

[ ![Logo](../../../../\_static/logo.png) ](../../../../index.html)

## Getting Started

- \* [Installation](../../../../docs/installation.html)

- \* [Install with pip](../../../../docs/installation.html#install-with-pip)

- \* [Install with Conda](../../../../docs/installation.html#install-with-conda)

- \* [Install from Source](../../../../docs/installation.html#install-from-source)

- \* [Editable Install](../../../../docs/installation.html#editable-install)

- \* [Install PyTorch with CUDA support](../../../../docs/installation.html#install-pytorch-with-cuda-support)

- \* [Quickstart](../../../../docs/quickstart.html)

- \* [Sentence Transformer](../../../../docs/quickstart.html#sentence-transformer)

- \* [Cross Encoder](../../../../docs/quickstart.html#cross-encoder)

- \* [Next Steps](../../../../docs/quickstart.html#next-steps)

## Sentence Transformer

- \* [Usage](../../../../docs/sentence\_transformer/usage/usage.html)

- \* [Computing Embeddings](../computing-embeddings/README.html)

- \* [Initializing a Sentence Transformer Model](../computing-embeddings/README.html#initializing-a-sentence-transformer-model)

- \* [Calculating Embeddings](../computing-embeddings/README.html#calculating-embeddings)

- \* [Prompt Templates](../computing-embeddings/README.html#prompt-templates)

- \* [Input Sequence Length](../computing-embeddings/README.html#id1)

- \* [Multi-Process / Multi-GPU Encoding](../computing-embeddings/README.html#multi-process-multi-gpu-encoding)

[\\* \[Semantic Textual Similarity\]\(../../docs/sentence\\_transformer/usage/semantic\\_textual\\_similarity.html\)](#)

[\\* \[Similarity Calculation\]\(../../docs/sentence\\_transformer/usage/semantic\\_textual\\_similarity.html#similarity-calculation\)](#)

[\\* \[Semantic Search\]\(../semantic-search/README.html\)](#)

[\\* \[Background\]\(../semantic-search/README.html#background\)](#)

[\\* \[Symmetric vs. Asymmetric Semantic Search\]\(../semantic-search/README.html#symmetric-vs-asymmetric-semantic-search\)](#)

[\\* \[Manual Implementation\]\(../semantic-search/README.html#manual-implementation\)](#)

[\\* \[Optimized Implementation\]\(../semantic-search/README.html#optimized-implementation\)](#)

[\\* \[Speed Optimization\]\(../semantic-search/README.html#speed-optimization\)](#)

[\\* \[Elasticsearch\]\(../semantic-search/README.html#elasticsearch\)](#)

[\\* \[Approximate Nearest Neighbor\]\(../semantic-search/README.html#approximate-nearest-neighbor\)](#)

[\\* \[Retrieve & Re-Rank\]\(../semantic-search/README.html#retrieve-re-rank\)](#)

[\\* \[Examples\]\(../semantic-search/README.html#examples\)](#)

[\\* \[Retrieve & Re-Rank\]\(../retrieve\\_rerank/README.html\)](#)

[\\* \[Retrieve & Re-Rank Pipeline\]\(../retrieve\\_rerank/README.html#retrieve-re-rank-pipeline\)](#)

[\\* \[Retrieval: Bi-Encoder\]\(../retrieve\\_rerank/README.html#retrieval-bi-encoder\)](#)

[\\* \[Re-Ranker: Cross-Encoder\]\(../retrieve\\_rerank/README.html#re-ranker-cross-encoder\)](#)

[\\* \[Example Scripts\]\(../retrieve\\_rerank/README.html#example-scripts\)](#)

[\\* \[Pre-trained Bi-Encoders \(Retrieval\)\]\(../retrieve\\_rerank/README.html#pre-trained-bi-encoders-retrieval\)](#)

[\\* \[Pre-trained Cross-Encoders \(Re-Ranker\)\]\(../retrieve\\_rerank/README.html#pre-trained-cross-encoders-re-ranker\)](#)

[\\* Clustering](#)

- \* k-Means
- \* Agglomerative Clustering
- \* Fast Clustering
- \* Topic Modeling
- \* [Paraphrase Mining](../paraphrase-mining/README.html)

\*

[`paraphrase\_mining()`](../paraphrase-mining/README.html#sentence\_transformers.util.paraphrase\_mining)

