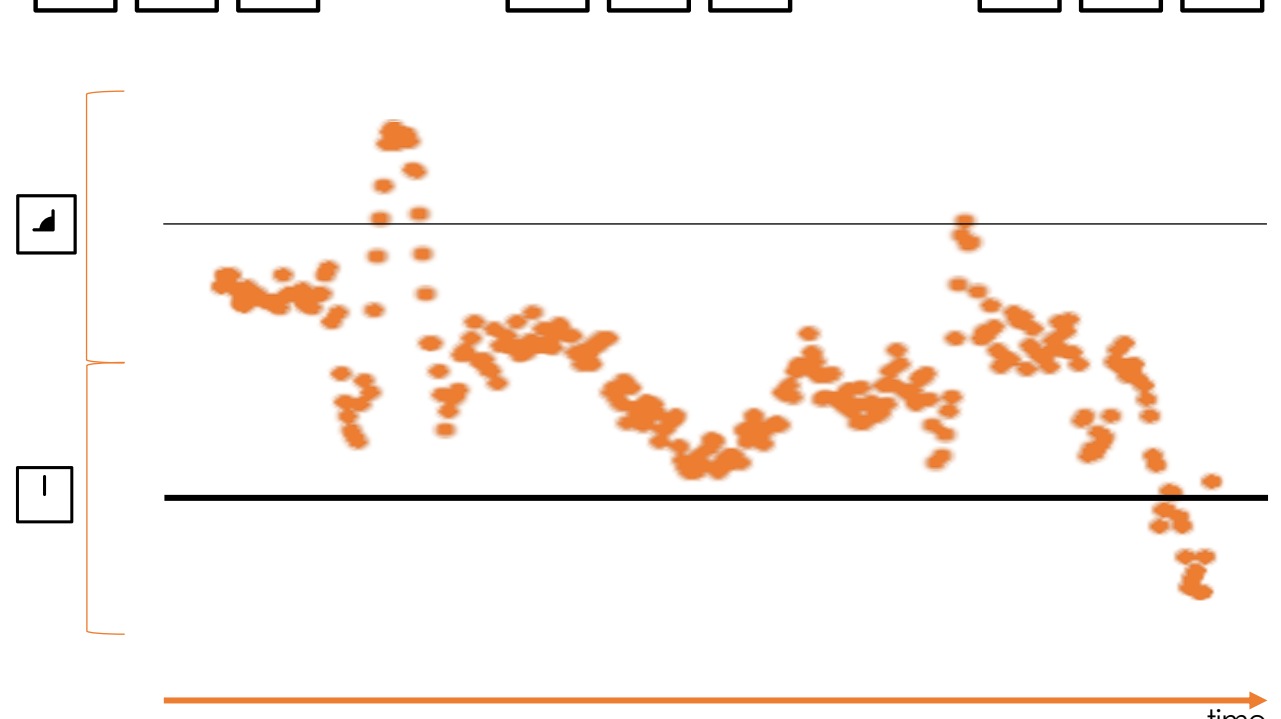
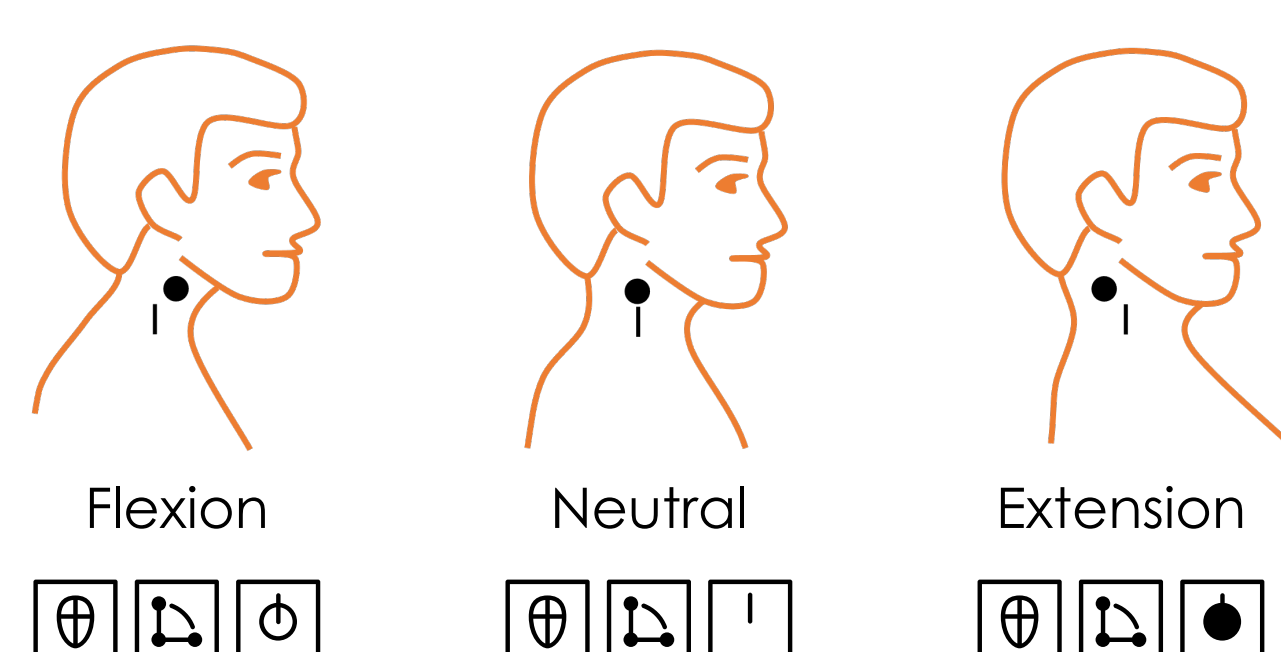
- Semantic analysis of the corpus to identify POIs with strong epistemic indications
- Inter-annotator agreement to validate the POIs selected for this study

