AbstractID: 1829 Title: Non-linear Warping: Targeting prostate cancer using magnetic spectroscopic images

Image registration is an important step in the treatment planning process. It provides a method to incorporate different types of diagnostic imaging information. One such application is to combine magnetic resonance spectroscopic images (MRSI) of the prostate with computed tomography images that are routinely used in the radiation treatment planning of prostate cancer. The presence of an endo-rectal coil poses a potential problem for the radiotherapy planning of the prostate. The coil deforms the prostate when it is filled with approximately 100cc of air required during MRS image acquisition. The inflated coil pushes the prostate superiorly and anteriorly, deforming the prostate anatomy in a non-linear manner. Consequently this deforms the spectroscopic imaging data as well. At our clinic, patients receiving radiation treatment for prostate cancer will not have that their prostate deformed in this manner. Currently, we are able to overcome this problem by applying a three-dimensional, non-linear transformation to the deformed prostate. By specifying 'tie-points' from each slice of the deformed data set and the non-deformed data set, we are able to use a simple three-dimensional polynomial transformation to map the MRS data onto the non-deformed data set. Accuracy estimates were obtained by analyzing physician contours on MRI data sets for a deformed (coil inflated) and non-deformed (coil deflated) patient. Results indicate for this ~125 cc prostate, that the method corrects the non-deformed case to an accuracy similar to the estimated intra-observer variability of +/-0.2 cc.