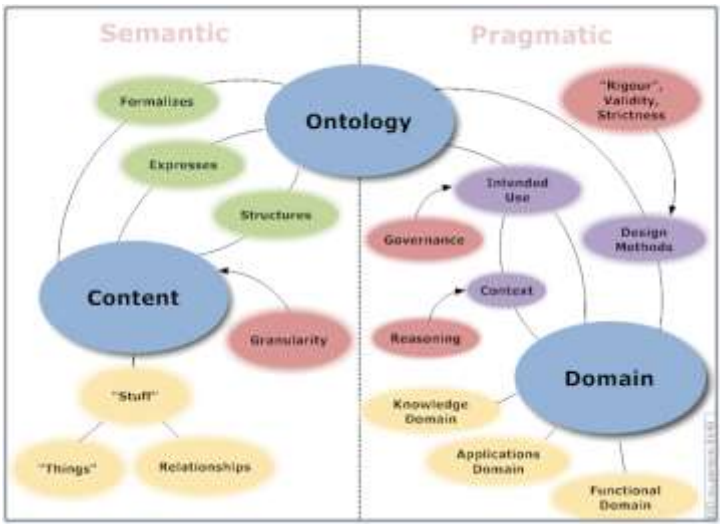

NODE-MATCH TOOL

User Guide

July 2012

Node-Match Tool

Simple ontology matching algorithms are based on lexical measures that only consider text similarity. Taking the shape and structure of the ontology into account while matching can lead to better results [1, 2, 3]. Node-Match illustrates the difference between the two approaches. It is based on S-Match [4] an open source toolkit for lightweight ontology matching and alignment. S-Match supports a rich GUI for designing lightweight ontologies and several ontology alignment algorithms. We use the Department Ontology from the running example in [1] to show the difference between difference ontology matching algorithms.

The following screenshot shows the two ontologies loaded in the GUI of S-Match. The ontologies represent information about different departments at a university.

