



SIGGRAPH ASIA 2019 BRISBANE



Learning an Intrinsic Garment Space for Interactive Authoring of Garment Animation

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Adobe



Background



Tang (Dunhuang), ~ 530 AD



French, 1799



Greece (Parthenon) ~ 400 BC



Tang (Changan), ~ 600 AD



Background



Disney, 1937



Toei Animation, 1990

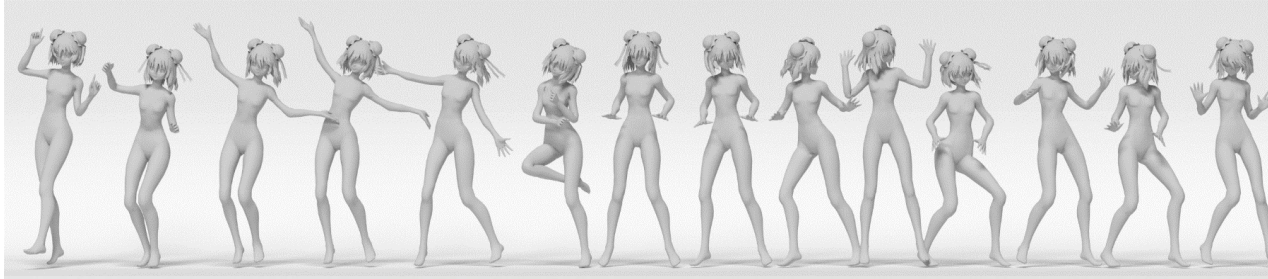


Illumination Entertainment, 2010

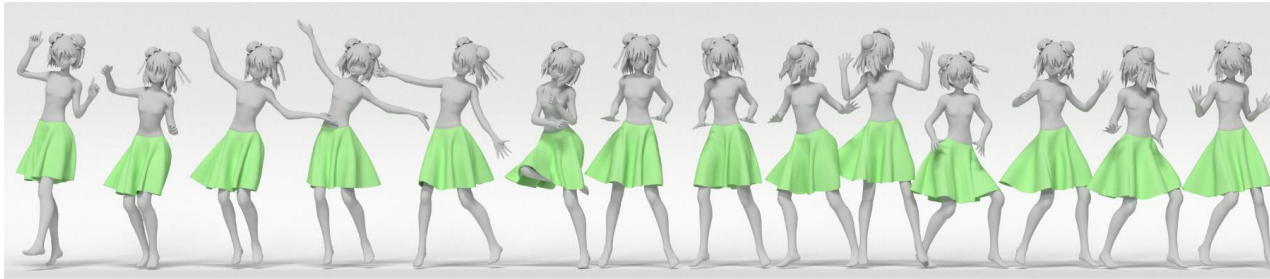


Problem formulation

Character Motion



Garment Animation





A possible approach: physically based simulation

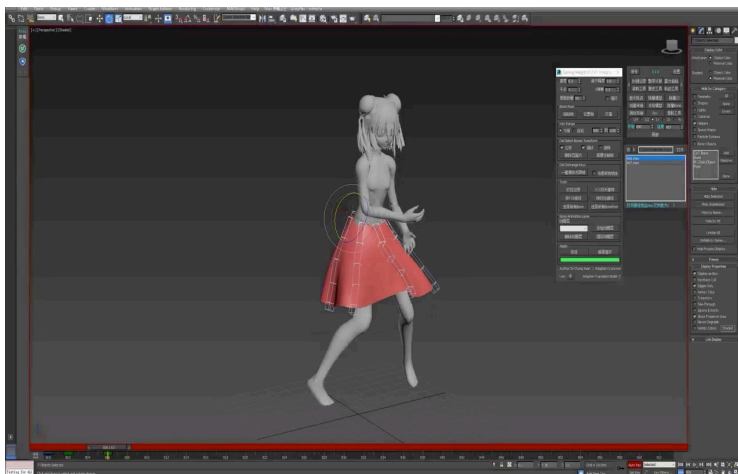
[Tang et al. 2018]



- +) Automatic
-) Lots of parameters
 - Hard to tune as a combination
 - Some parameters lack physical meaning
 - Global parameter set may not exist
 - Parameters interpolation leads to unexpected shape change
-) Difficult to apply shape constrains (keyframe control)



Current workflow: keyframes + interpolation

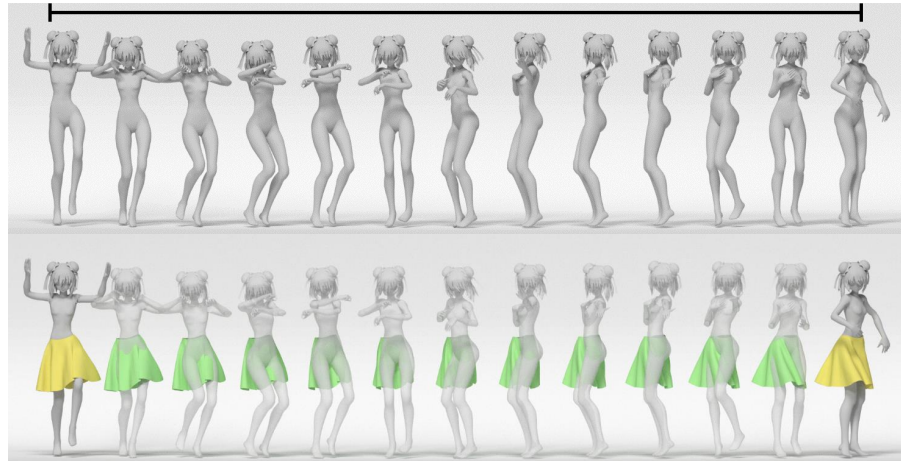


- + full control
- editing a keyframe is labor-consuming
- dense keyframe



Motivation

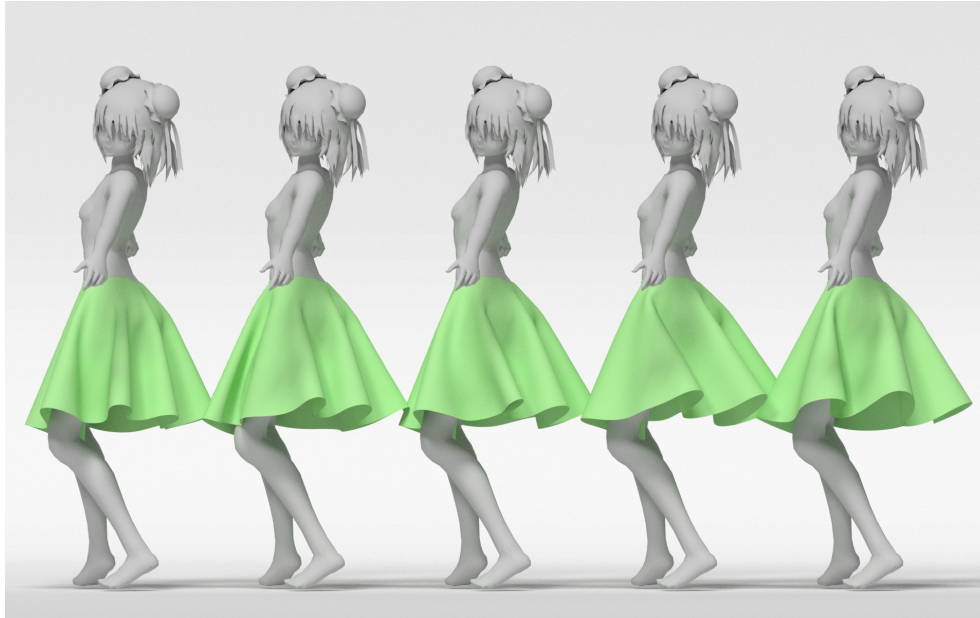
36 frames \approx 1.5s



Can we use fewer keyframes?



