Paper Critique:

Interactive Analysis of Word Vector Embeddings

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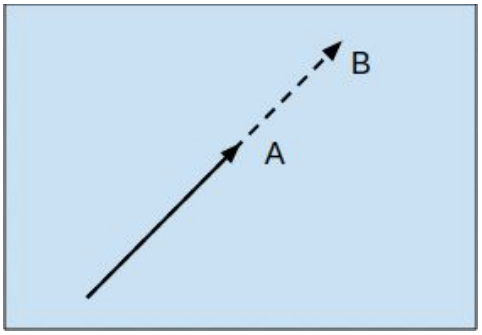
This paper brings out some interesting problems associated with word embeddings visualizations, especially the large scale paper review (111 ACL publications related to word embedding vectors). But a close inspection of the paper reveals that many of the visualization methods have some problems.



The **single neighborhood** task uses cosine distance which has been stated as the most common choice in the literature. Cosine distance though might be a good metric for comparing vector distance like [man-woman] and [king-queen] but word-embeddings are coordinates in the R_n dimensional space (scalar). If we consider them as vectors that would mean [word-origin] vector. Consider the example shown in the figure on left, both vectors have cosine similarity of 1 but they are not close in the vector space.

The coloring scheme used in the **multiple-neighborhood** task is quite confusing. A simpler design would have used lines when hovering over the words (even they had to resort to drawing a line on ‘cousin’ between the uncle and aunt axes to explain their coloring scheme).

It’s not clear how the paper computes **reconstructed co-occurrence** values of word pairs. The **embedding stability** analysis is concluded using banal arguments like ‘ stochastic nature of training embeddings can result in unexpected and unwanted local results’, the last visualization does not lead to a conclusion which essentially means that it is ineffective in meeting its goal (analyzing the stability of embeddings).