Emotional Facial Expressions in Synthesised Sign Language Avatars
A Manual Evaluation

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Abstract
This research explores and evaluates the contribution that facial expressions might have regarding improved comprehension and acceptability in sign language avatars. Focusing specifically on Irish Sign Language (ISL), we examine the Deaf community’s responsiveness to sign language avatars. The hypothesis of this is: Augmenting an existing avatar with the 7 widely accepted universal emotions identified by Paul Ekman to achieve underlying facial expressions, will make that avatar more human-like and improve usability and understandability for the ISL user.

Resources
a. SOI Corpus
Well established ISL corpus
Largest digitally annotated corpus in Europe
Developed at the Centre for Deaf Studies TCD
Rich selection of utterances with emotional facial expressions (EFEs)
Identified the section with the richest selection of EFE utterances
- From this chose 5 utterences (of varying size) which, between them, contained all 7 emotions

b. JASigning platform
State-of-the-art synthesised signing avatar platform
Developed at the University of East Anglia during the EU funded VISICAST and eSIGNs projects
The synthesis engine, Animgen: syntheses various geometric coordanates required for 3D animation based on input in the form of the Signing Gesture Markup Language (SiGML)

Evaluation Framework
Primary goal: to observe comprehension level for each avatar. Secondary goal: to obtain knowledge on some user habits.

Baseline
Augmented

5 content * 4 avatars = 20 signing videos
15 participants. Native ISL users from different demographic backgrounds
30 minute manual evaluation with interpreter present

Results

Why is this research important?
There are approximately 5,000 native users of ISL in the Republic of Ireland and 50,000 non-native users.
Lower literacy levels among Deaf adults causes communication difficulties
Limited access to interpreter services for ISL users.
Facial expressions carry linguistic and prosodic meaning (up to 70%).

Efforts made minor impact on average comprehension scores.
Large difference between Luna and Anna
Large difference between 1st and 2nd pass
Participants have little experience with avatar technology
Mobile technology may have had a positive impact on Deaf literacy levels

Future Work
A further investigation would be beneficial to identify why these attributes fared badly and how best to deliver a solution that will not only address these attributes but, by proxy, increase the comprehension level also.