Analysing Articulatory Data with Vector Norms and Related Methods

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Outline

▶ I will then talk about what we can and cannot do with these methods in time domain analysis of articulatory data these days. I will take short side trips to look at similar methods applied to other articulatory data. We have looked at tongue splines and lip videos and I will discuss what kind of challenges and understanding has resulted from those attempts. Finally, analysing 3D/4D ultrasound has been a recent major focus, but unfortunately frame rate issues are not so easy to solve.

▶ I will finish the talk by discussing why MRI would be very interesting to analyse with these methods – or adapted versions of them – and which definite and possible challenges one might come across.

Introduction: The why

- Pre-speech articulation is interesting from several points of view, but analysing ultrasound videos manually is not great.
- In my thesis I concentrated on timing of utterance onset in both acoustics and articulation (Palo 2019).
- The data was high-speed tongue ultrasound from a delayed naming experiment – specifically one using the Rastle instructions, see Rastle et al. (2005).

Introduction: The why

- When trying to identify movement onset in grayscale videos with a lot of speckle 'noise', it doesn't take long to grow a desire for an easier way.
- **[explain speckle noise and tongue ultrasound]**
- The first tool out of the box happened to work adequately – and so for my thesis I used Euclidean distance to identify articulatory

References

Palo, P. (2019). *Measuring Pre-Speech Articulation*. PhD thesis, Queen Margaret University, Edinburgh.

Rastle, K., Harrington, J. M., Croot, K. P., and Coltheart, M. (2005). Characterizing the Motor Execution Stage of Speech Production: Consonantal Effects on Delayed Naming Latency and Onset Duration. *Journal of Experimental Psychology: Human Perception and Performance*, 31(5):1083–1095.

Something else i.e. section title