93st MSS-Seminar
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MSS

Position-based Skin Deformations for Interactive Character Animation

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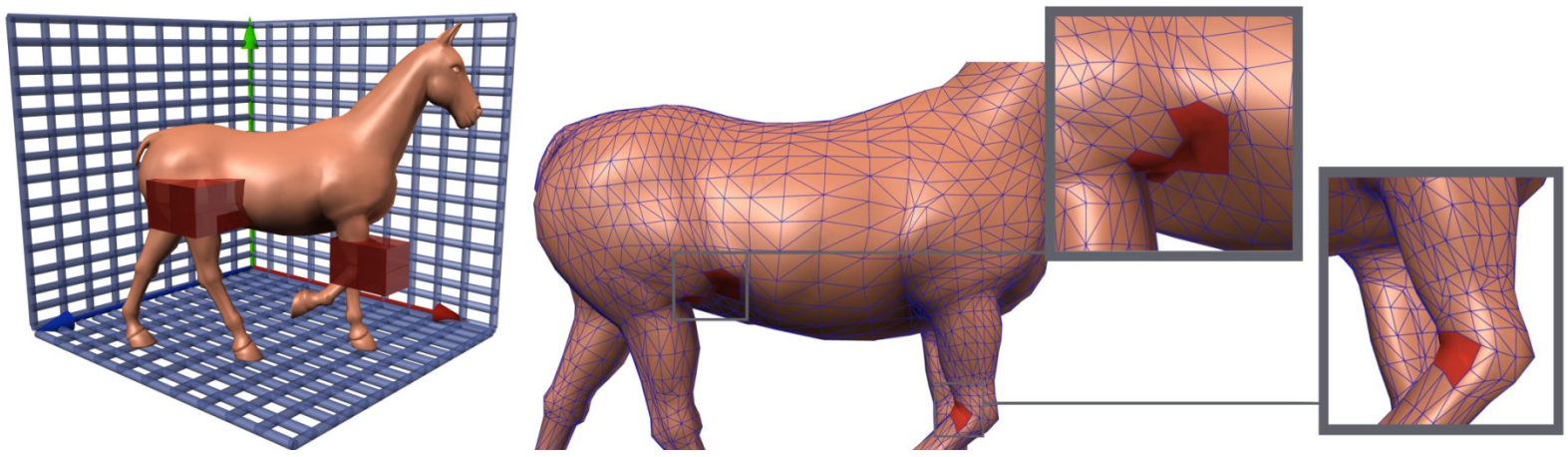

In character animation, skinning is the process of defining how geometric surface deforms according to skeletal poses. Modeling compelling and believable skin deformations is difficult and computationally demanding due to the nonlinear inner mechanics of the flesh. Physics-based skinning methods are able to reproduce realistic motions including secondary effects such as jiggling of soft tissues when the character is moving and volume conservation. Despite offering such realistic effects, physics-based simulation requires complex and intensive computations, and thus itis usually avoided in interactive animations. In this talk, I will be presenting a fast skinning method for soft character animation, suitable for real-time applications. The idea is to create a two-layered deformation schema, the result of which approximates the behavior of the skin. For each frame, the skin is first deformed with a classic linear blend skinning approach,which usually leads to unsightly artefacts like the well-known candy-wrapper effect and volume loss. Then, we enforce some geometric constraints which displace the positions of the vertices to mimic the behavior of the skin and achieve effects like volume preservation and jiggling. We allow the artist to control the amount of jiggling and the area of the skin affected by it. The geometric constraints are solved using a Position-Based Dynamics schema. We also employ a graph coloring algorithm for parallelizing the computation of the constraints. Being based on Position-Based Dynamics guarantees efficiency and real-time performances while enduring robustness and unconditional stability.