Neural Natural Language Processing in WebLicht

State-of-the-Art and Future Perspectives

Daniël de Kok

What is WebLicht?

H.264

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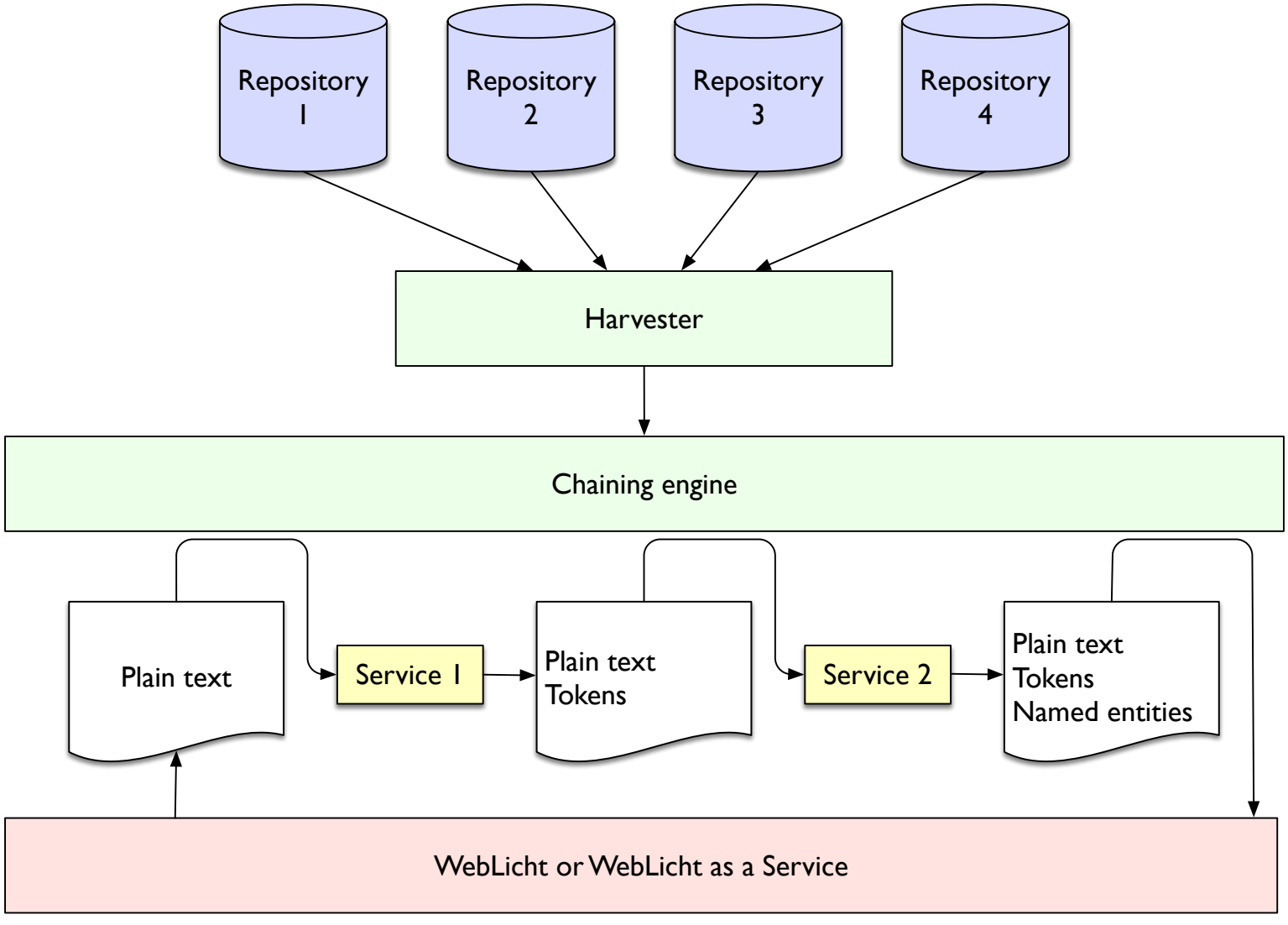
H.264

Sherlock Holmes[PER] ist eine 1886 vom britischen Schriftsteller Arthur Conan Doyle[PER] geschaffene Kunstfigur .

