

AbstractID: 3953 Title: Generic motion kernels for treatment planning incorporating interfraction motion.

Purpose:

To generate motion kernels for treatment planning incorporating interfraction motion.

Method and Materials:

Patients undergo MVCT guided tomotherapy treatments were enrolled in this study. Patients were set up using skin markers and lasers; daily MVCT images were acquired; the MVCT images were then registered to treatment planning KCVT by automatic and/or manual rigid body image registration. Patient shift was recorded and analyzed. Up to date, data from seven lung cancer and nine prostate cancer patients were acquired.

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Patient shifts were grouped according to the diseases and plotted in histogram. Generic motion kernels were derived by fitting distribution profiles into functions. For verification purpose, the daily shifts for each individual patient were also analyzed and compared to the generic ones.

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Results:

The daily patient shifts are principally normal distributions. Generic motion kernels were obtained for lung patients and prostate patients by fitting the distributions into Gaussian functions. The standard deviations in x, y and z directions were 0.4, 0.62 and 0.62 cm for the lung and 0.32, 0.74 and 0.63 cm for the prostate. The standard deviations of individual patients range from 0.21 to 0.33 cm in lateral direction, 0.19 to 0.57 cm in longitudinal direction and 0.21 to 1.47 in vertical direction. The mean values significantly deviated from zero.

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Conclusion:

Generic interfraction motion kernels obtained from large group of patients can be used for inverse or forward treatment planning to account for interfraction motion.

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