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Sub-parametric features of head movements and gaze conveying epistemicity: a study on French Sign Language (LSF) and French co-speech gestures.

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Introduction

Aim of the LexiKHuM project

- Explore human gestural communication (Sign Language [SL] and co-speech gestures [G]) 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

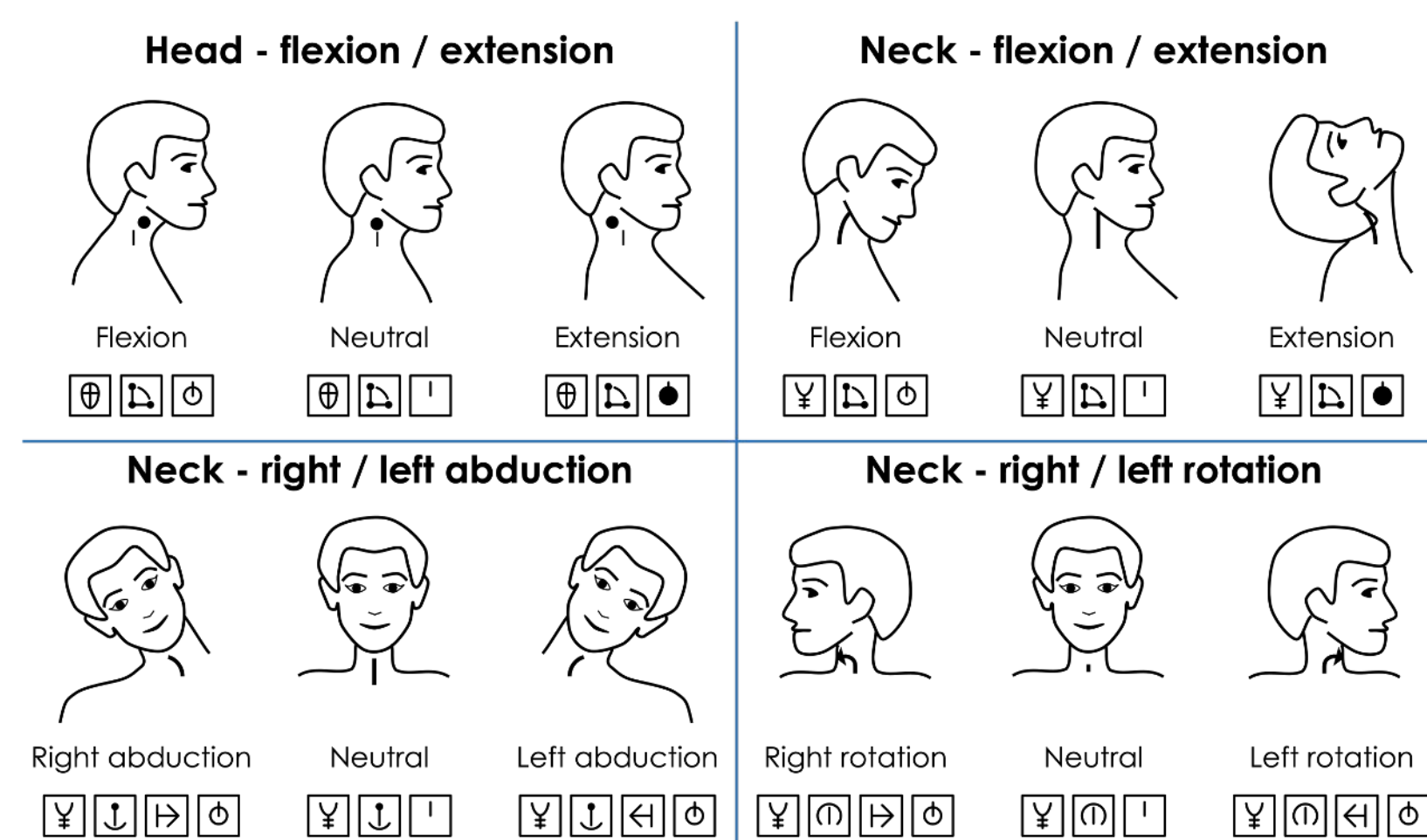
Our hypotheses

- Some properties of head movement are involved in the construction of epistemic gestures in SL and G
- The association of gaze direction and head movement is also relevant to express epistemicity
- We tested our hypotheses on **head flexion-extension and gaze**