WebLicht architecture



Text Corpus Format (TCF)

- XML data exchange format
- Annotations stored layer-wise
- Used by WebLicht webservices
- Tools for visualization, such as TüNDRA
- Tools for annotation, such as WebAnno

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- Many supported annotation layers, including:
  - Tokenization
  - Lemmas
  - Constituency & Dependency Parsing
  - Morphology
  - Named Entitities
  - References (anaphoric, cataphoric, coreference)
  - Geographical locations
  - Text structure

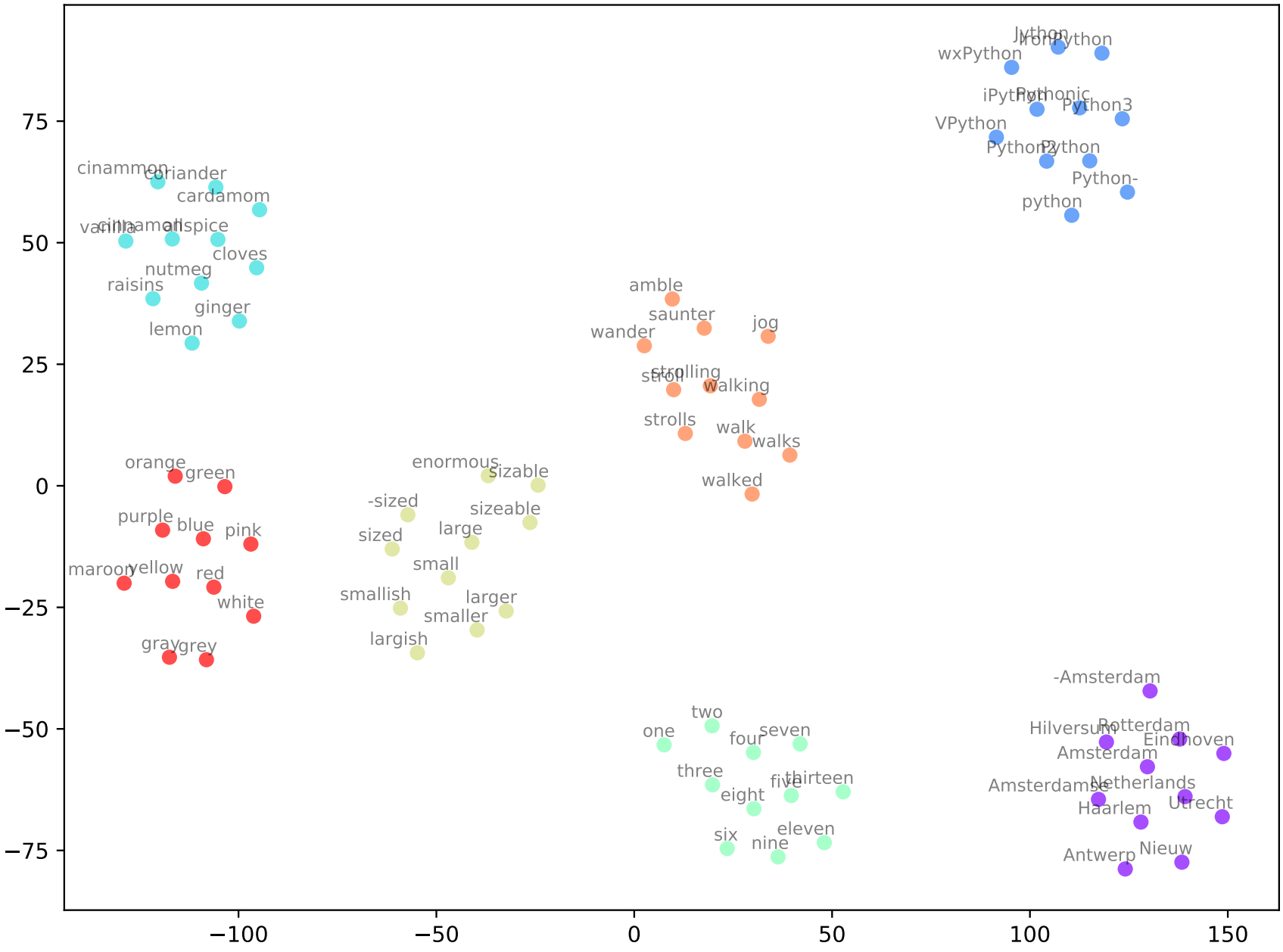
State-of-the-Art

State-of-the-Art: Neural language processing

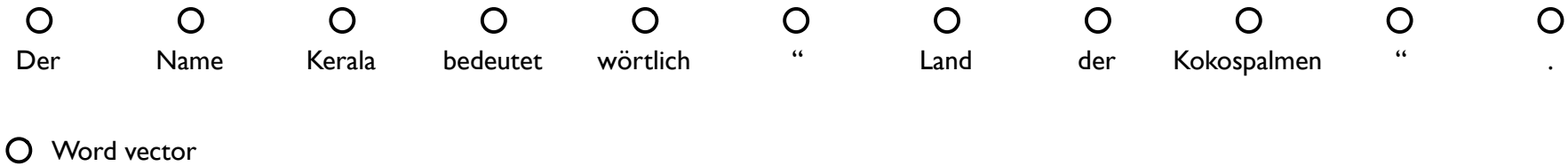
Key ingredients:

