

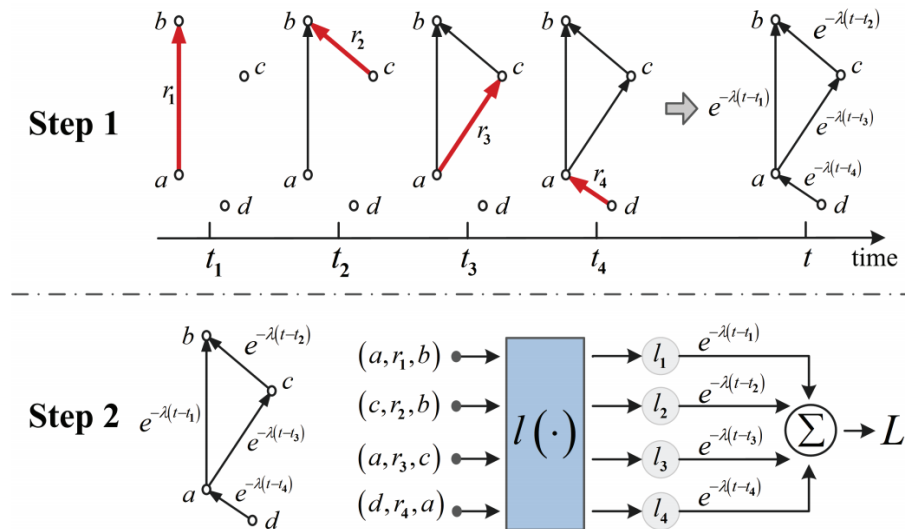
EvolveKG: A General Framework to Learn Evolving Knowledge Graphs

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Problems & Ideas

- Problems of evolving knowledge graphs learning
 - How to mathematically characterize the cross-time influence among knowledge with different generation times.
 - How to design and efficiently implement the algorithms to predict the generation of new knowledge by leveraging the historical ones.
- Ideas: A general framework that enables algorithms in the static knowledge graphs to learn the evolving ones.



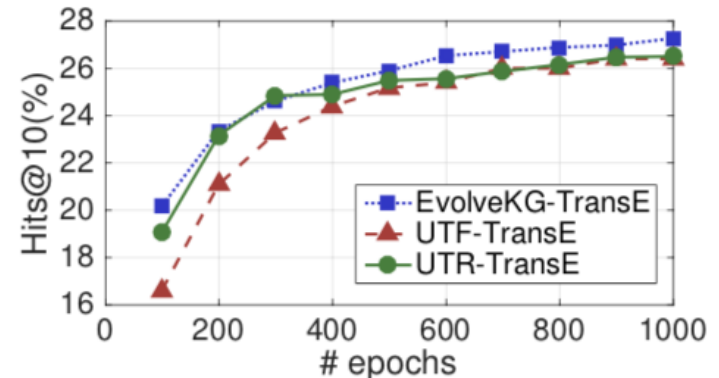
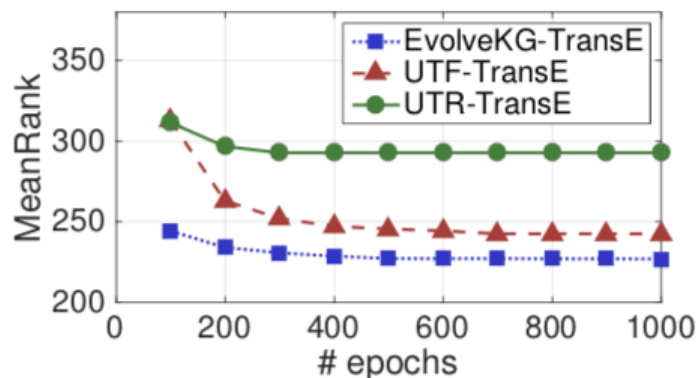
The implementation of the framework includes two steps:

Step 1: Transformation from an evolving knowledge graph to a newly proposed graph, i.e., Derivative Graph.

Step 2: Training on the Derivative Graph.

Main Contributions

- Contributions:
 - EvolveKG makes it feasible to learn evolving knowledge graphs by algorithms designed for static knowledge graphs;
 - We give a comprehensive theoretical analysis on Derivative Graph;
 - Compared with the original optimization problem given in traditional knowledge graphs, the revised one in EvolveKG involves no additional complexity in terms of concavity;
 - We provide evaluations on the prediction accuracy of EvolveKG. Experiments are given on 4 real datasets where it outperforms the baselines.



Meanrank and hits@10 results yielded by each method versus the number of epochs. Left: the average meanrank of the knowledges prediction; Right: the average hits@10 of the knowledge prediction.