

# CT Data Segmentation Based on Reference Skeleton Model

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## Abstract

Reliable segmentation of CT data is an essential preprocessing stage for radiotherapy planning. During the radiotherapy treatment, which usually consists of a series of medical procedures spread over time, the patient body and tumor size can change. This may cause the need for replanning the process [1]. Using individualized, realistic, digital model of the patient body can simplify and speed-up the task of replanning. Precise segmentation of the patients skeleton is a key-point for such an approach since the skeleton is the most invariant structure of the body. The paper presents a novel method of CT data processing. To extract skeletal structure of the patient, a reference model of the human skeleton is used. The method allows to obtain a surface or volume model of the patient bones which correspond with the CT data. The main advantage of the presented approach is the controllable smoothness and complexity of the result. This smoothness is obtained by morphing [2, 3] of the reference model to match the CT. In the first phase the affine transformation is applied to the reference model to bring it as close as possible to the CT data. Then consecutive one bone models are matched against the CT to find the input data for morphing. The morphing algorithm is applied to each bone, transforming the reference skeleton into the patient's one. The presented method is implemented in Python with extensive use of VTK library.

## References

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