- \* [Translated Sentence Mining](../parallel-sentence-mining/README.html)
- \* [Margin Based Mining](../parallel-sentence-mining/README.html#margin-based-mining)
- \* [Examples](../parallel-sentence-mining/README.html#examples)
- \* [Image Search](../image-search/README.html)
- \* [Installation](../image-search/README.html#installation)
- \* [Usage](../image-search/README.html#usage)
- \* [Examples](../image-search/README.html#examples)
- \* [Embedding Quantization](../embedding-quantization/README.html)
- \* [Binary Quantization](../embedding-quantization/README.html#binary-quantization)
- \* [Scalar (int8) Quantization](../embedding-quantization/README.html#scalar-int8-quantization)
- \* [Additional extensions](../embedding-quantization/README.html#additional-extensions)
- \* [Demo](../embedding-quantization/README.html#demo)
- \* [Try it yourself](../embedding-quantization/README.html#try-it-yourself)
- \* [Speeding up Inference](../../docs/sentence\_transformer/usage/efficiency.html)
- \* [PyTorch](../../docs/sentence\_transformer/usage/efficiency.html#pytorch)
- \* [ONNX](../../docs/sentence\_transformer/usage/efficiency.html#onnx)
- \* [OpenVINO](../../docs/sentence\_transformer/usage/efficiency.html#openvino)
- \* [Benchmarks](../../docs/sentence\_transformer/usage/efficiency.html#benchmarks)
- \* [Creating Custom Models](../../docs/sentence\_transformer/usage/custom\_models.html)

\* [Structure of Sentence Transformer

Models](../../../../docs/sentence\_transformer/usage/custom\_models.html#structure-of-sentence-transformer-models)

\* [Sentence Transformer Model from a Transformers

Model](../../../../docs/sentence\_transformer/usage/custom\_models.html#sentence-transformer-model-from-a-transformers-model)

\* [Pretrained Models](../../../../docs/sentence\_transformer/pretrained\_models.html)

\* [Original Models](../../../../docs/sentence\_transformer/pretrained\_models.html#original-models)

\* [Semantic Search

Models](../../../../docs/sentence\_transformer/pretrained\_models.html#semantic-search-models)

\* [Multi-QA Models](../../../../docs/sentence\_transformer/pretrained\_models.html#multi-qa-models)

\* [MSMARCO Passage

Models](../../../../docs/sentence\_transformer/pretrained\_models.html#msmarco-passage-models)

\* [Multilingual

Models](../../../../docs/sentence\_transformer/pretrained\_models.html#multilingual-models)

\* [Semantic Similarity

Models](../../../../docs/sentence\_transformer/pretrained\_models.html#semantic-similarity-models)

\* [Bitext Mining](../../../../docs/sentence\_transformer/pretrained\_models.html#bitext-mining)

\* [Image &

Text-Models](../../../../docs/sentence\_transformer/pretrained\_models.html#image-text-models)

\* [INSTRUCTOR

models](../../../../docs/sentence\_transformer/pretrained\_models.html#instructor-models)

\* [Scientific Similarity

Models](../../../../docs/sentence\_transformer/pretrained\_models.html#scientific-similarity-models)

\* [Training Overview](../../../../docs/sentence\_transformer/training\_overview.html)

\* [Why Finetune?](../../../../docs/sentence\_transformer/training\_overview.html#why-finetune)

\* [Training

Components](../../../../docs/sentence_transformer/training_overview.html#training-components)	
* [Dataset](../../../../docs/sentence_transformer/training_overview.html#dataset)	
* [Dataset Format](../../../../docs/sentence_transformer/training_overview.html#dataset-format)	
* [Loss Function](../../../../docs/sentence_transformer/training_overview.html#loss-function)	
	* [Training
Arguments](../../../../docs/sentence_transformer/training_overview.html#training-arguments)	
* [Evaluator](../../../../docs/sentence_transformer/training_overview.html#evaluator)	
* [Trainer](../../../../docs/sentence_transformer/training_overview.html#trainer)	
* [Callbacks](../../../../docs/sentence_transformer/training_overview.html#callbacks)	
	* [Multi-Dataset
Training](../../../../docs/sentence_transformer/training_overview.html#multi-dataset-training)	
	* [Deprecated
Training](../../../../docs/sentence_transformer/training_overview.html#deprecated-training)	
	* [Best Base Embedding
Models](../../../../docs/sentence_transformer/training_overview.html#best-base-embedding-models)	
* [Dataset Overview](../../../../docs/sentence_transformer/dataset_overview.html)	
	* [Datasets on the Hugging Face
Hub](../../../../docs/sentence_transformer/dataset_overview.html#datasets-on-the-hugging-face-hub)	
	* [Pre-existing
Datasets](../../../../docs/sentence_transformer/dataset_overview.html#pre-existing-datasets)	
* [Loss Overview](../../../../docs/sentence_transformer/loss_overview.html)	
* [Loss modifiers](../../../../docs/sentence_transformer/loss_overview.html#loss-modifiers)	
* [Distillation](../../../../docs/sentence_transformer/loss_overview.html#distillation)	
	* [Commonly used Loss
Functions](../../../../docs/sentence_transformer/loss_overview.html#commonly-used-loss-functions)	
	* [Custom Loss
Functions](../../../../docs/sentence_transformer/loss_overview.html#custom-loss-functions)	

