The Perception of Hand Gestures in Conversational Virtual Characters

Grace Lim, Jacob Justice, Alex Adkins, Sophie Jörg

Rhodes College

School of Computing, Clemson University

CLEMSON UNIVERSITY

Objectives

Hand gestures play a key role in conversation to convey information in conjunction with speech. In VR, even small modifications to hand motions affect how gestures are interpreted [1] and how a virtual avatar's personality is perceived [2]. We modify hand gestures captured during conversation to simulate errors in VR hand tracking to answer questions about their effects on comprehension, character perception, and viewer comfort.

Method

Four conditions were applied to the hand motions of virtual avatars with motion captured animations. We designed an experiment to show participants each condition in three types of communication: casual conversation, giving directions, and debate. Half the participants viewed the animations with sound and half viewed them without sound, and all were asked about their perception and comprehension of the animated characters and how comfortable they were with them.

References

[1] Sophie Jörg, Jessica Hodgins, and Carol O'Sullivan. 2010. The Perception of Finger Motions. In Proceedings of the 7th Symposium on Applied Perception in Graphics and Visualization (Los Angeles, California) (APGV '10). ACM, New York, NY, USA, 129–133. https://doi.org/10.1145/1836248.1836273

[2] Yingying Wang, Jean E Fox Tree, Marilyn Walker, and Michael Neff. 2016. Assessing the impact of hand motion on virtual character personality. ACM Transactions on Applied Perception (TAP) 13, 2 (2016), 1–23. https://doi.org/10.1145/2874357

Figure 1. The models that participants saw during the experiment. Each was used to animate a different type of communication.

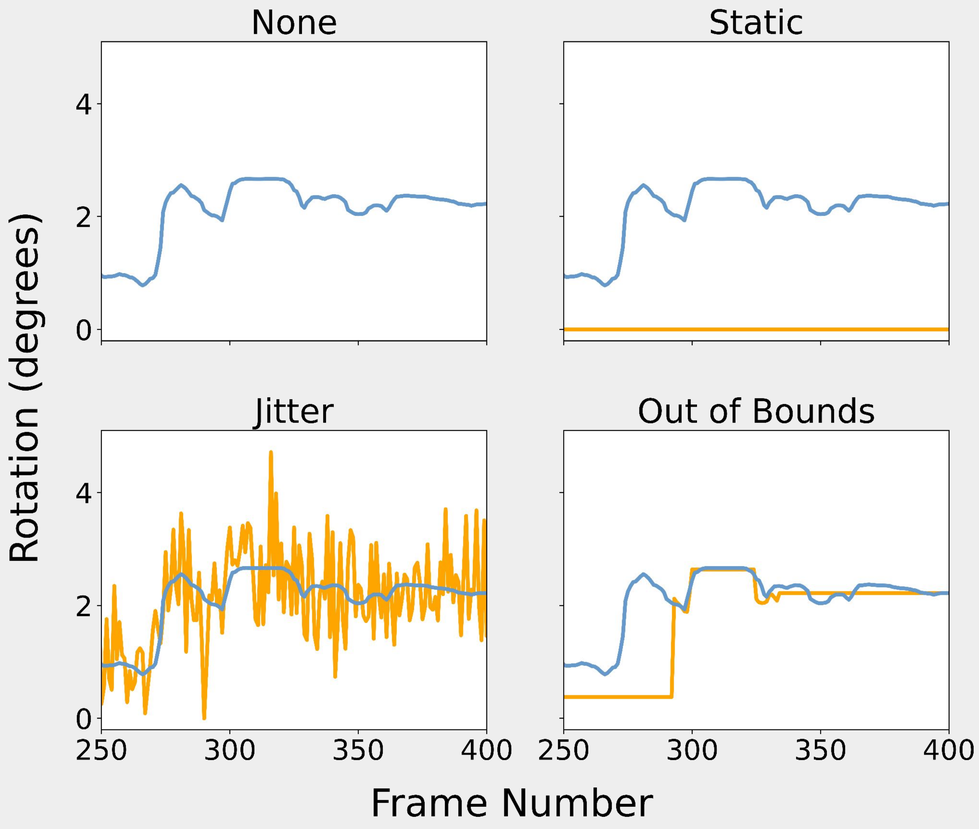

Figure 2. Rotations of the second right hand index joint for frames 250-400.

Results

Out of 61 participants from Amazon's mTurk, only 15 passed the attention checks to a satisfactory degree. We analyzed the data using factorial repeated measures ANOVA and found a significant interaction of sound and condition on realism, with $F(3, 39)=3.88$ and $p<0.05$. A Bonferroni post-hoc test showed no significant differences between the two independent variables.

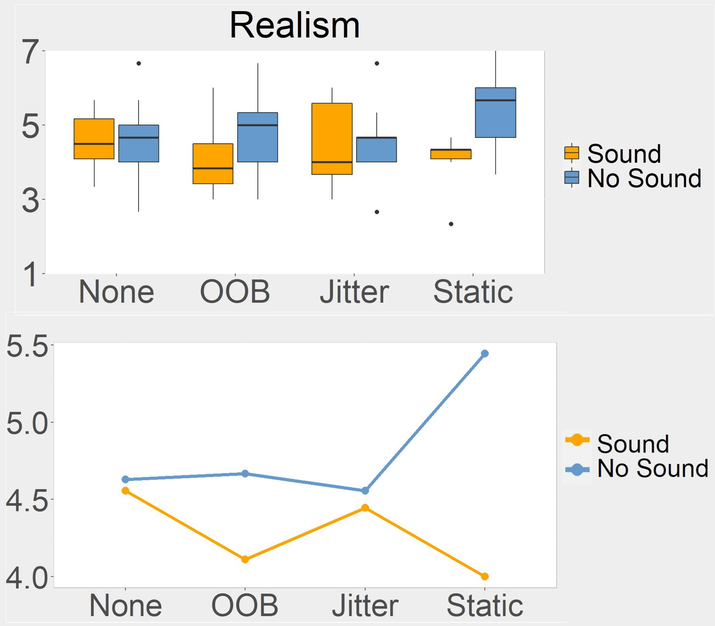

Figure 3. Distribution of results and the interaction graph for realism.

Conclusion

In our experiment, errors in hand motions and sound seem to affect the perceived realism of virtual characters, though they were expected to affect all seven measured factors of perception. However, the amount of high quality responses obtained was extremely low. With more high quality responses, further relationships between conditions and character perception might appear.