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INDUCING INTERPRETABLE WORD SENSES FOR WSD AND ENRICHMENT OF LEXICAL RESOURCES

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Overview

- **Inducing word sense representations**:
  - word sense embeddings via retrofitting [Pelevina et al., 2016, Remus and Biemann, 2018];
  - sparse sense representations [Panchenko et al., 2017c];
  - semantic classes [Panchenko et al., 2018]

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- **Making the induced senses interpretable** [Panchenko et al., 2017b, Panchenko et al., 2017c]

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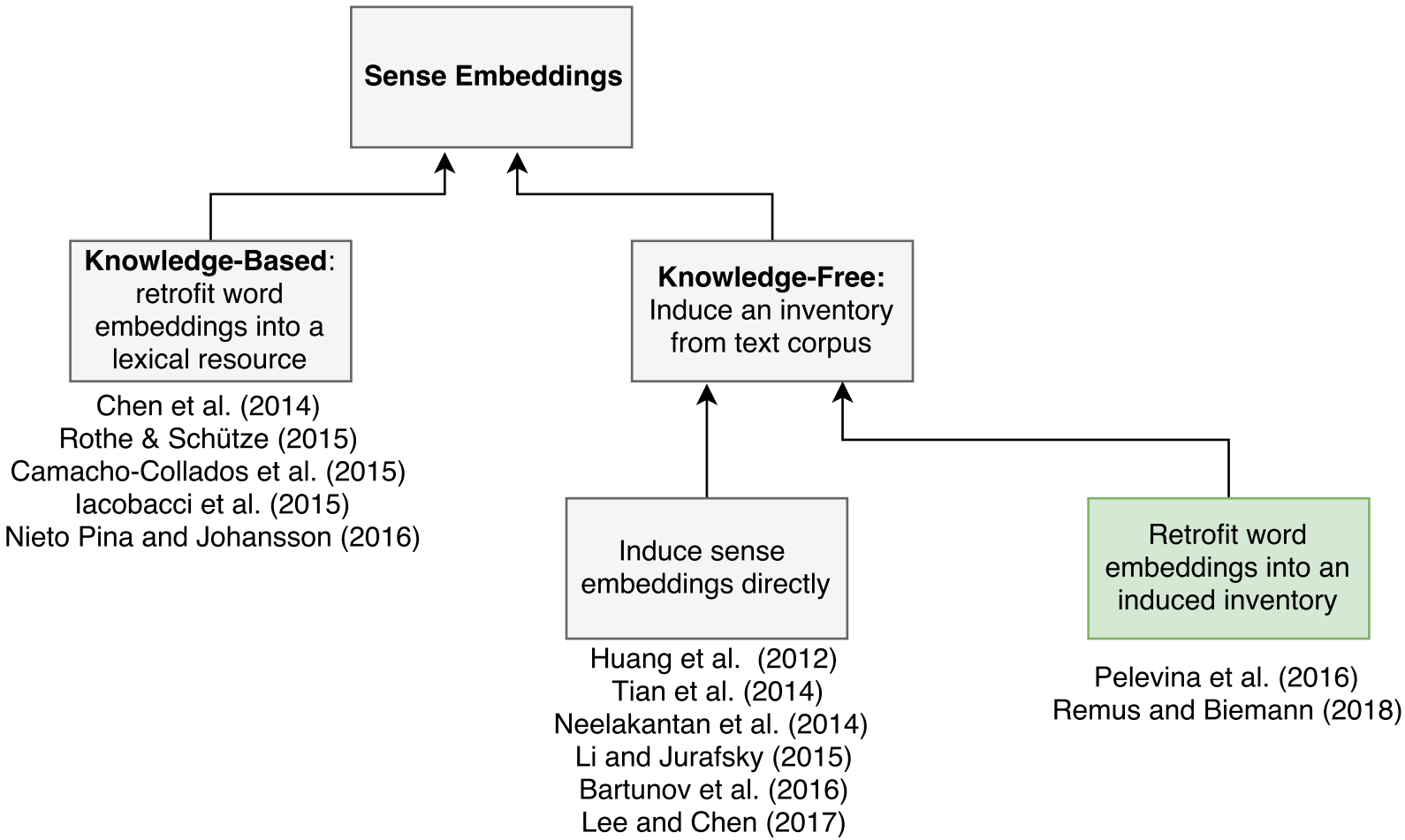
  - semantic classes [Panchenko et al., 2018]
- **Making the induced senses interpretable** [Panchenko et al., 2017b, Panchenko et al., 2017c]
- **Linking induced word senses to lexical resources** [Faralli et al., 2016, Panchenko et al., 2017a, Biemann et al., 2018]