- \* [Training Examples](../../docs/sentence\_transformer/training/examples.html)
- \* [Semantic Textual Similarity](../../training/sts/README.html)
- \* [Training data](../../training/sts/README.html#training-data)
- \* [Loss Function](../../training/sts/README.html#loss-function)
- \* [Natural Language Inference](../../training/nli/README.html)
- \* [Data](../../training/nli/README.html#data)
- \* [SoftmaxLoss](../../training/nli/README.html#softmaxloss)
- \* [MultipleNegativesRankingLoss](../../training/nli/README.html#multiplenegativesrankingloss)
- \* [Paraphrase Data](../../training/paraphrases/README.html)
- \* [Pre-Trained Models](../../training/paraphrases/README.html#pre-trained-models)
- \* [Quora Duplicate Questions](../../training/quora\_duplicate\_questions/README.html)
- \* [Training](../../training/quora\_duplicate\_questions/README.html#training)

\*

[MultipleNegativesRankingLoss](../../training/quora\_duplicate\_questions/README.html#multiplenegativesrankingloss)

- \* [Pretrained Models](../../training/quora\_duplicate\_questions/README.html#pretrained-models)
- \* [MS MARCO](../../training/ms\_marco/README.html)
- \* [Bi-Encoder](../../training/ms\_marco/README.html#bi-encoder)
- \* [Matryoshka Embeddings](../../training/matryoshka/README.html)
- \* [Use Cases](../../training/matryoshka/README.html#use-cases)
- \* [Results](../../training/matryoshka/README.html#results)
- \* [Training](../../training/matryoshka/README.html#training)
- \* [Inference](../../training/matryoshka/README.html#inference)
- \* [Code Examples](../../training/matryoshka/README.html#code-examples)
- \* [Adaptive Layers](../../training/adaptive\_layer/README.html)
- \* [Use Cases](../../training/adaptive\_layer/README.html#use-cases)
- \* [Results](../../training/adaptive\_layer/README.html#results)

- \* [Training](../../training/adaptive\_layer/README.html#training)
- \* [Inference](../../training/adaptive\_layer/README.html#inference)
- \* [Code Examples](../../training/adaptive\_layer/README.html#code-examples)
- \* [Multilingual Models](../../training/multilingual/README.html)
  - \* [Extend your own models](../../training/multilingual/README.html#extend-your-own-models)
  - \* [Training](../../training/multilingual/README.html#training)
  - \* [Datasets](../../training/multilingual/README.html#datasets)
  - \* [Sources for Training Data](../../training/multilingual/README.html#sources-for-training-data)
  - \* [Evaluation](../../training/multilingual/README.html#evaluation)
  - \* [Available Pre-trained Models](../../training/multilingual/README.html#available-pre-trained-models)
  - \* [Usage](../../training/multilingual/README.html#usage)
  - \* [Performance](../../training/multilingual/README.html#performance)
  - \* [Citation](../../training/multilingual/README.html#citation)
- \* [Model Distillation](../../training/distillation/README.html)
  - \* [Knowledge Distillation](../../training/distillation/README.html#knowledge-distillation)
  - \* [Speed - Performance Trade-Off](../../training/distillation/README.html#speed-performance-trade-off)
  - \* [Dimensionality Reduction](../../training/distillation/README.html#dimensionality-reduction)
  - \* [Quantization](../../training/distillation/README.html#quantization)
- \* [Augmented SBERT](../../training/data\_augmentation/README.html)
  - \* [Motivation](../../training/data\_augmentation/README.html#motivation)
  - \* [Extend to your own datasets](../../training/data\_augmentation/README.html#extend-to-your-own-datasets)
  - \* [Methodology](../../training/data\_augmentation/README.html#methodology)
    - \* [Scenario 1: Limited or small annotated datasets (few labeled sentence-pairs)](../../training/data\_augmentation/README.html#scenario-1-limited-or-small-annotat

ed-datasets-few-labeled-sentence-pairs)