- Vector representations of words
- Deep neural networks

Words as vectors



Recurrent neural networks (RNN)



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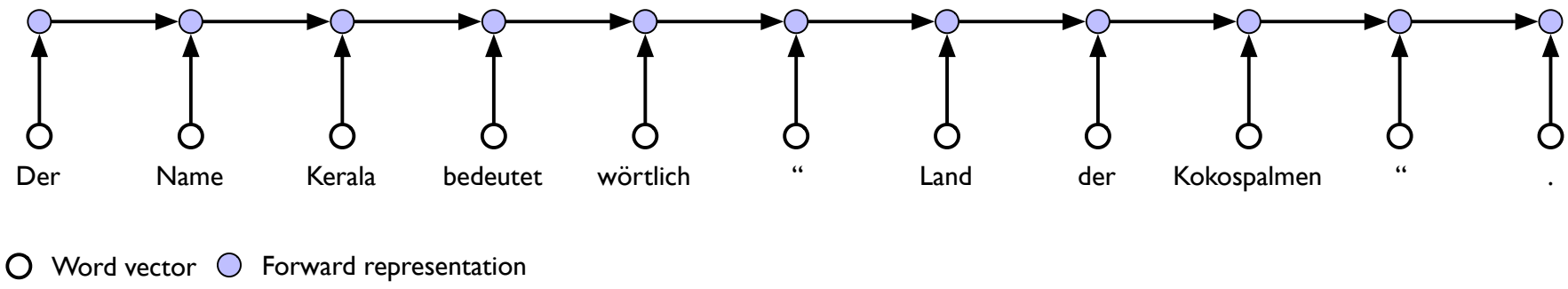

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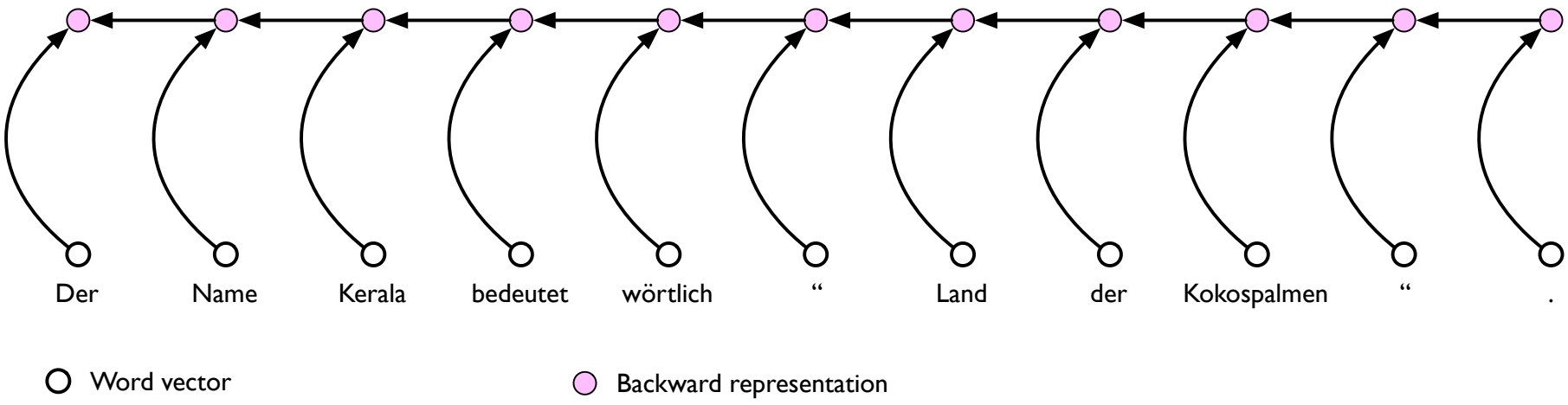

