

AbstractID: 2964 Title: Target volume definition by 4D CT imaging and temporal projections

Purpose: To develop a fast method for the definition of intra thoracic target volumes by 4D CT imaging, temporal projections as well as interactive visualization and drawing. Furthermore, to evaluate the utility of the method in the context of respiratory correlated and gated treatments.

Method and Materials:

After retrospectively gated 4D CT scanning, a 4D dataset comprising three-dimensional datasets corresponding to different phases of the breathing cycle is reconstructed. For the purpose of respiratory correlated or gated radiation treatments, after visual assessment of the magnitude of the lesion motion with respect to the respiratory signal, a subset of the 4D dataset is collapsed/projected in the time dimension with user selectable transfer function. Some sensible choices are maximum intensity or average value projections. Then, for a particular 2D slice, the user defines a target contour on the composite temporal projection image. Upon completion of the drawing, cine loop is played through time for the particular slice. If corrections are necessary, the cine is stopped: the user browses through the various time points of the particular 2D slice and adjusts the contours. Once the adjustments are completed, the target definition process continues with the next slice.

Results:

The proposed method was implemented in a software prototype and evaluated for several datasets. In comparison to the scenario of drawing target volumes on temporally sequential 3D datasets, the proposed method reduces target definition times by a factor of 5 to 10.

Conclusion:

A fast and efficient method has been developed for the definition of intra thoracic target volumes to be used in the planning of respiratory correlated or gated radiation treatments.

Conflict of Interest (only if applicable): Research supported by Siemens.