\* [Scenario 2: No annotated datasets (Only unlabeled sentence-pairs)](../../training/data\_augmentation/README.html#scenario-2-no-annotated-datasets-only-unlabeled-sentence-pairs)

\* [Training](../../training/data\_augmentation/README.html#training)

\* [Citation](../../training/data\_augmentation/README.html#citation)

\* [Training with Prompts](../../training/prompts/README.html)

\* [What are Prompts?](../../training/prompts/README.html#what-are-prompts)

\* [Why would we train with Prompts?](../../training/prompts/README.html#why-would-we-train-with-prompts)

\* [How do we train with Prompts?](../../training/prompts/README.html#how-do-we-train-with-prompts)

\* [Training with PEFT Adapters](../../training/peft/README.html)

\* [Compatibility Methods](../../training/peft/README.html#compatibility-methods)

\* [Adding a New Adapter](../../training/peft/README.html#adding-a-new-adapter)

\* [Loading a Pretrained Adapter](../../training/peft/README.html#loading-a-pretrained-adapter)

\* [Training Script](../../training/peft/README.html#training-script)

\* [Unsupervised Learning](../../unsupervised\_learning/README.html)

\* [TSDAE](../../unsupervised\_learning/README.html#tsdae)

\* [SimCSE](../../unsupervised\_learning/README.html#simcse)

\* [CT](../../unsupervised\_learning/README.html#ct)

\* [CT (In-Batch Negative Sampling)](../../unsupervised\_learning/README.html#ct-in-batch-negative-sampling)

\* [Masked Language Model (MLM)](../../unsupervised\_learning/README.html#masked-language-model-mlm)

\* [GenQ](../../unsupervised\_learning/README.html#genq)

\* [GPL](../../unsupervised\_learning/README.html#gpl)



\* [Performance Comparison](../../unsupervised\_learning/README.html#performance-comparison)

\* [Domain Adaptation](../../domain\_adaptation/README.html)

\* [Domain Adaptation vs. Unsupervised Learning](../../domain\_adaptation/README.html#domain-adaptation-vs-unsupervised-learning)

\* [Adaptive Pre-Training](../../domain\_adaptation/README.html#adaptive-pre-training)

\* [GPL: Generative Pseudo-Labeling](../../domain\_adaptation/README.html#gpl-generative-pseudo-labeling)

\* [Hyperparameter Optimization](../../training/hpo/README.html)

\* [HPO Components](../../training/hpo/README.html#hpo-components)

\* [Putting It All Together](../../training/hpo/README.html#putting-it-all-together)

\* [Example Scripts](../../training/hpo/README.html#example-scripts)

\* [Distributed Training](../../docs/sentence\_transformer/training/distributed.html)

\* [Comparison](../../docs/sentence\_transformer/training/distributed.html#comparison)

\* [FSDP](../../docs/sentence\_transformer/training/distributed.html#fsdp)

## Cross Encoder

\* [Usage](../../docs/cross\_encoder/usage/usage.html)

\* [Retrieve & Re-Rank](../retrieve\_rerank/README.html)

\* [Retrieve & Re-Rank Pipeline](../retrieve\_rerank/README.html#retrieve-re-rank-pipeline)

\* [Retrieval: Bi-Encoder](../retrieve\_rerank/README.html#retrieval-bi-encoder)

\* [Re-Ranker: Cross-Encoder](../retrieve\_rerank/README.html#re-ranker-cross-encoder)

\* [Example Scripts](../retrieve\_rerank/README.html#example-scripts)

\* [Pre-trained Bi-Encoders (Retrieval)](../retrieve\_rerank/README.html#pre-trained-bi-encoders-retrieval)

\* [Pre-trained Cross-Encoders

(Re-Ranker)](../retrieve\_rerank/README.html#pre-trained-cross-encoders-re-ranker)

\* [Pretrained Models](../docs/cross\_encoder/pretrained\_models.html)

\* [MS MARCO](../docs/cross\_encoder/pretrained\_models.html#ms-marco)

\* [SQuAD (QNLI)](../docs/cross\_encoder/pretrained\_models.html#squad-qnli)

\* [STSbenchmark](../docs/cross\_encoder/pretrained\_models.html#stsbenchmark)

\* [Quora Duplicate

Questions](../docs/cross\_encoder/pretrained\_models.html#quora-duplicate-questions)

