

Exercise: Items-based Recommender

Three computers, C1, C2, and C3, have the numerical features listed below:

Feature	Processor Speed	Disk Size	Memory Size
C1	3.06	500	6
C2	2.68	320	4
C3	2.92	640	6

We may imagine these values as defining a vector for each computer; for instance, C1's vector is [3.06, 500, 6]. We can compute the cosine distance between any two of the vectors, but if we do not scale the components, then the disk size will dominate and make differences in the other components essentially invisible. Let us use 1 as the scale factor for processor speed, α for the disk size, and β for the main memory size. In terms of α and β , compute the cosines of the angles between the vectors for each pair of the three computers in two following scenarios:

- What are the angles between the vectors if $\alpha = \beta = 1$?
- What are the angles between the vectors if $\alpha = 0.01$ and $\beta = 0.5$?
- Do you have any viewpoint about the choice of α , β in this case?