

WordSign

3D Animation of Sign Languages

You may be surprised to learn that over two hundred living sign languages have been identified in surveys conducted by SIL International. Yet only a small handful of these sign languages have even a complete book of the Bible, and only one, American Sign Language, has the entire New Testament. The reality is that millions of the world's Deaf are waiting for their first exposure to the Bible in their own heart language because they do not read a written language.

Current Approach

In recent years Bible translators have video recorded signers to produce content for the Deaf. Re-takes and manual editing make this a tedious process. Signers with skills appropriate for video storytelling come and go, or change in physical appearance before filming is complete, or may acquire damaged reputations, causing years of video production to lose its acceptability within the local deaf community. In countries where there is hostility toward Christianity, signers who appear on video often receive threats to their own personal safety.

The WordSign Project

In 2008 JAARS launched a project to accelerate the translation of sign languages. The WordSign project is developing advanced software tools for the production of sign language videos in movie-quality 3D animation.

3D Animation Technology

Phase I involves the development of motion capture and production editing software, built for use in conjunction with Maya™, an industry-standard commercial animation product from Autodesk. To make it easy to accurately represent the motions and gestures important in sign language storytelling, WordSign is developing motion capture software for use

JAARS



A deaf signer portrays multiple characters from a script and is recorded using the stereo camera.



WordSign software recognizes and tracks the 3D motions of the signer.



The signer's motions are mapped onto the underlying skeleton of a 3D animated character.



The 3D motions of animated characters follow the signer to produce a movie-quality final result.

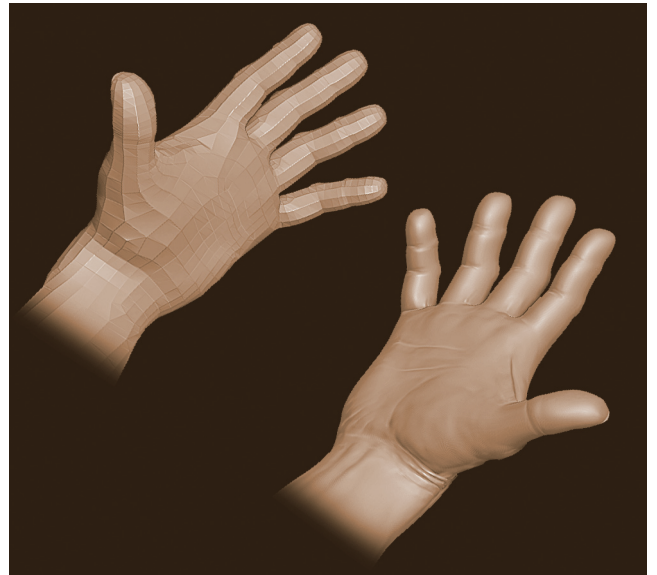
with a commercially available stereo camera, together delivering accurate 3D motion information. The motions of a signer's head, torso, arms, hands, and fingers, are recorded on a PC in stereo video, then automatically tracked using computer vision algorithm technology. The resulting output is able to drive the movements of animated characters in Maya.

In addition, WordSign is developing a sign language production editing environment as a plug-in enhancement to Maya. This capability will allow translators to compose sophisticated video productions, without needing to become expert animators. Using this editor, a motion-captured source file is combined with characters and contextual background scenery, allowing the user to make transitions and blends between characters and scenes and to change camera angles and lighting

The WordSign team is also developing libraries of photo-realistic animated Bible characters, whose appearances and clothing are historically accurate, plus 3D scenery that is easy to incorporate, enhancing acceptance by the Deaf.

How You Can Help

The WordSign project is funded by the donations of individuals with a passion for accelerating Bible translation. Current needs are to fund completion of the first phase of software development. To make a donation, please contact JAARS and designate your gift for project WRD100. WordSign is also looking for volunteers with computer graphics, programming, and animation skills.



The geometric detail of animated characters are 3D modeled in Maya. Texture mapping and color (not shown here) are applied as a final step.



A full 3D animation model of Nicodemus, a Pharisee from the Gospel of John chapter 3.

Animating the Word in sign language.

A small stereo camera records video on a PC's hard disk drive, enabling software to compute 3D depth for each pixel within a fraction of a centimeter.