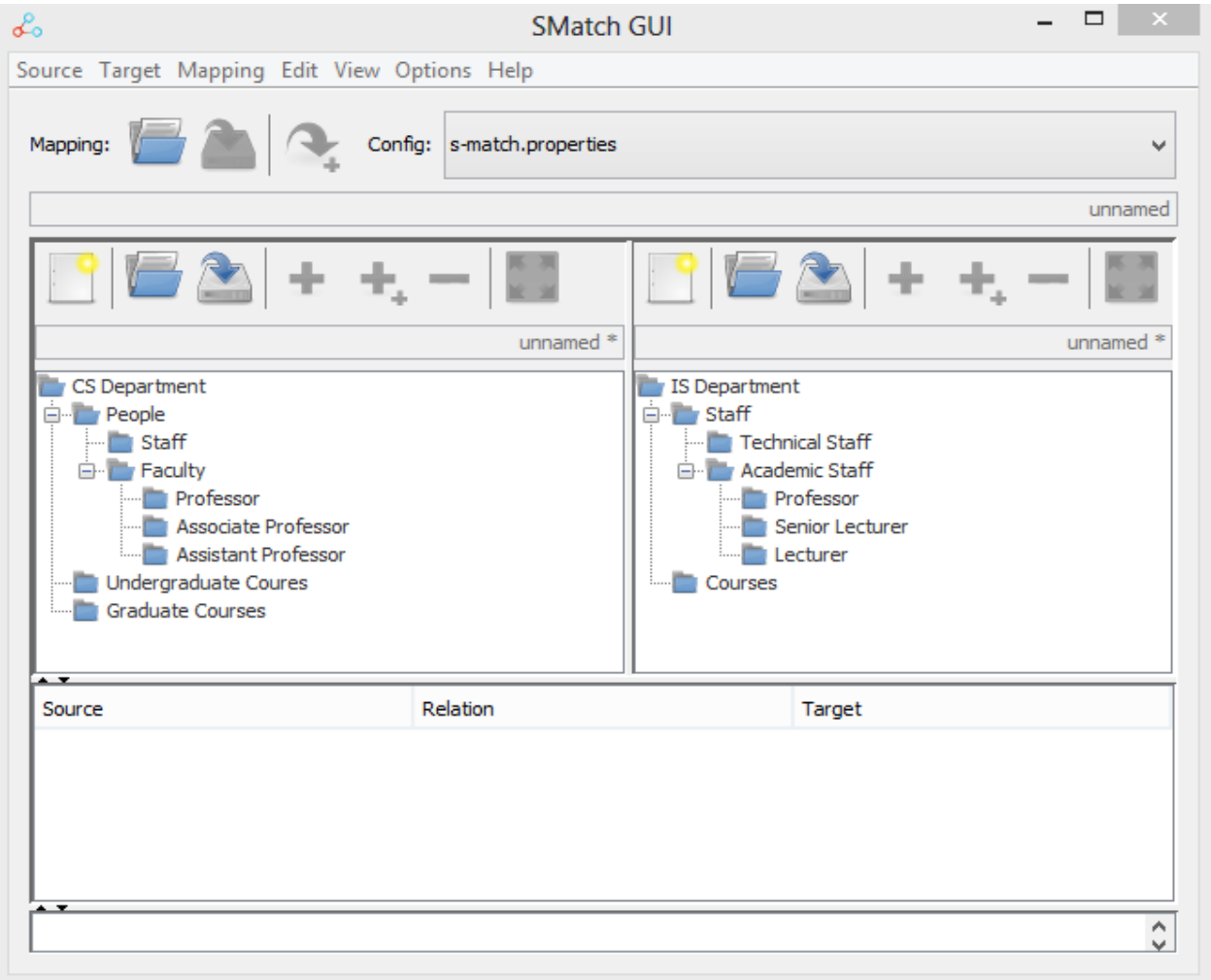

Figure 1. CS Department and IS Department Ontologies

We are interested in alignment of these two ontologies by matching them. We choose the default matching algorithm (s-match.properties) in S-Match using the “Config”: dropdown on the top right. This gives the following results. As is clear below it leads to a large number of matches. Not all of these matches are really useful, as it also shows a match between “Professor” and “Academic Staff”. This matching algorithm is thus too permissive.

