Resources for the study of visual language data:
SignStream software for linguistic annotation and analysis of digital video and an annotated ASL corpus

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http://www.bu.edu/asllrp/SignStream/
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A substantial amount of high quality video data—including multiple synchronized views of native users of American Sign Language (ASL)—has been collected in our Center for Sign Language and Gesture Resources. These data, along with linguistic annotations produced through the use of SignStream, are being made publicly available in a variety of formats. The data have been annotated as part of the American Sign Language Linguistic Research Project (ASLLRP) and have served as the basis for our linguistic analyses of ASL (including results to be presented in the afternoon session), as well as for collaborations between our linguistic research team and computer scientists (especially Stan Sclaroff, BU; Dimitris Metaxas, Rutgers U.; and Christian Vogler, Gallaudet U.; for further information, see [1-3, 5, 11-13]).

This session will offer a demonstration of the **SignStream software**, which we have designed to facilitate the linguistic analysis of visual language data [4, 6-8]. It can be used not only for linguistic analysis of signed languages but also for study of other types of data in digital video format that may be of linguistic interest. The current version of SignStream—distributed on a non-profit basis to researchers, educators, and students—runs on MacOS computers. A Java-based Open Source reimplementation that will also run on other platforms is currently underway; a preliminary Java SignStream transcription viewer is now available.

Information about the sets of **digital video files** and **corresponding annotations** that we distribute will also be presented (cf. [9, 10]). Thus far, we have collected over 1,000 elicited sentences, illustrating a broad range of syntactic constructions, as well as about 15 short stories and 2 dialogs of approx. 25 minutes in length. The annotations consist of identification and part of speech tagging of the manual signs as well as labeling of relevant co-occurring gestures of the face and upper body (including head positions and movements, such as nods, shakes, and tilts; eye aperture and gaze; eyebrow position; nose wrinkling, etc.) manifested over lexical and phrasal domains, which have critical linguistic functions in signed languages, plus English translations of the sentences.

References

[1] Alon, J., and S. Sclaroff. 2004. Simultaneous Localization and Recognition of Dynamic Hand Gestures. *Proc. IEEE Workshop on Real-Time Vision for Human-Computer Interaction.*

[2] Castelli, T. J., M. Betke, and C. Neidle. In prep. Facial Feature Tracking and Occlusion Processing in American Sign Language. Ms. Boston University, Boston, MA.

[3] La Cascia, M., J. Isidoro, and S. Sclaroff. 1998. Head Tracking via Robust Registration in Texture Map Images. *Proceedings, Computer Vision and Pattern Recognition (CVPR) 1998.*

[4] MacLaughlin, D., C. Neidle, and D. Greenfield. 2000. SignStream™ User's Guide, Version 2.0. Boston, MA: American Sign Language Linguistic Research Project No. 9, Boston University.

[5] Neidle, C., S. Sclaroff, and V. Athitsos. 2001. SignStream™: A Tool for Linguistic and Computer Vision Research on Visual-Gestural Language Data. *Behavior Research Methods, Instruments, and Computers* 33:311-320.

[6] Neidle, C. 2002. SignStream™ Annotation: Conventions used for the American Sign Language Linguistic Research Project. Boston, MA: American Sign Language Linguistic Research Project Report No. 11, Boston University.

[7] Neidle, C. ed. 2003. *SignStream™ - Version 2.2 CD-ROM*. Boston, MA: American Sign Language Linguistics Research Project, Boston University.

[8] Neidle, C. ed. 2003. *ASLLRP Electronic Publications 3.0, CD-ROM*. Boston, MA: American Sign Language Linguistic Research Project, Boston University.

[9] Neidle, C. ed. 2003. *NCSLGR SignStream Databases CD-ROM, Vol. 1*. Boston, MA: American Sign Language Linguistic Research Project, Boston University.

[10] Neidle, C. ed. 2004. *ASLLRP SignStream Databases CD-ROM, Vol. 1, version 2*. Boston, MA: American Sign Language Linguistic Research Project, Boston University.

[11] Sigal, L., S. Sclaroff, and V. Athitsos. 2000. Estimation and Prediction of Evolving Color Distributions for Skin Segmentation Under Varying Illumination. *Proc. IEE Conf. on Computer Vision and Pattern Recognition (CVPR).*

[12] Vogler, C., and D. Metaxas. 2001. A Framework for Recognizing the Simultaneous Aspects of American Sign Language. *Computer Vision and Image Understanding* 81:358-384.

[13] Vogler, C., and D. Metaxas. 2004. Handshapes and movements: Multiple-channel ASL recognition. *Proceedings of the Gesture Workshop'03, Genova, Italy; Springer Lecture Notes in Artificial Intelligence* 2915:247-258.