title and link	***description***
Improving Distributional Similarity with Lessons Learned from Word ...	• word similarity • analogy
Dependency-Based Word Embeddings	• qualitativ: compare neighborhoods across embeddings • word similarity
Multi-Granularity Chinese Word Embedding	• word similarity • analogy • qualitative: local neighborhoods
A Mixture Model for Learning Multi-Sense Word Embeddings	• word similarity • analogy
Learning Crosslingual Word Embeddings without Bilingual Corpora	• multilingual • word similarities (monolingual)
Word Embeddings with Limited Memory	• word similarity • phrase similarity
A Latent Variable Model Approach to PMI-based Word Embeddings	• analogy
Prepositional Phrase Attachment over Word Embedding Products	• extrinsic
A Simple Word Embedding Model for Lexical Substitution	• lexical substitution (nearest neighbors after vector averaging)
Segmentation-Free Word Embedding for Unsegmented Languages	• extrinsic
Evaluation methods for unsupervised word embeddings	• word similarity • analogy • concept categorization • selectional preference
Dict2vec : Learning Word Embeddings using Lexical Dictionaries	• word similarity • extrinsic
Task-Oriented Learning of Word Embeddings for Semantic Relation ...	• extrinsic
Refining Word Embeddings for Sentiment Analysis	• extrinsic
Language classification from bilingual word embedding graphs	• word similarity
Learning principled bilingual mappings of word embeddings while ...	• multilingual
A Word Embedding Approach to Identifying Verb-Noun Idiomatic ...	• extrinsic

Deep Multilingual Correlation for Improved Word Embeddings	• word & bigram similarity
Siamese CBOW: Optimizing Word Embeddings for Sentence ...	• sentence similarity (word averaging + nearest neighbor)
Spectral Graph-Based Method of Multimodal Word Embedding	• word similarity
Cross-lingual Models of Word Embeddings: An Empirical Comparison	• multilingual
How to Train good Word Embeddings for Biomedical NLP	• word similarity • extrinsic
D-GloVe: A Feasible Least Squares Model for Estimating Word ...	• word similarity • analogy
The Interplay of Semantics and Morphology in Word Embeddings	• word similarity • qualitative: morphological features (of nearest neighbors)
Multilingual Training of Crosslingual Word Embeddings	• word similarity • multilingual
Learning Sentiment-Specific Word Embedding for Twitter Sentiment ...	• extrinsic
Unsupervised Morphology Induction Using Word Embeddings	• word similarity
Word Embedding Distance Pattern for Keyphrase Classification in ...	• extrinsic
Revisiting Word Embedding for Contrasting Meaning	• find most contrasting word in set of candidate words (similar to analogy task in this particular embedding)
AutoExtend: Extending Word Embeddings to Embeddings for ...	• synset / lexeme similarity (similar to word similarity in this particular embedding)
A Comparison of Word Embeddings for English and Cross-Lingual ...	• multilingual
Modeling Context Words as Regions: An Ordinal Regression ...	• word similarity • analogy
Mimicking Word Embeddings using Subword RNNs	• word similarity • qualitative: nearest neighbors
Morphological Priors for Probabilistic Neural Word Embeddings	• extrinsic • word similarity • qvec
An Error-Oriented Approach to Word Embedding Pre-Training	• find unlikely word in a sentence to predict errors

Adapting Pre-trained Word Embeddings For Use In Medical Coding	• extrinsic
The Role of Context Types and Dimensionality in Learning Word ...	• extrinsic • word similarity
Entity Extraction in Biomedical Corpora: An Approach to Evaluate ...	• extrinsic
A Strong Baseline for Learning Cross-Lingual Word Embeddings ...	• multilingual
Symmetric Pattern Based Word Embeddings for Improved Word ...	• word similarity • analogy
Word Embedding-based Antonym Detection using Thesauri and ...	• synonym / antonym detection (specifically encoded in embedding)
Diachronic Word Embeddings Reveal Statistical Laws of Semantic ...	• nearest neighbors (multiple embeddings)
On Approximately Searching for Similar Word Embeddings	• nearest neighbors (strategies to make search more efficient)
Evaluation of acoustic word embeddings	• embeds accoustic samples instead of written words
Using word embedding for bio-event extraction	• extrinsic
Investigating Language Universal and Specific Properties in Word ...	• extrinsic
Using Word Embedding for Cross-Language Plagiarism Detection	• multilingual
Word Re-Embedding via Manifold Dimensionality Retention	• word similarity
Intrinsic Subspace Evaluation of Word Embedding Representations	• extrinsic
Learning Semantic Word Embeddings based on Ordinal Knowledge ...	• extrinsic • synonym selection • word similarity • sentence completion (using co-ocurrence probability)
Beyond Bilingual: Multi-sense Word Embeddings using Multilingual ...	• multilingual
Determining Gains Acquired from Word Embedding Quantitatively ...	• extrinsic
Specializing Word Embeddings for Similarity or Relatedness	• extrinsic • synonym selection

