P13: Word Similarity

Project owner Arvi Tavast

- Andreas Pung, Alfred Saidlo, Karl Vaba, Merlin Kasesalu

UNIVERSITY OF TARTU
1632

Problem

- Analyze a huge amount of written Estonian text
- For the most common words, find the most similar words
- Provide this data to Arvi Tavast

UNIVERSITY OF TARTU
1632

Why?

- This data can be used for inclusion in dictionaries
- Coming up with similar words manually can be tedious

UNIVERSITY OF TARTU
1632

How?

- Imagine two points

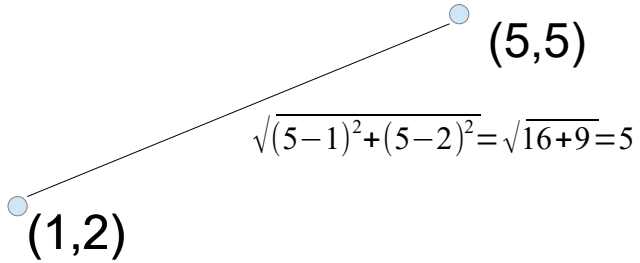
- How close are they?

4

UNIVERSITY OF TARTU

How?

- Imagine two points



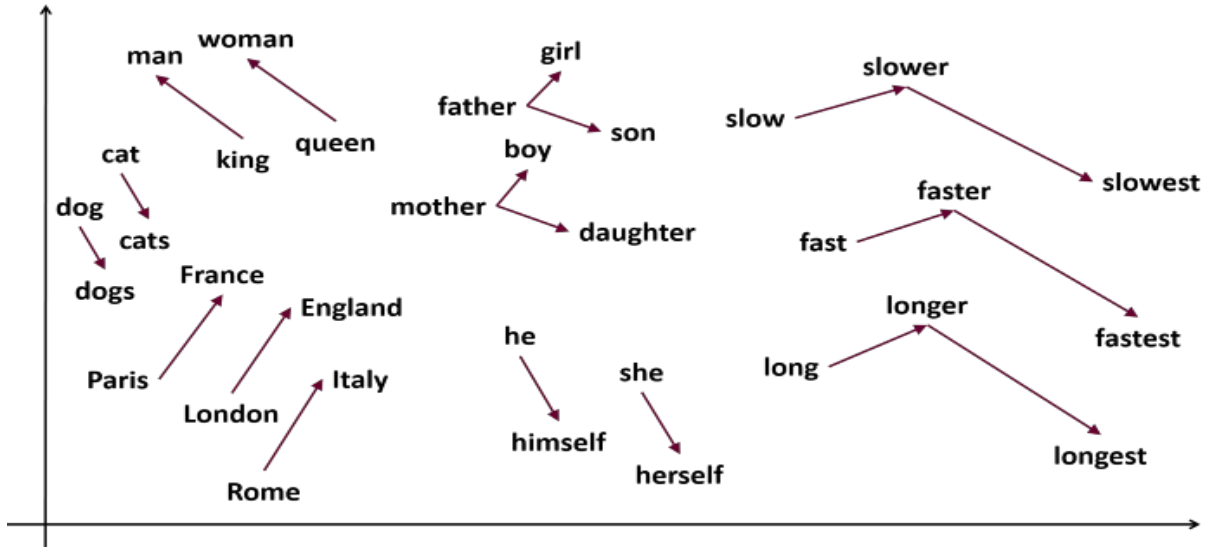
Obviously, we find the euclidean distance

5

UNIVERSITY OF TARTU

How?

- If we have a method for transforming words into tuples of numbers (vectors), we can find their similarity by distance
- Word2vec does exactly that



Source: https://medium.com/analytics-vidhya/implementing-word2vec-in-tensorflow-44f93cf2665f

UNIVERSITY OF TARTU

The results

- We ran word2vec models with different parameters (dimensionality, epochs, cbow vs skip-gram)
- For each model we put together a .csv file where we publish the 50 most similar words for 200000 most common words.

UNIVERSITY OF TARTU
1632

The results

- For example, one of our models says that the most similar words for “tark” are “arukas” and “intelligentne”
- Then again for the word “abitu” (helpless) one model thinks a similar word is “{politician name here}“

UNIVERSITY OF TARTU
1632

Evaluation

- Obviously with multiple models we need a way to compare them
- This is not straightforward for unsupervised learning

UNIVERSITY OF TARTU
1632

Evaluation

- Arvi provided us with a list of words with similar words attached
- We compared how “similar” each model is to this standard

UNIVERSITY OF TARTU
1632

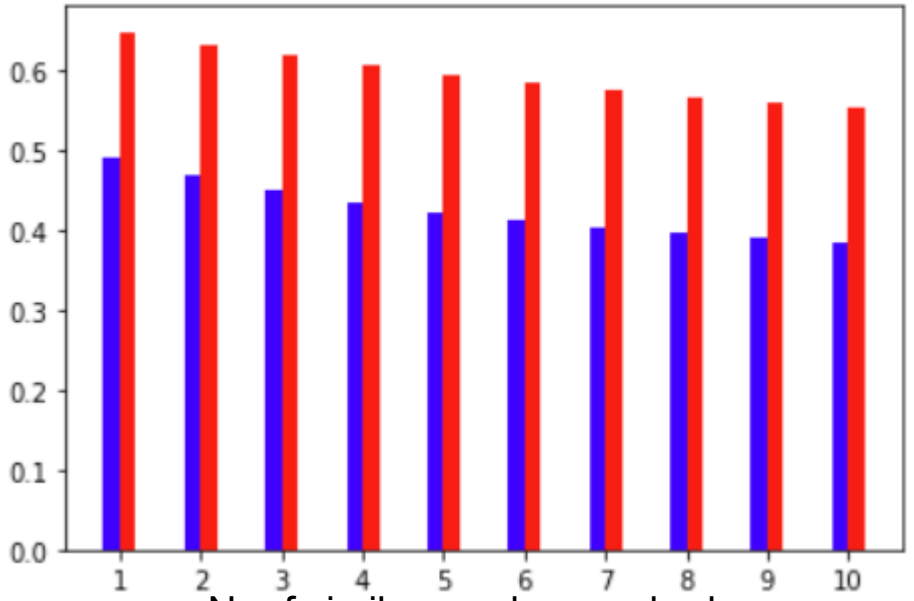
Evaluation

- For that let's look at the standard:

  It says the most similar word to “lahe” is “tore”
- Now we can check if our model also thinks the word “tore” is similar to “lahe” (if it appears in the top N most similar words)
- We can repeat this for all words in the standard and get a success rate

Red: CBOW
Blue: Skip-gram

Sucessful searches /
Total words searched



Nr of similar words searched per word in the standard

As we can see, models trained using CBOW is more similar to the standard since more searches are successful.

UNIVERSITY OF TARTU

Shortcomings

- We didn't manage to parse the largest files so our models had to be trained on a subset of the data
- While we were initially optimistic about training lots of different models, we limited ourselves to word2vec due to time constraints

- **Thanks for listening!**