Graph Matching Framework

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1 Experimental Evaluation

In this chapter we present the evaluation results of the proposed algorithm on some synthetic data and on some real images.

1.1 Synthetic Point set Matching

For the first test we adopted a commonly used approach of evaluation Graph Matching algorithms on the synthetic generated set of nodes (see [1], [2], [4]).
For this propose one generates first n_1 normal distributed points $V_1 \subset \mathbb{R}^2$ with zero mean and standard deviation 1. The second set V_2 is created from the first one by adding noise $\mathcal{N}(0, \sigma^2)$ to the positions of points in V_1 and m additional normal distributed points with $\mathcal{N}(0, 1)$. That means, that the set V_2 consists of $n_2 = n_1 + \bar{n}$ nodes, where n_1 points are inliers and $\bar{n}$ points are outliers. The task is to find the correspondences between points in two sets.
In this test we follow the setup in [1] and compare our approach with following state of the art methods: *MPM* [1], *RRWM* [2], *SM* [3], *IPFP* [4]. We fixed the number n_1 to 100 and vary the number of outliers $\bar{n}$ and the standard deviation σ^2 of the noise in the inlier positions. The discretization of the continuous solution is performed in all cases using greedy assignment from [3].

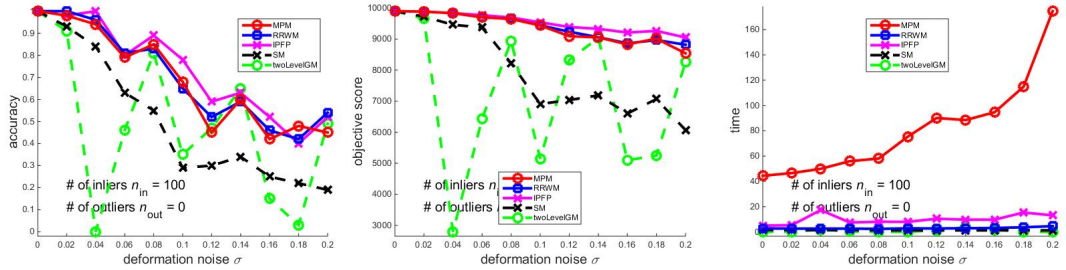

Figure 1: Deformation test: $n_1 = 100$, $n_2 = 100$, $m_1 =$, $m_2 =$, $\sigma^2 \in [0, 0.2]$

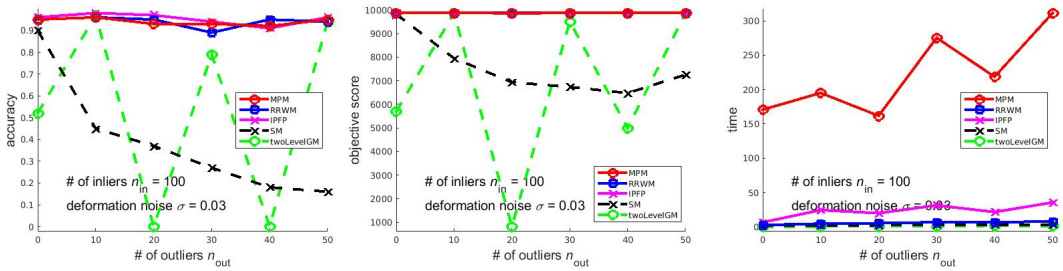

Figure 2: Outliers test:$n_1 = 100$, $\bar{n} \in [0, 50]$, $m_1 =$, $m_2 =$, $\sigma^2 = 0.03$

1.2 Image Affine Transformation

1.3 Real Images

References

[1] M. Cho and O. Duchenne. Finding Matches in a Haystack : A Max-Pooling Strategy for Graph Matching in the Presence of Outliers. *CVPR*, 2014.

[2] M. Cho, J. Lee, and K. M. Lee. Reweighted Random Walks for Graph Matching. *ECCV*, 2010.

[3] M. Leordeanu and M. Hebert. A spectral technique for correspondence problems using pairwise constraints. In *ICCV*, 2005.

[4] M. Leordeanu, M. Hebert, R. Sukthankar, and M. Herbert. An Integer Projected Fixed Point Method for Graph Matching and MAP Inference. In *NIPS*, 2009.