Knowledge Graph Alignment Network with Gated Multi-hop Neighborhood Aggregation

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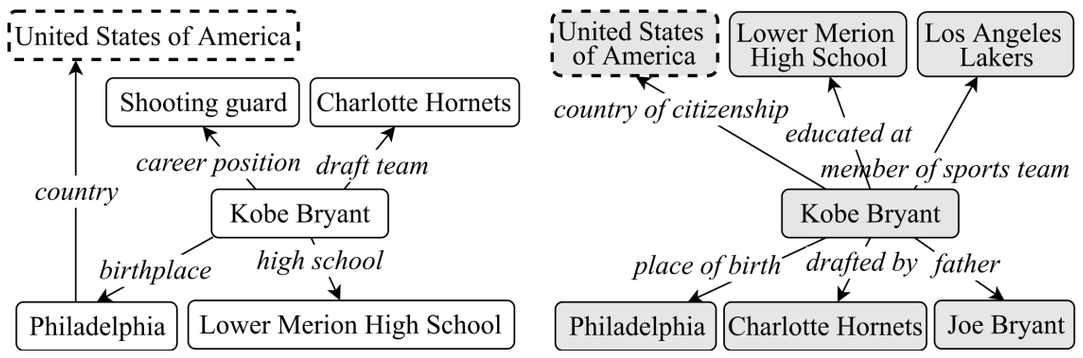
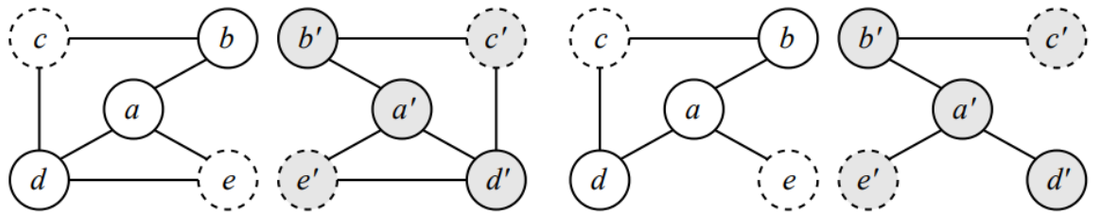
Introduction

- Entity alignment is the task of identifying equivalent entities from different knowledge graphs (KGs).
- Graph neural networks have emerged as a powerful paradigm for embedding-based entity alignment. The embedding of a node is learned by recursively aggregating the representations of its neighboring nodes.
- In real KGs, the equivalent entities usually have non-isomorphic neighborhood structures.

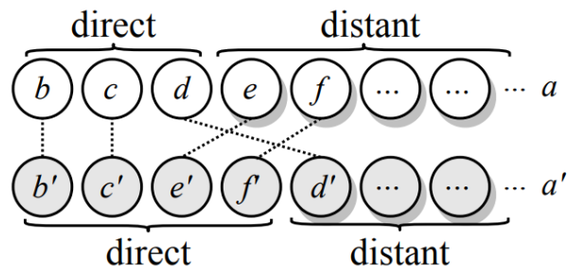


Preliminaries

- GNNs would learn the same representations for the entities having isomorphic neighborhood with identical feature vectors representing corresponding neighbors.

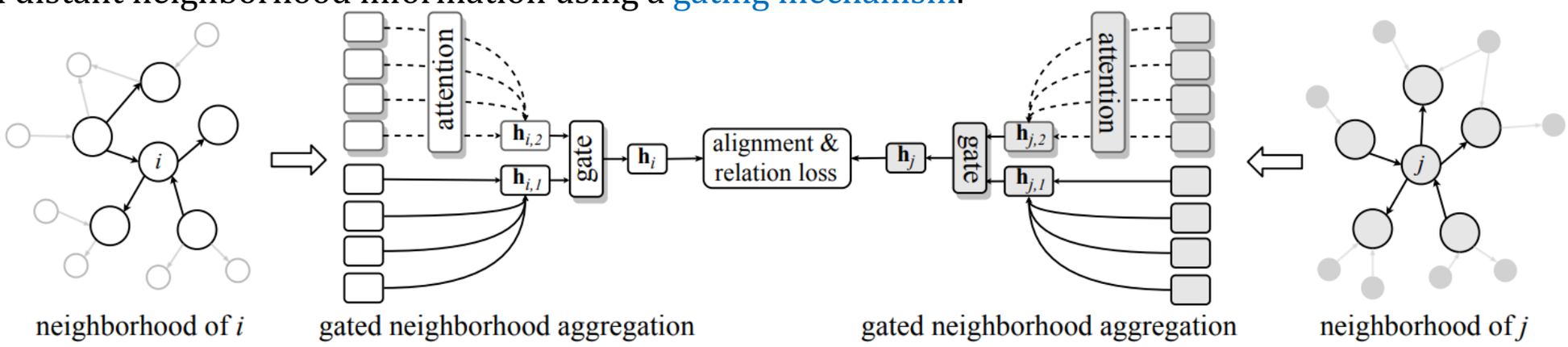


- Our model is motivated by the finding that the schema heterogeneity of KGs usually brings about the mixture of direct and distant neighbors of equivalent entities.



Model

AliNet introduces distant neighbors to expand the overlap between their neighborhood structures. It employs an attention mechanism to highlight helpful distant neighbors and reduce noises. Then, it controls the aggregation of both direct and distant neighborhood information using a gating mechanism.



Experiments

Datasets

- **DBP15K** has three datasets built from multi-lingual DBpedia, namely DBP_{ZH-EN} (Chinese-English), DBP_{JA-EN} (Japanese-English) and DBP_{FR-EN} (French-English).
- **DWY100K** has two datasets, namely DBP-WD (DBpedia-Wikidata) and DBP-YG (DBpedia-YAGO3).

Results

Methods	DBP_{ZH-EN}		DBP_{JA-EN}		DBP_{FR-EN}		DBP-WD		DBP-YG	
	Hits@1	MRR	Hits@1	MRR	Hits@1	MRR	Hits@1	MRR	Hits@1	MRR
MTransE	0.308	0.364	0.279	0.349	0.244	0.335	0.281	0.363	0.252	0.334
AlignE	0.472	0.581	0.448	0.563	0.481	0.599	0.566	0.655	0.633	0.707
GCN-Align	0.413	0.549	0.399	0.546	0.373	0.532	0.506	0.600	0.597	0.682
MuGNN	0.494	0.611	0.501	0.621	0.495	0.621	0.616	0.714	0.741	0.810
GCN	0.487	0.559	0.507	0.618	0.508	0.628	0.613	0.698	0.733	0.796
GAT	0.418	0.508	0.446	0.537	0.442	0.546	0.540	0.625	0.563	0.648
R-GCN	0.463	0.564	0.471	0.571	0.469	0.570	0.574	0.651	0.617	0.692
AliNet	**0.539**	**0.628**	**0.549**	**0.645**	**0.552**	**0.657**	**0.690**	**0.766**	**0.786**	**0.841**

Any questions, please email to zqsun.nju@gmail.com

Source code: https://github.com/nju-websoft/AliNet

Thanks!