

REFERENCES

- Aires, K. R., Santana, A. M., & Medeiros, A. A. (2008, March). Optical flow using color information: preliminary results. In Proceedings of the 2008 ACM symposium on Applied computing (pp. 1607-1611). ACM.
- Alexa, M., Behr, J., Cohen-Or, D., Fleishman, S., Levin, D., & Silva, C. T. (2003). Computing and rendering point set surfaces. *Visualization and Computer Graphics, IEEE Transactions on*, 9(1), 3-15.
- Al-Mayah, A., Moseley, J., & Brock, K. K. (2008). Contact surface and material nonlinearity modeling of human lungs. *Physics in medicine and biology*, 53(1), 305.
- Ashburner, J., & Friston, K. J. (2011). Diffeomorphic registration using geodesic shooting and Gauss–Newton optimisation. *NeuroImage*, 55(3), 954-967.
- Bajcsy, R., & Kovačič, S. (1989). Multiresolution elastic matching. *Computer vision, graphics, and image processing*, 46(1), 1-21.
- Baker, S., Scharstein, D., Lewis, J. P., Roth, S., Black, M. J., & Szeliski, R. (2011). A database and evaluation methodology for optical flow. *International Journal of Computer Vision*, 92(1), 1-31.
- Barron, J. L., Fleet, D. J., & Beauchemin, S. S. (1994). Performance of optical flow techniques. *International journal of computer vision*, 12(1), 43-77.
- Bay H, Ess A, Tuytelaars T, Van Gool L (2008) SURF: Speeded Up Robust Features. *Computer Vision and Image Understanding (CVIU)* 110:346-359.
- Bay H, Tuytelaars T, Van Gool L (2006) Surf: Speeded up robust features. *Computer Vision – ECCV 2006* 3951:404-417, Springer Berlin Heidelberg, Zurich.
- Beauchemin, S. S., & Barron, J. L. (1995). The computation of optical flow. *ACM Computing Surveys (CSUR)*, 27(3), 433-466.
- Beuthien, B., Kamen, A., & Fischer, B. (2010). Recursive Green's function registration. In *Medical Image Computing and Computer-Assisted Intervention–MICCAI 2010* (pp. 546-553). Springer Berlin Heidelberg.
- Black, M. J., & Anandan, P. (1996). The robust estimation of multiple motions: Parametric and piecewise-smooth flow fields. *Computer vision and image understanding*, 63(1), 75-104.
- Blackall JM, Ahmad S, Miquel ME, McClelland JR, Landau DB, Hawkes DJ (2006) MRI-based measurements of respiratory motion variability and assessment of imaging strategies for radiotherapy planning. *Phys. Med. Biol.* 51: 4147–4169.
- Bookstein, F. L., & Green, W. D. (1993). A feature space for edgels in images with landmarks. *Journal of Mathematical Imaging and Vision*, 3(3), 231-261.