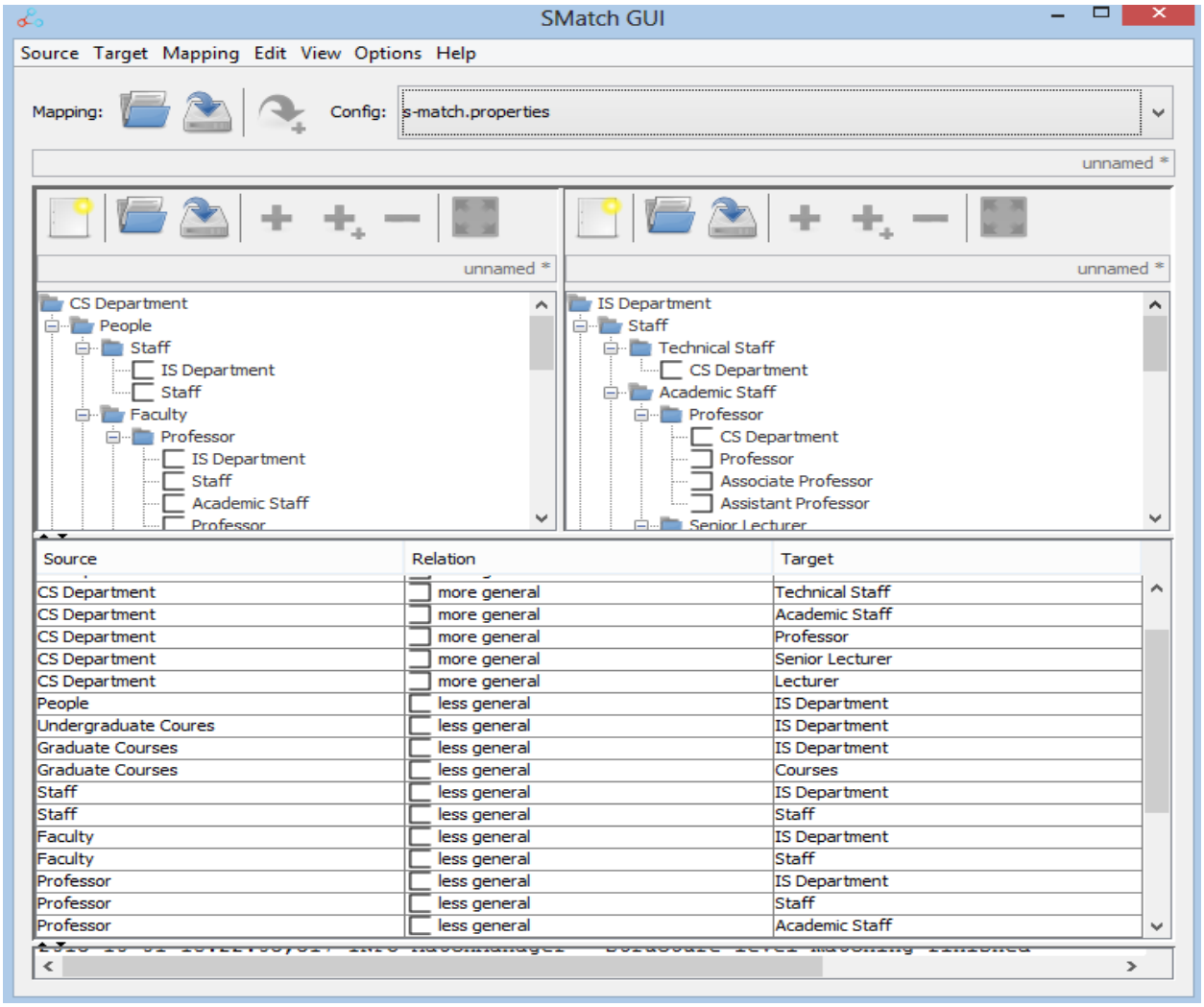

Figure 2. Default Matching Algorithm of S-Match (Too Permissive)

Next we choose the “s-match-spsm.properties” configuration, which uses a lexical measure to check textual similarities between the two ontologies. It leads to the result shown in the following screenshot. Now only the “Graduate Courses” node in the CS Department is matched with “Courses” node in the IS Department. Clearly several of the possible matches are missing. Thus this matching algorithm is too restrictive.

