

Publication

An inhomogeneous multi-resolution regularization concept for discontinuity preserving image registration

ConferencePaper (Artikel, die in Tagungsbänden erschienen sind)

ID 4508846

Author(s) Jud, Christoph; Sandkühler, Robin; Cattin, Philippe C.

Author(s) at UniBasel [Jud, Christoph](#) ;

Year 2018

Title An inhomogeneous multi-resolution regularization concept for discontinuity preserving image registration

Editor(s) Klein, Stefan; Staring, Marius; Durrleman, Stanley; Sommer, Stefan

Book title (Conference Proceedings) Biomedical Image Registration

Place of Conference Leiden, Germany

Publisher Springer

Place of Publication Cham

Pages 3-12

ISSN/ISBN 978-3-319-92257-7 ; 978-3-319-92258-4

Sliding organs pose challenges in the registration of dynamic medical images because the smoothness criterion which is commonly assumed over the whole image domain does not apply at the sliding interfaces. In this case, image registration methods have to cope with local discontinuities in the correspondence map. We present a new registration methodology based on a multi-resolution transformation model which is defined as a directed acyclic graph. The graph's edges connect consecutive resolution levels enabling to inhomogeneously pass displacements through to higher levels. Thus, they are well suited to cope with local discontinuities while aiming at smooth correspondence maps. We introduce three regularization terms which operate on the graph. A total variation term ensuring discontinuity preserving smoothness, a sparsity term on zero edge-weights to prevent trivial solutions and a term which prefers transformations which are explained in lower resolution levels. For an early proof of concept we analyze the registration performance of our method on synthetic 2D data and on a 2D slice of the POPI model.

Series title Lecture Notes in Computer Science

Number 10883

edoc-URL <https://edoc.unibas.ch/71151/>

Full Text on edoc No;

Digital Object Identifier DOI 10.1007/978-3-319-92258-4_1

ISI-Number INSPEC:17828298

Document type (ISI) inproceedings