Right-truncatable Neural Word Embeddings	• word similarity • sentence completion (using co-ocurrence probability)
Bilingual Word Embeddings from Parallel and Non-parallel Corpora ...	• multilingual • extrinsic
MGNC-CNN: A Simple Approach to Exploiting Multiple Word ...	• extrinsic
Intrinsic Evaluations of Word Embeddings: What Can We Do Better?	• critical discussion of evaluation methods; call for more exploratory analysis of word embeddings
Tracing armed conflicts with diachronic word embedding models	• nearest neighbors (multiple embeddings)
Analyzing Word Embeddings through Multilingual Evaluation	• extrinsic
Automated WordNet Construction Using Word Embeddings	• multilingual
Word Embeddings as Metric Recovery in Semantic Spaces	• analogy • series completion (based on vector offset; similar to analogy) • concept categorization
Predicting the Compositionality of Nominal Compounds: Giving ...	• identify compound nouns (through nearest neighbor search)
Better Summarization Evaluation with Word Embeddings for ROUGE	• text summary evaluation (based on similarity of phrases to texts obtained through averaging word vectors)
Nonparametric Spherical Topic Modeling with Word Embeddings	• extrinsic
Exploring Word Embedding for Drug Name Recognition	• extrinsic
Word Embeddings based on Fixed-Size Ordinally Forgetting Encoding	• word similarity
Lexical Comparison Between Wikipedia and Twitter Corpora by ...	• linguistic study (with lots of uses of word similarity)
A Simple Regularization-based Algorithm for Learning Cross ...	• multilingual • extrinsic
PPDB 2.0: Better paraphrase ranking, fine-grained entailment ...	• lexical resource that now supports word embeddings
Centroid-based Text Summarization	• text summarization (based on

through Compositionality of ...	similarity of phrases to texts obtained through averaging word vectors)
Word Similarity Based on Word Embedding and Knowledge Base	• word similarity
Bilingual Word Embeddings for Phrase-Based Machine Translation	• multilingual • extrinsic
Predicting Polarities of Tweets by Composing Word Embeddings ...	• extrinsic
Unsupervised POS Induction with Word Embeddings	• extrinsic
Semantic Annotation Aggregation with Conditional Crowdsourcing ...	• extrinsic
Bilingual Word Embeddings from Non-Parallel Document-Aligned ...	• multilingual
Recognizing Textual Entailment in Twitter Using Word Embeddings	• extrinsic
Arabic Textual Entailment with Word Embeddings	• extrinsic
Comparing Fifty Natural Languages and Twelve Genetic Languages ...	• multilingual • word similarity • compare embeddings of different languages to measure similarity
Cross-Lingual Word Embeddings for Low-Resource Language ...	• multilingual • word similarity
Delexicalized Word Embeddings for Cross-lingual Dependency ...	• extrinsic
How Well Can We Predict Hypernyms from Word Embeddings? A ...	• extrinsic
Evaluating word embeddings with fMRI and eye-tracking	• extrinsic
Adjusting Word Embeddings with Semantic Intensity Orders	• semantic intensity (similar to word similarity)
An Improved Crowdsourcing Based Evaluation Technique for Word ...	• embedding evaluation through crowd sourcing
Word Embedding for Response-To-Text Assessment of Evidence	• extrinsic
Chinese Grammatical Error Diagnosis Using Single Word Embedding	• extrinsic
Syntax-Aware Multi-Sense Word	• qualitative: nearest neighbors