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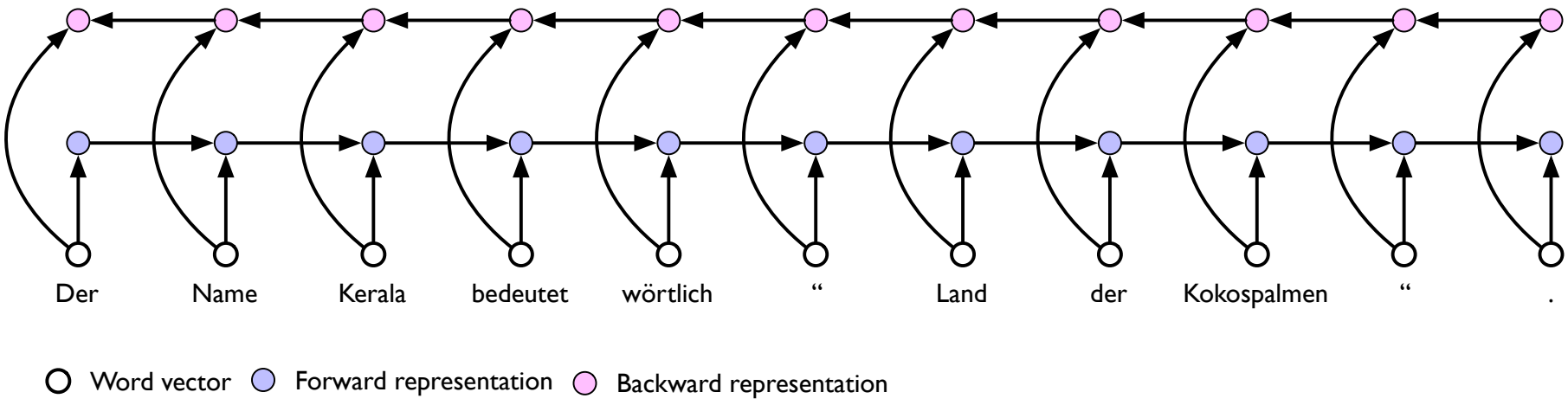

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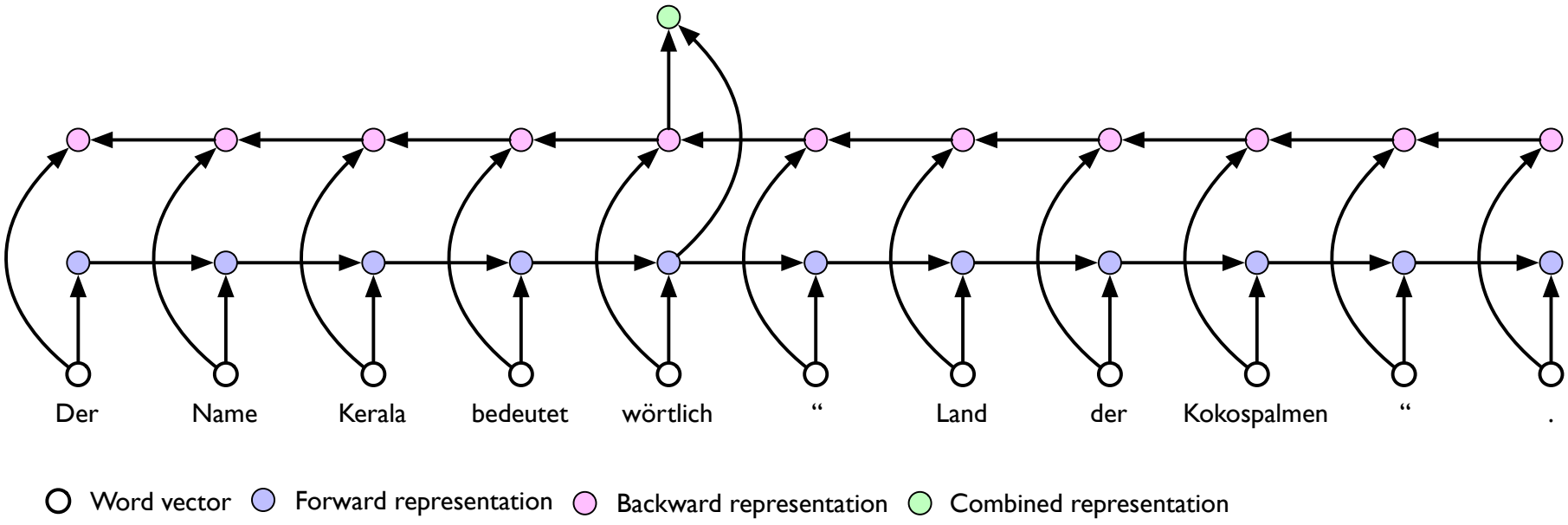
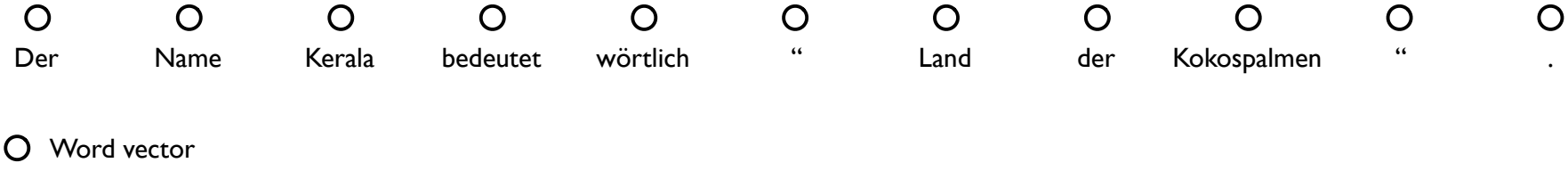


