

AbstractID: 3788 Title: A Technique for Dose Reconstruction in Image-Guided Radiation Therapy

Purpose:

Images from volumetric CT-based image-guided radiation therapy (IGRT) can be used to reconstruct the doses delivered to the patient. The goal of this work was to develop a technique for data preparation and dose reconstructions for Megavoltage CT (MVCT) images acquired on a helical tomotherapy system.

Method and Materials:

MVCT images must be processed prior to dose reconstruction. The first step is for the MVCT images to be re-sampled to the dimensions of the kVCT images. The second step was to map the CT numbers (*i.e. electron density*) for the voxels within the MVCT data sets to match the kVCT CT numbers. Next, any missing data in the MVCT images (*due to field-of-view limitations*) must be padded with the data from the kVCT image set. The composite image set was then gaussian filtered. Finally, the treatment-planning cluster was used to re-compute doses based on the MVCT anatomy imaged during a particular fraction.

Results:

The goal of this work was to develop a system to perform dose reconstruction on MVCT images. A process was developed to match image dimensions, boundaries, resolutions and final completion of limited field of view. A custom program was then written that creates an input deck with the appropriate machine parameters, data files and treatment delivery sinogram for dose reconstruction. Dose reconstruction has been performed for prostate, head & neck, and lung cases.

Conclusion:

A technique has been developed to pre-process MVCT data and to perform dose reconstruction.

Conflict of Interest:

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