Embeddings for Deep ...	• word similarity • extrinsic
A Probabilistic Model for Learning Multi-Prototype Word Embeddings	• qualitative: nearest neighbors • word similarity
Learning Sense-specific Word Embeddings By Exploiting Bilingual ...	• multilingual
Learning bilingual word embeddings with (almost) no bilingual data	• multilingual
Elucidating Conceptual Properties from Word Embeddings	• study into what single dimensions of word embeddings encode
Temporal dynamics of semantic relations in word embeddings: an ...	• conflict prediction (based on nearest neighbor search after linear mapping of vectors)
Morphological Word-Embeddings	• measure encoded morphological information (through nearest neighbor search / comparison)
A Joint Model for Word Embedding and Word Morphology	• word similarity • analogy • classify morpheme boundaries (based on an embedding of subwords)
Learning Compositionality Functions on Word Embeddings for ...	• extrinsic
A Simple but Tough-To-Beat Baseline for Sentence Embeddings	• extrinsic • sentence similarity (similar to word similarity)
Man is to Computer Programmer as Woman is to Homemaker? Debiasing Word Embeddings	• measure gender bias by projecting words on concept axes within an embedding
Don’t count, predict! A systematic comparison of context-counting vs. context-predicting semantic vectors	• word similarity • synonym selection • concept categorization • selectional preferences • analogy
Empath: Understanding Topic Signals in Large-Scale Text	• word similarity • crowd sourcing
Retrofitting Word Vectors to Semantic Lexicons	• word similarity • anology (targeting syntactic relations) • synonym selection • extrinsic
What can you do with a rock?	• analogy

Affordance extraction via word embeddings	• explore embeddings by mapping words on concept axes
Fast Training of word2vec Representations Using n-gram Corpora	• multilingual • word similarity • extrinsic
A framework for analyzing semantic change of words across time	• nearest neighbors (multiple embeddings) • sentiment analysis (compare sentiment words in the neighborhood in multiple embeddings)
Statistically Significant Detection of Linguistic Change	• changes of a word vector over time (based on an alignment between multiple embeddings)
Linguistic Regularities in Sparse and Explicit Word Representations	• analogy
Efficient Estimation of Word Representations in Vector Space	• analogy (qualitative and quantitive)
Distributed Representations of Words and Phrases and their Compositionality	• analogy (qualitative and quantitive)
GloVe: Global Vectors for Word Representation	• word similarity • analogy • extrinsic
Learning Word Meta-Embeddings	• word similarity • analogy • extrinsic
Evaluation of Word Vector Representations by Subspace Alignment	• qvec • word similarity • extrinsic

Additional Vis / HCI papers (that are primarily discussed as related work):

Visual Tools for Debugging Neural Language Models	• word similarity (and changes during training, including thirs words responsible for these changes during training) • activation patterns in the neural network used for training • corpus analysis during training
Visual Exploration of Semantic Relationships in Neural Word Embeddings	• word similarity • analogy • nearest neighbors • compare embeddings

Embedding Projector: Interactive visualization and interpretation of embeddings	• nearest neighbors • word similarity • finding global structure • meaningful directions (e.g., for analogy)
ConceptVector: Text Visual Analytics via Interactive Lexicon Building Using Word Embedding	• nearest neighbors • concept synthesis based on nearest neighbors
cite2vec: Citation-Driven Document Exploration via Word Embeddings	• special embedding (words & citations) • finding global structure (through 2D projection using t-SNE) • analyzing citations trough their position in the word / citation space • analyze documents through their position on the word space

- word similarity: 43
- analogy: 22
- neighborhoods (simple: 10 / compare: 7)
- synonym selection: 4
- concept projection: 2
- similarity between compound entities (phrases, sentences; incl. selectional preferences): 6
- context prediction: 3
  sentence completion / error prediction

- concept categorization: 3
  Concept categorization relies on clustering vectors and measures cluster purity based on semantics groups. While it is intrinsic evaluation, it uses an additional unsupervised machine learning step.

- multilingual: 17
- extrinsic: 43
- qvec: 2

- **qualitative:** some papers provide qualitative evaluation by listing a specific pattern from the embeddings. For example, the nearest neighbors for some chosen words.
- **extrinsic:** extrinsic evaluation is based on downstream NLP applications. Here, we have used the label extrinsic as follows: Every evaluation that

uses additional machine learning methods, e.g., classification of word vectors, are labeled extrinsic.

- **crowd sourcing:** One popular way of evaluating word embeddings comparatively is to extract nearest neighbors of a specific word from multiple embeddings. Through crowd sourcing, labelers are asked to decide which one of these extracted neighbors is closest to the query word. This compares the intuitiveness of the semantic / linguistic knowledge encoded within embeddings.
- **qvec:** Evaluation metric based on the correlations of dimensions in a word embedding with word descriptions extracted from knowledge about the word from lexicons (including semantic relations and part-of-speech).