Transformer



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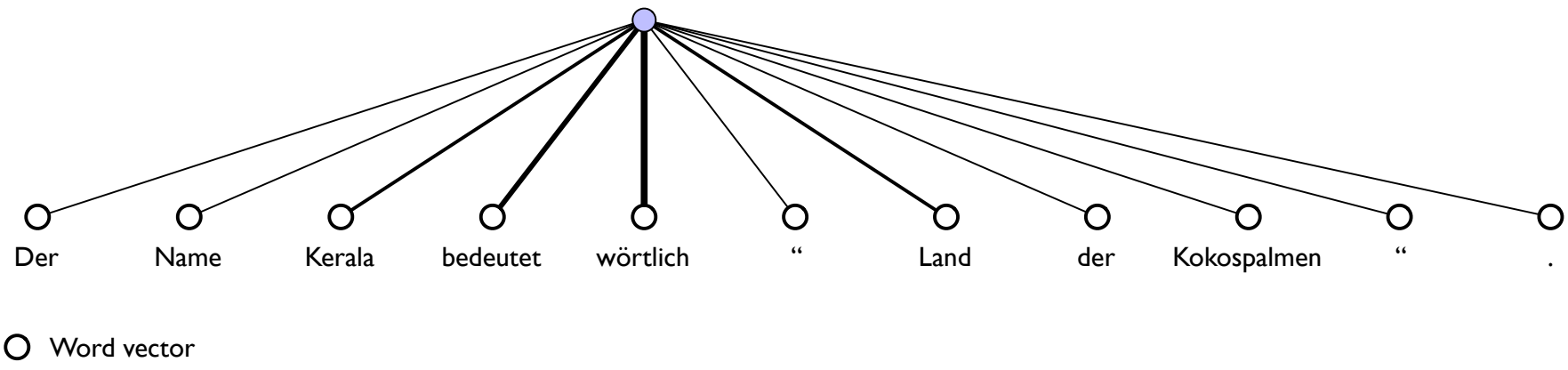

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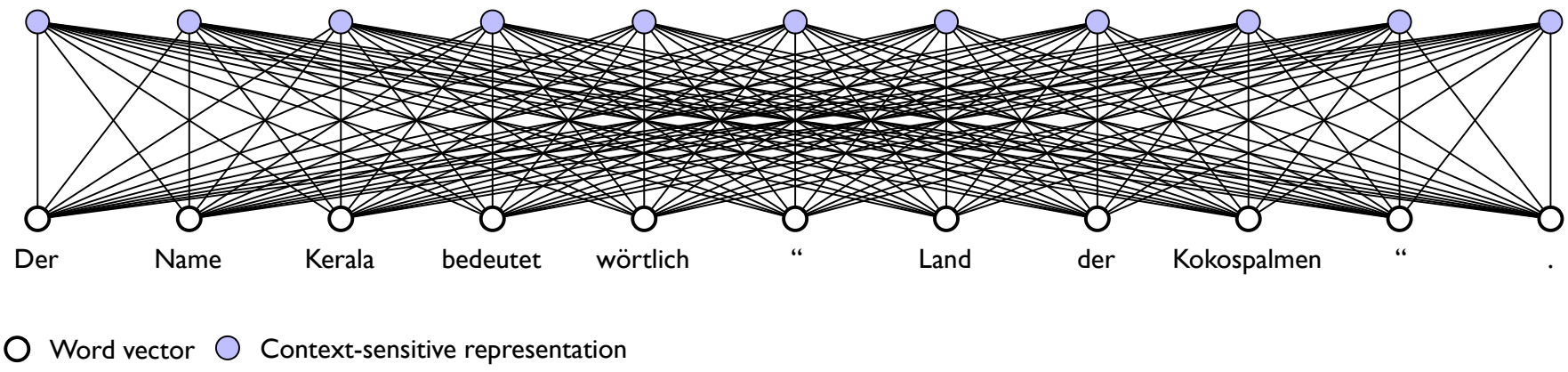