POIs transcription:

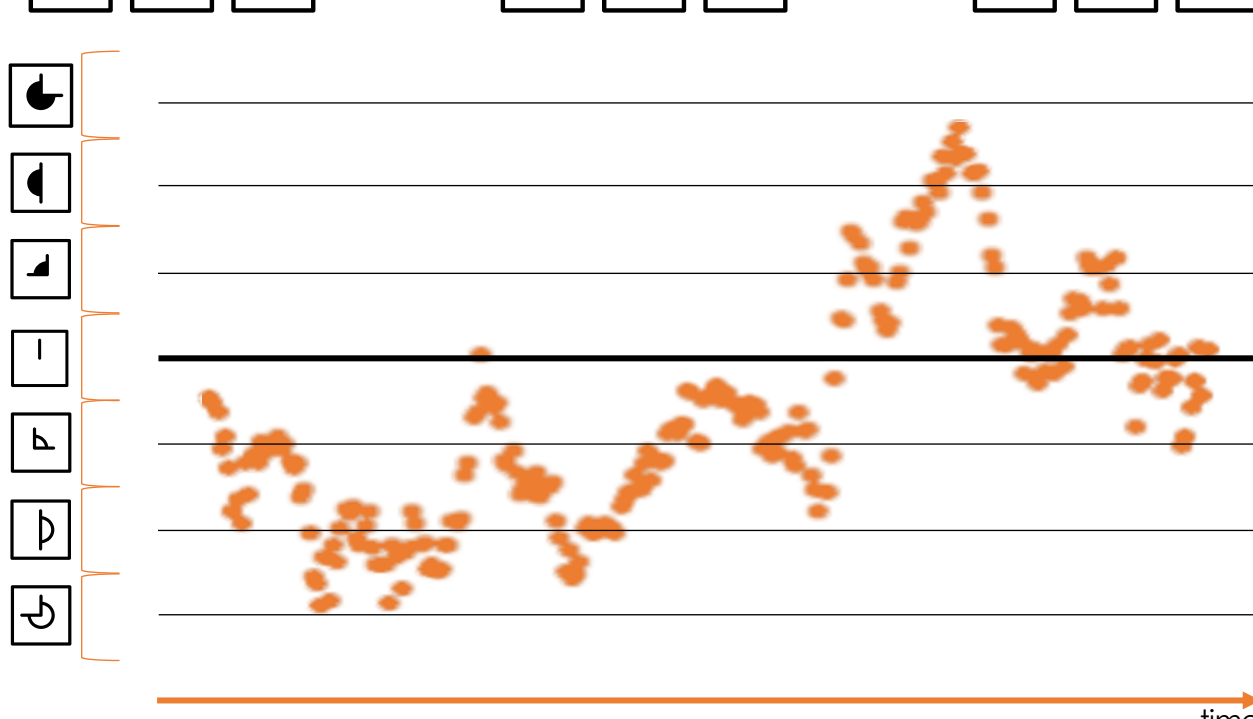
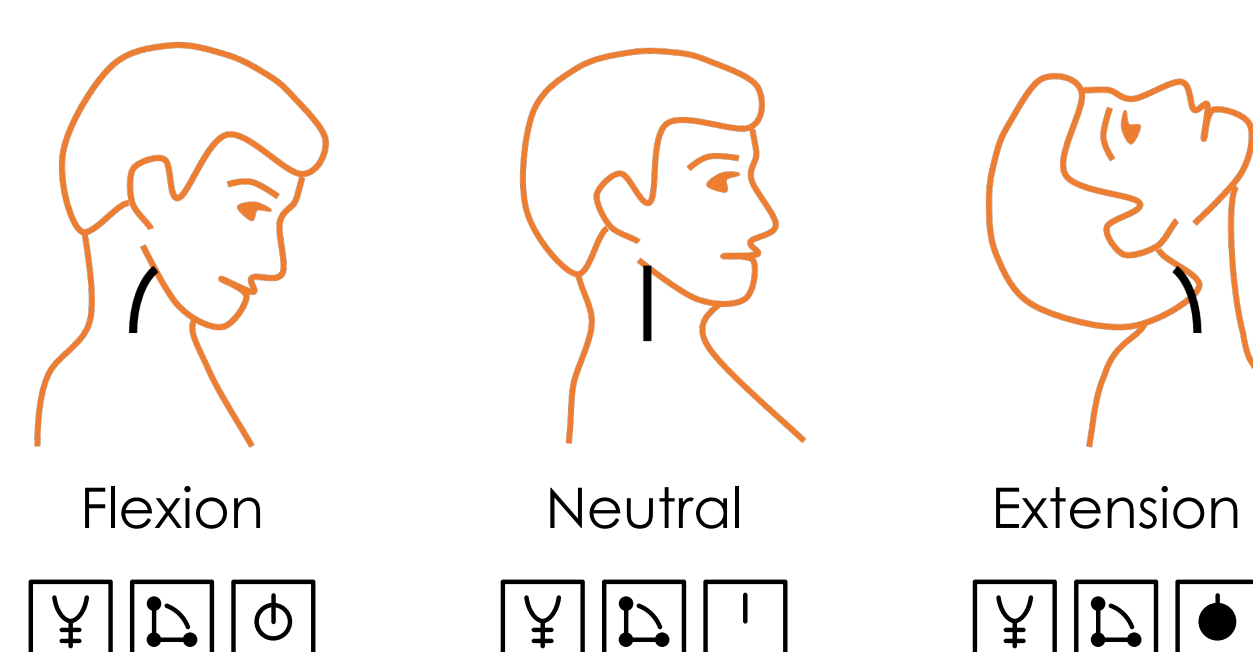
- Two complementary methods to annotate articulatory features
- manual annotation using ELAN
- semi-automatic annotation using Motion Capture (AlphaPose, Opencv)

