RepOSE User Manual

- RepOSE_v2, *the legacy system for debugging missing is-a relations in a network of ontologies. [1]*

The steps are as follows:

1. As input our system takes a set of ontologies in OWL format as well as a set of PRAs in RDF format. The ontologies and PRAs can be imported using button “Load Ontologies and Mappings”. A pop-up window will show up for the user to specify the text file with the ontology network information. The text file describes an ontology network, the template of which is as follows (A sample file is given in the folder sampleInput):

   "----------
   <URI of ontology 1>
   <URI of ontology 2>
   <PRA file for ontology 1 and 2>

   <URI of ontology 2>
   <URI of ontology 3>
   <PRA file for ontology 2 and 3>

   ...."

   Example:

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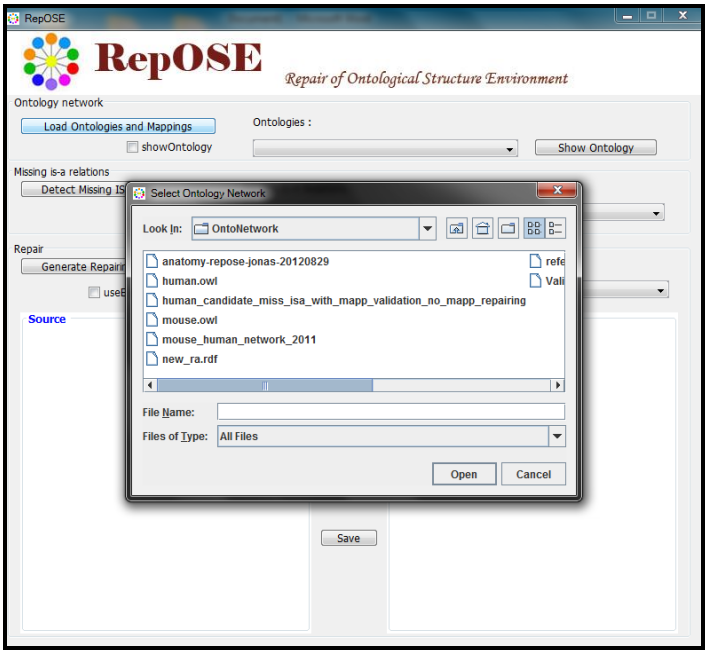
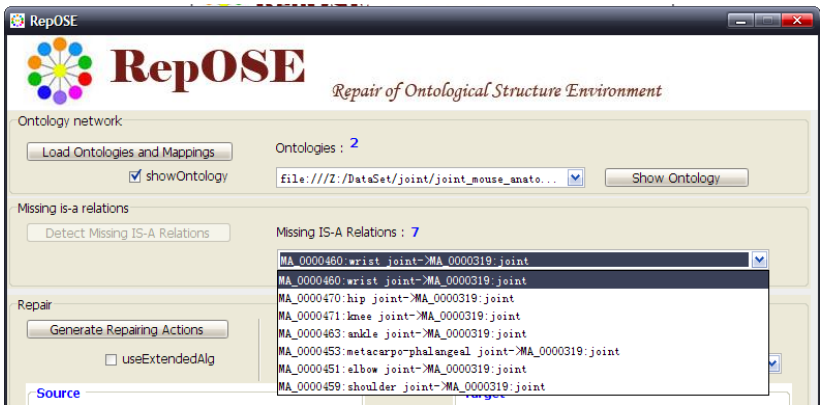
   file:///C:/Users/Desktop/OntoNetwork/mouse.owl
   file:///C:/Users/Desktop/ OntoNetwork /human.owl
   C:\Users\Desktop\ OntoNetwork \RA.rdf



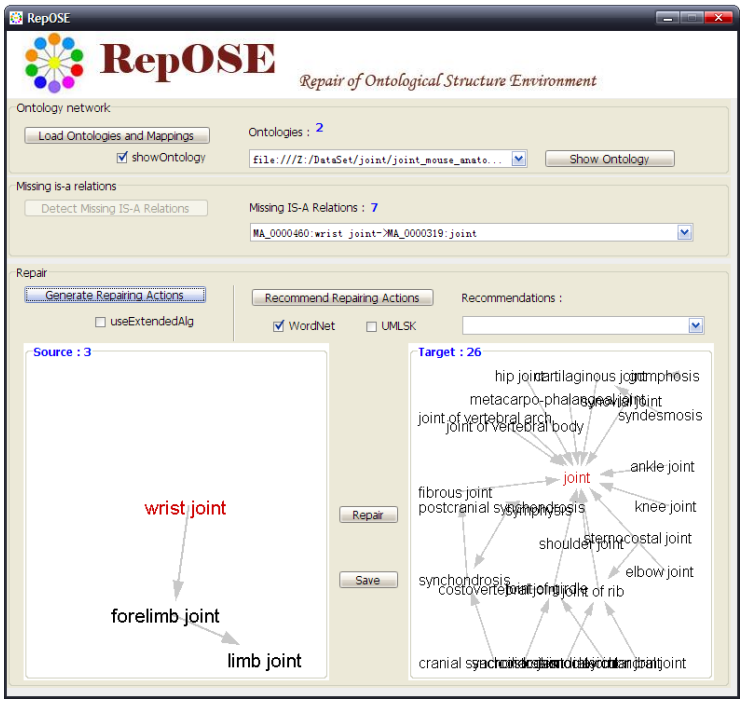
   As a result, the user can see the list of ontologies in the “Ontologies” menu.