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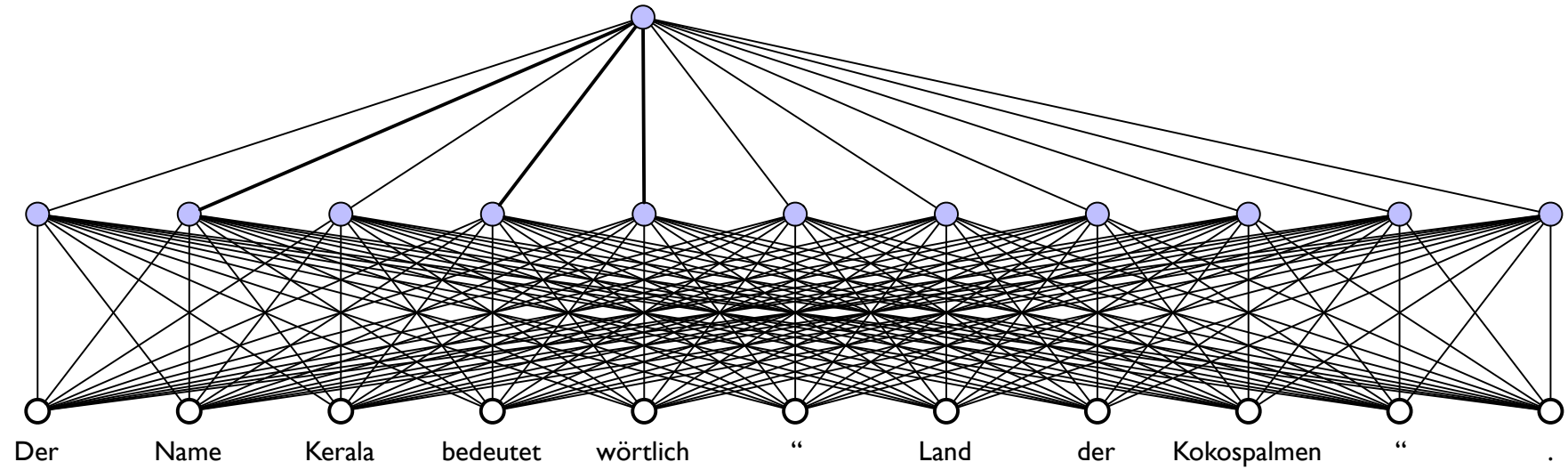

Improvements in syntactic tasks

[1] Joint work with Erik Schill.
[2] Joint work with Tobias Pütz.

Improvements in syntactic tasks

Part-of-speech tagging[1]

VVFIN	**ART**	**NN**	**PTKVZ**	**$.**
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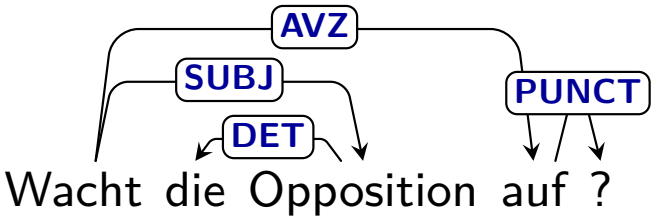

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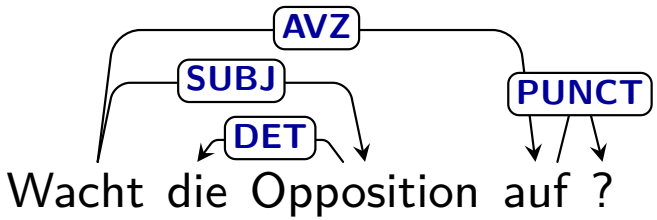

Tagger	Accuracy
Linear SVM	89.9
Feed forward NN	91.8
RNN	94.4
Transformer	94.7
RNN + pretraining	96.1
Transformer + pretraining	96.3