\* [NLI](../docs/cross\_encoder/pretrained\_models.html#nli)

\* [Community Models](../docs/cross\_encoder/pretrained\_models.html#community-models)

\* [Training Overview](../docs/cross\_encoder/training\_overview.html)

\* [Training Examples](../docs/cross\_encoder/training/examples.html)

\* [MS MARCO](../training/ms\_marco/cross\_encoder\_README.html)

\* [Cross-Encoder](../training/ms\_marco/cross\_encoder\_README.html#cross-encoder)

\* [Cross-Encoder Knowledge

Distillation](../training/ms\_marco/cross\_encoder\_README.html#cross-encoder-knowledge-distillation)

Package Reference

\* [Sentence Transformer](../docs/package\_reference/sentence\_transformer/index.html)

\*

[SentenceTransformer](../docs/package\_reference/sentence\_transformer/SentenceTransformer.html)

\*

[SentenceTransformer](../docs/package\_reference/sentence\_transformer/SentenceTransformer.html#id1)

\*

[SentenceTransformerModelCardData](../../docs/package\_reference/sentence\_transformer/SentenceTransformer.html#sentencetransformermodelcarddata)

\*

[SimilarityFunction](../../docs/package\_reference/sentence\_transformer/SentenceTransformer.html#similarityfunction)

\* [Trainer](../../docs/package\_reference/sentence\_transformer/trainer.html)

\*

[SentenceTransformerTrainer](../../docs/package\_reference/sentence\_transformer/trainer.html#sentencetransformertrainer)

\* [Training Arguments](../../docs/package\_reference/sentence\_transformer/training\_args.html)

\*

[SentenceTransformerTrainingArguments](../../docs/package\_reference/sentence\_transformer/training\_args.html#sentencetransformertrainingarguments)

\* [Losses](../../docs/package\_reference/sentence\_transformer/losses.html)

\*

[BatchAllTripletLoss](../../docs/package\_reference/sentence\_transformer/losses.html#batchalltripletloss)

\*

[BatchHardSoftMarginTripletLoss](../../docs/package\_reference/sentence\_transformer/losses.html#batchhardsoftmargintripletloss)

\*

[BatchHardTripletLoss](../../docs/package\_reference/sentence\_transformer/losses.html#batchhardtripletloss)

\*

[BatchSemiHardTripletLoss](../../docs/package\_reference/sentence\_transformer/losses.html#batchsemihardtripletloss)

\*

[ContrastiveLoss](../../docs/package\_reference/sentence\_transformer/losses.html#contrastiveloss)

\*

[OnlineContrastiveLoss](../../docs/package\_reference/sentence\_transformer/losses.html#onlinecontrastiveloss)

\*

[ContrastiveTensionLoss](../../docs/package\_reference/sentence\_transformer/losses.html#contrastivetensionloss)

\*

[ContrastiveTensionLossInBatchNegatives](../../docs/package\_reference/sentence\_transformer/losses.html#contrastivetensionlossinbatchnegatives)

\* [CoSENTLoss](../../docs/package\_reference/sentence\_transformer/losses.html#cosentloss)

\* [AngleLoss](../../docs/package\_reference/sentence\_transformer/losses.html#angleloss)

\*

[CosineSimilarityLoss](../../docs/package\_reference/sentence\_transformer/losses.html#cosinesimilarityloss)

\*

[DenoisingAutoEncoderLoss](../../docs/package\_reference/sentence\_transformer/losses.html#denoisingautoencoderloss)

\*

[GISTEmbedLoss](../../docs/package\_reference/sentence\_transformer/losses.html#gistembedloss)

\*

[CachedGISTEmbedLoss](../../docs/package\_reference/sentence\_transformer/losses.html#cachedgistembedloss)

\* [MSELoss](../../docs/package\_reference/sentence\_transformer/losses.html#mseloss)

\*

[MarginMSELoss](../../docs/package\_reference/sentence\_transformer/losses.html#marginmseloss)

)

\*

[MatryoshkaLoss](../../docs/package\_reference/sentence\_transformer/losses.html#matryoshkaloss)

)

\*

[Matryoshka2dLoss](../../docs/package\_reference/sentence\_transformer/losses.html#matryoshka2dloss)

\*

[AdaptiveLayerLoss](../../docs/package\_reference/sentence\_transformer/losses.html#adaptivelayerloss)

\*

[MegaBatchMarginLoss](../../docs/package\_reference/sentence\_transformer/losses.html#megabatchmarginloss)

