The Challenge of Preserving Captured Sign Language Data in Human Avatar Models

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OVERVIEW

Language attitude studies seek to reveal speech communities' underlying attitudes and to study certain contexts that sustain idealization or stigmatization of language varieties. Methodology for studying language attitudes typically includes language judgment tasks based on audio recordings (Campbell-Kibler, 2010). While audio recordings can be obtained without visual markers, the same is not true of the video recordings required to capture sign language. As a result, it is often difficult to distinguish language judgments from social ones. Hill (2012) found that research informants were often reserved with their language judgments in order to avoid looking judgmental about signers' appearance. Motion capture and animation technology address this problem by masking sign models' identities with avatars.

METHODOLOGICAL CHALLENGES

The proposed technological solution, however, presents a novel challenge, namely how to preserve the signer's facial expressions, manual movements, and body shifts in the avatar embodiment. Linguistically, sign language involves subtle movement nuances that indicate specific meanings. Invisible placeholders in space represent objects in sign language, and the angles between the hands and face convey grammatical information. There needs to be precise coordination between facial expressions and hand signs in order for avatars to be fluent and comprehensible (Heunerfauth, Lu, and Kacorri, 2015).

With our own in-house system of motion capture, we used the Vicon optical motion capture system to record precise body and finger motions, and a face recording headgear to capture facial expressions. In Autodesk Maya, we designed semi-realistic human models with noticeable racial and sexual phenotypes and established the mesh topology and body rigs with accurate joint placements for spatial reference and signing poses. We customized a user-interface system to enable the automatic connection between the signer's facial data (including eye tracking, blinking, and brow movements) and Performer Dynamics.

CONCLUSION

Our in-house system design and workflow documentation proposes solutions that enable us to preserve signing precision in human avatar models. The next step is to study whether avatars can be used to detect language judgments based on language, race, and gender.

Fig. 1. Screenshots of animated signing avatars following the original model signer

Keywords—*Motion capture, language attitudes, racial and gender identities, workflow*

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