Evaluating and improving the interpretability of item embeddings using item-tag relevance information

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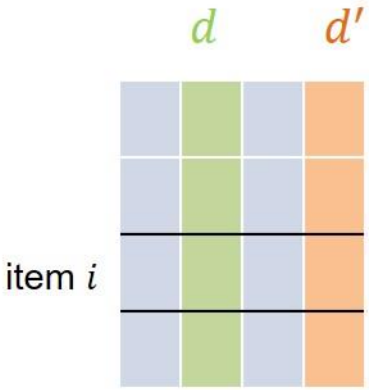
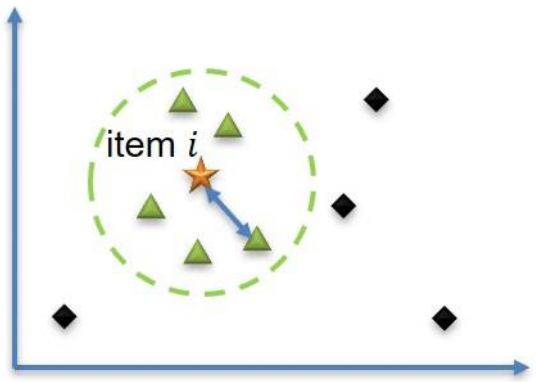
Problems & Ideas

- Problems: interpretability of item embeddings
  - How to automatically evaluate the interpretability of item embeddings?
  - How to cope with the bias in item embeddings caused by flaws in input matrices?
- Ideas: leveraging the item-tag relevance information
  - Design two novel metrics: one measures the interpretability of individual dimensions of item embeddings; the other measures the semantic coherence within local neighborhoods of the latent space
  - Tag-informed Item Embedding (TIE): joint matrix factorization



Individual dimensions of item embeddings

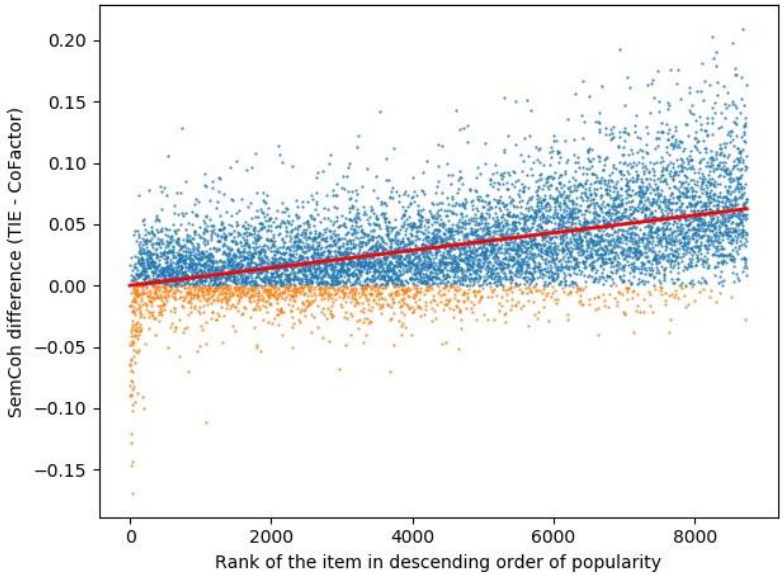


Local neighborhoods of the latent space

Main Contributions

- **The interpretability of item embeddings is improved in terms of the two proposed metrics.**

Model	SemSimRatio	SemCoh
WMF	1.1262	0.7783
CoFactor	1.0827	0.7670
TMF	1.1666	0.8465
TIE	1.1301	0.7983



- **The top-N recommendation performance is also improved.**

Model	Recall@20	Recall@50	NDCG@100	MAP@100
WMF	0.1331	0.1659	0.1612	0.0475
CoFactor	0.1456	0.1799	0.1760	**0.0568**
TMF	0.1442	0.1809	0.1752	0.0548
TIE	**0.1494**	**0.1835**	**0.1780**	0.0565