- Bro-Nielsen, M., & Gramkow, C. (1996). Fast fluid registration of medical images. In *Visualization in Biomedical Computing* (pp. 265-276). Springer Berlin Heidelberg.
- Brock, K. K., Sharpe, M. B., Dawson, L. A., Kim, S. M., & Jaffray, D. A. (2005). Accuracy of finite element model-based multi-organ deformable image registration. *Medical physics*, 32(6), 1647-1659.
- Broit, C. (1981). Optimal registration of deformed images.
- Cachier, P., Bardinet, E., Dormont, D., Pennec, X., & Ayache, N. (2003). Iconic feature based nonrigid registration: the PASHA algorithm. *Computer vision and image understanding*, 89(2), 272-298.
- Castillo, E., Castillo, R., Fuentes, D., & Guerrero, T. (2014). SU-EJ-197: A Moving Least Squares Approach for Computing Spatially Accurate Transformations That Satisfy Strict Physiologic Constraints. *Medical Physics*, 41(6), 202-202.
- Castillo, E., Castillo, R., Martinez, J., Shenoy, M., & Guerrero, T. (2010). Four-dimensional deformable image registration using trajectory modeling. *Physics in medicine and biology*, 55(1), 305.
- Castillo, R., Castillo, E., Guerra, R., Johnson, V. E., McPhail, T., Garg, A. K., & Guerrero, T. (2009). A framework for evaluation of deformable image registration spatial accuracy using large landmark point sets. *Physics in medicine and biology*, 54(7), 1849.
- Chiang, M. C., Leow, A. D., Klunder, A. D., Dutton, R. A., Barysheva, M., Rose, S. E., ... & Thompson, P. M. (2008). Fluid registration of diffusion tensor images using information theory. *Medical Imaging, IEEE Transactions on*, 27(4), 442-456.
- Christensen, G. E., Rabbitt, R. D., & Miller, M. I. (1996). Deformable templates using large deformation kinematics. *Image Processing, IEEE Transactions on*, 5(10), 1435-1447.
- Christensen, G. E., Joshi, S. C., & Miller, M. I. (1997). Volumetric transformation of brain anatomy. *Medical Imaging, IEEE Transactions on*, 16(6), 864-877.
- Christensen, G. E., & Johnson, H. J. (2001). Consistent image registration. *Medical Imaging, IEEE Transactions on*, 20(7), 568-582.
- Cornelis, N., & Gool, L. V. (2008, June). Fast scale invariant feature detection and matching on programmable graphics hardware. In *Computer Vision and Pattern Recognition Workshops, 2008. CVPRW'08. IEEE Computer Society Conference on* (pp. 1-8). IEEE.
- Cotter, C. J., & Holm, D. D. (2006). Singular solutions, momentum maps and computational anatomy. *arXiv preprint nlin/0605020*.
- D'Agostino, E., Maes, F., Vandermeulen, D., & Suetens, P. (2003). A viscous fluid model for multimodal non-rigid image registration using mutual information. *Medical image analysis*, 7(4), 565-575.

- Davatzikos, C. (1997). Spatial transformation and registration of brain images using elastically deformable models. *Computer Vision and Image Understanding*, 66(2), 207-222.
- Dupuis, P., Grenander, U., & Miller, M. I. (1998). Variational problems on flows of diffeomorphisms for image matching. *Quarterly of applied mathematics*, 56(3), 587.
- Dykstra, A. R., Chan, A. M., Quinn, B. T., Zepeda, R., Keller, C. J., Cormier, J., Madsen, J. R., Eskandar, E. N., & Cash, S. S. (2012). Individualized localization and cortical surface-based registration of intracranial electrodes. *Neuroimage*, 59(4), 3563-3570.
- Ehrhardt, J., Werner R, Schmidt-Richberg A, Handels H (2011) Statistical Modeling of 4D Respiratory Lung Motion Using Diffeomorphic Image Registration. *Medical Imaging, IEEE Transactions on*. Doi: 0.1109/TMI.2010.2076299.
- Feldmar, J., & Ayache, N. (1996). Rigid, affine and locally affine registration of free-form surfaces. *International journal of computer vision*, 18(2), 99-119.
- Fischer, B., & Modersitzki, J. (2002). Fast diffusion registration. *Contemporary Mathematics*, 313, 117-128.
- Fischer, B., & Modersitzki, J. (2003). Curvature based image registration. *Journal of Mathematical Imaging and Vision*, 18(1), 81-85.
- Fischer, B., & Modersitzki, J. (2004). A unified approach to fast image registration and a new curvature based registration technique. *Linear Algebra and its applications*, 380, 107-124.
- Fleet, D., & Weiss, Y. (2006). Optical flow estimation. In *Handbook of mathematical models in computer vision* (pp. 237-257). Springer US.
- Fuerst, B., Mansi, T., Carnis, F., Salzle, M., Zhang, J., Declerck, J., ... & Kamen, A. (2015). Patient-Specific Biomechanical Model for the Prediction of Lung Motion From 4-D CT Images. *Medical Imaging, IEEE Transactions on*, 34(2), 599-607.
- Goitein M (2004) Organ and tumor motion: An overview. *Seminars in Radiation Oncology*, 14, 2–9.
- Hadamard, J. (2014). *Lectures on Cauchy's problem in linear partial differential equations*. Courier Corporation.
- Haller, J. A., Kramer, S. S., & Lietman, S. A. (1987). Use of CT scans in selection of patients for pectusexcavatum surgery: a preliminary report. *Journal of pediatric surgery*, 22(10), 904-906.
- Heinrich, H. P., Jenkinson, M., Brady, M., & Schnabel, J. (2013). MRF-based deformable registration and ventilation estimation of lung CT. *Medical Imaging, IEEE Transactions on*, 32(7), 1239-1248.