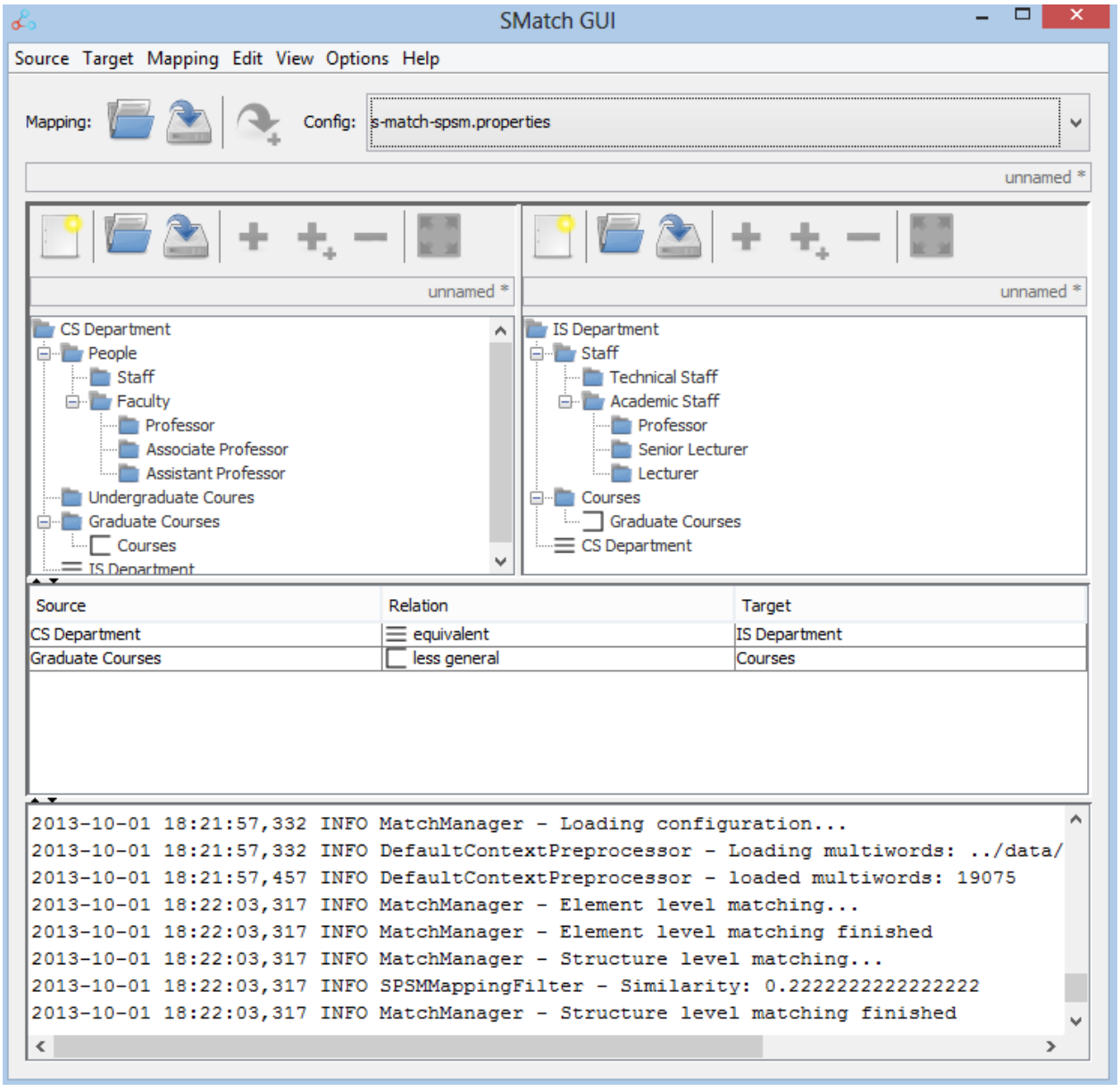

Figure 3. Matching based on Textual Similarity (Too Restrictive)

Thus in order to strike a balance between the two matching algorithms we use the “s-match-minimal” configuration which like [1] and [3] provides a structural alignment between the two ontologies. It gives the following result. Node ranking also can discover a match between “Faculty” and “Staff” nodes in the two ontologies in addition to the lexically similar “Courses” node. The output log below the match shows that tree based structural alignment was used in this example.

