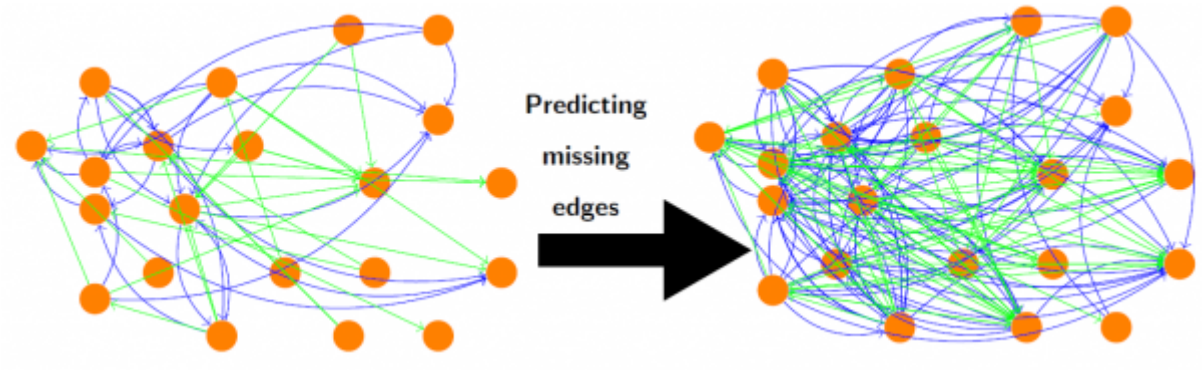
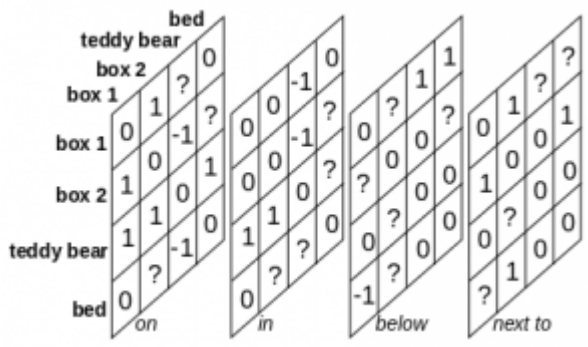
Innsbruck Object Relation Dataset

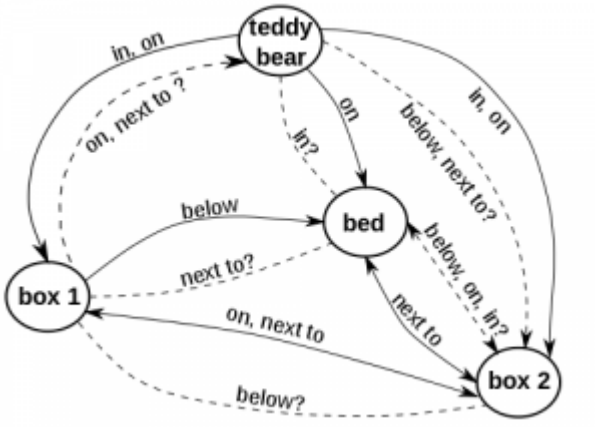
This dataset contains the set of possible object-object spatial relations. Learning object-object relations is a difficult problem with sparse, noisy, corrupted and incomplete information which makes it an interesting and challenging machine learning problem. We formulate this problem as the problem of learning missing edges in a multigraph.

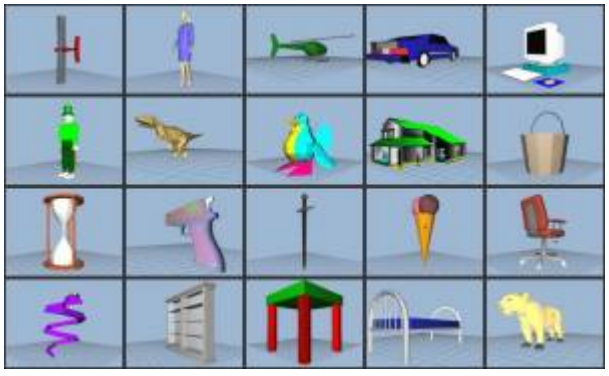
Keywords: missing link prediction, data imputation, matrix completion, recommender systems, low-rank approximation



The learning scenario based on which this database was created is a toy clean-up task in a room of kids, where an agent needs to plan how to transform a messy child's room into a tidy room by moving objects to their storage locations and creating order. An agent can integrate knowledge of possible spatial relations of objects into the planning process and use it to update the world model. Large numbers of objects and their potential interactions in this scenario make this task a large-scale problem. Estimating the missing relations based on those already known can accelerate planning procedures.







Dataset Features

- The dataset is based on the Princeton Shape Benchmark database.
- The dataset contains 4 sets for the each possible connection between objects (*in*, *on*, *below* and *next to*). The problem is formulated that all possible relations should be treated so two objects can have multiple connections.
- Links between objects are determined by values:
  - **0** - no connection
  - **1** - direct connection
  - **-1** - reverse connection
  - **empty** - unknown connection
- You can download the dataset here.

Reference

Please cite this paper if you use this dataset:

Senka Krivić, Sandor Szedmak, Hanchen Xiong, Justus Piater, Learning missing edges via kernels in partially-known graphs. European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning, 2015. [PDF] [Abstract] [BibTeX]

Acknowledgement

This research has received funding from the European Community's Seventh Framework Programme FP7/2007-2013 (Specific Programme Cooperation, Theme 3,Information and Communication Technologies) under grant agreement no. 610532, Squirrel and no. 270273, Xperience.

Contact senka.krivic@uibk.ac.at