- Henn, S. (2006). A full curvature based algorithm for image registration. *Journal of Mathematical Imaging and Vision*, 24(2), 195-208.
- Higham, N. J. (2005). The scaling and squaring method for the matrix exponential revisited. *SIAM Journal on Matrix Analysis and Applications*, 26(4), 1179-1193.
- Horn, B. K., & Schunck, B. G. (1981, November). Determining optical flow. In 1981 Technical symposium east (pp. 319-331). International Society for Optics and Photonics.
- Igarashi, T., Moscovich, T., and Hughes, J. F. 2005. As rigid-as-possible shape manipulation. *ACM Trans. Graph.* 24, 3, 1134–1141.
- Jain, A. K., Zhong, Y., & Lakshmanan, S. (1996). Object matching using deformable templates. *Pattern Analysis and Machine Intelligence, IEEE Transactions on*, 18(3), 267-278.
- Joshi, S. C., & Miller, M. I. (2000). Landmark matching via large deformation diffeomorphisms. *Image Processing, IEEE Transactions on*, 9(8), 1357-1370.
- Kang, T. K., Choi, I. H., & Lim, M. T. (2015). MDGHM-SURF: A robust local image descriptor based on modified discrete Gaussian–Hermite moment. *Pattern Recognition*, 48(3), 670-684.
- Keall PJ et al. (2006) The management of respiratory motion in radiation oncology report of AAPM task group 76. *Medical Physics* 33:3874–3900.
- Kim, H. C., Park, H. J., Nam, K. W., Kim, S. M., Choi, E. J., Jin, S., ... & Kim, M. G. (2010). Fully automatic initialization method for quantitative assessment of chest-wall deformity in funnel chest patients. *Medical & biological engineering & computing*, 48(6), 589-595.
- Koenderink, J. J. (1984). The structure of images. *Biological cybernetics*, 50(5), 363-370.
- Kybic, J., & Unser, M. (2003). Fast parametric elastic image registration. *Image Processing, IEEE Transactions on*, 12(11), 1427-1442.
- Lancaster, P., & Salkauskas, K. (1981). Surfaces generated by moving least squares methods. *Mathematics of computation*, 37(155), 141-158.
- Leow, A., Huang, S. C., Geng, A., Becker, J., Davis, S., Toga, A., & Thompson, P. (2005, July). Inverse consistent mapping in 3D deformable image registration: its construction and statistical properties. In *Information Processing in Medical Imaging* (pp. 493-503). Springer Berlin Heidelberg.
- Lindeberg, T. (1998). Feature detection with automatic scale selection. *International journal of computer vision*, 30(2), 79-116.
- Lucas, B. D., & Kanade, T. (1981, August). An iterative image registration technique with an application to stereo vision. In *IJCAI* (Vol. 81, pp. 674-679).

