

AbstractID: 7569 Title: An interactive deformable 3D/3D image registration system: radial basis functions

Purpose: Deformable image registration becomes challenging in the existence of noise and/or extrinsic objects such as rectum fillings or gas, and subject to failure. When the registration is unsatisfactory the result needs to be corrected. For this purpose we have developed an interactive 3D/3D deformable registration system that allows users to easily modify the registration using computer input devices.

Method and Materials: The system uses radial basis functions to deform one of the input volumes. Users can edit control points on three orthogonal sectional views: selecting, moving, adding, and removing control points. As the function status changes the renderer updates the views real-time to feed the change back to the user. The system also has automatic local registration features, which utilize box or mask ROI based rigid body registrations to establish correspondences of the selected points.

Results: Real-time rendering is very important for interactive editing. The editing of radial basis functions was possible up to 125 control points without major noticeable delay. The computer was equipped with one 3.0GHz CPU, 2GB system memory, and an NVidia GeForce 6800 graphics adaptor with 512MB GPU memory.

Conclusion: We have developed an interactive deformable 3D/3D image registration system that allows editing radial basis functions interactively. We find this system is useful to correct registration errors after an automatic registration session.