Inducing word sense representations

Related work



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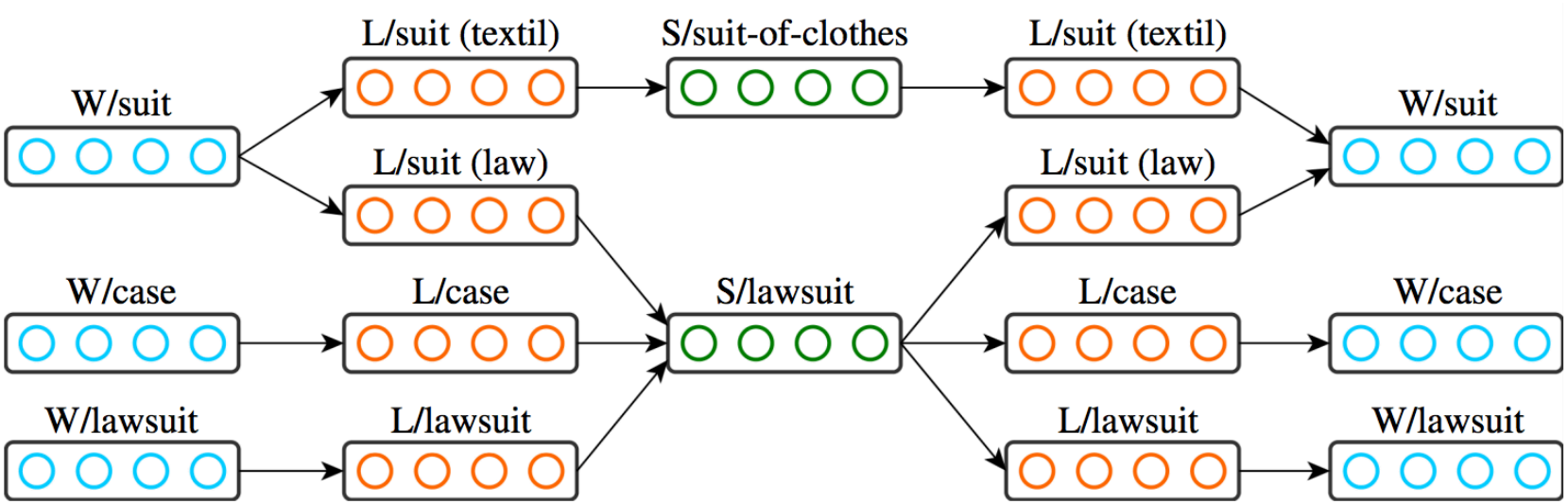
Related work: Knowledge-Based Sense Embeddings

- AutoExtend [Rothe and Schütze, 2015]



* image is reproduced from the original paper

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Related work: Knowledge-Free Sense Embeddings

- Adagram [Bartunov et al., 2016]
- Multiple vector representations θ for each word:

$$p(Y, Z, \beta | X, \alpha, \theta) = \prod_{w=1}^{V} \prod_{k=1}^{\infty} p(\beta_{wk}|\alpha) \prod_{i=1}^{N} [p(z_i|x_i, \beta) \prod_{j=1}^{C} p(y_{ij}|z_i, x_i, \theta)],$$

  - α – a meta-parameter controlling number of senses;
  - z_i – a hidden variable: a sense index in context;
  - $p(\beta_{wk}|\alpha)$ – a priory probability of the k-th sense of the word w;
  - $p(z_i|x_i, \beta)$ – probability of observing word x_i in the sense z_i;
  - $\prod_{j=1}^{C} p(y_{ij}|z_i, x_i, \theta)$ – probability of a context C.

Conclusion

Summary

- How to **induce word senses** and **semantic classes** from text and synonyms.

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- Hypernymy labels **improve hypernymy extraction**.

Summary

- How to **induce word senses** and **semantic classes** from text and synonyms.
- **Interpretability can be added** on the top of induced word senses in a model agnostic way.
- Hypernymy labels **improve hypernymy extraction**.
- Linking induced word senses to lexical resources:
  - improves **performance of WSD**;
  - can be used to **enrich lexical resources** with new senses.

A New Shared Task on WSI&D

- Participate in an ACL SIGSLAV sponsored shared task on **word sense induction and disambiguation** for Russian!

A lexical sample task evaluated using the ARI measure

- Target word, e.g. “bank” (in Russian).
- Contexts where the word occurs.
- You need to group the contexts by senses.

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- **More details**: `http://russe.nlpub.org/2018/wsi`
- You can participate by **31.01.2018**.

Thank you!

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