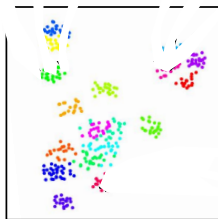
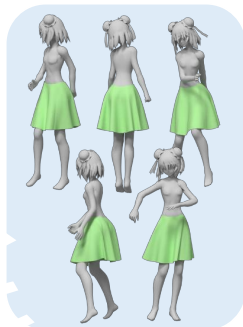
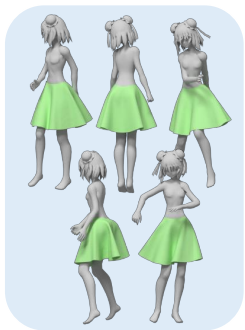
Key observation



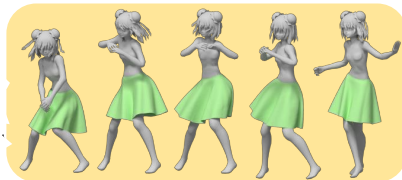
What can be changed in a certain keyframe?

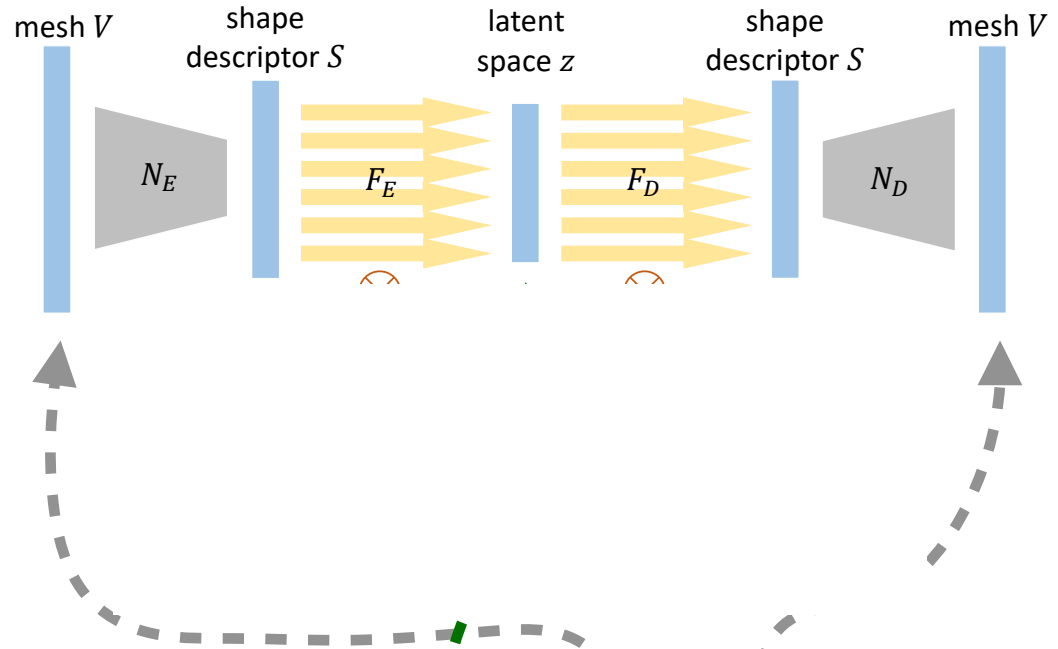


Solution: factor out character motion and motion independent parameters



Latent Space



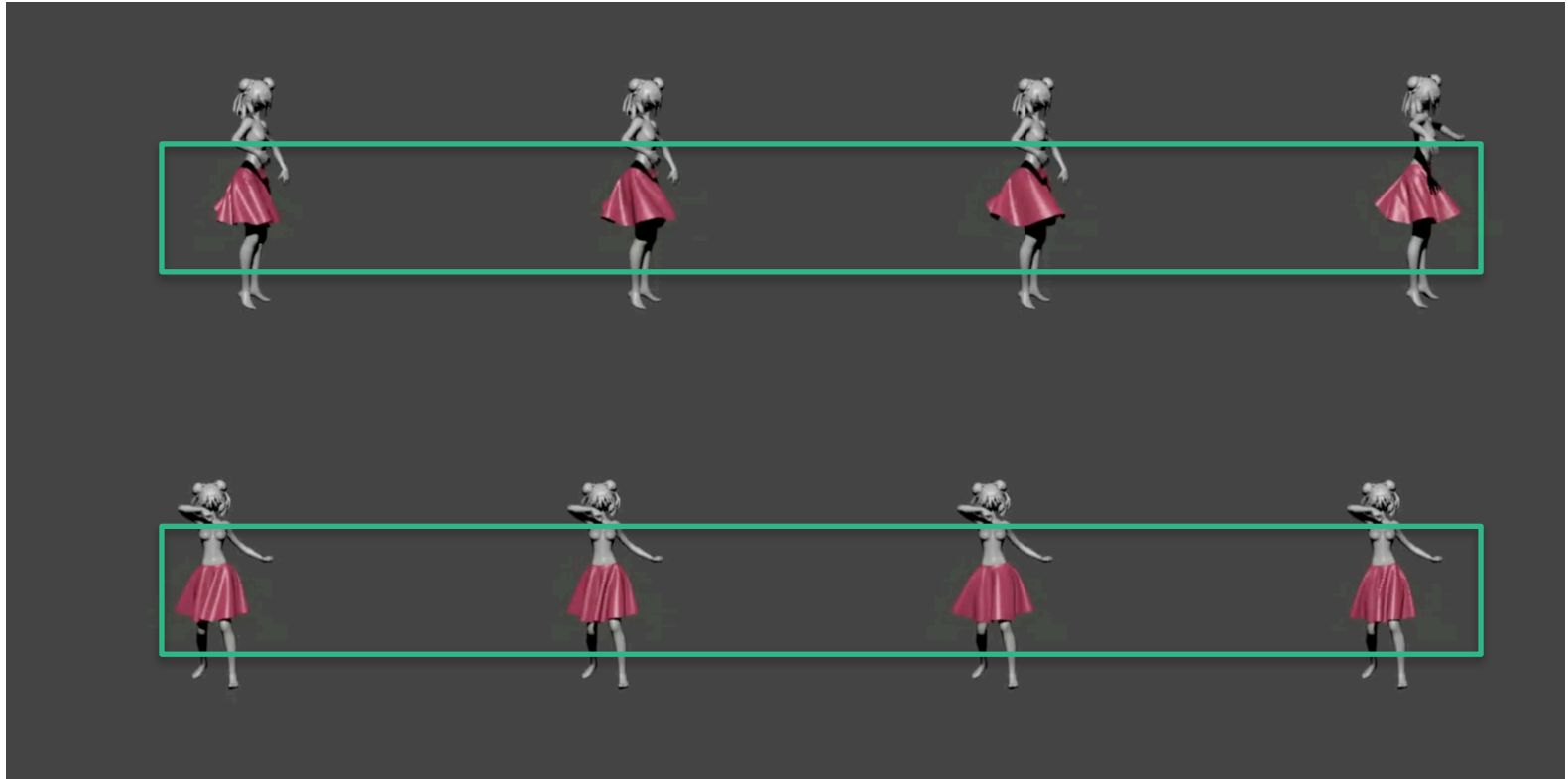


For a batch generated with the same parameters:

