

# Word Embeddings

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## Word Embeddings

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When talking about NN and NLP, we need to know about word embeddings.

Basically, a word embedding is a mapping of a word into a very high dimensioned vector space.

200-300 dimensions are not unusual.

Each word is mapped into the vector space and as such is represented by a multi-dimensional vector.

For example, the word “dog” might be mapped to: (0.01, -0.934, 0.7 , ...)

## Word Embeddings

Consider the following visualization of number related terms.

This is an excerpt of a larger space (see below for the image source of the entire space)

The number words are in their little partition of the word vector space.



Image source: [http://metaoptimize.s3.amazonaws.com/cw-embeddings-ACL2010/embeddings-mostcommon.EMBEDDING\\_SIZE=50.png](http://metaoptimize.s3.amazonaws.com/cw-embeddings-ACL2010/embeddings-mostcommon.EMBEDDING_SIZE=50.png)

## Word Embeddings

Word embeddings can be quite useful in language translation.

Consider the following overlay of English and Chinese word embeddings.

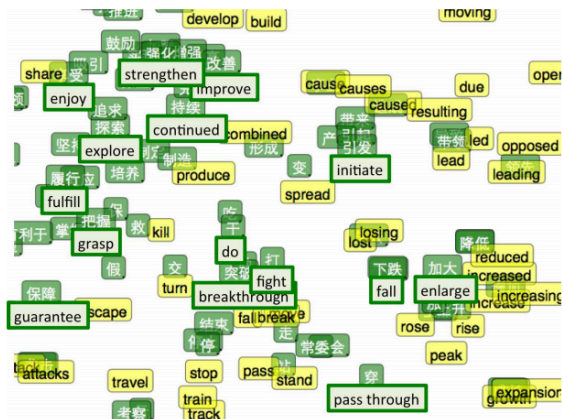


Image source: [http://ai.stanford.edu/~wzou/emnlp2013\\_ZouSocherC Manning.pdf](http://ai.stanford.edu/~wzou/emnlp2013_ZouSocherC Manning.pdf)

## Word Embeddings

Another useful application of word embeddings are for paraphrase detection.

Consider a different excerpt from the same vector space we saw before.

We can calculate the distance between words to realize that "planned" and "expected" are closer in meaning than "planned" and "ended"



Image source: [http://metaoptimize.s3.amazonaws.com/cw-embeddings-ACL2010/embeddings-mostcommon.EMBEDDING\\_SIZE=50.png](http://metaoptimize.s3.amazonaws.com/cw-embeddings-ACL2010/embeddings-mostcommon.EMBEDDING_SIZE=50.png)