Deformable Human Modeling from Medical Image Scans

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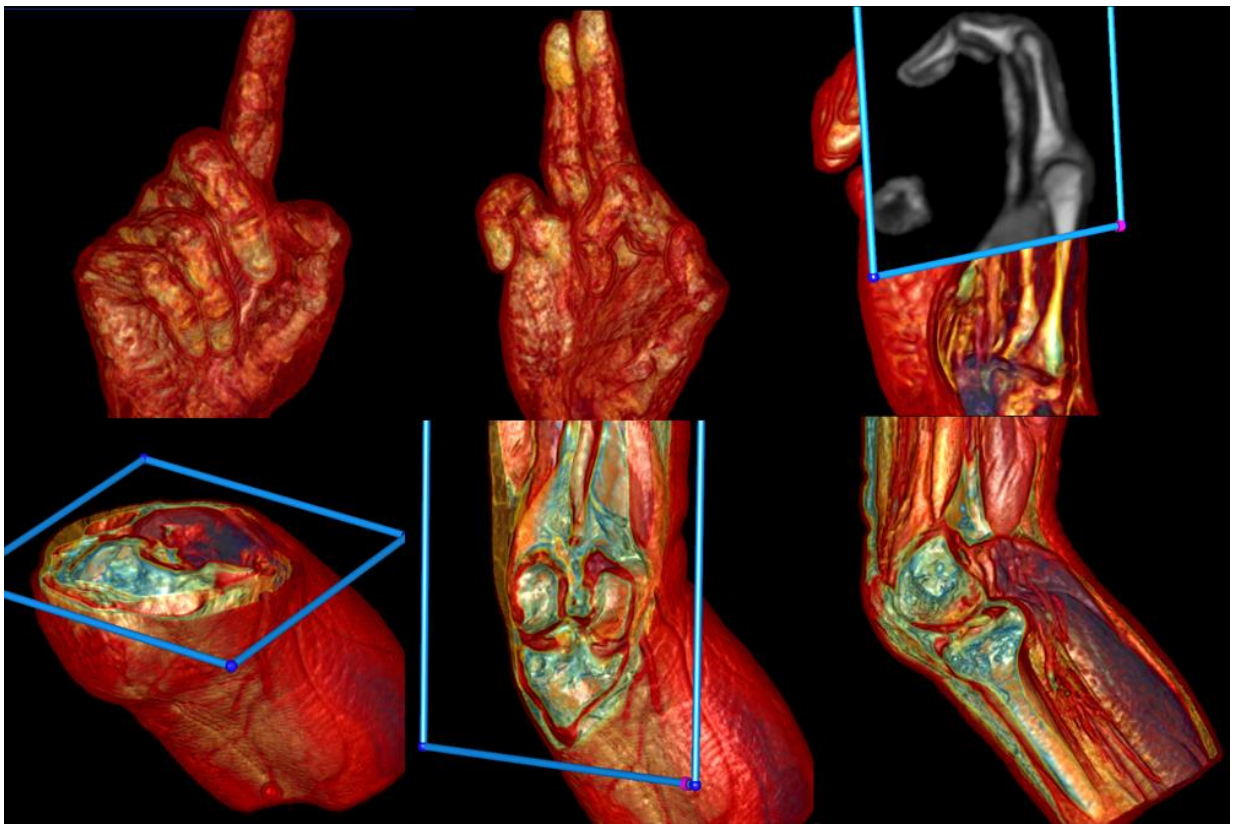

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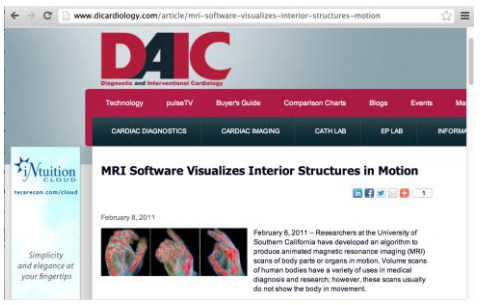

Diagnostic and Interventional Cardiology

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This study describes a complete system to create anatomically accurate example-based volume deformation and animation of articulated body regions, starting from multiple medical volume scans of a specific individual.

In order to solve the correspondence problem across volume scans, a template volume is registered to each sample. The wide range of pose variations is first approximated by volume blend deformation (VBD), providing proper initialization of the articulated subject in different poses.

A novel registration method is presented to efficiently reduce the computation cost while avoiding strong local minima inherent in complex articulated body volume registration. The algorithm highly constrains the degrees of freedom and search space involved in the non-linear optimization, using hierarchical volume structures and locally constrained deformation based on the biharmonic clamped spline.

Our registration step establishes a correspondence across scans, allowing a data-driven deformation approach in the volume domain. The results provide an occlusion free person-specific 3D human body model, asymptotically accurate inner tissue deformations, and realistic volume animation of articulated movements driven by standard joint control estimated from the actual skeleton.

For more information: **www.ncbi.nlm.nih.gov/pubmed/21233517** , **IEEE transactions on visualization and computer graphics**, **Vol17, No3, 2011**