$$E = \mathbf{Var}(z) + \lambda \cdot \|S_i - S_i^*\|$$

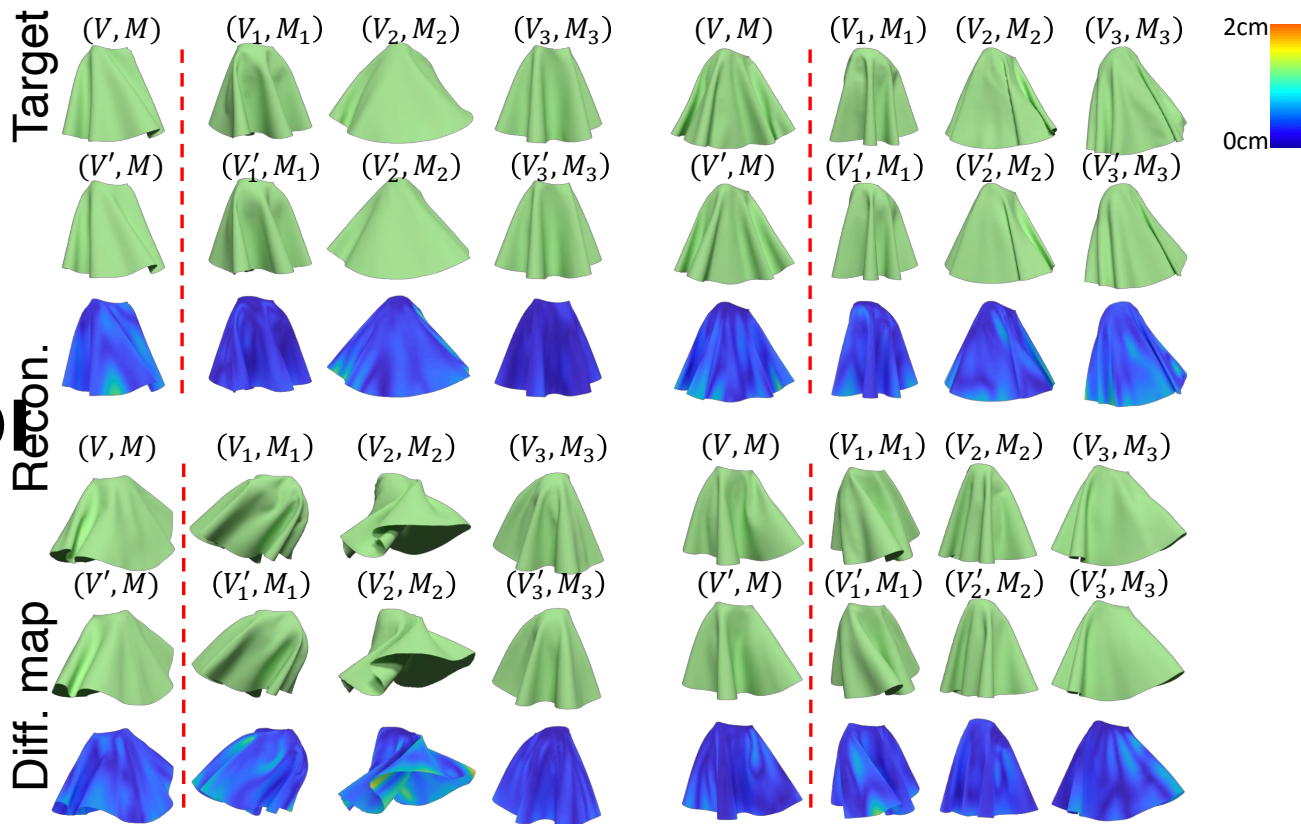


Data generation



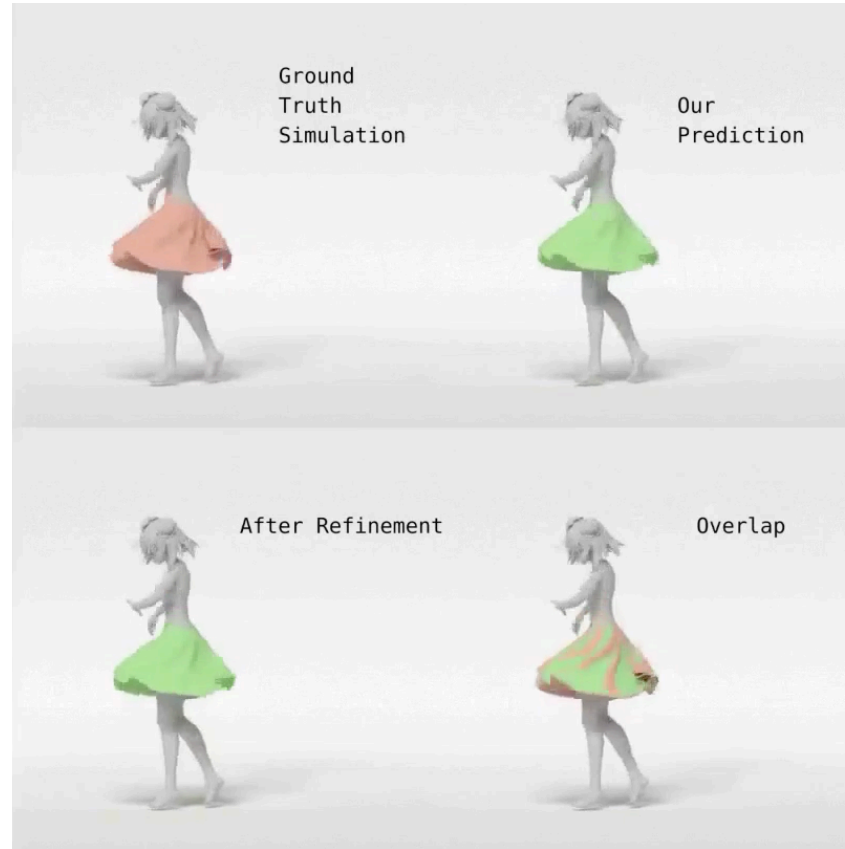


Evaluation





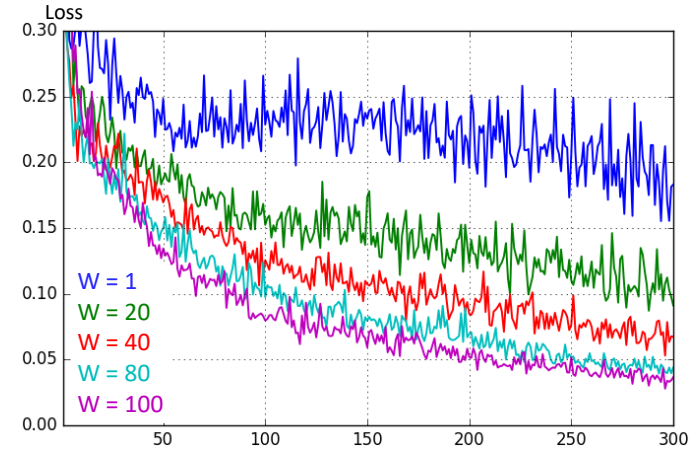
