Testing Reweighted Random Walk Method (RRWM) for Graph Matching

June 19, 2015

We consider two graphs $G_1 = (V, D, E)$ and $G_2 = (V, D, E)$, where $V = \{v_i\}_{i=1}^{n_1(n_2)}$ is the set of nodes, $D = \{d_i\}_{i=1}^{n_1(n_2)}$ is the set of node attributes and $E = \{e_j\}_{j=1}^{m_1(m_2)}$ is the set of graph edges.
We want to test the behaviour of the $RRWM$ in case of matching two graphs with a common sub-graph. The results of tests are represented below. In the first case, graphs G_1 and G_2 are almost similar (except for one additional node and missing edge in G_2). In the second and third tests, one graph is a sub-graph of the other. In the fourth case both graphs have a common sub-graph.
We can see, that RRWM had achieved good results in all case. Notable, that the algorithm was able to detect common structure of the graphs in all tests.

Case 1: $V(G_1) \cap V(G2) = V(G_1)$, $n_1 = 17$, $n_2 = 18$

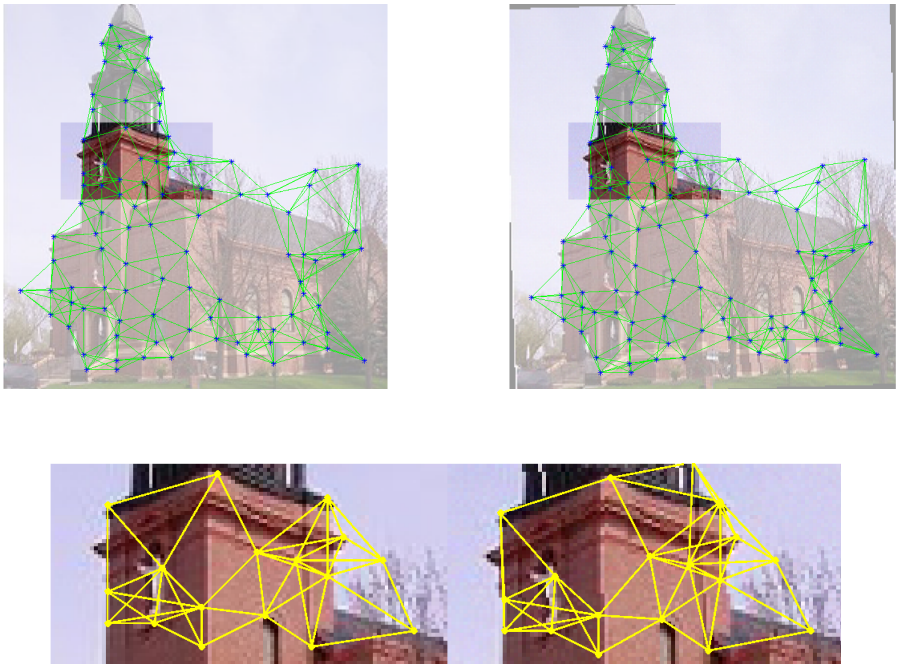

Figure 1: Graphs G_1 and G_2

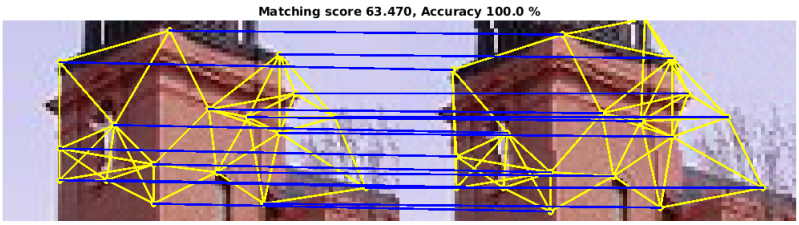

Figure 2: Matching result

Case 2: $V(G_1) \cap V(G2) = V(G_1)$, $n_1 = 17$, $n_2 = 21$

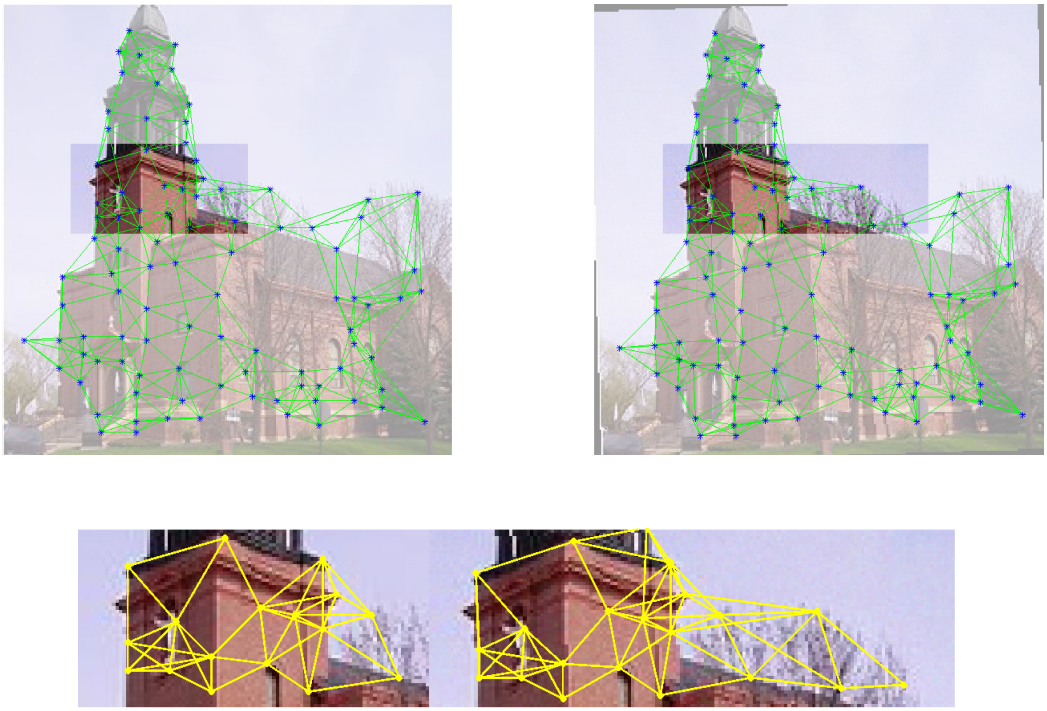

Figure 3: Graphs G_1 and G_2