- Malis, E. (2004, April). Improving vision-based control using efficient second-order minimization techniques. In *Robotics and Automation, 2004. Proceedings. ICRA'04. 2004 IEEE International Conference on* (Vol. 2, pp. 1843-1848). IEEE.
- Markelj, P., Tomaževič, D., Likar, B., & Pernuš, F. (2012). A review of 3D/2D registration methods for image-guided interventions. *Medical image analysis*, 16(3), 642-661.
- Marsland, S., & McLachlan, R. (2007, July). A Hamiltonian particle method for diffeomorphic image registration. In *Information Processing in Medical Imaging* (pp. 396-407). Springer Berlin Heidelberg.
- Marsland, S., & Twining, C. J. (2004). Constructing diffeomorphic representations for the groupwise analysis of nonrigid registrations of medical images. *Medical Imaging, IEEE Transactions on*, 23(8), 1006-1020.
- Mcgregor, B. (1998). Automatic registration of images of pigmented skin lesions. *Pattern Recognition*, 31(6), 805-817.
- Mikolajczyk, K.; Schmid, C., "Indexing based on scale invariant interest points," in *Computer Vision, 2001. ICCV 2001. Proceedings. Eighth IEEE International Conference on* , vol.1, no., pp.525-531 vol.1, 2001
- Modersitzki, J. (2004). *Numerical methods for image registration*. Oxford university press.
- Moler, C., & Van Loan, C. (2003). Nineteen dubious ways to compute the exponential of a matrix, twenty-five years later. *SIAM review*, 45(1), 3-49.
- Muenzing SEA, Van Ginnekan B, Viergever MA, Pluim JPW (2014) DIRBoost-an algorithm for boosting deformable image registration: application to lung CT intra-subject registration. *Medical Image Analysis, Elsevier* 18, 449-459.
- Murphy, K., Van Ginneken, B., Reinhardt, J. M., Kabus, S., Ding, K., Deng, X., ... & Vercauteren, T. (2011). Evaluation of registration methods on thoracic CT: the EMPIRE10 challenge. *Medical Imaging, IEEE Transactions on*, 30(11), 1901-1920.
- Nakagomi, K., Shimizu, A., Kobatake, H., Yakami, M., Fujimoto, K., & Togashi, K. (2013). Multi-shape graph cuts with neighbor prior constraints and its application to lung segmentation from a chest CT volume. *Medical image analysis*, 17(1), 62-77.
- Nehmeh SA, Erdi YE, Pan T et al (2004) Quantitation of respiratory motion during 4D-PET/CT acquisition. *Med. Phys.*, vol. 31, no. 6, pp. 1333–1338, 2004.
- Oliviera FPM, Tavares JMRS (2012) *Medical Image Registration: a Review*. *Computer methods in Biomechanics and Biomedical Engineering* 17, 73-93.
- Pang et al. (2012) Fully affine invariant SURF for image matching. *Neurocomputing* 85:6-10, ISSN 0925-2312.
- Pedersen, J. T., (Q4 2011) SURF: Feature detection & description, jtp@cs.au.dk.

Pennec, X., Stefanescu, R., Arsigny, V., Fillard, P., & Ayache, N. (2005). Riemannian elasticity: A statistical regularization framework for non-linear registration. In *Medical Image Computing and Computer-Assisted Intervention—MICCAI 2005* (pp. 943-950). Springer Berlin Heidelberg.

Peyrat, J. M., Delingette, H., Sermesant, M., Pennec, X., Xu, C., & Ayache, N. (2008). Registration of 4D time-series of cardiac images with multichannel diffeomorphic demons. In *Medical Image Computing and Computer-Assisted Intervention—MICCAI 2008* (pp. 972-979). Springer Berlin Heidelberg.

Rabbitt, R. D., Weiss, J. A., Christensen, G. E., & Miller, M. I. (1995, August). Mapping of hyperelastic deformable templates using the finite element method. In *SPIE's 1995 International Symposium on Optical Science, Engineering, and Instrumentation* (pp. 252-265). International Society for Optics and Photonics.

Reinhardt JM, Ding K, Cao K, Christensen GE, Hoffman EA, Bodas SV (2008) Registration-based estimates of local lung tissue expansion compared to Xenon CT measures of specific ventilation. *Med. Image Anal.*, vol. 12, no. 6, pp. 752–763.

