



Advanced Seminar Knowledge Graphs meet Language Models

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Information Systems
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Themes



- **KG embeddings with LMs input**
- **Jointly KG embedding and LMs**
- **LMs with KG component as input**

KG embeddings with LMs input

- Xu, J., Qiu, X., Chen, K., & Huang, X. (2017). [Knowledge Graph Representation with Jointly Structural and Textual Encoding](#). IJCAI.
- Yao, Liang et al. “[KG-BERT: BERT for Knowledge Graph Completion](#).” ArXiv abs/1909.03193 (2019).
- Wang, Liang et al. “[SimKGC: Simple Contrastive Knowledge Graph Completion with Pre-trained Language Models](#).” ACL (2022):

Jointly KG embedding and LMs

- Wang, Zhen et al. “Knowledge Graph and Text Jointly Embedding.” *EMNLP* (2014).
- Sun, Tianxiang et al. “CoLAKE: Contextualized Language and Knowledge Embedding.” *COLING* (2020).
- Wang, Xiaozhi et al. “KEPLER: A Unified Model for Knowledge Embedding and Pre-trained Language Representation.” *Transactions of the Association for Computational Linguistics* 9 (2021): 176-194.

LMs with KG component as input

- Zhang, Z., Han, X., Liu, Z., Jiang, X., Sun, M., & Liu, Q. (2019). [ERNIE: Enhanced Language Representation with Informative Entities](#). ACL
- Liu, Weijie et al. ["K-BERT: Enabling Language Representation with Knowledge Graph."](#) AAAI (2020).
- Fichtel, Leandra et al. ["Prompt Tuning or Fine-Tuning - Investigating Relational Knowledge in Pre-Trained Language Models."](#) AKBC (2021).

■ **KG embeddings with LMs input (Maluna)**

- Xu, J., Qiu, X., Chen, K., & Huang, X. (2017). [Knowledge Graph Representation with Jointly Structural and Textual Encoding](#). IJCAI.
- Yao, Liang et al. “[KG-BERT: BERT for Knowledge Graph Completion](#).” ArXiv abs/1909.03193 (2019).
- Wang, Liang et al. “[SimKGC: Simple Contrastive Knowledge Graph Completion with Pre-trained Language Models](#).” ACL (2022):

■ **Jointly KG embedding and LMs (Kien)**

- Wang, Zhen et al. “[Knowledge Graph and Text Jointly Embedding](#).” EMNLP (2014).
- Sun, Tianxiang et al. “[CoLAKE: Contextualized Language and Knowledge Embedding](#).” COLING (2020).
- Wang, Xiaozhi et al. “[KEPLER: A Unified Model for Knowledge Embedding and Pre-trained Language Representation](#).” *Transactions of the Association for Computational Linguistics* 9 (2021): 176-194.

■ **LMs with KG component as input (Lukas)**

- Zhang, Z., Han, X., Liu, Z., Jiang, X., Sun, M., & Liu, Q. (2019). [ERNIE: Enhanced Language Representation with Informative Entities](#). ACL
- Liu, Weijie et al. “[K-BERT: Enabling Language Representation with Knowledge Graph](#).” AAAI (2020).
- Fichtel, Leandra et al. “[Prompt Tuning or Fine-Tuning - Investigating Relational Knowledge in Pre-Trained Language Models](#).” AKBC (2021).

Context (LMs)

GLOVE

GloVe: Global Vectors for Word Representation by Jeffrey Pennington et al.

**January
2, 2014**

TRANSFORMER

Attention Is All You Need by Ashish Vaswani et al

**June 12,
2017**

BERT

BERT: Pre-training of Deep Bidirectional Transformers for...

**October
11, 2018**

**January
16, 2013**

WORD2VEC

Word2Vec Paper by Tomas Mikolov et al

**July 15,
2016**

FASTTEXT

Enriching Word Vectors with Subword Information by Piotr Bojanowski et al

**February
15, 2018**

ELMO

Deep contextualized word representations by Matthew E. Peters et al

Poster Session

- 21st July at 14:00
- Posters
 - A1 (templates available at owncloud - choose your poison)
 - <https://owncloud.hpi.de/s/fiTgpyWZI2QAcD8>
 - 18th July deadline for provided printing service
- Minute madness before the session
- Consultation during paper research
 - Arrange with us by email ~2 weeks

Literature

Knowledge Graphs

Gerhard Weikum, Xin Luna Dong, Simon Razniewski and Fabian Suchanek (2021), "Machine Knowledge: Creation and Curation of Comprehensive Knowledge Bases", Foundations and Trends® in Databases: Vol. 10: No. 2-4, pp 108-490. <http://dx.doi.org/10.1561/1900000064> **(Chapter 1)**

Language Models

Dan Jurafsky and James H. Martin, "Speech and Language Processing" (3rd ed. draft) <https://web.stanford.edu/~jurafsky/slp3/> **(Chapter 9)**

Language Models As or For Knowledge Bases

Simon Razniewski , Andrew Yates , Nora Kassner and Gerhard Weikum
<https://arxiv.org/abs/2110.04888>