We noticed that there is some confusion concerning the concept of cosine similarity. Therefore this additional explanation:

Given two vectors **a** and **b** we know that the angle **alpha** between these vectors can be computed with help of the formula:

**cos(alpha) = a*b/|a||b|**

where **a*b** denotes the dot product of both vectors and **|a|** and **|b|** their lengths, therefore:

**alpha=arccos(a*b/|a||b|).**

Once we know **alpha** we can find the **cosine similarity** between both vectors - it is:

**1- alpha/180**.

[Keep in mind that there are two implementations of **arccos**: one returns **alpha** in *degrees* (this is what we need when we divide alpha by 180) or in *radians* (then we should divide **alpha** by **pi**) – use the first one!]

For example, suppose that we have two vectors:

a=(0, 5, 4, 0, 3,0) and

b=(5, 1, 1, 0, 0,0).

Then the following Matlab code:

```
a=[0, 5, 4, 0, 3, 0]
b=[5, 1, 1, 0, 0, 0]
ab=a*transpose(b)
cos_ab=ab/(norm(a)*norm(b))
alpha=acosd(cos_ab)
cossim=1-alpha/180
```

will produce:

```
ab = 9

cos_ab = 0.2449

alpha = 75.8212

cossim = 0.5788
```

Notice that the Matlab function `acosd` returns the result in degrees (and not radians) – exaclty what we need!

We can define the cosine similarity (in Matlab) as:

```
function cs=cos_sim(v1,v2)
THETA=sum(v1.*v2)/(norm(v1)*norm(v2));
cs=1-acosd(THETA)/180;
```

You can easily rewrite this function in Python!