

Entity-related paths modeling for knowledge base completion

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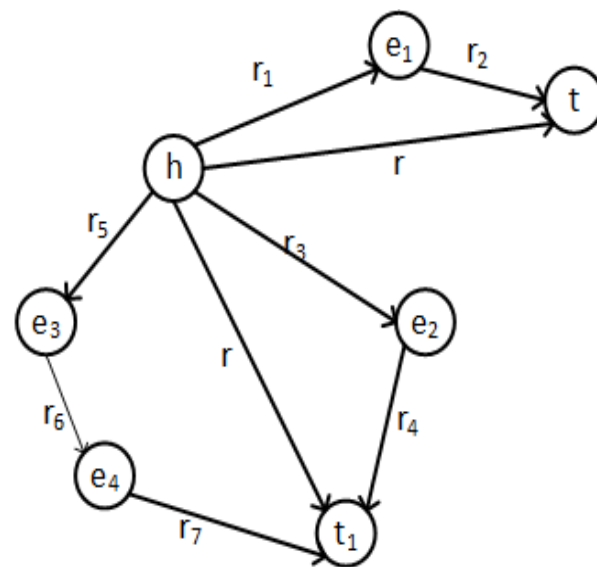
Problems & Ideas

- Problems of KB completion

PTransE considers multiple-step relation paths $[(h \xrightarrow{r} t; h \xrightarrow{r_1} e_1 \xrightarrow{r_2} t)$ and $(h \xrightarrow{r} t_1; h \xrightarrow{r_5} e_3 \xrightarrow{r_6} e_4 \xrightarrow{r_7} t_1)]$ based on TransE but ignores the association between entity and their related entities with the same direct relationships (t and t_1)

- Ideas:

The dissimilarity of these related entities (t and t_1) should not exceed a certain threshold. We proposed *EPTransE* which adjusts the embedding vector of an entity by comparing it with its related entities which connected by the same direct relationship. *EPTransE* further makes the euclidean distance of them less than a certain threshold.



Two units with the same direct relationship p

Main Contributions

- The result of Entity prediction**

Metric	Mean Rank		Hits@10(%)	
	Raw	Filter	Raw	Filter
SE	273	162	28.8	39.8
TransE	243	125	34.9	47.1
ETransE	252	133	33.2	45.9
TransH	212	87	45.7	64.4
TransR	198	77	48.2	68.7
PTransE(ADD,2-step)	200	54	51.8	83.4
PTransE(MUL,2-step)	216	67	47.4	77.7
PTransE(RNN,2-step)	242	92	50.6	82.8
PTransE(ADD,3-step)	207	58	51.4	84.6
EPTransE(ADD,2-step)	182	45	53.9	87.8
EPTransE(MUL,2-step)	205	56	52.7	87.7
EPTransE(ADD,3-step)	180	46	53.2	82.1

- The result of Relation prediction**

Metric	Mean Rank		Hits@10(%)	
	Raw	Filter	Raw	Filter
TransE	2.8	2.5	65.1	84.3
PTransE(ADD,2-step)	1.7	1.2	69.5	93.6
PTransE(MUL,2-step)	2.5	2.0	66.3	89.0
Phrase(RNN,2-step)	1.9	1.4	68.3	93.2
PTransE(ADD,3-step)	1.8	1.4	68.5	94.0
EPTransE(ADD,2-step)	1.8	1.4	69.1	93.3
EPTransE(MUL,2-step)	3.1	2.7	63.2	85.5
EPTransE(ADD,3-step)	2.0	1.6	68.1	90.0