Creating a Training Dataset for an Automatic Educational Feedback System for American Sign Language Students

The LATLab
Linguistic and Assistive Technologies Laboratory

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Big Picture: Overall Project

Students learning American Sign Language (ASL) lack interactive tools to give them feedback on their signing accuracy, when a human ASL instructor is not available. In this multi-university NSF-funded project, we are creating software, utilizing a Kinect camera, to aid students who are learning ASL. We are currently in the phase of the project where we collect ASL videos from participants to build a dataset for training the automatic error identification software. At the conclusion of data collection, we will release this corpus to the research community; this resource should benefit researchers in sign language linguistics, computer vision, and students or instructors who want to learn more about ASL.

Focus of This Corpus

How can we use machine learning to discern fluency levels in students' ASL performance?

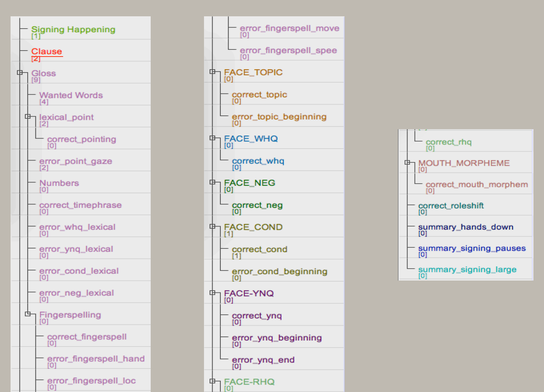
We are collecting ASL videos from participants with varying fluency levels. The Kinect video data is also annotated with ground truth (when errors or linguistic events occur in the signing). With this multisensory information, researchers are able to train models for fluency detection.

Recording the Corpus

We have setup the Microsoft Kinect in the LATLab to record participants signing in response to prompts typical of homework assignments in ASL courses. Participants are encouraged to use the full range of ASL linguistic features such as classifiers, facial expressions, hand gestures, and body pose changes. Furthermore, the prompts include certain words that we wanted them to sign that we used for our initial training dataset.

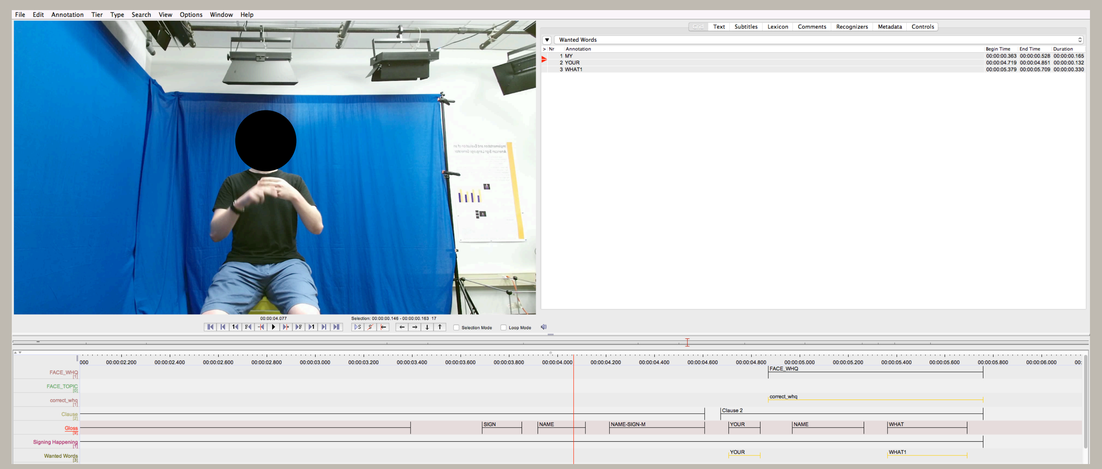
Linguistic Data we Collected

In the ELAN program, we set up a list of tiers (specific linguistic features) that our team used to annotate data when viewing the videos. Those are shown below:



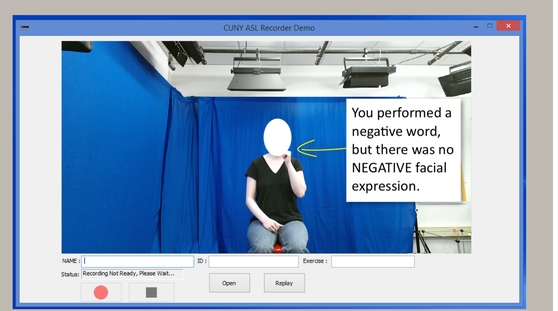
Annotating the Corpus

We used the ELAN program (EUDICO Linguistic Annotator) to annotate the ground truth of participants' ASL signs. Below is a screenshot of the program:



Discussion

We have collected over a thousand short video clips of participants signing. With the corpus, our collaborators at the City University of New York (CUNY) are developing the automatic error-detection and feedback component of the system. The program will be used and evaluated in a 2nd-semester ASL course at CUNY Hunter College. A prototype software design appears to the right.



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