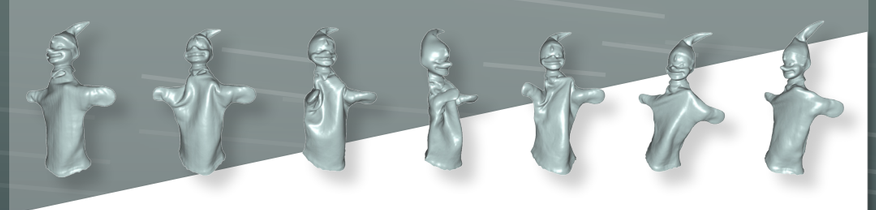
Animation Reconstruction of Deformable Surfaces

Accurate and reliable 3D digitization of dynamic shapes is a critical component in the creation of compelling CG animations. Digitizing deformable surfaces has applications ranging from robotics, biomedicine, education to interactive games and film production. Markerless 3D acquisition technologies, in the form of continuous high-resolution scan sequences, are becoming increasingly widespread and not only capture static shapes, but also entire performances. However, due to the lack of inter-frame correspondences, the potential gains offered by these systems (such as recovery of fine-scale dynamics) have yet to be tapped. The primary purpose of this dissertation is to investigate foundational algorithms and frameworks that reliably compute these correspondences in order to obtain a complete digital representation of deforming surfaces from acquired data. We further our explorations in an important subfield of computer graphics, the realistic animation of human faces, and develop a full system for real-time markerless facial tracking and expression transfer to arbitrary characters. To this end, we complement our framework with a new automatic rigging tool which offers an intuitive way for instrumenting captured facial animations.



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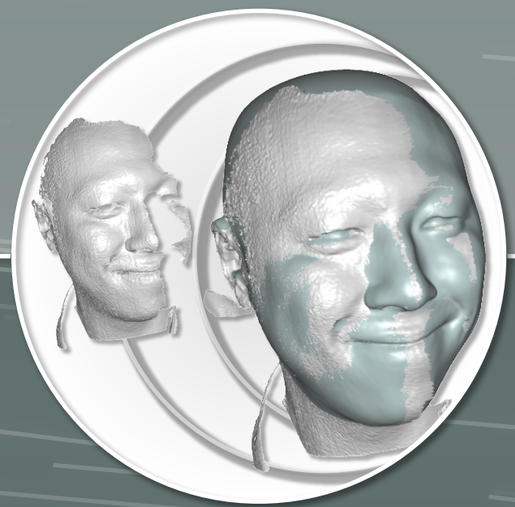

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