Head

Flexion / Extension

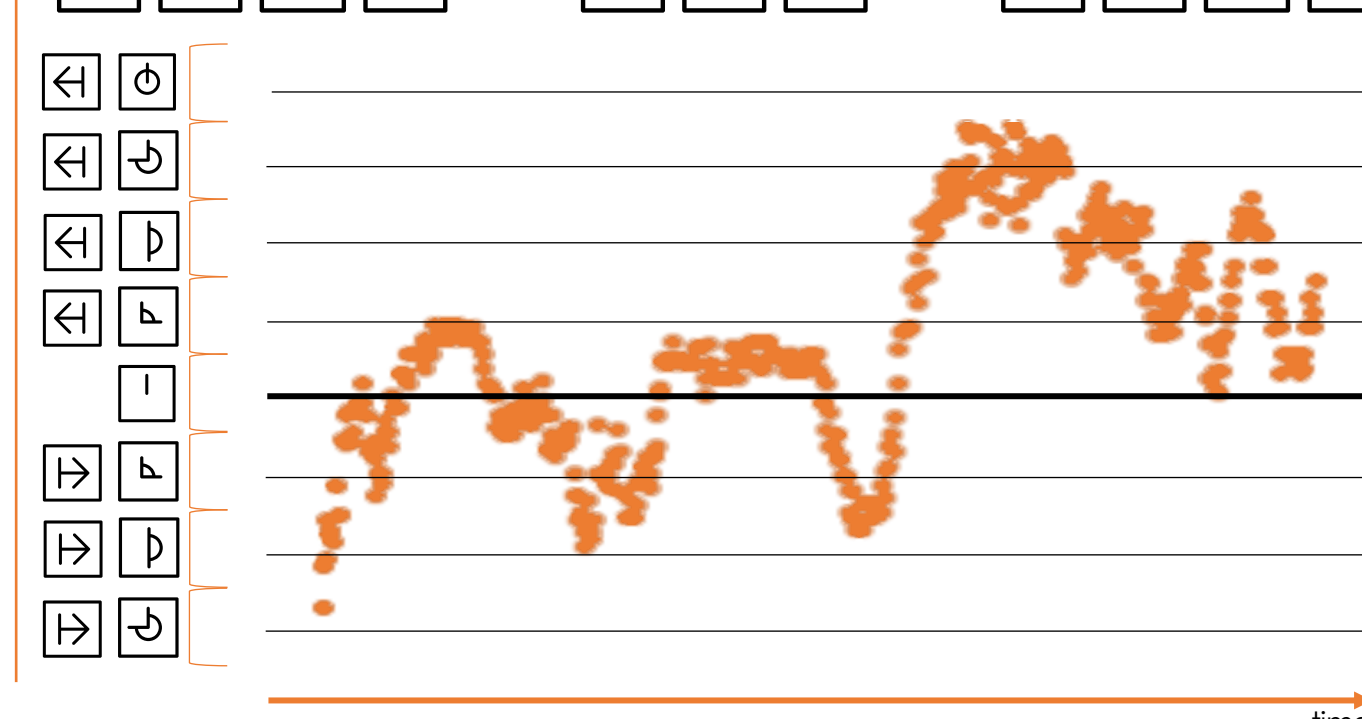
