IN5550: Neural Methods in Natural Language Processing
Sub-lecture 4.3
Count-based (explicit) vector semantic models

Andrey Kutuzov

University of Oslo



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- Interpretability is an important property of sparse representations.

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(dot product of unit-normalized vectors)

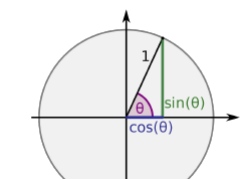
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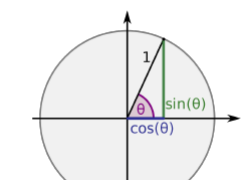
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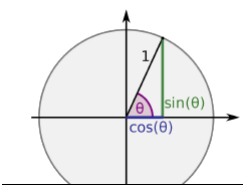


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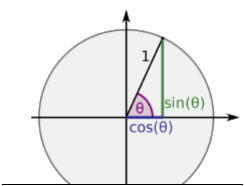
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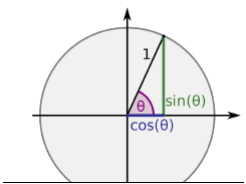
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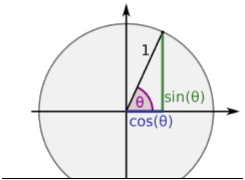
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Question: why not simply use dot product?

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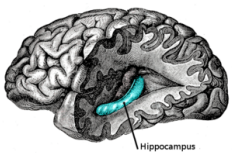
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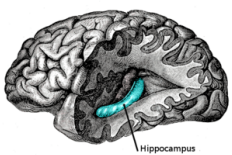
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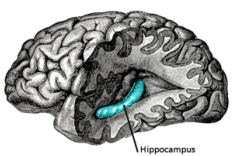
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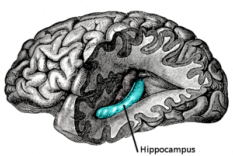
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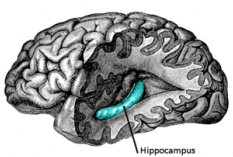
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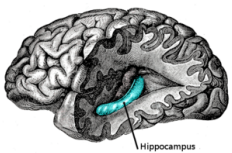
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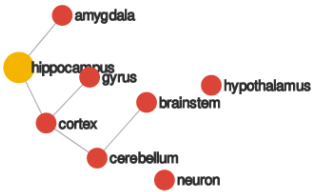


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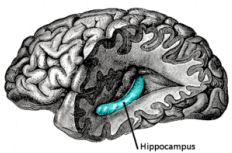
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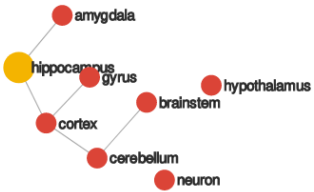


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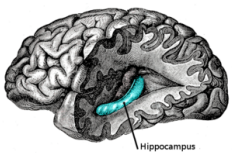


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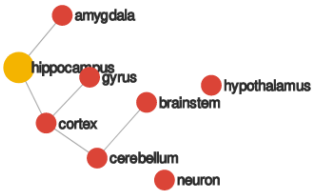


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Question: what do the edges in the graph denote?



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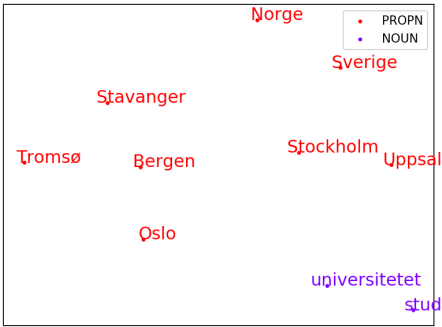
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- Can even reduce to the dimensionality of 2 or 1.
- Such reduced 'implicit' vectors are usually dense and have much more rights to be called 'word embeddings'.
- NB: still nothing 'neural' or 'deep' here!

Word embeddings

An extreme case: 2-dimensional word embeddings:

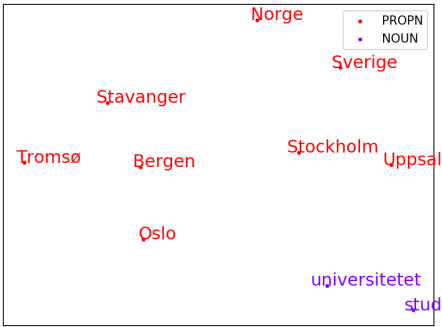


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[Van der Maaten and Hinton, 2008]

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Vector components (x and y) are not directly interpretable any more, of course.
An 'explicit' model turned to an 'implicit' one. Semantic information is distributed across the remaining dimensions.

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But where is machine learning and neural networks? See sub-lecture 4.4!

References I

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Goldberg, Y. (2017).
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