\*

[MultipleNegativesRankingLoss](../../docs/package\_reference/sentence\_transformer/losses.html#multiplenegativesrankingloss)

\*

[CachedMultipleNegativesRankingLoss](../../docs/package\_reference/sentence\_transformer/losses.html#cachedmultiplenegativesrankingloss)

\*

[MultipleNegativesSymmetricRankingLoss](../../docs/package\_reference/sentence\_transformer/losses.html#multiplenegativessymmetricrankingloss)

\*

[CachedMultipleNegativesSymmetricRankingLoss](../../docs/package\_reference/sentence\_transformer/losses.html#cachedmultiplenegativessymmetricrankingloss)

\* [SoftmaxLoss](../../docs/package\_reference/sentence\_transformer/losses.html#softmaxloss)

\* [TripletLoss](../../docs/package\_reference/sentence\_transformer/losses.html#tripletloss)

\* [Samplers](../../docs/package\_reference/sentence\_transformer/sampler.html)

\*

[BatchSamplers](../../docs/package\_reference/sentence\_transformer/sampler.html#batchsamplers)  
)

\*

[MultiDatasetBatchSamplers](../../docs/package\_reference/sentence\_transformer/sampler.html#multidatasetbatchsamplers)

\* [Evaluation](../../docs/package\_reference/sentence\_transformer/evaluation.html)

\*

[BinaryClassificationEvaluator](../../docs/package\_reference/sentence\_transformer/evaluation.html#binaryclassificationevaluator)

\*

[EmbeddingSimilarityEvaluator](../../docs/package\_reference/sentence\_transformer/evaluation.html#embeddingsimilarityevaluator)

\*

[InformationRetrievalEvaluator](../../docs/package\_reference/sentence\_transformer/evaluation.html#informationretrievalevaluator)

\*

[NanoBEIREvaluator](../../docs/package\_reference/sentence\_transformer/evaluation.html#nanobeirevaluator)

\*

[MSEEvaluator](../../docs/package\_reference/sentence\_transformer/evaluation.html#mseevaluator)  
)

\*

[ParaphraseMiningEvaluator](../../docs/package\_reference/sentence\_transformer/evaluation.html#paraphraseminingevaluator)

\*

[RerankingEvaluator](../../../../docs/package\_reference/sentence\_transformer/evaluation.html#reranking-evaluator)

\*

[SentenceEvaluator](../../../../docs/package\_reference/sentence\_transformer/evaluation.html#sentence-evaluator)

\*

[SequentialEvaluator](../../../../docs/package\_reference/sentence\_transformer/evaluation.html#sequential-evaluator)

\*

[TranslationEvaluator](../../../../docs/package\_reference/sentence\_transformer/evaluation.html#translation-evaluator)

\*

[TripletEvaluator](../../../../docs/package\_reference/sentence\_transformer/evaluation.html#triplet-evaluator)

\* [Datasets](../../../../docs/package\_reference/sentence\_transformer/datasets.html)

\*

[ParallelSentencesDataset](../../../../docs/package\_reference/sentence\_transformer/datasets.html#parallel-sentences-dataset)

\*

[SentenceLabelDataset](../../../../docs/package\_reference/sentence\_transformer/datasets.html#sentence-label-dataset)

\*

[DenoisingAutoEncoderDataset](../../../../docs/package\_reference/sentence\_transformer/datasets.html#denoising-auto-encoder-dataset)

\*

[NoDuplicatesDataLoader](../../../../docs/package\_reference/sentence\_transformer/datasets.html#no-duplicates-data-loader)

- \* [Models](../../docs/package\_reference/sentence\_transformer/models.html)
  - \* [Main Classes](../../docs/package\_reference/sentence\_transformer/models.html#main-classes)
    - \* [Further Classes](../../docs/package\_reference/sentence\_transformer/models.html#further-classes)
- \* [quantization](../../docs/package\_reference/sentence\_transformer/quantization.html)
  - \* [quantize\_embeddings()](../../docs/package\_reference/sentence\_transformer/quantization.html#sentence\_transformers.quantization.quantize\_embeddings)
  - \* [semantic\_search\_faiss()](../../docs/package\_reference/sentence\_transformer/quantization.html#sentence\_transformers.quantization.semantic\_search\_faiss)
  - \* [semantic\_search\_usearch()](../../docs/package\_reference/sentence\_transformer/quantization.html#sentence\_transformers.quantization.semantic\_search\_usearch)
- \* [Cross Encoder](../../docs/package\_reference/cross\_encoder/index.html)
  - \* [CrossEncoder](../../docs/package\_reference/cross\_encoder/cross\_encoder.html)
    - \* [CrossEncoder](../../docs/package\_reference/cross\_encoder/cross\_encoder.html#id1)
      - \* [Training Inputs](../../docs/package\_reference/cross\_encoder/cross\_encoder.html#training-inputs)
  - \* [Evaluation](../../docs/package\_reference/cross\_encoder/evaluation.html)
    - \* [CEBinaryAccuracyEvaluator](../../docs/package\_reference/cross\_encoder/evaluation.html#cebinaryaccuracyevaluator)
    - \* [CEBinaryClassificationEvaluator](../../docs/package\_reference/cross\_encoder/evaluation.html#cebinaryclassificationevaluator)