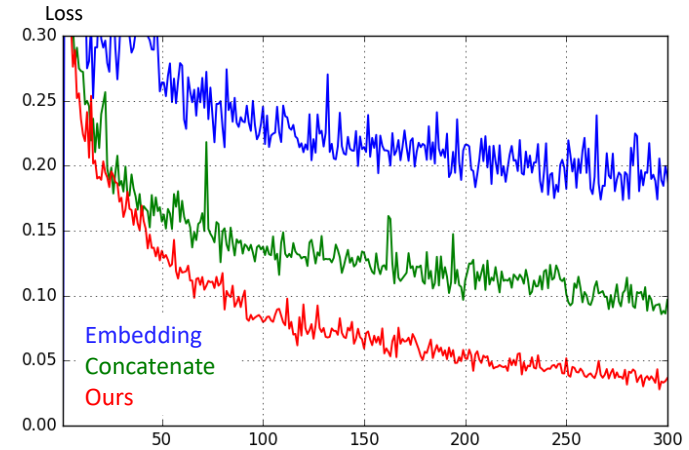
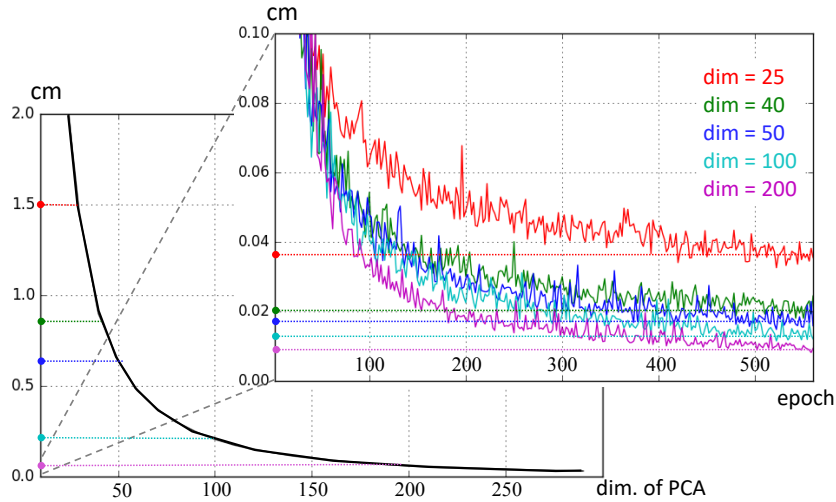
Evaluation





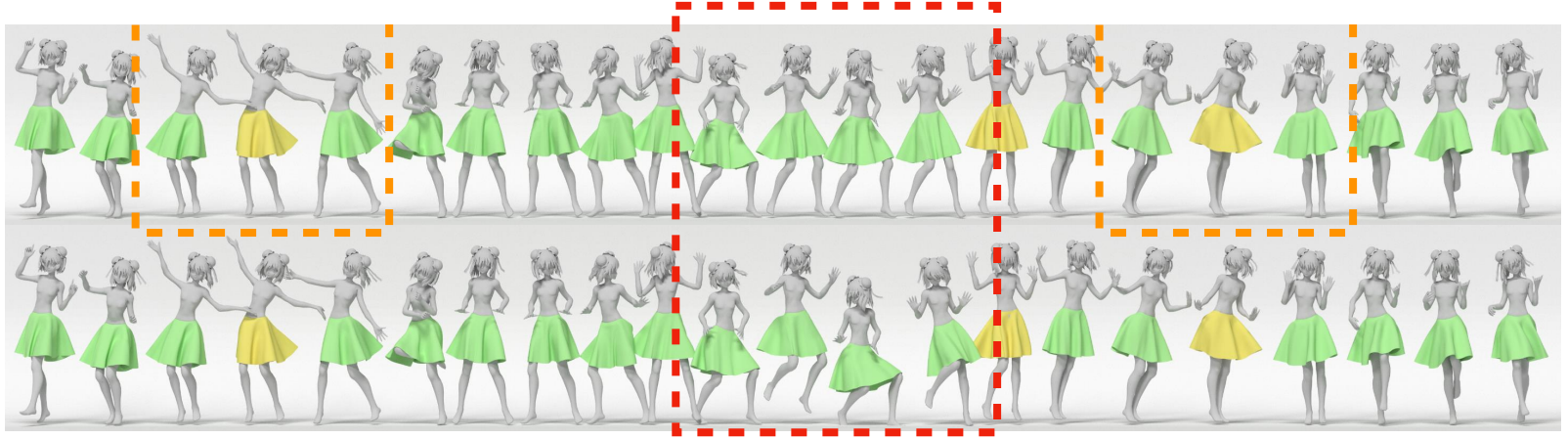
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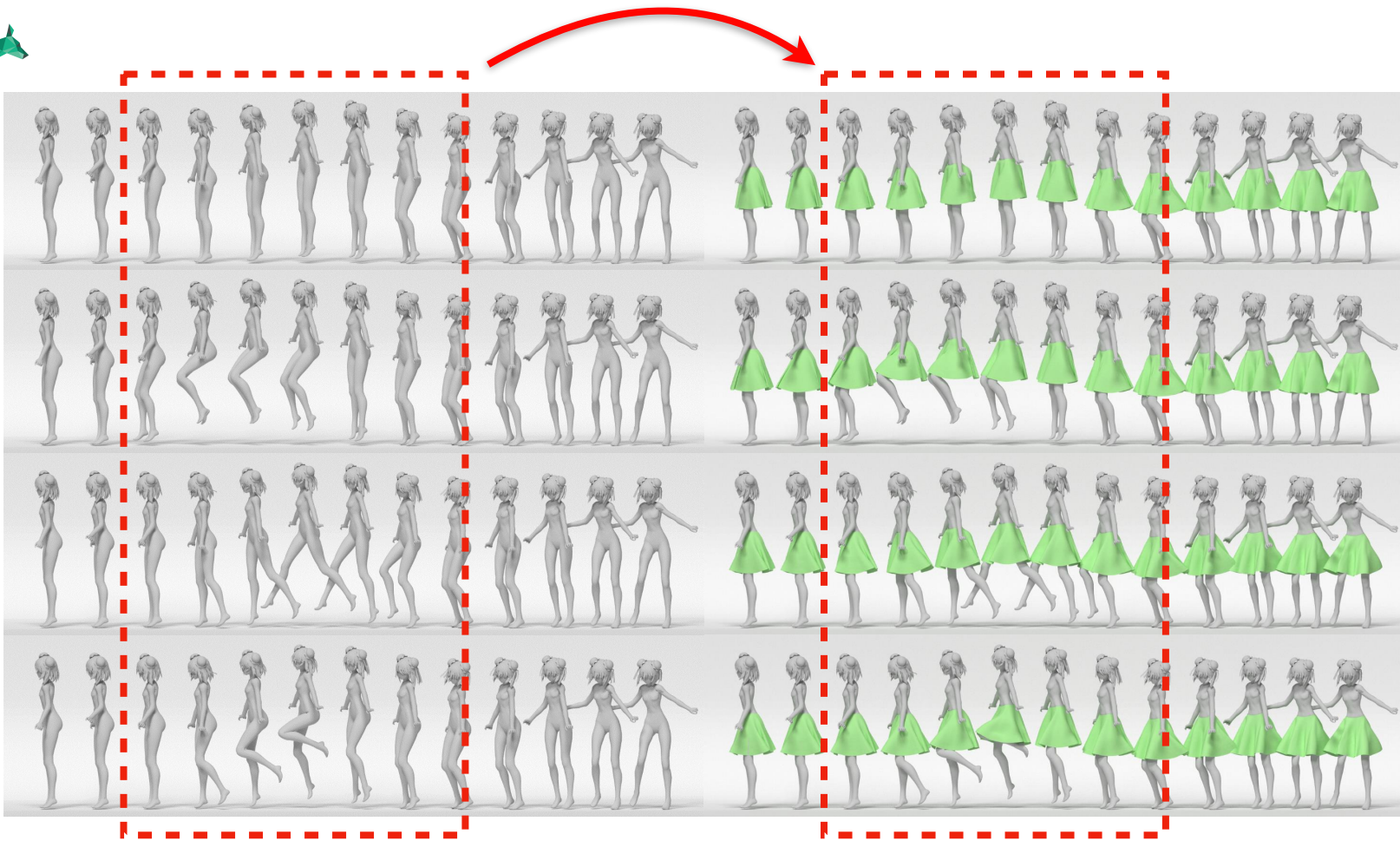
Evaluation





