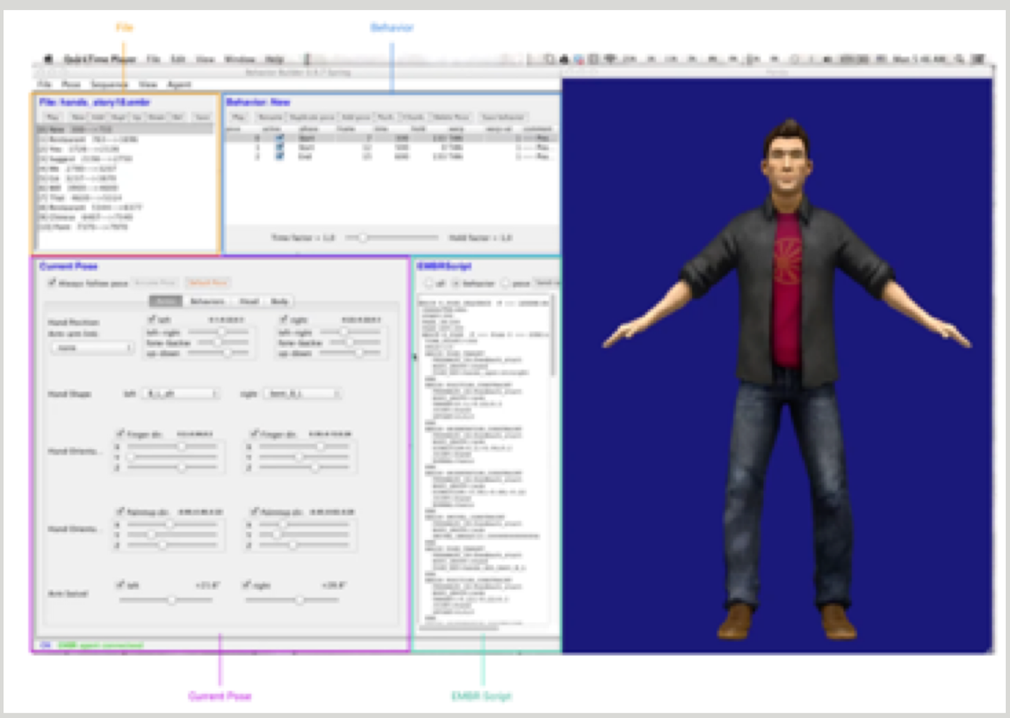
Designing an Interface to Support the Creation of Animations of Individual ASL Signs

RIT
Spandana Jaggumantri, Sedeeq Al-khazraji, Abraham Glasser, Matt Huenerfauth
Golisano College of Computing and Information Sciences (GCCIS)
Rochester Institute of Technology

Figure 1: Screenshot of EMBR Behavior Builder software



Summary

In support of our lab's ongoing research on synthesizing ASL animations, we have designed an authoring-tool user-interface for members of our lab to create new single ASL sign animation for our system. Figure 1 displays our lab's prior authoring tool: Behavior Builder tool provided with EMBR [5]. Our design process included three rounds of iterative prototyping, interviews, and feedback from researchers at our lab who critiqued static interface design prototypes. Participants gave qualitative feedback about the prototypes and were asked whether the controls would enable them to manipulate various parameters of the sign. This poster describes our design process and the final user-interface design.

Methodology

Prior research on user-interfaces and tools for sign language sign authoring were consulted [1-8,10,12-14], prior to conducting initial usability tests with our current tool, which revealed that researchers on our team had difficulty when authoring individual ASL signs, due to various issues, e.g. mapping of controls to the character, inputting numerical values to set locations of the hands, information hierarchy and navigation of the interface, selecting hand shapes based on names rather than images, and latency between making changes and seeing the character's pose.

IRB-approved studies were conducted with three rounds of prototyping with a total of 10-12 participants. Feedback was gathered using open ended questions regarding the following:

- Whether the labels were understandable user-interface for controlling the virtual human, e.g. hand orientation,
- Whether the controls would enable the user to manipulate the hand shape, hand location, or hand orientation of the virtual human to match a desired pose,
- Whether the controls enable the user to easily manipulate the timing of individual poses to produce an animation with an overall movement or acceleration that is desired.

User feedback was prioritized based on frequency and level of impact, to guide multiple rounds of prototype creation and revision, for use in subsequent rounds of usability testing.