\*

[CECorrelationEvaluator](../../docs/package\_reference/cross\_encoder/evaluation.html#cecorrelationevaluator)

\* [CEF1Evaluator](../../docs/package\_reference/cross\_encoder/evaluation.html#cef1evaluator)

\*

[CESoftmaxAccuracyEvaluator](../../docs/package\_reference/cross\_encoder/evaluation.html#cesoftmaxaccuracyevaluator)

\*

[CERerankingEvaluator](../../docs/package\_reference/cross\_encoder/evaluation.html#cererankingevaluator)

\* [util](../../docs/package\_reference/util.html)

\* [Helper Functions](../../docs/package\_reference/util.html#module-sentence\_transformers.util)

\*

[`community\_detection()`](../../docs/package\_reference/util.html#sentence\_transformers.util.community\_detection)

\* [`http\_get()`](../../docs/package\_reference/util.html#sentence\_transformers.util.http\_get)

\*

[`is\_training\_available()`](../../docs/package\_reference/util.html#sentence\_transformers.util.is\_training\_available)

\*

[`mine\_hard\_negatives()`](../../docs/package\_reference/util.html#sentence\_transformers.util.mine\_hard\_negatives)

\*

[`normalize\_embeddings()`](../../docs/package\_reference/util.html#sentence\_transformers.util.normalize\_embeddings)

\*

[`paraphrase\_mining()`](../../docs/package\_reference/util.html#sentence\_transformers.util.paraphrase\_mining)

ase\_mining)

\*

[`semantic\_search()](../../docs/package\_reference/util.html#sentence\_transformers.util.semantic\_search)

\*

[`truncate\_embeddings()](../../docs/package\_reference/util.html#sentence\_transformers.util.truncate\_embeddings)

\*

[Model

Optimization](../../docs/package\_reference/util.html#module-sentence\_transformers.backend)

\*

[`export\_dynamic\_quantized\_onnx\_model()](../../docs/package\_reference/util.html#sentence\_transformers.backend.export\_dynamic\_quantized\_onnx\_model)

\*

[`export\_optimized\_onnx\_model()](../../docs/package\_reference/util.html#sentence\_transformers.backend.export\_optimized\_onnx\_model)

\*

[`export\_static\_quantized\_openvino\_model()](../../docs/package\_reference/util.html#sentence\_transformers.backend.export\_static\_quantized\_openvino\_model)

\* [Similarity Metrics](../../docs/package\_reference/util.html#module-sentence\_transformers.util)

\* [`cos\_sim()](../../docs/package\_reference/util.html#sentence\_transformers.util.cos\_sim)

\* [`dot\_score()](../../docs/package\_reference/util.html#sentence\_transformers.util.dot\_score)

\*

[`euclidean\_sim()](../../docs/package\_reference/util.html#sentence\_transformers.util.euclidean\_sim)

\*

[`manhattan\_sim()](../../docs/package\_reference/util.html#sentence\_transformers.util.manhattan\_sim)

\*

[ pairwise\_cos\_sim() ](../../docs/package\_reference/util.html#sentence\_transformers.util.pairwise\_cos\_sim)

\*

[ pairwise\_dot\_score() ](../../docs/package\_reference/util.html#sentence\_transformers.util.pairwise\_dot\_score)

\*

[ pairwise\_euclidean\_sim() ](../../docs/package\_reference/util.html#sentence\_transformers.util.pairwise\_euclidean\_sim)

\*

[ pairwise\_manhattan\_sim() ](../../docs/package\_reference/util.html#sentence\_transformers.util.pairwise\_manhattan\_sim)

\_\_[Sentence Transformers](../../index.html)

\* [(../../index.html)

\* [Usage](../../docs/sentence\_transformer/usage/usage.html)

\* Clustering

\* [ Edit on

GitHub](https://github.com/UKPLab/sentence-transformers/blob/master/examples/applications/clustering/README.md)

\* \* \*

# Clusteringif•

Sentence-Transformers can be used in different ways to perform clustering of

small or large set of sentences.