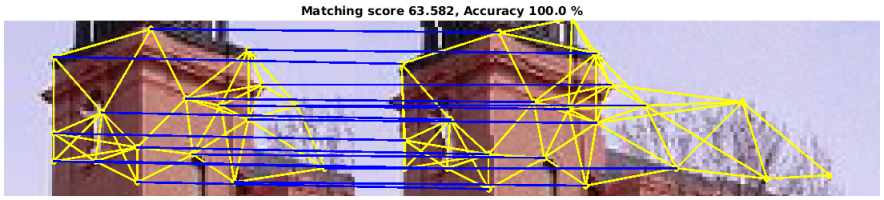

Figure 4: Matching result

Case 3: $V(G_1) \cap V(G2) = V(G_2) \setminus \{v\}$, $n_1 = 23$, $n_2 = 18$

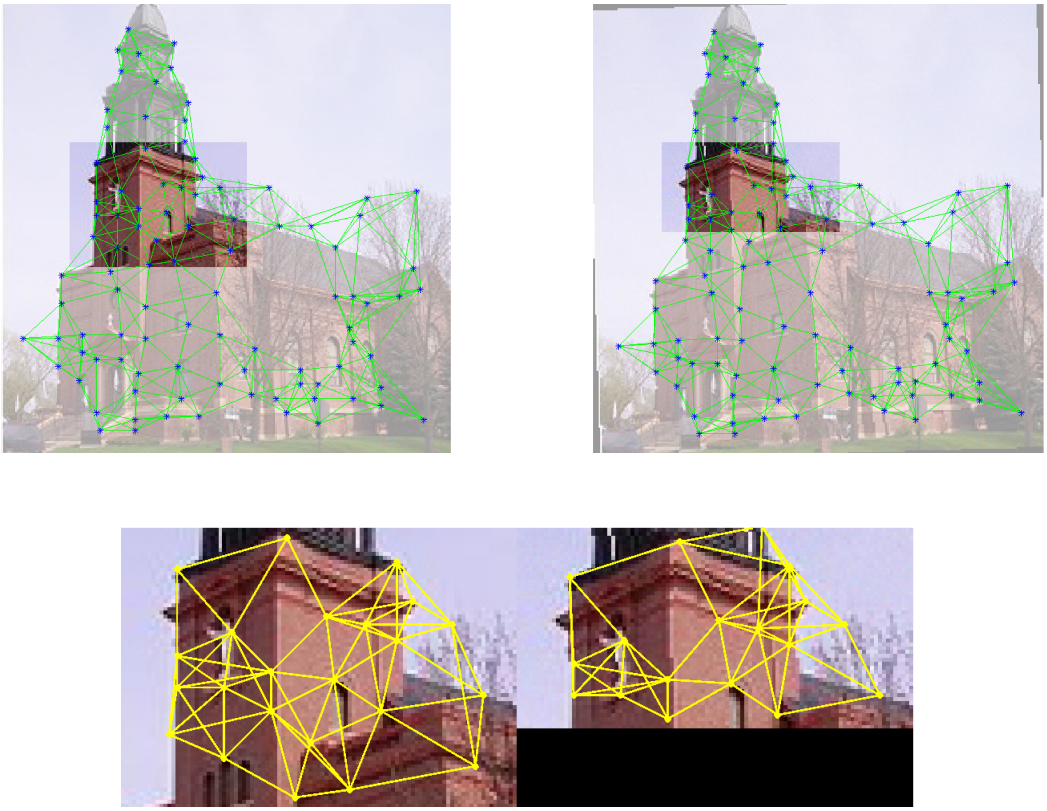

Figure 5: Graphs G_1 and G_2

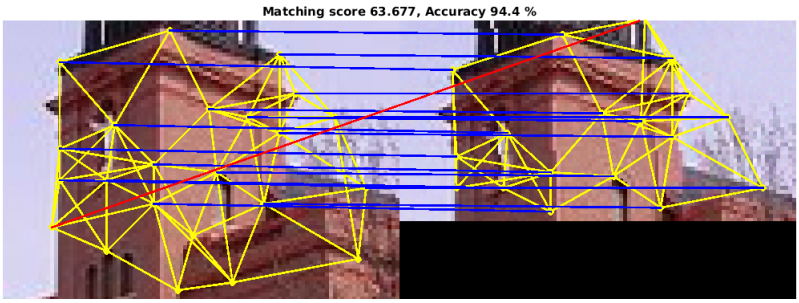

Figure 6: Matching result

Case 4: $V(G_1) \cap V(G2) = V(H)$, $H \subset G_1$, $H \subset G_2$

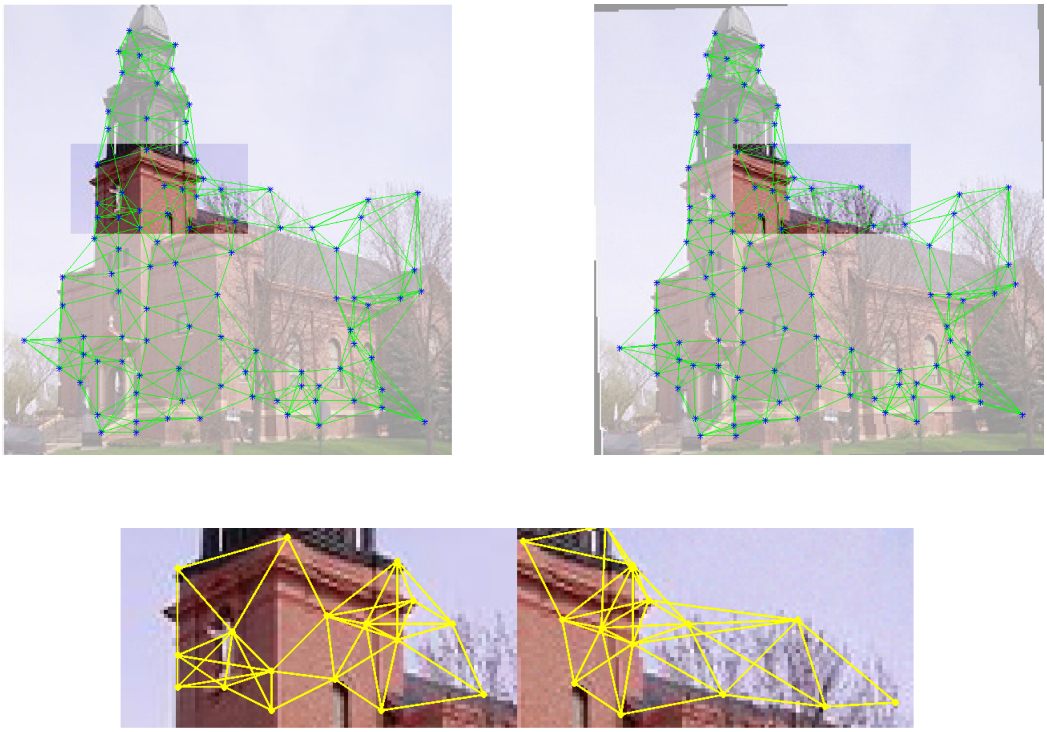