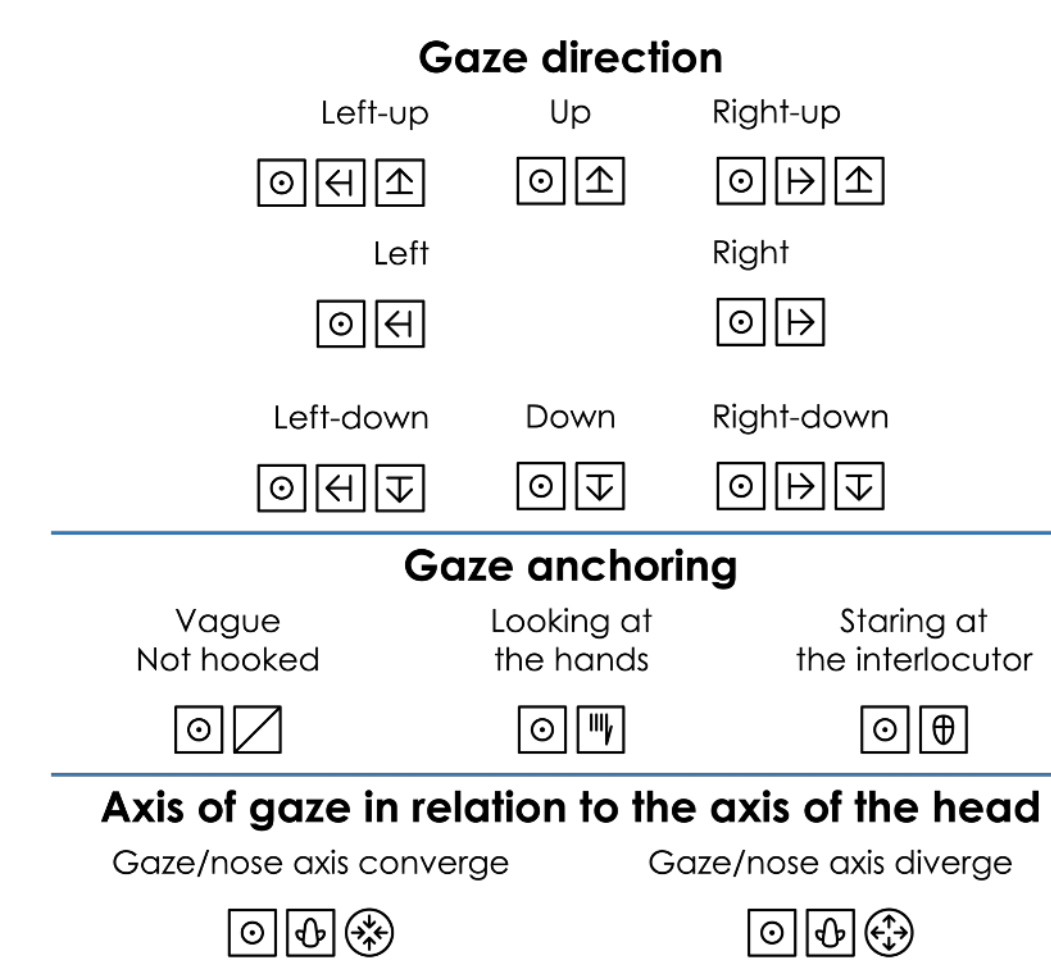
Corpus DEGELS1



Head position annotation



Gaze annotation



Methodology

Analysis grid

- Based on kinesiological studies and analyses of movement in SL prosody
- Transcribed with the Typannot kinesiological transcription system

Annotation methodology

Points of interest [POI] identification:

- Semantic analysis of the corpus to identify POI with strong epistemic indications