Rohr, K., Stiehl, H. S., Sprengel, R., Buzug, T. M., Weese, J., & Kuhn, M. H. (2001). Landmark-based elastic registration using approximating thin-plate splines. *Medical Imaging, IEEE Transactions on*, 20(6), 526-534.

Sarrut D, Boldea V, Miguët S, Ginestet C (2006) Simulation of four-dimensional CT images from deformable registration between inhale and exhale breath-hold CT scans. *Med. Phys.*, vol. 33, no. 3, pp. 605–617.

Sato, A. K., Stevo, N. A., Tavares, R. S., Tsuzuki, M. S. G., Kadota, E., Gotoh, T., Kagei, S. & Iwasawa, T. (2011). Registration of temporal sequences of coronal and sagittal MR images through respiratory patterns. *Biomedical Signal Processing and Control*, 6(1), 34-47.

Schaefer, S., McPhail, T., & Warren, J. (2006, July). Image deformation using moving least squares. In *ACM Transactions on Graphics (TOG)* (Vol. 25, No. 3, pp. 533-540). ACM.

Silva, E. A., Panetta, K., & Aghaian, S. S. (2007, April). Quantifying image similarity using measure of enhancement by entropy. In *Defense and Security Symposium* (pp. 65790U-65790U). International Society for Optics and Photonics.

So, R. W., Tang, T. W., & Chung, A. C. (2011). Non-rigid image registration of brain magnetic resonance images using graph-cuts. *Pattern Recognition*, 44(10), 2450-2467.

Sotiras, A., Davatzikos, C., & Paragios, N., (2013) Deformable Medical Image Registration: A Survey. *IEEE Transactions on Medical Imaging* 32, 1153-1190.

Stefanescu, R., Pennec, X., & Ayache, N. (2004). Grid powered nonlinear image registration with locally adaptive regularization. *Medical image analysis*, 8(3), 325-342.

Stevo, N., Campos, R., Tavares, R. S., Tsuzuki, M. D. S. G., Gotoh, T., Kagei, S., Iwasawa, T., (2009) Registration of temporal sequences of coronal and sagittal images obtained from magnetic resonance. Proceedings of XX International Congress of Mechanical Engineering.

Sull, S., & Ahuja, N. (1995). Integrated matching and segmentation of multiple features in two views. *Computer vision and image understanding*, 62(3), 279-297.

Sun, D., Roth, S., & Black, M. J. (2014). A quantitative analysis of current practices in optical flow estimation and the principles behind them. *International Journal of Computer Vision*, 106(2), 115-137.

Sundaram, T. A., & Gee, J. C. (2005). Towards a model of lung biomechanics: pulmonary kinematics via registration of serial lung images. *Medical image analysis*, 9(6), 524-537.

Szeliski, R., & Coughlan, J. (1994, June). Hierarchical spline-based image registration. In *Computer Vision and Pattern Recognition, 1994. Proceedings CVPR'94., 1994 IEEE Computer Society Conference on* (pp. 194-201). IEEE.

Szeliski, R., & Coughlan, J. (1997). Spline-based image registration. *International Journal of Computer Vision*, 22(3), 199-218.

Thirion, J. P. (1998). Image matching as a diffusion process: an analogy with Maxwell's demons. *Medical image analysis*, 2(3), 243-260.

Thomson, W. (1874). 9. The Kinetic Theory of the Dissipation of Energy. *Proceedings of the Royal Society of Edinburgh*, 8, 325-334.

Trouvé, A. (1998). Diffeomorphisms groups and pattern matching in image analysis. *International Journal of Computer Vision*, 28(3), 213-221.

Tsui, B. M., Segars WP, Lalush DS (2000) Effects of Upward Creep and Respiratory Motion in Myocardial SPECT. *IEEE Transactions on Nuclear Science*, v. 47, pp. 1192-1195.

