EXTENDING MORPHS IN AZEE USING POSE SPACE DEFORMATIONS

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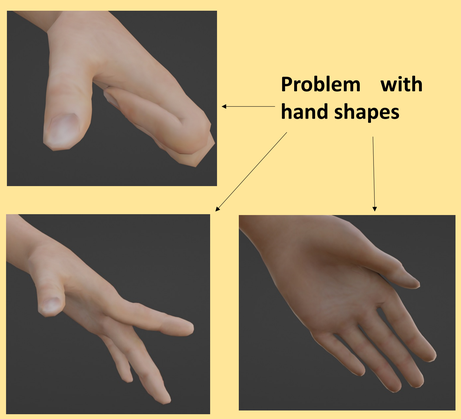
Abstract

- ***Objective***: *Enhancing the realism of signing avatars by developing a methodology for creating a set of morphs in the AZee language.*
- ***Methodology***: *Capturing both rigid and non-rigid shape changes, as well as facial expressions, by studying local avatar movements and incorporating a popular cognitive facial model*
- ***Results***: *Integration of the morphs with a parameterized 3D avatar model in a Blender add-on resulted in faster real-time synthesis and more realistic movements.*
- ***Significance***: *The proposed methodology contributes to the field of signing avatars by providing a more intuitive toolkit for AZee linguists, allowing them to create highly realistic and immersive signing avatars.*

Introduction

- Procedural synthesis of sign language involves generating animations for signing avatars based on a list of motion constraints.
- AZee model enables the creation of custom sign language content without the need for pre-animated data. However, existing techniques using inverse kinematics (IK) or forward kinematics (FK) for shape configuration often produce unnatural or incorrect poses.

```
orient
 'dir
 !index
  L
  2
 'along
 oppvect
  dir
  !palm
   L
```

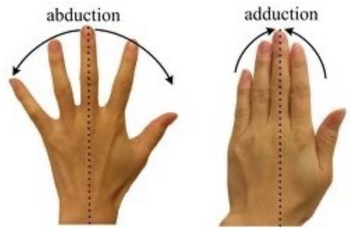


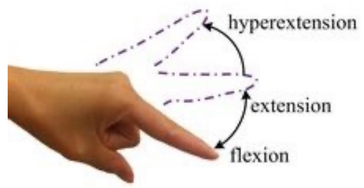
Methodology

Morphs constraints in AZee

```
morph
    'morph id
    weight [0 , 1]
```

Morphs which control the skeleton



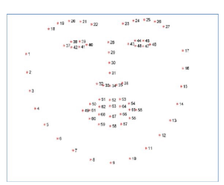


Morphs which control the face

Upper Face Action Units					
AU 1	AU 2	AU 4	AU 5	AU 6	AU 7
Inner Brow Raiser	Outer Brow Raiser	Brow Lowerer	Upper Lid Raiser	Cheek Raiser	Lid Tightener
*AU 41	*AU 42	*AU 43	AU 44	AU 45	AU 46
Lid Droop	Slit	Eyes Closed	Squint	Blink	Wink
Lower Face Action Units					
AU 9	AU 10	AU 11	AU 12	AU 13	AU 14
Nose Wrinkler	Upper Lip Raiser	Nasolabial Deepener	Lip Corner Puller	Cheek Puffer	Dimpler
AU 15	AU 16	AU 17	AU 18	AU 20	AU 22
Lip Corner Depressor	Lower Lip Depressor	Chin Raiser	Lip Puckerer	Lip Stretcher	Lip Funneler
AU 23	AU 24	*AU 25	*AU 26	*AU 27	AU 28
Lip Tightener	Lip Pressor	Lips Part	Jaw Drop	Mouth Stretch	Lip Suck

FACS

AUs 51 to 60 and 61 to 69 not added

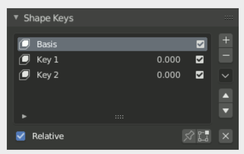


Landmarks

Results

morph id	Movement
I closed	Hyperextension and Flexion of index fingers
M closed	Hyperextension and Flexion of middle fingers
R closed	Hyperextension and Flexion of ring fingers
L closed	Hyperextension and Flexion of little fingers
T closed	Hyperextension and Flexion of thumbs
palm extended	Adduction and Abduction of the palms

First Set of AZee Skeletal Morphs



Shape Keys

Improved hand shapes

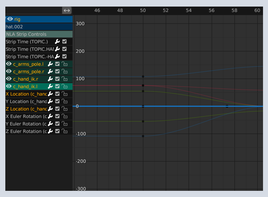
Conclusion And Future Work

- We presented a methodology that successfully extends the low-level capabilities of AZee by integrating a new set of morphs.
- This results in improved shapes, ease of posing for linguists, and faster run-time performance.

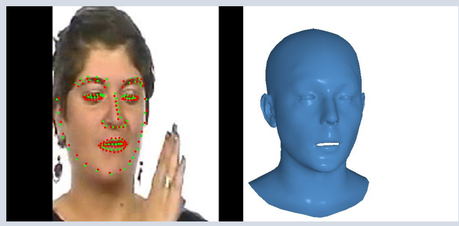
Limitations

- **Larger Use Cases**: Such as spine extension, and head movements.
- **Low Coverage**: More AUs such as Paula and larger coverage of facial expressions using FLAME.
- **Naturalness**: modify the bezier handles of the underlying motion curves resulting in smoother and more natural transitions between poses.

Paula



F-Curve calculation-based on motion templates



FLAME

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