AbstractID: 7278 Title: A semi-manual contouring method in TCS views

Purpose:
Contouring plays an important role in radiation therapy. The traditional slice-by-slice manual contouring method is very time-consuming. There have been several automatic and semi-automatic segmentation methods proposed to make contouring easier. However, those methods are limited by the image quality and image features. In particular, all those methods fail in the prostate region where both prostate and rectum are difficult to segment.

Methods:
The contouring method we propose here only requires a few manual contours drawn in TCS (transversal, coronal, and sagittal) views. Our algorithm will then generate a 3D surface based on those manual contours. This method consists of two steps. The first step is a surface-fitting process (the same principle as curve-fitting). It determines a surface that approximates the manually drawn contour/control points. Different model is used for different organ (prostate, rectum) to create fit surface. The second step is a surface deformation process. A smooth deformation field is created automatically to deform the surface so that it passes through the manual contour points. This makes sure that the resulting surface conforms to the given contours.

Results:
This algorithm is very fast and user interactions can be easily incorporated. The algorithm was tested on 39 prostate and rectum cases and the results match manual contour results very well. Five manual contours are used. The false-negative rate is around 0.07-0.08 and the speed-up is around 3-5.

Conclusions
We have presented a semi-automatic method that only require human operator to draw a few manual contours to delineate a 3D structure. This method will produce a smooth contour and it is very robust.