AbstractID: 5249 Title: Inter-observer Variation In The Planning Of Head/Neck Radiotherapy

Purpose: Understanding inter-observer variation is not only important for evaluating deformable image registration (DIR) which can be used to automatically transform the manual contours of a treatment plan into daily contours facilitating offline or online adaptive radiotherapy, but also helps physicians set reasonable margins on the regions of interest (ROI) when they make treatment plans. The purpose of this study is to determine the observer variation for Head/Neck patients using the implemented radial-difference approach and the common-area method to study the observer-drawn contour pairs.

Method and Materials: Two sets of images for each of seven head and neck patients were taken several weeks apart, and the original image sets were used for treatment plans. For each image set, the ROIs: Primary GTV, Nodal GTV, Cord, left Parotid, and right Parotid were contoured by three experienced physicians. The difference of two contours drawn by different physicians was measured using: (1) the radial difference of the paired contours where the center-mass of a contour is used as the origin of the polar coordinate system, and (2) the ratio of the common area of two contours over the total area of those contours, $R = 2[(C1 \bigcap C2)/(C1 \bigcup C2)]$. Results for all the ROI are plotted in histograms to quantify the observer variation.

Results: The radial differences for primary GTV, nodal GTV, cord, left parotid, and right parotid are 2.7 ± 2.0 mm, 2.4 ± 1.9 mm, 1.8 ± 0.8 mm, 2.6 ± 2.1 mm, and 2.5 ± 1.9 mm, respectively, and the values of R are 0.75 ± 0.14, 0.82 ± 0.11, 0.82 ± 0.07, 0.80 ± 0.10, and 0.80 ± 0.12, respectively.

Conclusion: The inter-observer variations in the planning of Head/Neck patients are about 3 mm for Cord and 5 mm for the others. These values place an upper limit on the accuracy of DIR algorithm.