Ugural, A. C., & Fenster, S. K. (2003). *Advanced strength and applied elasticity*. Pearson education.

Vedam SS, Keall PJ, Docef A, Todor DA, Kini VR, Mohan R (2004) Predicting respiratory motion for four-dimensional radio-therapy. *Med. Phys.*, vol. 31, no. 8, pp. 2274-2283.

Vercauteren, T., Pennec, X., Malis, E., Perchant, A., & Ayache, N. (2007, July). Insight into efficient image registration techniques and the demons algorithm. In *Information Processing in Medical Imaging* (pp. 495-506). Springer Berlin Heidelberg.

Viola, P., & Jones, M. (2001). Rapid object detection using a boosted cascade of simple features. In *Computer Vision and Pattern Recognition, 2001. CVPR 2001. Proceedings of the 2001 IEEE Computer Society Conference on* (Vol. 1, pp. I-511). IEEE.

- Wang, Y., & Staib, L. H. (2000). Physical model-based non-rigid registration incorporating statistical shape information. *Medical image analysis*, 4(1), 7-20.
- Wang, Z., Bovik, A. C., Sheikh, H. R., & Simoncelli, E. P. (2004). Image quality assessment: from error visibility to structural similarity. *Image Processing, IEEE Transactions on*, 13(4), 600-612.
- Warren, D. H., & Strelow, E. R. (1985). Sensory substitution in blind children and neonates. In *Electronic Spatial Sensing for the Blind* (pp. 273-298). Springer Netherlands.
- Xiong, G., Chen, C., Chen, J., Xie, Y., & Xing, L. (2012). Tracking the motion trajectories of junction structures in 4D CT images of the lung. *Physics in medicine and biology*, 57(15), 4905.
- Yanovsky, I., Le Guyader, C., Leow, A., Toga, A., Thompson, P., & Vese, L. (2008, October). Unbiased volumetric registration via nonlinear elastic regularization. In *2nd MICCAI Workshop on Mathematical Foundations of Computational Anatomy*.
- Yeo, B. T., Vercauteren, T., Fillard, P., Peyrat, J. M., Pennec, X., Golland, P., ... & Clatz, O. (2009). DT-REFinD: Diffusion tensor registration with exact finite-strain differential. *Medical Imaging, IEEE Transactions on*, 28(12), 1914-1928.
- Yeo, B. T., Sabuncu, M. R., Vercauteren, T., Ayache, N., Fischl, B., & Golland, P. (2010). Spherical demons: fast diffeomorphic landmark-free surface registration. *Medical Imaging, IEEE Transactions on*, 29(3), 650-668.
- Yoon H, Chung H, Hahn H (2009) SURF algorithm with color and global characteristics. *ICCAS-SICE 2009*. 183-187.
- Zhang, B., Arola, D. D., Roys, S., & Gullapalli, R. P. (2011). Three-dimensional elastic image registration based on strain energy minimization: application to prostate magnetic resonance imaging. *Journal of digital imaging*, 24(4), 573-585.
- Zhang, T., Orton, N. P., Mackie, T. R., & Paliwal, B. R. (2004). Technical note: A novel boundary condition using contact elements for finite element based deformable image registration. *Medical physics*, 31(9), 2412-2415.
- Zhang, Y., Yang, J., Zhang, L., Balter, P. A., & Dong, L. (2013). Modeling respiratory motion for reducing motion artifacts in 4D CT images. *Medical physics*, 40(4), 041716.
- Zitova, B., & Flusser, J. (2003). Image registration methods: a survey. *Image and vision computing*, 21(11), 977-1000.
- Zordan VB, Celly B, Chiu B, DiLorenzo PC (2004) Breathe Easy: Model and Control of Simulated Respiration for Animation. *Proceedings of the 2004 ACM SIGGRAPH/Eurographics symposium on Computer animation*, Grenoble, France.
- <http://www.dir-lab.com/Motivation.html>.