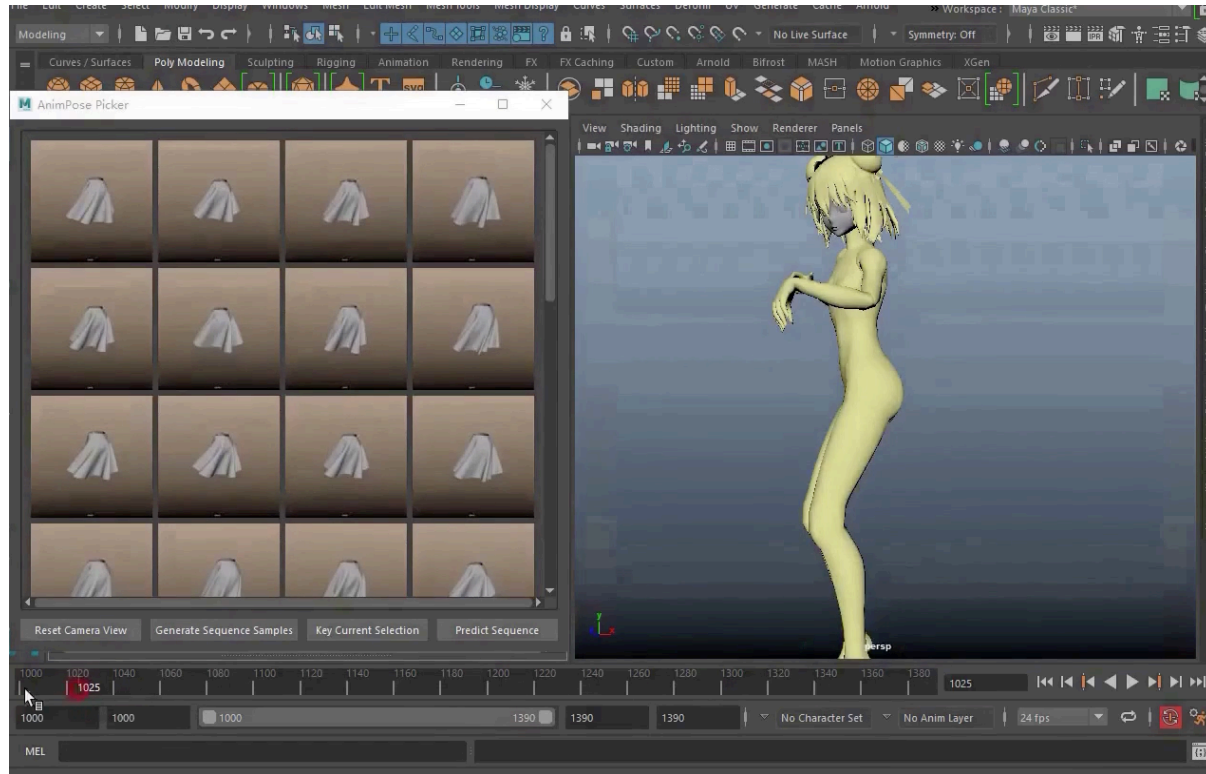
Interactive design pipeline





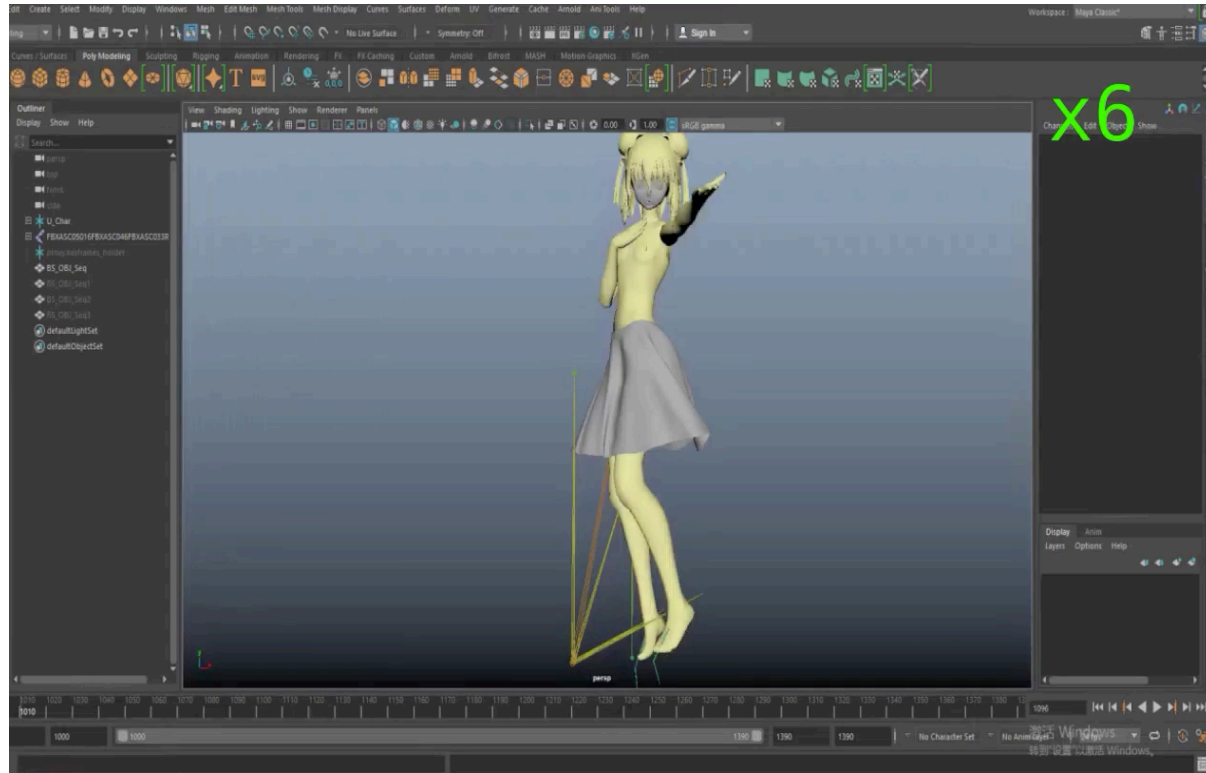


User interface





User interface



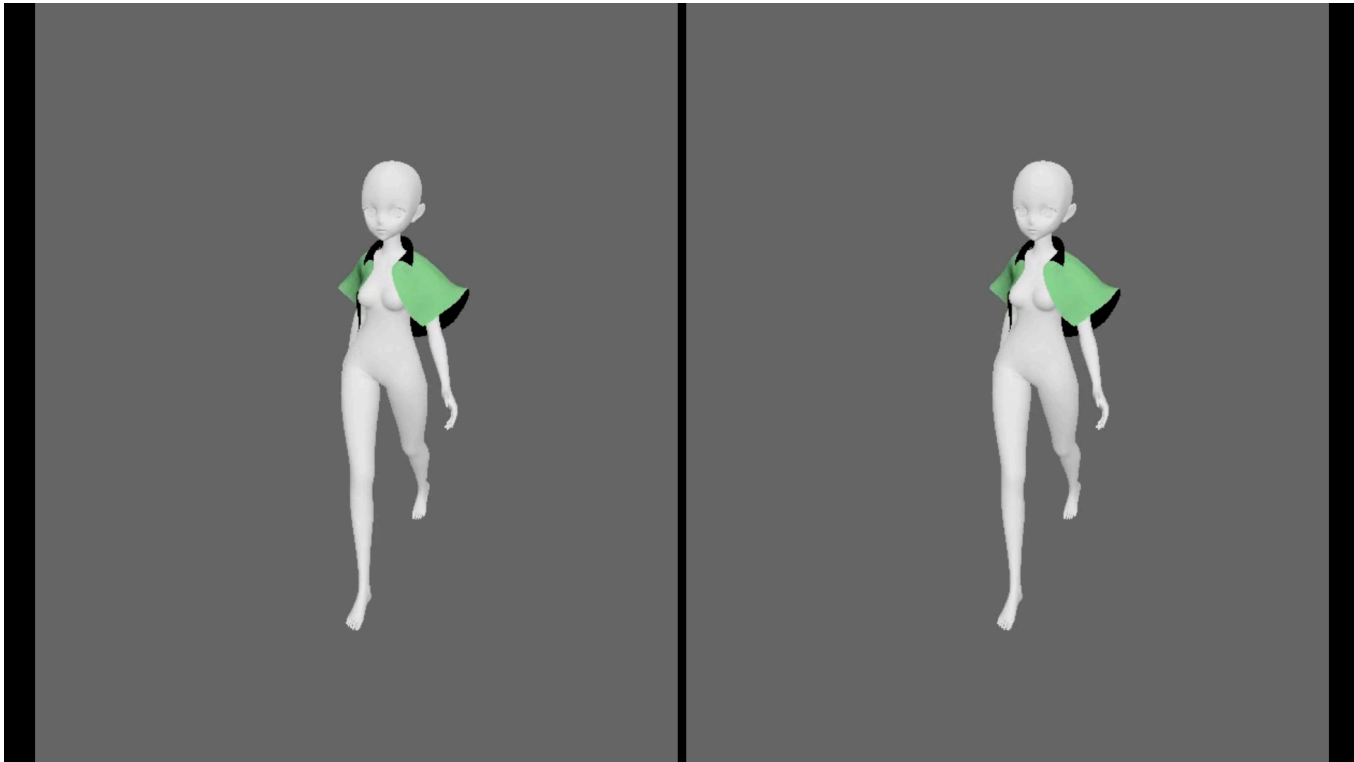