### ## k-Means if •

[kmeans.py](https://github.com/UKPLab/sentence-transformers/tree/master/examples/applications/clustering/kmeans.py) contains an example of using [K-means Clustering Algorithm](https://scikit-learn.org/stable/modules/clustering.html#k-means). K-Means requires that the number of clusters is specified beforehand. The sentences are clustered in groups of about equal size.

### ## Agglomerative Clustering if •

[agglomerative.py](https://github.com/UKPLab/sentence-transformers/tree/master/examples/applications/clustering/agglomerative.py) shows an example of using [Hierarchical clustering](https://scikit-learn.org/stable/modules/clustering.html#hierarchical-clustering) using the [Agglomerative Clustering Algorithm](https://scikit-learn.org/stable/modules/generated/sklearn.cluster.AgglomerativeClustering.html#sklearn.cluster.AgglomerativeClustering).

In contrast to k-means, we can specify a threshold for the clustering:

Clusters below that threshold are merged. This algorithm can be useful if the number of clusters is unknown. By the threshold, we can control if we want to have many small and fine-grained clusters or few coarse-grained clusters.

### ## Fast Clustering if •

Agglomerative Clustering for larger datasets is quite slow, so it is only applicable for maybe a few thousand sentences.

In [fast\_clustering.py](https://github.com/UKPLab/sentence-transformers/tree/master/examples/applications/clustering/fast\_clustering.py) we present a clustering algorithm that is tuned for large datasets (50k sentences in less than 5 seconds). In a large list of sentences it searches for local communities: A local community is a set of highly similar sentences.

You can configure the threshold of cosine-similarity for which we consider two sentences as similar. Also, you can specify the minimal size for a local community. This allows you to get either large coarse-grained clusters or small fine-grained clusters.

We apply it on the [Quora Duplicate Questions](https://huggingface.co/datasets/sentence-transformers/quora-duplicates) dataset and the output looks something like this:

#### Cluster 1, #83 Elements

What should I do to improve my English ?  
What should I do to improve my spoken English?  
Can I improve my English?  
...

#### Cluster 2, #79 Elements

How can I earn money online?

How do I earn money online?

Can I earn money online?

...

...

## Cluster 47, #25 Elements

What are some mind-blowing Mobile gadgets that exist that most people don't know about?

What are some mind-blowing gadgets and technologies that exist that most people don't know about?

What are some mind-blowing mobile technology tools that exist that most people don't know about?

...

## ## Topic Modeling

Topic modeling is the process of discovering topics in a collection of documents.

An example is shown in the following picture, which shows the identified topics in the 20 newsgroup dataset:

![[20news]]([https://raw.githubusercontent.com/UKPLab/sentence-transformers/master/docs/img/20news\\_semantic.png](https://raw.githubusercontent.com/UKPLab/sentence-transformers/master/docs/img/20news_semantic.png))

For each topic, you want to extract the words that describe this topic:

![[20news]]([https://raw.githubusercontent.com/UKPLab/sentence-transformers/master/docs/img/20news\\_top2vec.png](https://raw.githubusercontent.com/UKPLab/sentence-transformers/master/docs/img/20news_top2vec.png))

Sentence-Transformers can be used to identify these topics in a collection of sentences, paragraphs or short documents. For an excellent tutorial, see [Topic Modeling with BERT](<https://towardsdatascience.com/topic-modeling-with-bert-779f7db187e6>) as well as the [BERTopic](<https://github.com/MaartenGr/BERTopic>) and [Top2Vec](<https://github.com/ddangelov/Top2Vec>) repositories.

Image source: [Top2Vec: Distributed Representations of Topics](<https://arxiv.org/abs/2008.09470>)

[ Previous](../retrieve\_rerank/README.html "Retrieve & Re-Rank") [Next](../paraphrase-mining/README.html "Paraphrase Mining")

\* \* \*

(C) Copyright 2025.

Built with [Sphinx](<https://www.sphinx-doc.org/>) using a [theme]([https://github.com/readthedocs/sphinx\\_rtd\\_theme](https://github.com/readthedocs/sphinx_rtd_theme)) provided by [Read the Docs](<https://readthedocs.org>).