ABSTRACT

The present invention relates to a method for classification of an organ in a tomographic image. The method comprises the steps of receiving (102) a 3-dimensional anatomical tomographic target image comprising a water image data set and a fat image data set, each with a plurality of volume elements, providing (104) a prototype image comprising a 3-dimensional image data set with a plurality of volume elements, wherein a sub-set of the volume elements are given an organ label, transforming (106) the prototype image by applying a deformation field onto the volume elements of the prototype image such that each labeled volume element for a current organ is determined to be equivalent to a location for a volume element in a corresponding organ in the target image, and transferring (108) the labels of the labeled volume elements of the prototype image to corresponding volume elements of the target image.

Fig. 1

WE CLAIM:

1. Method for classification of organs in a tomographic image, wherein the method comprises the steps of:

receiving (102) a 3-dimensional anatomical tomographic target image comprising a water image data set and a fat image data set, each with a plurality of volume elements,

providing (104) a prototype image comprising a 3-dimensional image data set with a plurality of volume elements, wherein a sub-set of the volume elements are given a organ label,

transforming (106) the prototype image by applying a deformation field onto the volume elements of the prototype image such that each labeled volume element for a current organ is determined to be equivalent to a location for a volume element in a corresponding organ in the target image,

transferring (108) the labels of the labeled volume elements of the prototype image to corresponding volume elements of the target image,

wherein similarly labeled volume elements in the target image define an organ volume representing a current organ,

extending (110) said organ volume to the entire organ based on properties in the target image,

calibrating the target image based on labeled organs in the water image data set, wherein each labeled volume element in the target image is given a predetermined water value, and

subtracting said predetermined water value with that labeled volume element's fat value in the fat image data set.

2. Method according to claim 1, wherein the step of extending (110) the organ volume comprises detecting an edge of the organ in the target image.

3. Method according to claim 1 or 2, wherein the method further comprises a step of manually entering (112) a label to, or removing a label from, a volume element in the

target image, wherein said manual step is followed by a redefinition of the organ volume referring to the present label.

4. Method according to any of the claims 1-3, wherein the step of transforming (106) the prototype image comprises applying a non-rigid co-registration of the prototype image onto the target image to increase the similarity between the prototype image and the target image, and wherein the non-rigid co-registration provides said deformation field representing a deformed prototype image.

5. Method according to any of the preceding claims, wherein said tomographic image is received from a magnetic resonance (MR) scanner or a computed tomography (CT) scanner.

6. Method according to any of the preceding claims, wherein the method further comprises the step of removing the label of a first labeled volume element in the target image based on an analysis of said first labeled volume element compared to a similarly labeled second volume element in the target image.

7. Method according to claim 6, wherein said analysis comprises an analysis of said first labeled volume element in the water image data set and in the fat image data set compared to the similarly labeled second volume element in the water image data set and the fat image data set.

8. Method according to claim 6 or 7, wherein the step of removing a first labeled volume element comprises determining a water-fat relationship for the first labeled volume element, comparing said water-fat relationship with a corresponding water-fat relationship for the similarly labeled second volume element in the target image, and removing the first labeled volume element based on said comparison.

9. Method according to claim 6, wherein said analysis is based on the first and second labeled volume elements' geometric location in the target image.

10. Method according to claim 6, wherein the prototype image comprises an indicator on which said analysis is based.

11. Method according to any of the preceding claims, wherein the step of providing (104) a prototype image comprises providing a plurality of prototype images, wherein the step of transforming the prototype image comprises transforming the plurality of prototype images, which step is followed by a step of determining which of the transformed prototype images that best corresponds to the target image.

12. Method according to any of the claims 1-10, wherein said prototype image is a mirrored copy of said target image.

13. Method according to claim 1, wherein the method further comprises a step of interpolating the labeled volume elements into a homogeneous organ volume based on the predetermined water values in the labeled volume elements.

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