2. Once the “Detect Missing IS-A Relations” button is clicked, missing is-a relations are detected in all ontologies. Then, the user can select which ontology to repair, and the “Missing IS-A Relations” menu shows the missing is-a relations of the currently selected ontology.



3. Clicking on the "Generate Repairing Actions" button, results in the computation of repairing actions for the missing is-a relations of the ontology under repair, which is preceded by a two-stage preprocessing step. During the preprocessing, one stage is to identify the missing is-a relations which are actually equivalence relations and repair them by adding the equivalence relations. The other is to identify and remove the redundant missing is-a relations which are derivable from the ontology extended with other missing is-a relations. Then, repairing actions for each missing is-a relation are computed and presented as Source and Target sets.

   The selection of the "useExtendAlg" checkbox makes the computation use our extended algorithm, otherwise our basic algorithm is used. Once the Source and Target sets are computed, the missing is-a relations are ranked with respect to the number of possible repairing actions. The first missing is-a relation in the list has the fewest possible repairing actions, and may therefore be a good starting point. When the user chooses a missing is-a relation, the Source and Target sets for the repairing actions are shown in the panels on the left and the right, respectively. Both these panels have zoom control and could be opened in a separate window by double clicking. The concepts in the missing is-a relation are highlighted in red.

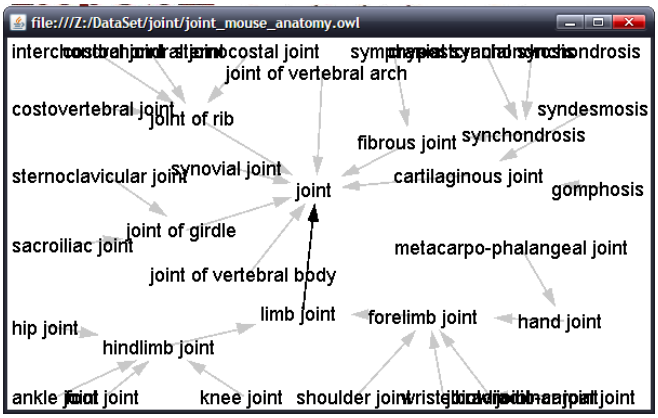


4. For the selected missing is-a relation, the user can also ask for recommended repairing actions by clicking the "Recommend Repairing Actions" button. The two checkboxes allow the user to specify the external domain knowledge used for generating recommendations. In our case, the system uses WordNet and recommends to add an is-a relation between *limb joint* and *joint*. In general, the system presents a list of recommendations.

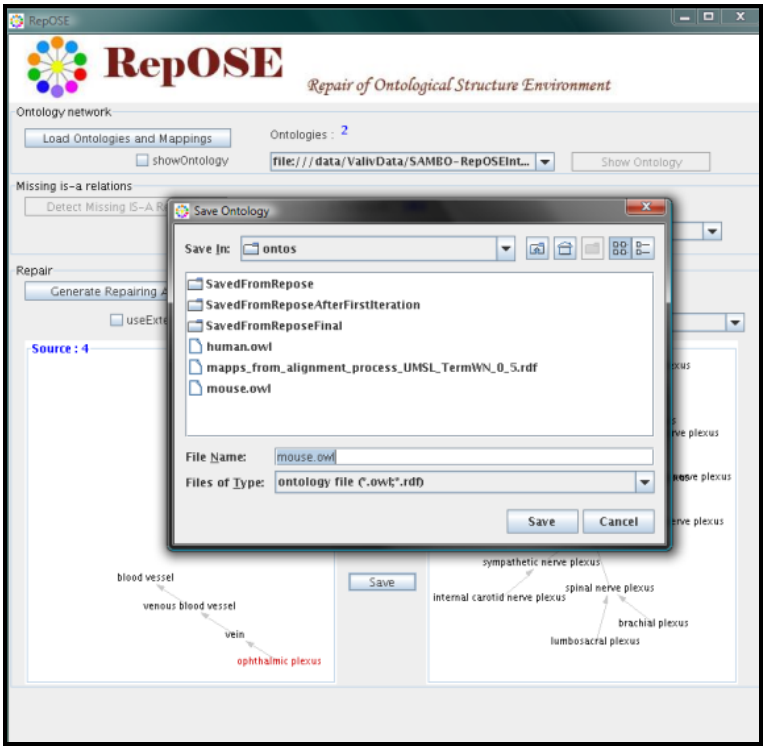
   By selecting an element in the list, the concepts in the recommended repairing action are identified by round boxes in the panels and the "Missing IS-A Relations" menu shows the missing is-a relations of the currently selected ontology.

5. The user can repair the missing is-a relation by selecting a concept in the Source panel and a concept in the Target panel and clicking on the "Repair" button. The repairing action is then added to the ontology, and other missing is-a relations are updated, as well as the set of missing is-a relations of every ontology in the network.

6. At all times during the process the user can inspect the ontology under repair by clicking the "Show Ontology" button. The is-a structure of the repaired ontology will be shown in a separate window with newly added is-a relations being highlighted.



7. The user can save the repaired ontology into an OWL file by clicking the Save button, or select another ontology to repair. The whole debugging process runs semi-automatically until no more missing is-a relations are found or unrepaired in the networked ontologies.



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[1] Liu Q, Lambrix P, A system for debugging missing is-a structure in networked ontologies, Proceedings of the 7th International Conference on Data Integration in the Life Sciences - DILS 2010, LNBI 6254, 50-57, Gothenburg, Sweden, 2010. @ Springer-Verlag.

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