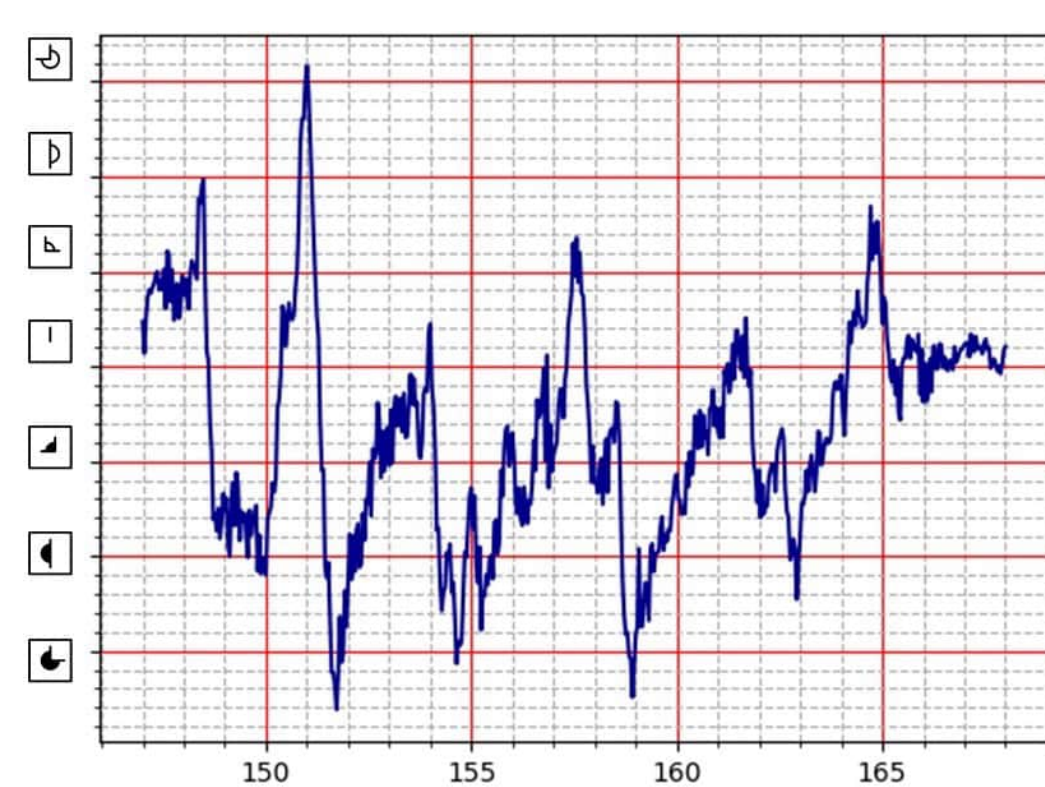
- **40 sequences selected**

transcription of POI articulatory features :

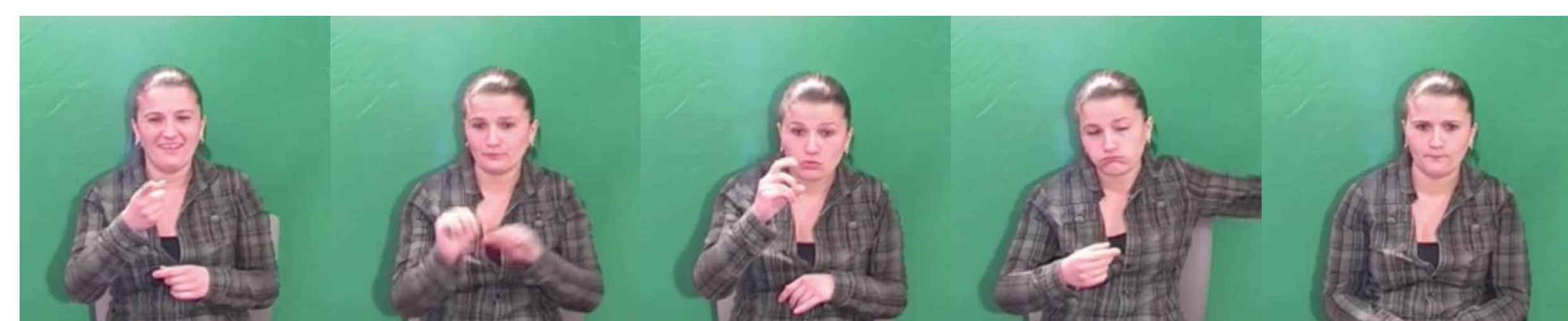
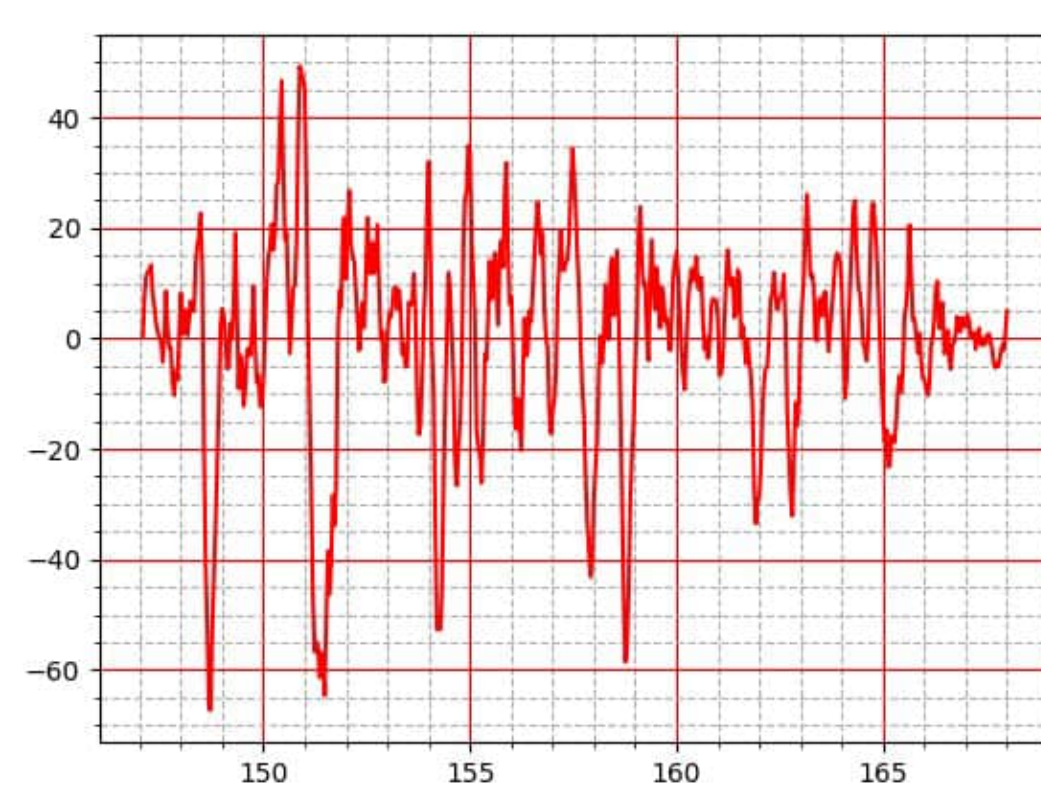
- Two complementary methods:
- manual annotation using ELAN
- **semi-automatic annotation** using AlphaPose Motion Capture [MoCap]