More results



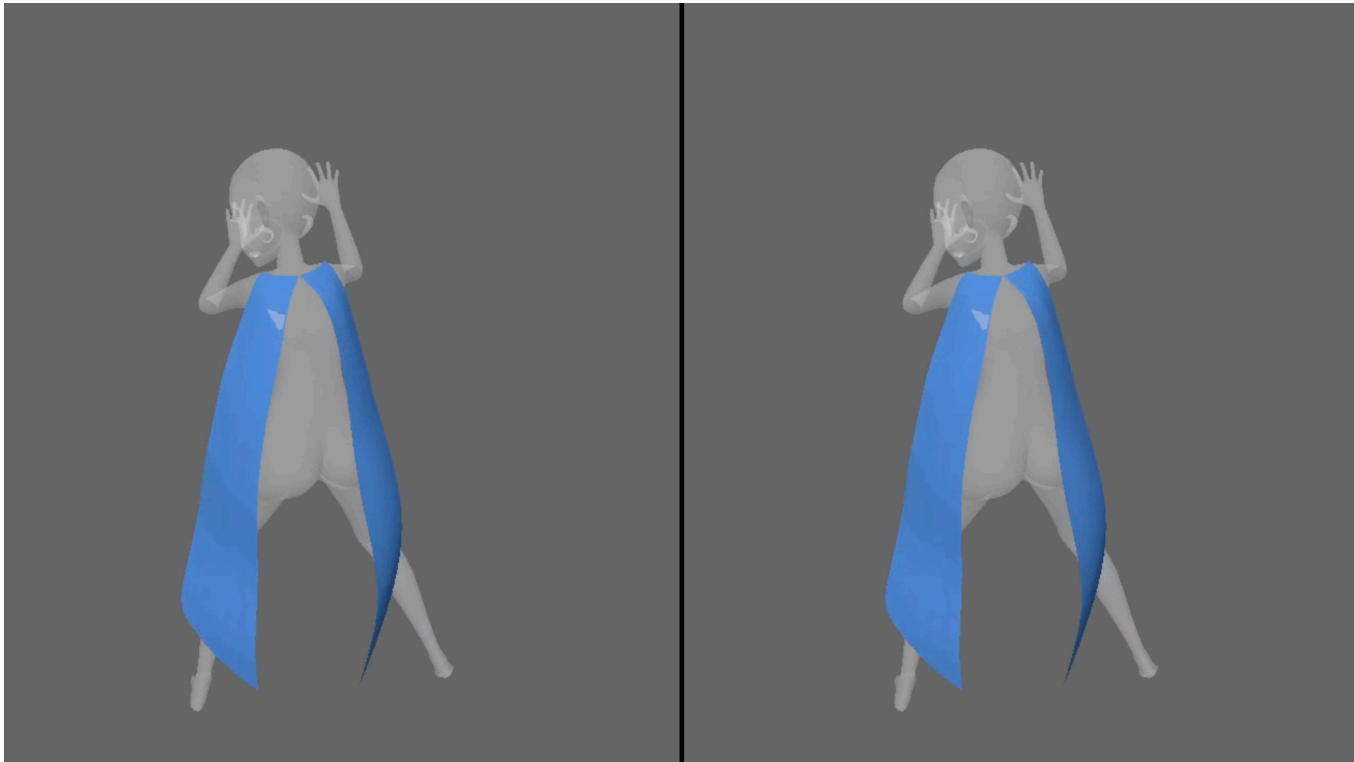


More results



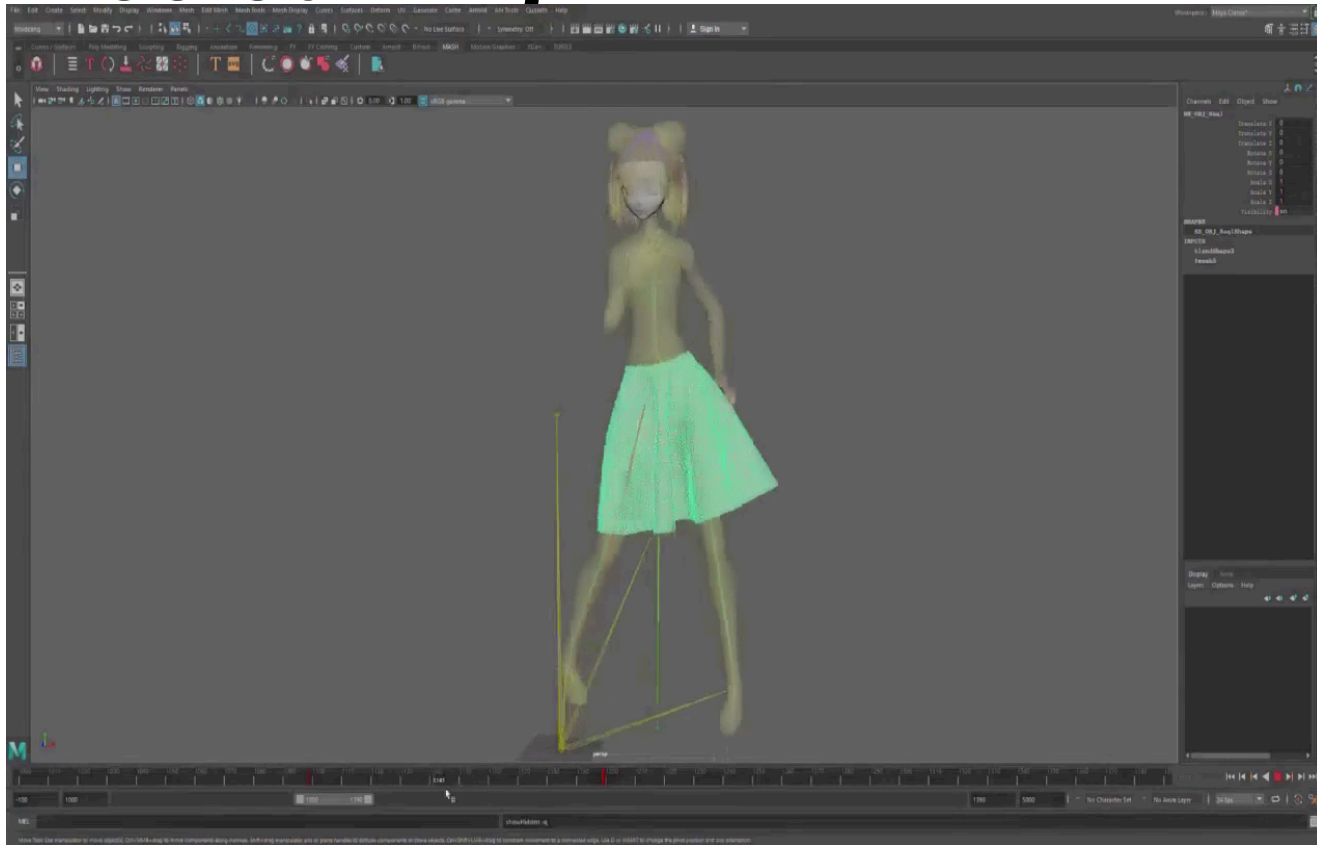


More results



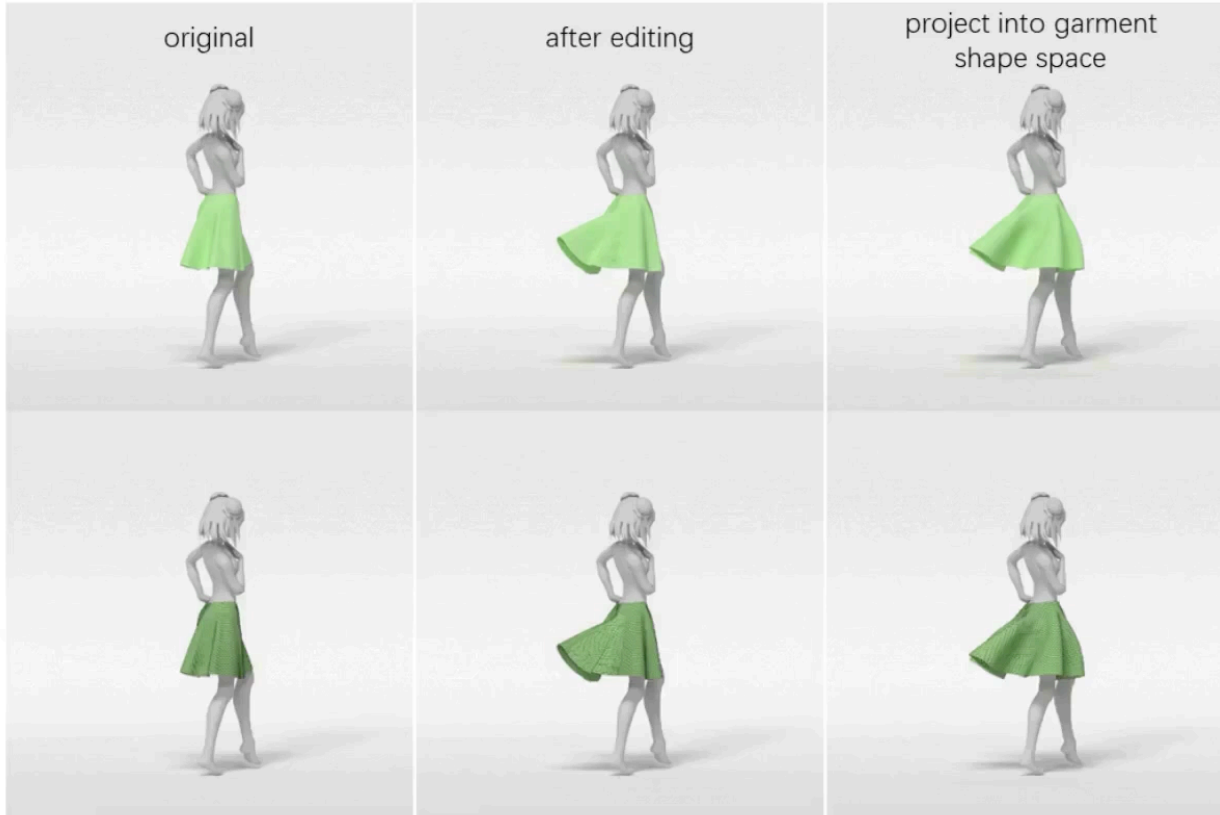