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Conclusion

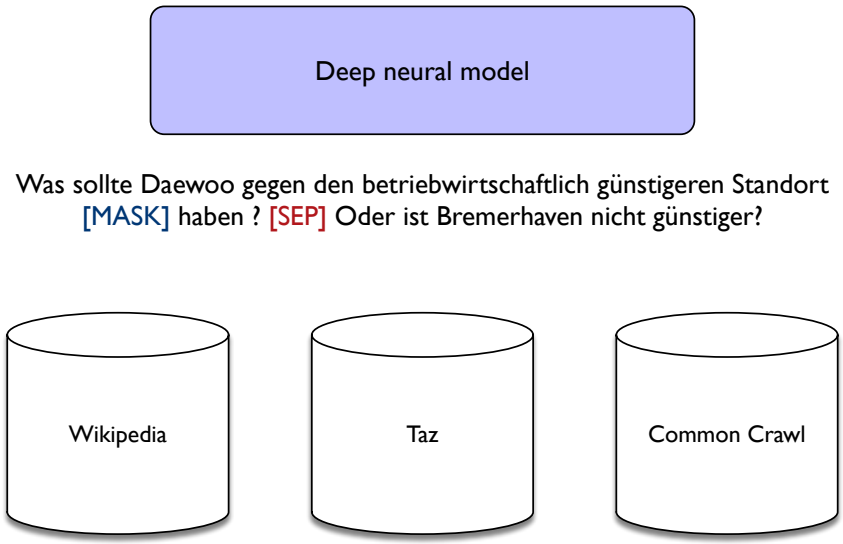
- WebLicht allows you to build text analysis piplines: https://weblicht.sfs.uni-tuebingen.de
- WebLicht can be integrated in other applications using WebLicht as a Service: https://weblicht.sfs.uni-tuebingen.de/WaaS/
- State-of-the-Art: annotations tools using neural networks

Thank you!

Future perspectives

Pretraining (Peters et al., 2018 & Devlin et al., 2019)

Pretraining



Finetuning

Pretraining (Peters et al., 2018 & Devlin et al., 2019)

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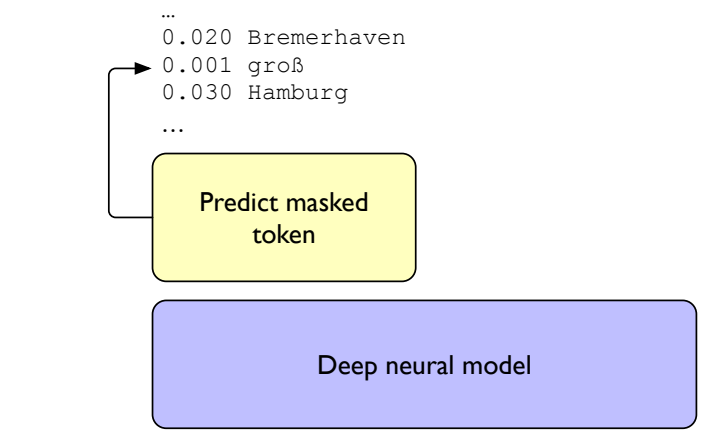
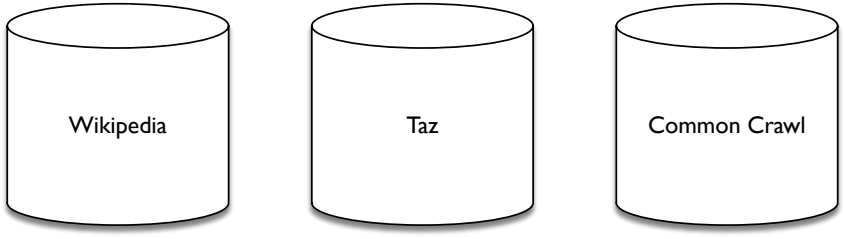


Was sollte Daewoo gegen den betriebwirtschaftlich günstigeren Standort [MASK] haben ? [SEP] Oder ist Bremerhaven nicht günstiger?



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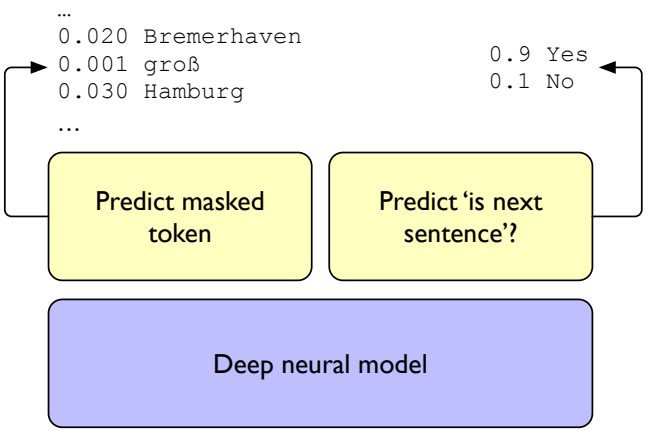