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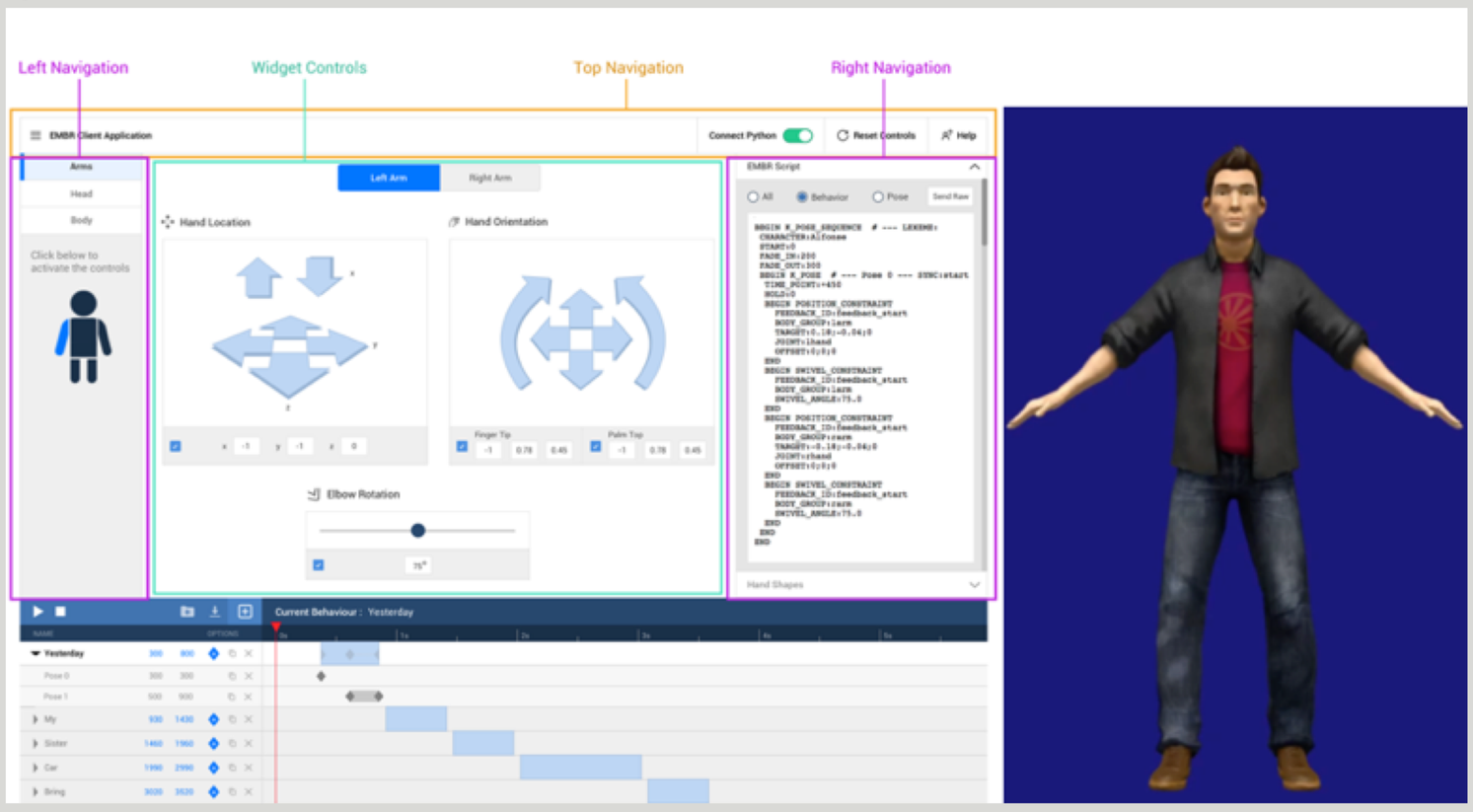
Figure 2: Final version of user interface



User Interface

Figure 2 illustrates our final prototype design, which included several regions:

- Top Navigation: This region contains commands for refreshing the visual display window with the virtual human character or other file access.
- Left Navigation: This region enables the user to select body components to control (via clicking on portions of a human-shaped graphic).
- Widget Controls: This region contains 3D location-adjustment and rotational controls for moving the selected body segment, e.g. the right hand, through the use of clickable arrows.
- Right Container: This region provided users with the ability to change the handshape via a grid of handshapes images, or to view and edit the "EMBRscript" (the underlying notation that specifies the movement of the virtual human), which may be needed for fine-grained adjustments to the animation for designing experimental stimuli for specific research projects.

Overall, after the final round of prototyping, participants indicated satisfaction with the arrangement of controls on the prototype interface in open-ended feedback questions.

Conclusion and Future Work

We have presented the design of user interface for enabling a user to author individual ASL sign animations as part of a system for semi-automating the generation of ASL messages. The primary contribution of this work is our presentation of a final design for our system, as illustrated in Figure 2, as well as our description of our approach in gathering feedback from researchers in a multi-round usability study. Our future work will extend our prototype design to include controls for non-manual signals, and future work will include usability testing of this system to determine if it is efficient and effective at enabling users to author ASL signs.

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