# New Directions in Vector Space Models of Meaning

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ACL 2014 Tutorial

## Tutorial Slides URL

## **Tutorial Slides**

Available from June 2014 onwards at <a href="http://www.egrefen.com/ACL2014VectorTutorial">http://www.egrefen.com/ACL2014VectorTutorial</a>

## Outline

1 Distributional Semantics

2 Neural Language Models

3 Semantic Composition

#### **Distributional Semantics**

- Firth, J.R. (1957). A synopsis of linguistic theory 1930-1955.
- Grefenstette, G. (1994). Explorations in automatic thesaurus discovery.
- Harris, Z.S. (1968). Mathematical structures of language.
- Hoffman, T. and Puzicha, J. (1998). Unsupervised learning from dyadic data.
- Landauer, T.K. and Dumais, S.T. (1997). A solution to Plato's problem: The latent semantic analysis theory of acquisition, induction, and representation of knowledge.
- Lin, D. and Pantel, P. (2001). DIRT Discovery of Inference Rules from Text.
- Padó, S. and Lapata, M. (2007). Dependency-based construction of semantic space models.
- Turney, P.D. and Pantel, P. (2010). From frequency to meaning: Vector space models of semantics.

#### **Neural Language Modelling**

- Bengio, Y., Schwenk, H., Senécal, J. S., Morin, F. and Gauvain, J.L. (2006).
  Neural probabilistic language models.
- Brown, P.F., Desouza, P.V., Mercer, R.L., Pietra, V.J.D. and Lai, J.C. (1992).
  Class-based n-gram models of natural language.
- Grefenstette, E., Blunsom, P., de Freitas, N. and Hermann, K.M. (2014). A Deep Architecture for Semantic Parsing.
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  Recurrent neural network based language model.
- Mnih, A. and Hinton, G. (2007). Three new graphical models for statistical language modelling.
- Mnih, A. and Hinton, G. (2008). A Scalable Hierarchical Distributed Language Model.
- Sutskever, I., Martens, J. and Hinton, G. (2011). Generating text with recurrent neural networks.

#### Compositionality

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  Multi-step regression learning for compositional distributional semantics.
- Grefenstette, E. and Sadrzadeh, M. (2011). Experimental support for a categorical compositional distributional model of meaning.
- Hermann, K.M. and Blunsom, P. (2013). The role of syntax in vector space models of compositional semantics.
- Hermann, K. M. and Blunsom, P. (2014). Multilingual Models for Compositional Distributed Semantics.
- Kalchbrenner, N. and Blunsom, P. (2013). Recurrent convolutional neural networks for discourse compositionality.
- Kalchbrenner, N., Grefenstette, E. and Blunsom, P. (2014). A Convolutional Neural Network for Modelling Sentences.
- Lazaridou, A., Marelli, M., Zamparelli, R. and Baroni, M. (2013).
  Compositionally derived representations of morphologically complex words in distributional semantics.

#### Compositionality (continued)

- LeCun, Y. and Bengio, Y. (1995). Convolutional networks for images, speech, and time series.
- Marelli, M., Menini, S., Baroni, M., Bentivogli, L., Bernardi, R. and Zamparelli, R. (2014). A SICK cure for the evaluation of compositional distributional semantic models.
- Mitchell, J. and Lapata, M. (2008). Vector-based Models of Semantic Composition.
- Socher, R., Pennington, J., Huang, E.H., Ng, A.Y. and Manning, C.D. (2011).
  Semi-supervised recursive autoencoders for predicting sentiment distributions.