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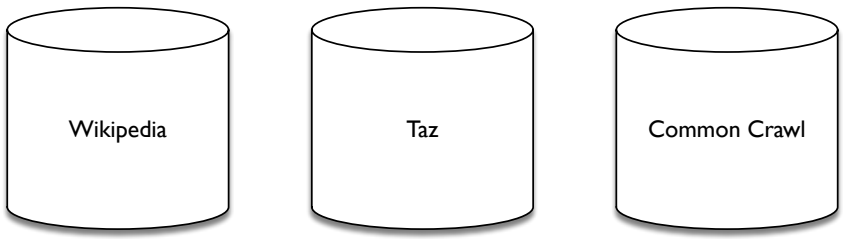

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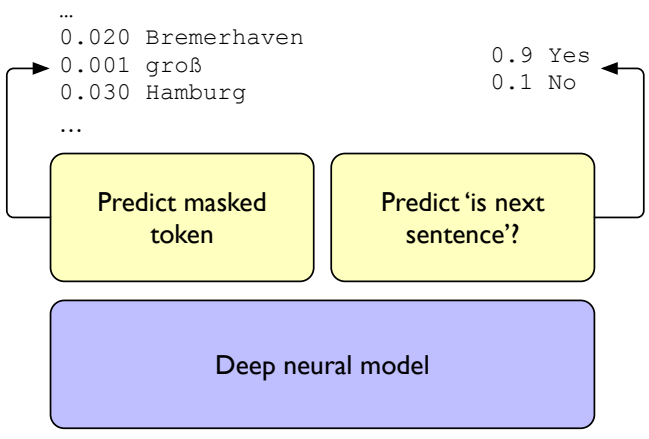

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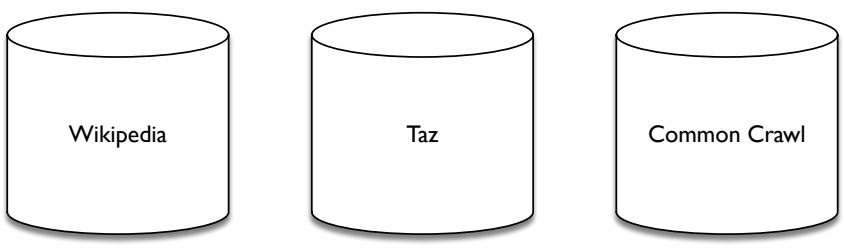

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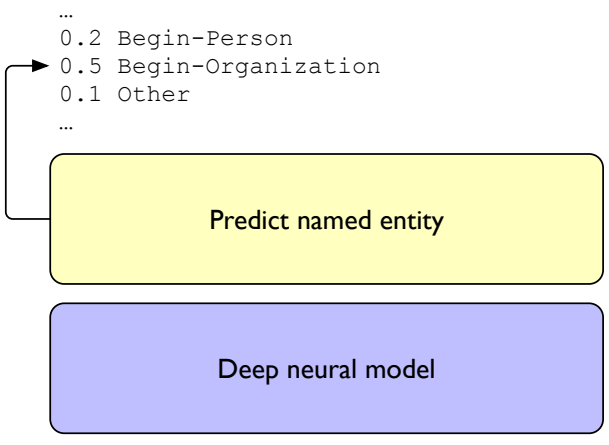

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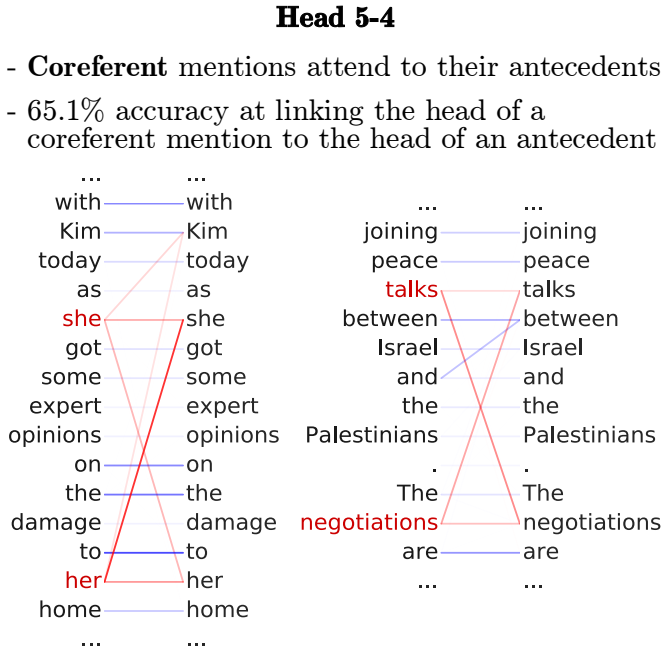

(Source: Clark et al., 2019)