

Combining Contextual Words and Knowledge

Graph Embeddings

Software project, work update 4

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OUTLINES

1. Recap.
2. Current state : Auto-encoders Meta Embeddings
3. Future work .

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Recap

Dimensionality Reduction using PCA :

- Results were almost the same or even worse comparing to the traditional concatenation .

Reduced Dimension Models (Dimension = 400)	MRR	MAP@k=1
Contextual Embeddings	0.656	0.433
KG Embeddings	0.750	0.557
Concatenation	0.708	0.481

Original Models (Dimension)	MRR	MAP@k=1
Contextual Embeddings (2048)	0.554	0.554
KG Embeddings (800)	0.817	0.663
Concatenation (2848)	0.738	0.533

Entity Typing

Original Models (Dimension)	MAP@k=10	Precision @ k (mean \pm sd)
Contextual Embeddings (1024)	0.631	0.449 \pm 0.271
KG Embeddings (400)	0.825	0.528 \pm 0.269
Concatenation (1424)	0.828	0.527 \pm 0.268

Reduced Dimension Models (Dimension = 200)	MAP@k=10	Precision @ k (mean \pm sd)
Contextual Embeddings	0.190	0.208 \pm 0.249
KG Embeddings	0.673	0.476 \pm 0.261
Concatenation	0.297	0.306 \pm 0.277

Relation Prediction with Concatenated Model

Dimension	MRR	MAP@k=1
400	0.708	0.481
800	0.716	0.493
1200	0.710	0.476
2848	0.738	0.533

Current state : Auto-Encoder Meta-Embedding

Results :

- The model gives unexpected model : this may caused by an error in the model structure or maybe something else .
- We still working on figuring out the reasons behind these results .

Model	MAP@k	Mean Precision@k	Std
AAEME	0.101	0.200	0.282
CAEME	0.137	0.246	0.299
DAEME	0.125	0.198	0.212

Future work

To do :

- Before next meeting (in parallel) :
 - a. Re-produce the Auto-encoder model in “Learning Word Meta-Embeddings by Autoencoding” inorder to figure out the reason behind the low results.
 - b. Implementing the multihead attention mechanism.

References :

1. Bollegala, Danushka, and Cong Bao. "Learning word meta-embeddings by autoencoding." Proceedings of the 27th International Conference on Computational Linguistics. 2018.
2. James O'Neill and Danushka Bollegala: Semi-Supervised Multi-Task Word Embeddings arXiv, 2018. [arXiv]

Thank you! Questions?

