

Review of: "Deep Learning in Medical Image Registration: Introduction and Survey"

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Potential competing interests: No potential competing interests to declare.

The paper comprehensive overview of the topic of image registration in the field of medical imaging. It covers various essential aspects of image registration, from the basic concept to advanced techniques, applications, and potential future directions.

This abstract serves as an informative and well-structured introduction to the complex field of image registration in medical imaging. Image registration is a crucial process that enables the alignment of medical images in a standardized reference frame, facilitating the work of medical practitioners. The abstract begins by defining image registration and its significance in medical imaging, emphasizing the need for alignment in terms of rotation and scale.

One of the notable strengths of this paper is its ability to cater to a diverse audience, from those seeking a basic understanding of image registration to those interested in more advanced techniques. It introduces the topic using a simple numeric example, which can help newcomers grasp the concept, while also delving into the intricacies of various image transformation methods, including affine, deformable, invertible, and bidirectional transformations.

Furthermore, the paper provides a comprehensive overview of popular medical image registration algorithms, giving readers a sense of the diversity of approaches available, such as Voxelmorph, Demons, SyN, Iterative Closest Point, and SynthMorph. It also explores the concept of atlas-based registration and multistage registration techniques, demonstrating a clear understanding of the subject matter.

The inclusion of discussions on medical image registration taxonomies, datasets, and evaluation measures, such as correlation-based metrics, segmentation-based metrics, processing time, and model size, showcases the abstract's commitment to providing a holistic view of the field. This will be valuable to researchers and practitioners looking to assess and compare different registration methods.

Furthermore, the article goes beyond theory and discusses practical applications of image registration, such as image-guided surgery, motion tracking, and tumor diagnosis, underlining the real-world relevance of this field. Finally, it offers a glimpse into the future by mentioning potential research directions, including the development of transformers, which hints at the evolving nature of image registration techniques.

In conclusion, this article effectively encapsulates the breadth and depth of image registration in medical imaging. It is a valuable resource for both beginners and experts in the field, offering a comprehensive overview, practical insights, and a glimpse into the future of this essential area of research.

