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Kyle Duarte, Sylvie Gibet

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Reading Between the Signs:
How are Transitions Built in Signed Languages?

TISLR 2010 Abstract

Kyle Duarte (presents in ASL) and Sylvie Gibet (presents in English)

Université de Bretagne Sud, Laboratoire VALORIA
Vannes, France

The SignCom project exists to combine motion capture (mocap) data with linguistic descriptions of LSF (French Sign Language) for the purposes of phonetic analysis and language synthesis. To accomplish these aims we must fully understand articulator motion, specifically the prototypical ways in which signers create fluid sign streams by appending transitions between signs in the discourse[1]. The unique approach of combining quantitative data with existing linguistic analysis methods allows us to accurately extract such prototypes, beginning with a pilot study on hand position, described here.

The data used for this study includes mocap data of a French Deaf signer describing inviting friends over to her house for a cocktail party. A consumer-grade video camera was used to capture visual information about the sequences, and a 12-camera motion capture system was used to store quantitative information about the signer's body parts during sign production. These two data streams were synchronized and subsequently annotated in ELAN. Data was then transcribed per the video data, using the mocap data to annotate hand configurations when otherwise hidden from the video camera's view, as per published notation standards [2].

We adopt a target-based understanding of sign formation for the purposes of this study[3]. That is to say that signs are learned as sequences of targets (hand configurations, placements, etc.) and signers are expected to improvise natural transitions between these targets. For example, the LSF sign ORGANISER, meaning *to organize* in English is produced like the ASL sign BICYCLE except with the hands rotating as if to indicate pedaling backwards. This sign is in fact the result of two identical hand configurations, given starting positions for the hands, and a circular trajectory for the hands during the sign. As no two instances of the sign's production are the same, even performed by the same signer, but all understandable instances of the sign's production are similar, even performed by multiple signers, we consider that there is a mental target for each component that signers recall during production. Interlocutors recognize the variants in targets' instantiations and reconstruct meaning from what they see.

Our work aims at constructing both pure targets and understanding their recognizable variants in order to create virtual signers (avatars) who sign like humans. It is when virtual signers use imperfect target realizations that their sign streams take on characters of their own. Further, it is only because of our unique

synchronization of traditional linguistic annotation techniques and mocap data that we are able to empirically derive such motion and configuration targets.

We consider that analyzing cognitive linguistics models of prototypical phonologies and their instantiations in the discourse will further our understanding of linguistics dynamics in LSF, for other signed languages as well, and for the human faculties of language and cognition in general.

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