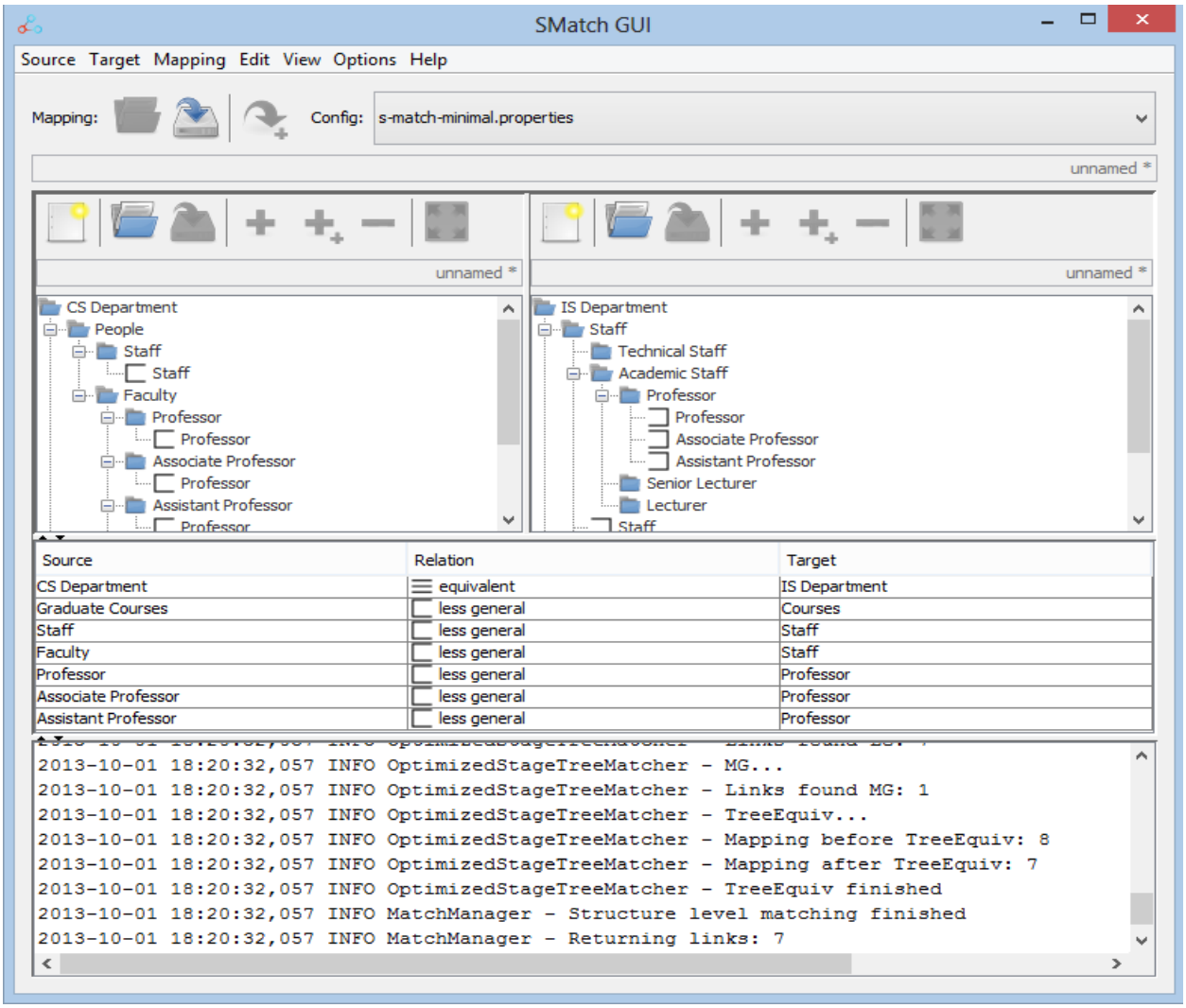

Figure 4. Structural Matching (similar to [1, 3])

Thus, S-Match tool can be used to for ontology matching using lexical as well as structural measures. The example ontologies demonstrate the importance of not relying only on textual similarity but also considering the structure and shape of the ontologies for alignment.

References

[1] Sharma, Asankhaya, and Durvasula VLN Somayajulu. "Ontology Matching and Schema Integration Using Node Ranking." In SWWS, pp. 43-48. 2006.

[2] Sharma, Asankhaya. "REVISITING ONTOLOGY ALIGNMENT IN WEB 2.0." In Tech Report NITW (2009).

[3] Sharma, Asankhaya. "Ontology Matching Using Weighted Graphs." In Digital Information Management, 2006 1st International Conference on, pp. 121-124. IEEE, 2006.

[4] Giunchiglia, Fausto, Aliaksandr Autayeu, and Juan Pane. "S-Match: an open source framework for matching lightweight ontologies." Semantic Web 3, no. 3 (2012): 307-317.