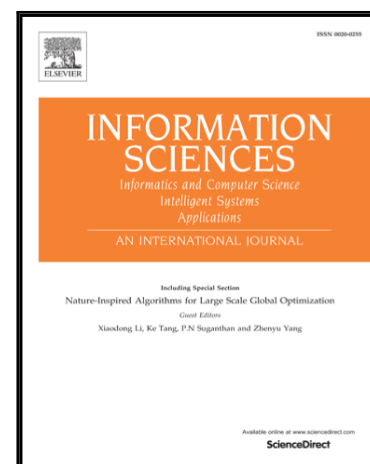


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Removing Mismatches for Retinal Image Registration via Multi-Attribute-Driven Regularized Mixture Model

Gang Wang^{a,b,*}, Zhicheng Wang^{b,*}, Yufei Chen^b, Qiangqiang Zhou^b, Weidong Zhao^b

^a*School of Statistics and Management, Shanghai University of Finance and Economics, Shanghai 200433, China*

^b*CAD Research Center, College of Electronic and Information Engineering, Tongji University, Shanghai 201804, China*

Abstract

In order to address the problem of retinal image registration, this paper proposes and analyzes a novel and general matching algorithm called Multi-Attribute-Driven Regularized Mixture Model (MAD-RMM). Mismatches removal can play a key role in image registration, which refers to establish reliable matches between two point sets. Here the presented approach starts from multi-feature attributes which are used to guide the feature matching to identify inliers (correct matches) from outliers (incorrect matches), and then estimates the spatial transformation. In this paper, motivated by the problem of feature matching that the initial correspondence is always contaminated by outliers, thereby we formulate this issue as a probability deformable mixture model which consists of Gaussian components for inliers and uniform components for outliers. Moreover, the algorithm takes full advantage of using multiple attributes for better general matching performance. Here we are assuming all inliers are mapped into a high-dimensional feature space, namely reproducing kernel Hilbert space (RKHS), and the closed-form solution to the mapping function is given by the representation theorem with L_2 norm regularization under the Expectation-Maximization (EM) algorithm. Finally, we evaluate the performance of the algorithm by applying it to retinal image registration on several datasets, where experimental results demonstrate that the MAD-RMM outperforms current state-of-the-art methods and shows the robustness to outliers on real retinal images.

Keywords: Retinal image registration, Point set registration, Mixture model, Kernel Method

*Corresponding author

Email addresses: gwang.cv@gmail.com (Gang Wang), zhichengwang@tongji.edu.cn (Zhicheng Wang)

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