Figure 7: Graphs G_1 and G_2

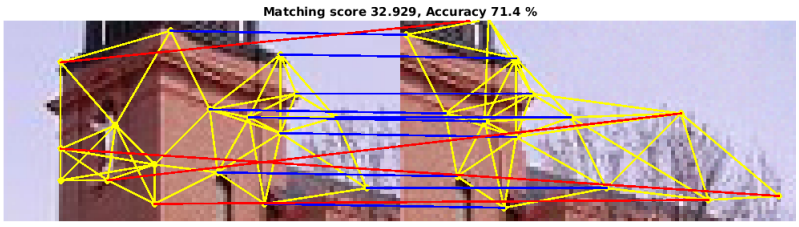

Figure 8: Matching result

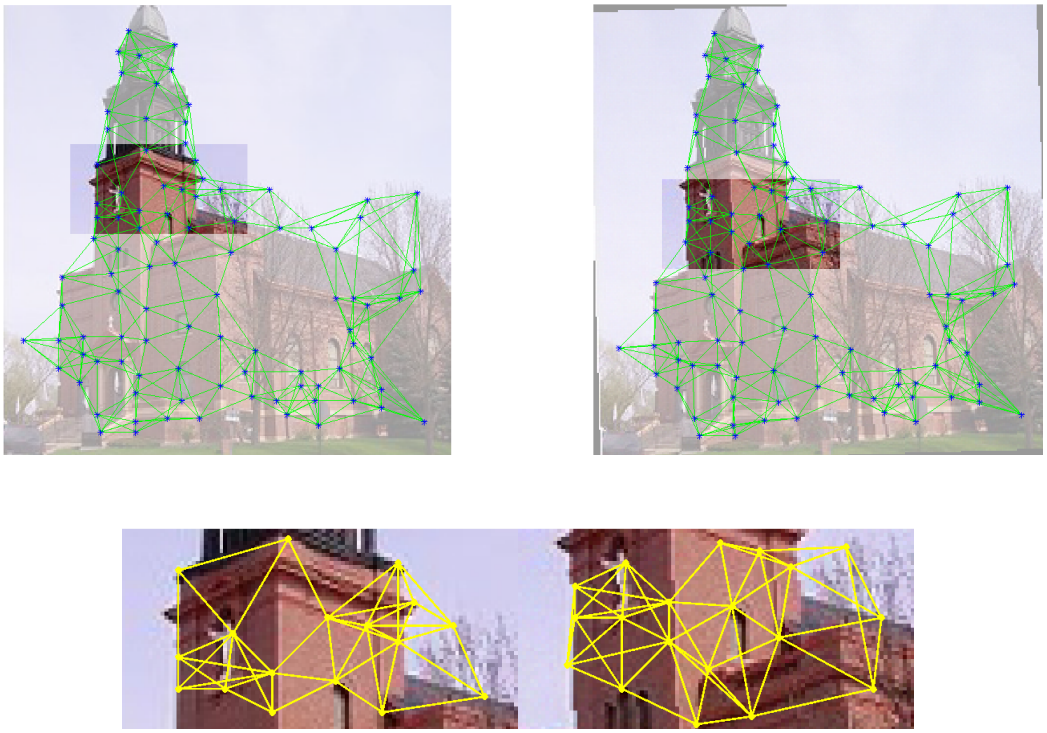

Figure 9: Graphs G_1 and G_2

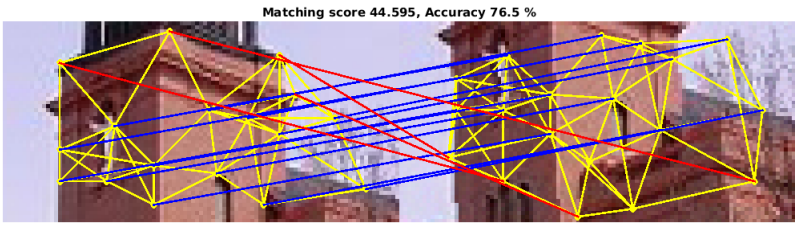

Figure 10: Matching result

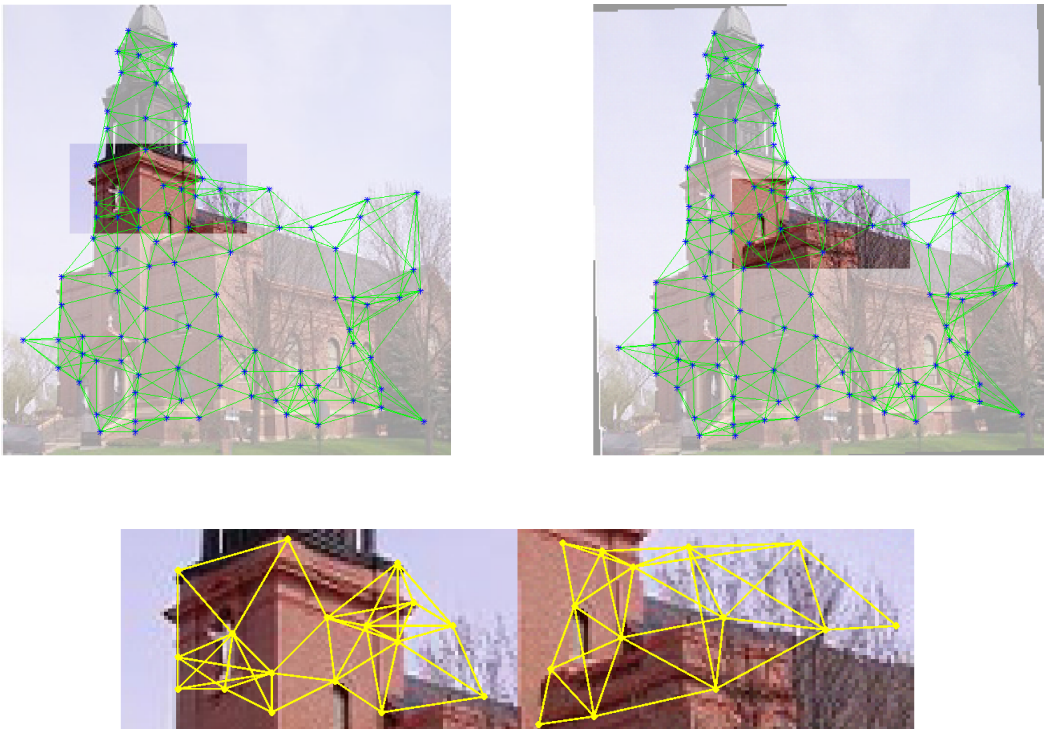

Figure 11: Graphs G_1 and G_2

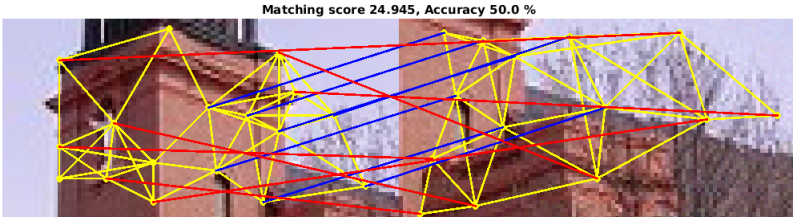

Figure 12: Matching result