Free editing





Free editing



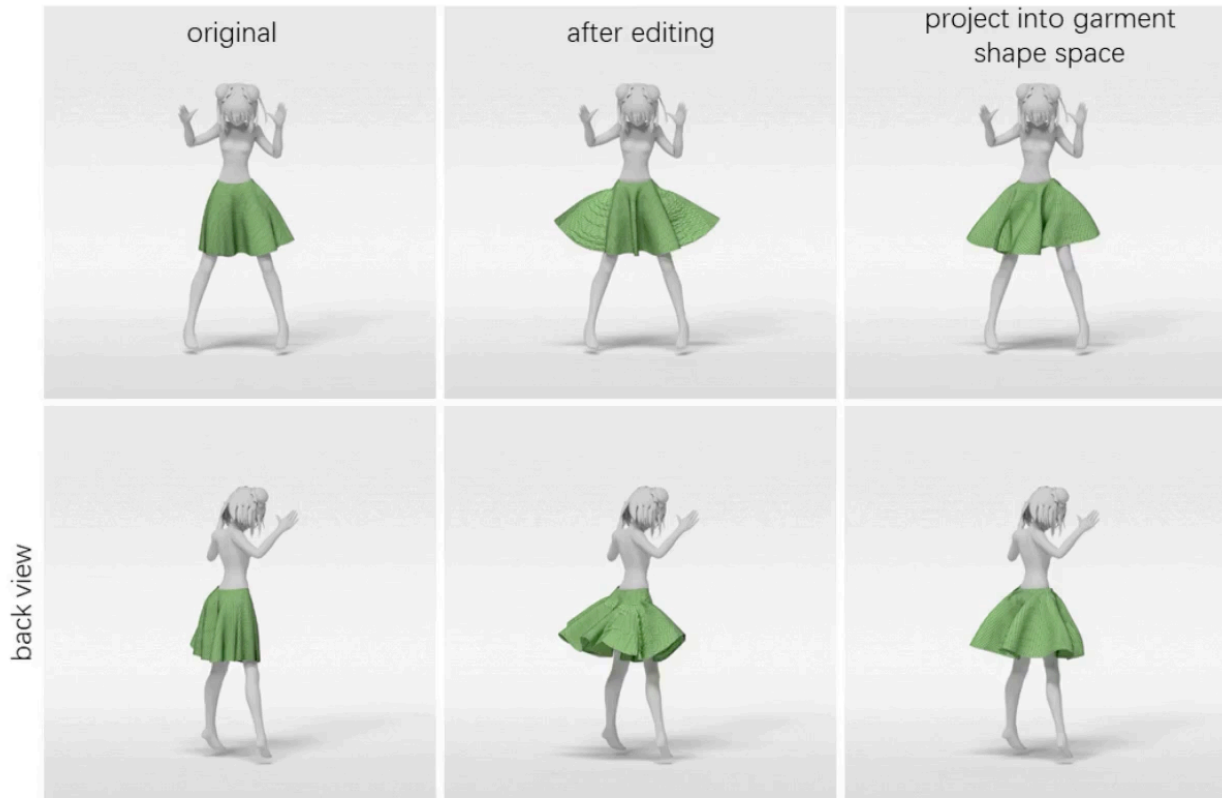


Free editing



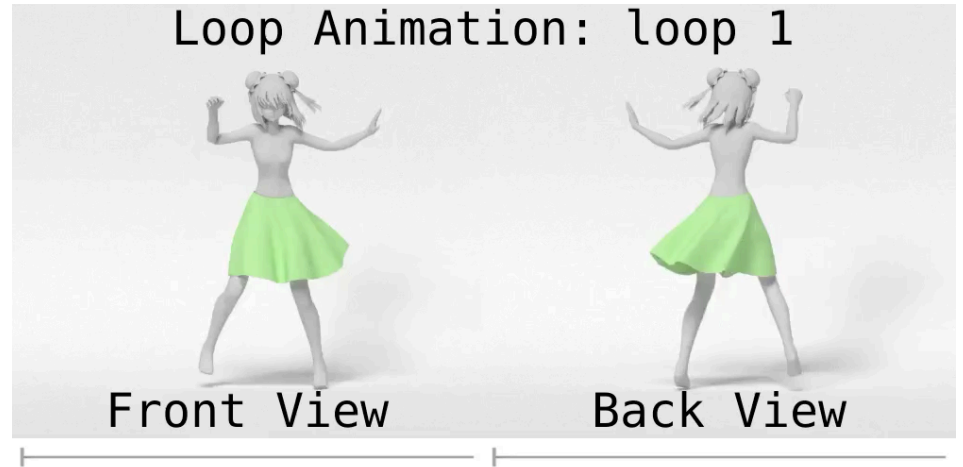


Free editing





Other applications





Limitation & Future work

- Unicode for different types of garment





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Thank you

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