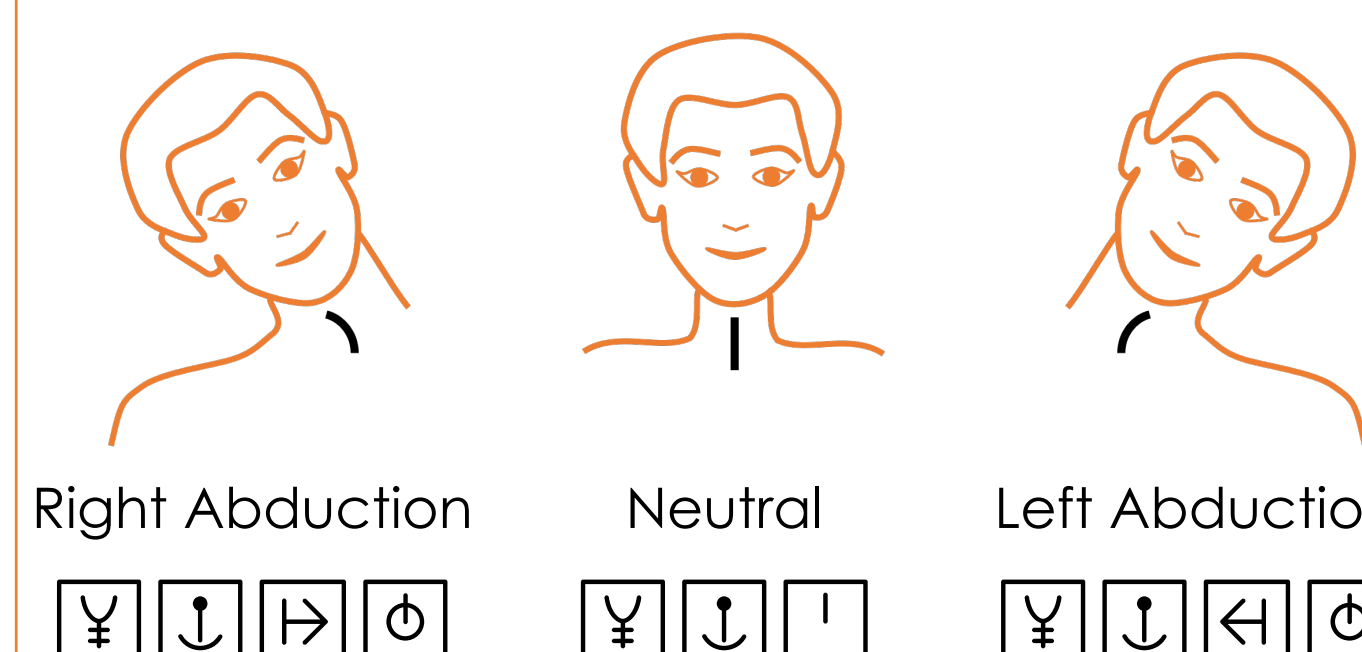