Certainty

Neck - FlxExt amplitude (Typannot notches/sec)



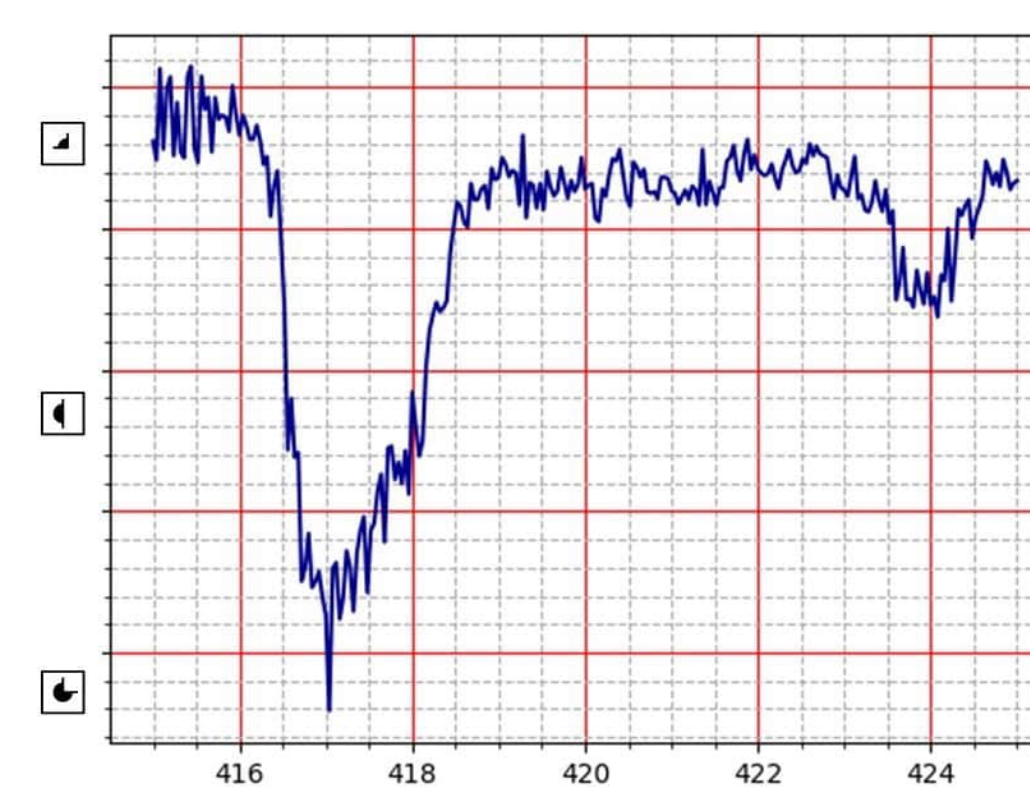
Neck - FlxExt speed (deg/sec)



