Neural Network project, paper:RELATIVE REPRESENTATIONS ENABLE ZERO-SHOT LATENT SPACE COMMUNICATION , RESULTS

Antonino Prinzivalli

2058753

prinzivalli.2058753@studenti.uniroma1.it

1 AE Stitching

In my experiments, I observed that without using relative representations, the results after stitching were completely nonsensical. However, when applying relative representations and selecting just 10 anchors, I obtained very good results. To further improve reconstruction quality, a possible enhancement would be to increase the number of anchors.

2 Relative VAE

The results for the relative VAE are similar to those of the AE. Without relative representations, the results make some sense but are still incorrect. After applying relative representations, I obtained good results.

3 Word embeddings

In this section, I noticed the importance of choosing anchors carefully. Randomly selecting words does not yield good results; a strategic approach and proper text processing are necessary. Before applying relative representations, the two spaces appeared similar but rotated, for example. However, after applying relative representations, the spaces aligned well, resulting in a significant increase in similarity, as i computed in the code.

4 Similarity of the latent spaces with CNN

Although I couldn't train hundreds of models as done in the paper, the experiments with a few models still provided valuable insights. Even with similar accuracy scores, it is evident that models with similar scores (and epochs) have more similar representations.

5 Text classification

This section presented several challenges, starting with finding a new dataset since the original Amazon dataset is no longer available. Additionally, automating the translation of sentences from English to Italian proved difficult. I attempted to use another model for this purpose, but it consumed a significant amount of computational resources. I successfully trained the classifier using absolute representations, as shown in the code. However, training with relative representations resulted in random outcomes. In my opinion, this is due to the choice of anchors. The importance of selecting the right anchors, as observed in the word embeddings section, is confirmed here. I could have experimented with more complex strategies, but I was already facing computational limitations. Even with this simpler approach (like select the first 768 sentence), using two models (Italian and English) to compute the embeddings required the paid version of Colab. To improve the selection of anchors, we could search through all the sentences and make selections based on similarity. Choosing anchors that are too similar does not yield good results.

6 Possible future improvements

It could be interesting to explore how relative representations can be combined with sense embeddings. By using models trained on word senses, such as those in WordNet or BabelNet, we can disambiguate words and build better and less ambiguous representations. This approach could potentially enhance the performance of relative representation methods, leading to better results.