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

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

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

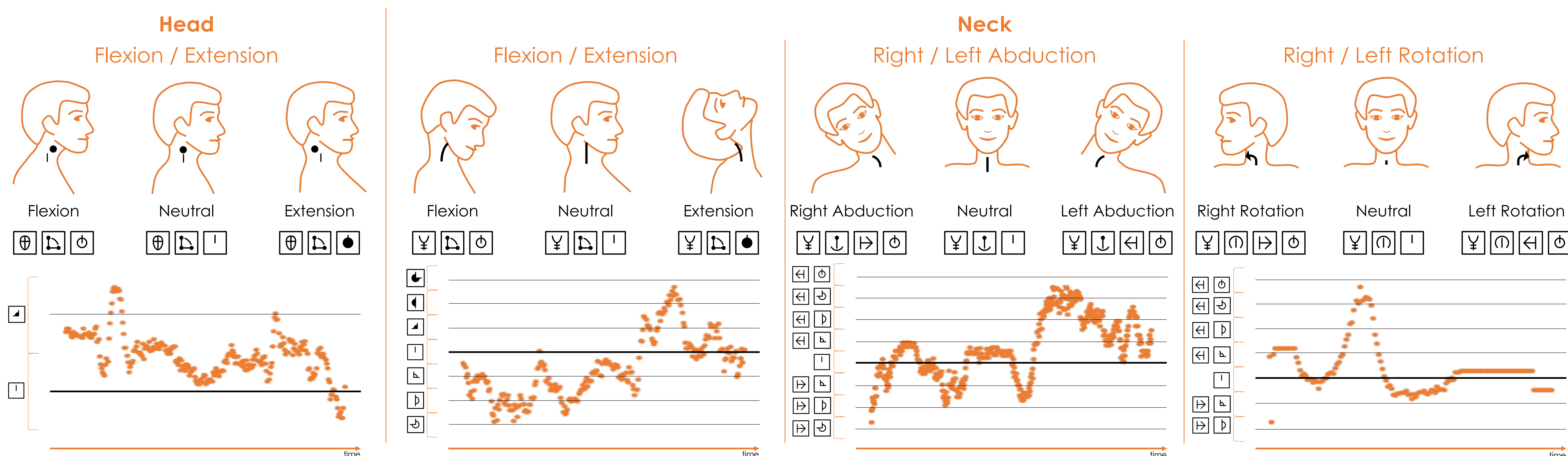
- Based on kinesiological studies and analyses of movement in SL prosody
- Transcribed with Typannot, a transcription system developed for kinesiological studies
- If you are interested in Typannot, come to C. Danet conference (Jul 14, 3:15 PM, Corboy 209)

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, Opency)



Some preliminary findings

Certainty

Head Flex-Ext

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

Uncertainty

Head Flex-Ext

[SL] head hold

Neck Rotation

[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 epistemic 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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Bibliography