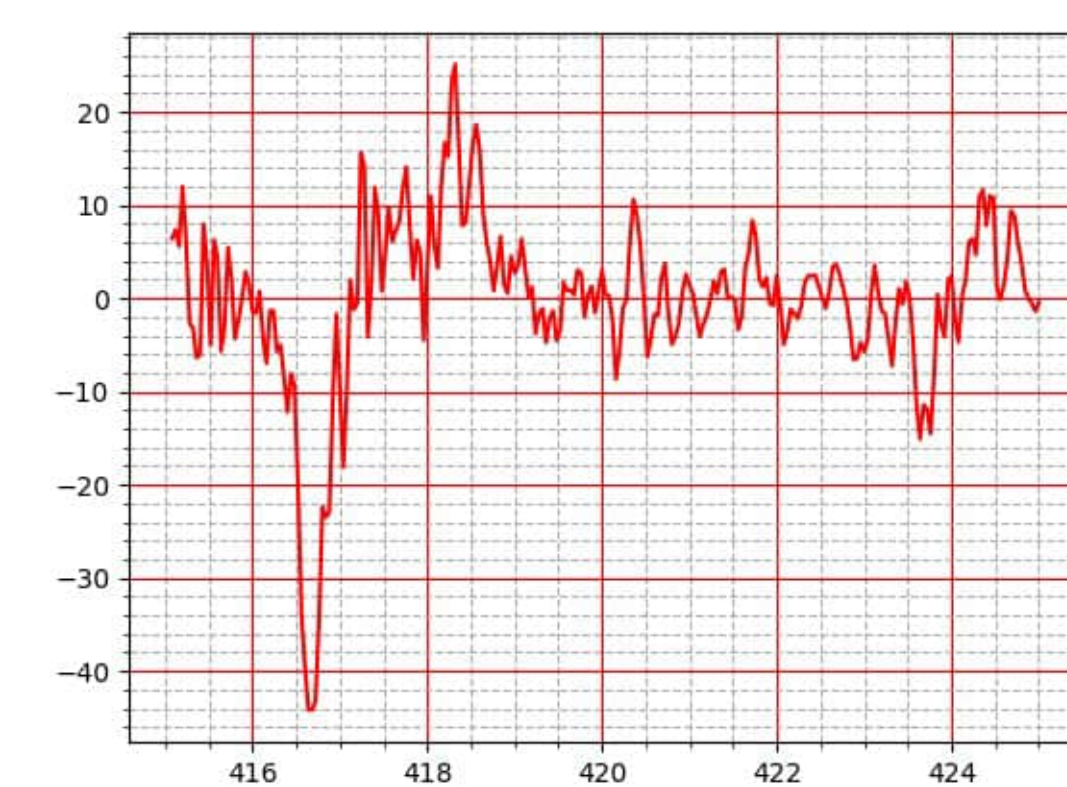
Gaze: [gaze icons] (x4) - [gaze icon]

Uncertainty

Neck - FlxExt amplitude (Typannot notches/sec)



Neck - FlxExt speed (deg/sec)



Gaze: [gaze icons]

Results

	Certainty markers	Uncertainty markers
Movement	repeated nods (passing through neutral position)	holding neck (out of neutral position)
Tension	motion tension (large speed contrasts)	relaxed movement (no significant speed contrasts)
Gaze	interlocutor & hands	vague
Gaze/head	aligned	unaligned

Conclusions

- Sub-parametric characteristics of SL and G 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 shoulder and torso; expand our corpus; enrich MoCap data and analysis

Credits

Our team would like to thank:
 L. Boutora & A. Braffort (DEGELS1)
 ESAD GestualScript Team (Typannot)
 K. Bou Orm & R. Fath (MoCap analysis)
 M. Nauge (MoCap protocol validation)
 A. Morgenstern (protocol validation)

Bibliography