Flexion / Extension

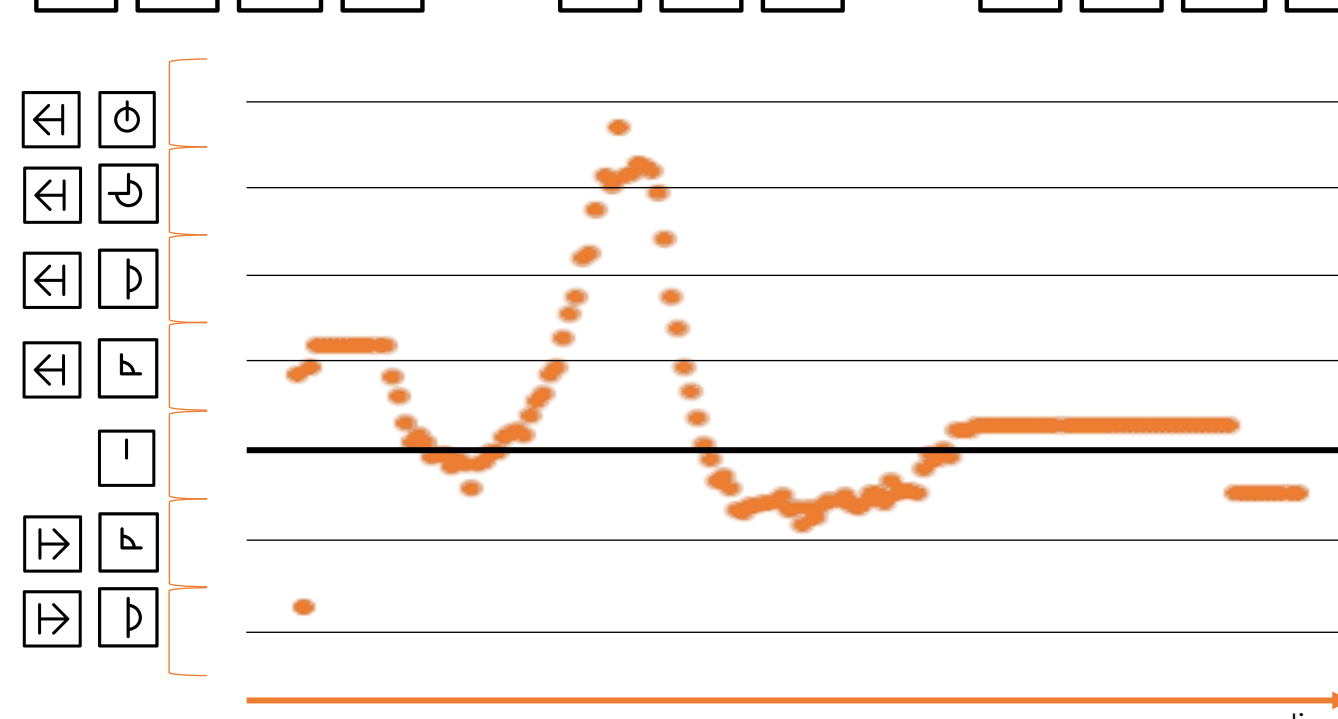
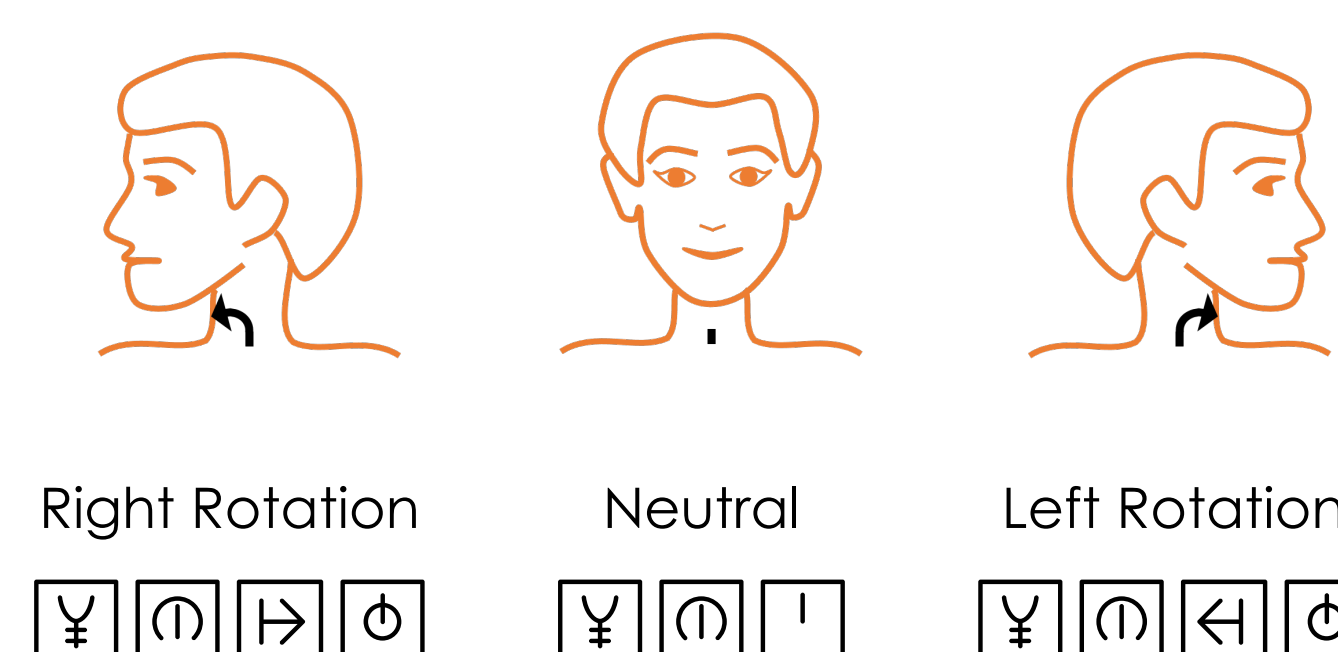


Neck

Right / Left Abduction



Right / Left Rotation



Some preliminary findings

Certainty

Head
Flex-Ext

[SL&G] greater amplitude of head movements always going through the neutral position

Uncertainty

Head
Flex-Ext
Neck
Rotation

[SL] head hold
[SL] greater amplitude of neck rotation movements

Conclusions

- Sub-parametric characteristics of gestures and signs can be investigated thanks to our articulatory description
- There are common features between SL and G for epistemics gestures
- Further steps: apply our methodology to head, shoulder, torso and gaze, in a larger corpus; enrich MoCap data and analysis

Credits

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 L. Boutora & A. Braffort (Degels1)
 ESAD GestualScript Team (Typannot)
 K. Bou Orm (MoCap data analysis)

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Bibliography

