

Publication

A Closest Point Proposal for MCMC-based Probabilistic Surface Registration

ConferencePaper (Artikel, die in Tagungsbänden erschienen sind)**ID** 4614252**Author(s)** Madsen, Dennis; Morel-Forster, Andreas; Kahr, Patrick; Rahbani, Dana; Vetter, Thomas; Lüthi, Marcel**Author(s) at UniBasel** [Vetter, Thomas](#) ; [Madsen, Dennis](#) ; [Morel, Andreas](#) ; [Kahr, Patrick](#) ; [Rahbani, Dana](#) ; [Lüthi, Marcel](#) ;**Year** 2020**Title** A Closest Point Proposal for MCMC-based Probabilistic Surface Registration**Editor(s)** Vedaldi, Andrea; Bischof, Horst; Brox, Thomas; Frahm, Jan-Michael**Book title (Conference Proceedings)** Computer Vision - ECCV 2020. 16th European Conference, Glasgow, UK, August 23–28, 2020, Proceedings, Part XVII**Place of Conference** Glasgow, UK**Publisher** Springer**Place of Publication** Cham**Pages** 281-296**ISSN/ISBN** 978-3-030-58519-8 ; 978-3-030-58520-4

We propose to view non-rigid surface registration as a probabilistic inference problem. Given a target surface, we estimate the posterior distribution of surface registrations. We demonstrate how the posterior distribution can be used to build shape models that generalize better and show how to visualize the uncertainty in the established correspondence. Furthermore, in a reconstruction task, we show how to estimate the posterior distribution of missing data without assuming a fixed point-to-point correspondence. We introduce the closest-point proposal for the Metropolis-Hastings algorithm. Our proposal overcomes the limitation of slow convergence compared to a random-walk strategy. As the algorithm decouples inference from modeling the posterior using a propose-and-verify scheme, we show how to choose different distance measures for the likelihood model. All presented results are fully reproducible using publicly available data and our open-source implementation of the registration framework.

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