

cosine_similarity

`sklearn.metrics.pairwise.cosine_similarity(X, Y=None, dense_output=True)`

[\[source\]](#)

Compute cosine similarity between samples in X and Y.

Cosine similarity, or the cosine kernel, computes similarity as the normalized dot product of X and Y:

$$K(X, Y) = \langle X, Y \rangle / (||X|| * ||Y||)$$

On L2-normalized data, this function is equivalent to `linear_kernel`.

Read more in the [User Guide](#).

Parameters:

X : *{array-like, sparse matrix} of shape (n_samples_X, n_features)*

Input data.

Y : *{array-like, sparse matrix} of shape (n_samples_Y, n_features), default=None*

Input data. If `None`, the output will be the pairwise similarities between all samples in `X`.

dense_output : *bool, default=True*

Whether to return dense output even when the input is sparse. If `False`, the output is sparse if both input arrays are sparse.

 **Added in version 0.17:** parameter `dense_output` for dense output.

Returns:

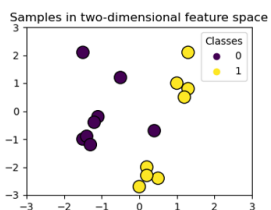
similarities : *ndarray or sparse matrix of shape (n_samples_X, n_samples_Y)*

Returns the cosine similarity between samples in X and Y.

Examples

```
>>> from sklearn.metrics.pairwise import cosine_similarity
>>> X = [[0, 0, 0], [1, 1, 1]]
>>> Y = [[1, 0, 0], [1, 1, 0]]
>>> cosine_similarity(X, Y)
array([[0.        , 0.        ],
       [0.57735027, 0.81649658]])
```

Gallery examples



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