AbstractID: 8283 Title: Automated Detection of Gold Seeds in Prostate Electronic Portal Images

Purpose: Implanted gold seed markers are currently used to localize the relative prostate position in prostate electronic portal images during radiation therapy. This study describes a new algorithm that automatically identifies the gold seed marker positions in the Anterior-Posterior (AP) and Lateral (LAT) prostate electronic portal image pairs. **Method and Materials:** Four prostate patients were imaged on a Siemens Oncor linear accelerator using standard AP and LAT image projections. The automated detection algorithm includes two phases: The first phase is to preprocess the image by passing a selected bandpass filter, including "Intensity Autoscale" and "Contrast Saturation" functions to produce a better visual contrast of the three gold seeds; The second phase is to do automatic detection by utilizing "Prewitt" edge detection method to convert the image into black and white image, and then detecting each gold seed position in a pre knowledge based selected window for AP and LAT images. The automatic detection algorithm was written in Matlab, and the detection results were compared to the positions which we marked in EPID images by using ImageJ. **Results:** For all the collected images, the gold seed markers are clearly visualized on the preprocessed images. We tested 8 pairs (AP/LAT) of images using the automatic detection algorithm and compared the gold seed positions to the manually marked seed positions. The automatic detection algorithm is able to locate the seed to within ±4 pixels (which is within ±1.6mm) of the manual seed location. **Conclusions:** This method improves visualization of EPID images and also has good accuracy for localizing the position of gold seeds on AP and LAT projections. Future work will adapt the localization algorithm for routine clinical use for the automatic detection of gold seeds in prostate EPID images.