

1. Create 2 vectors/lists (one goldstandard and one submission vector)
2. Populate both vectors with one vector for each instance which is existing in the submission as well as goldstandard (Microblogs: id; Headlines: match those which belong together)
3. Populate the instance vectors with all scores related to an instance (Microblogs: cashtag; Headlines: companies) *Mind the order of your scores*  
*Example for a vector with 3 different instances which are related to 2, 3, and 1 entities: [[0.11, 0.22], [0.4, 0.43, -0.234], [0.231]]*
4. totalscore = 0.0    totalcount = 0.0
5. Iterate through the submission vector. As the gold standard vector is populated according to the matching instances and entities in the submission vector, both vectors should be the same length. This ensures that element indices in the GS vector always correspond with the element indices in the Submissionvector.

Pseudocode:

- a. If  $\text{len}(\text{Submissionvector}[i]) > 1$ :
  - i.  $\text{totalscore} += \text{len}(\text{Submissionvector}[i]) * \text{cosine\_similarity}(\text{Submissionvector}[i], \text{GSvector}[i])$   
 $\text{totalcount} += \text{len}(\text{Submissionvector}[i])$
- b. Else:
  - i.  $\text{totalcount} += 1.0$   
 $\text{Submissionscore} = \text{Submissionvector}[i][0]$   
 $\text{GSscore} = \text{GSvector}[i][0]$   
 If  $((\text{GSscore} \geq 0 \text{ and } \text{Submissionscore} \geq 0) \text{ or } (\text{GSscore} \leq 0 \text{ and } \text{Submissionscore} \leq 0))$ :  
 $\text{totalscore} += 1 - \text{absolute}(\text{GSscore} - \text{Submissionscore})$
6.  $\text{similarity\_score} = \text{totalscore} / \text{totalcount}$
7.  $\text{cosine\_weight} = \text{totalcount} / \text{length\_of\_the\_Goldstandard}$  (*number of annotated entities divided by number of all possible annotations*)
8.  $\text{final\_score} = \text{similarity\_score} * \text{cosine\_weight}$