Easy-to-Assess Image Registration

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WARF: P110163US02

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a more intuitive method for visualizing the image registration mappings used in radiation treatment planning.

Overview

In radiation therapy it is essential to target the malignancy while sparing healthy tissue. To help plan treatment, a tumor or other target is identified and delineated in medical images, along with at-risk organs and other regions where radiation dosage must be limited.

'Image registration' is an important tool in the process, helping align objects of interest (OOIs) and transferring other image data across images taken at different times. The tool also enables adaptive planning, in which a clinician transmits the treatment plan and OOIs to a new image acquired during the course of therapy. This is done using a mapping technique, such as a transformation matrix or deformation vector field (DVF) created by a registration algorithm. Accurate and precise mapping is critical to minimize errors.

Unfortunately, current schemes for visualizing and understanding image registrations rely on arrows, color coding or overlaid distorted grids. These all require interpolation on the part of a user trying to correlate specific points on two different images. A more intuitive approach would be greatly beneficial.

The Invention

A UW–Madison researcher and others have developed a program that allows specific correlated points to be clearly displayed on two different medical images. This helps visualize landmarks and flag any errors in the mapping process.

Specifically, a computer is programmed to receive the two different images, register them and display them side-by-side. The user identifies a feature in one of the images. The location of this feature in the second image according to the registration is then determined using the transformation matrix or DVF, and highlighted for the user. Disparities, such as differences in pixel value, also may be displayed. This makes any misalignment visually apparent and provides an efficient method of validating image registration accuracy.

Applications

- Radiation treatment planning software

Key Benefits

- More intuitive display
- Image features can be mapped in real time.
- Coding (e.g., color coding) can be employed to show shearing effects of a surface.
- Cuts processing time
- Capable of 3-D displays

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Additional Information

Related Technologies

- WARF reference number P110232US01 describes a corrective strategy to minimize discrepancies resulting from inverse-inconsistent and non-transitive DVFs in radiotherapy dose accumulation.

Tech Fields

- Radiation Therapy : Treatment planning

For current licensing status, please contact Jeanine Burmania at jeanine@warf.org or 608-960-9846