

Building an Initial solution

- We assume that the embedding spaces are perfectly isometric therefore the similarity matrices MX and MZ would be equivalent up to a permutation of their rows and columns. Without this assumption, mapping two monolingual embeddings into a common multilingual embedding space without supervision is hopeless.
- Using the above assumption, trying to align the matrices by trying out all the permutations of rows and columns becomes computationally intractable and hence we overcome this problem by sorting the rows of MX and MZ . The idea behind sorting is that, if two words of same meaning have similar similarity distribution then their sorted vectors will be more similar and hence by sorting we are able to align their j th dimension.
- After sorting, for each row in MX we find its nearest neighbor among the rows of MZ . If for the i th row in MX , the nearest neighbor is the j th row in MZ then we make $D_{ij} = 1$ else $D_{ij} = 0$. Using nearest neighbor we find the most similar word in the other language and make the initial solution as above.