

The pytorch ecosystem

Machine Learning Operations

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The ecosystem



Collection of frameworks
build to be used in
combination with
Pytorch

PyTorch

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ECOSYSTEM TOOLS

Tap into a rich ecosystem of tools, libraries, and more to support, accelerate, and explore AI development.

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Sort ▾

PyTorch-NLP 🔒 1.9k

Basic Utilities for PyTorch Natural Language Processing (NLP).

DeepSpeed 🔒 4.6k

DeepSpeed is a deep learning optimization library that makes distributed training easy, efficient, and effective.

Albumentations 🔒 7.6k

Fast and extensible image augmentation library for different CV tasks like classification, segmentation, object detection and pose estimation.

Captum 🔒 2.2k

Captum ("comprehension" in Latin) is an open source, extensible library for model interpretability built on PyTorch.

Fremwork categorising



Data specific frameworks	Training frameworks	Utility frameworks
Transformers	fastai	Albumentations
Detectron2	Ray	PySyft
Pytorch geometric	Pytorch Lightning	Pyro
Flair	Horovod	Optuna
AllenNLP	DeepSpeed	Hydra
ParlAI	ONNX Runtime	Pytorch Metric Learning
DGL	skorch	Einops
PyTorch3D	Ignite	
MMF	Polyaxon	
Kornia		

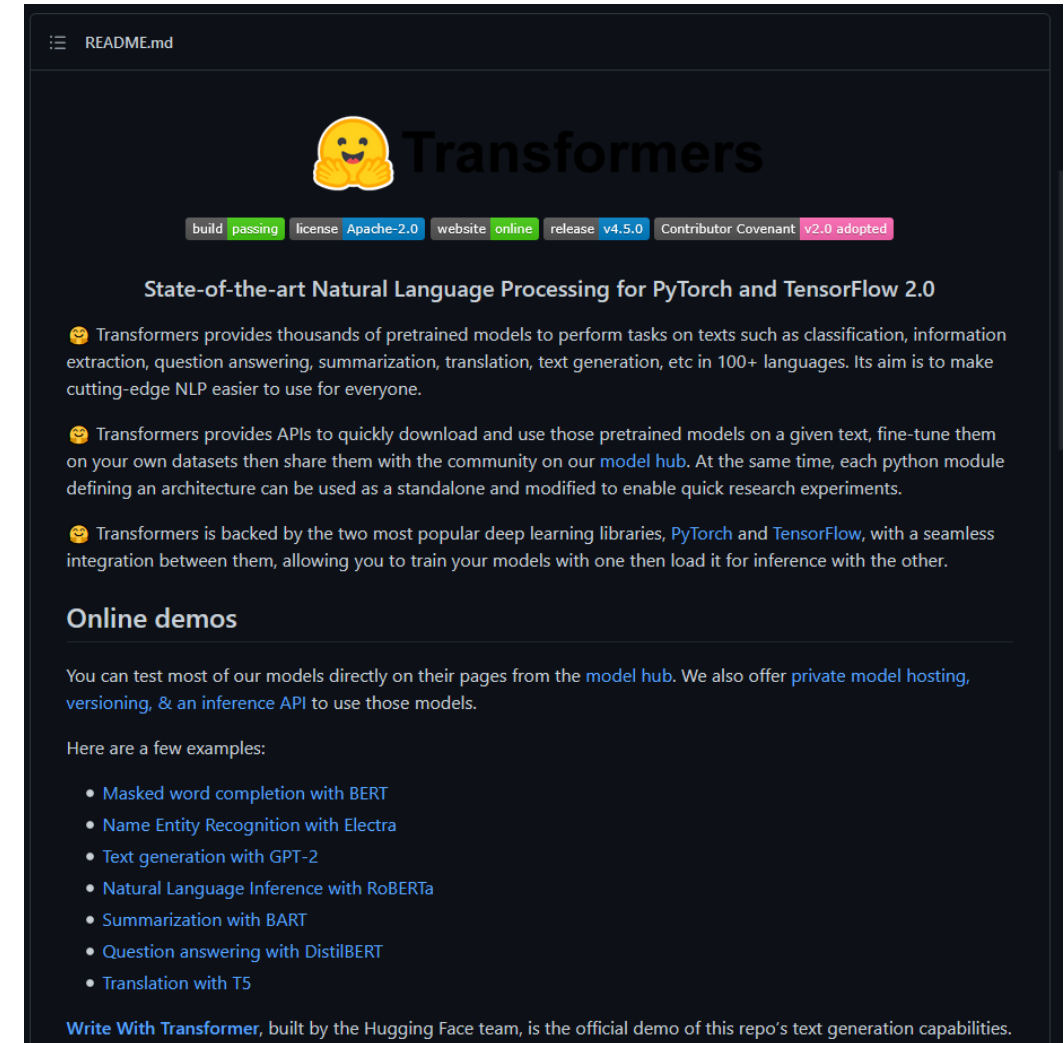


Project 1: NLP



Framework: Transformers (Huggingface)

- <https://github.com/huggingface/transformers>
- State-of-the-art NLP models
- Most starred framework in the ecosystem

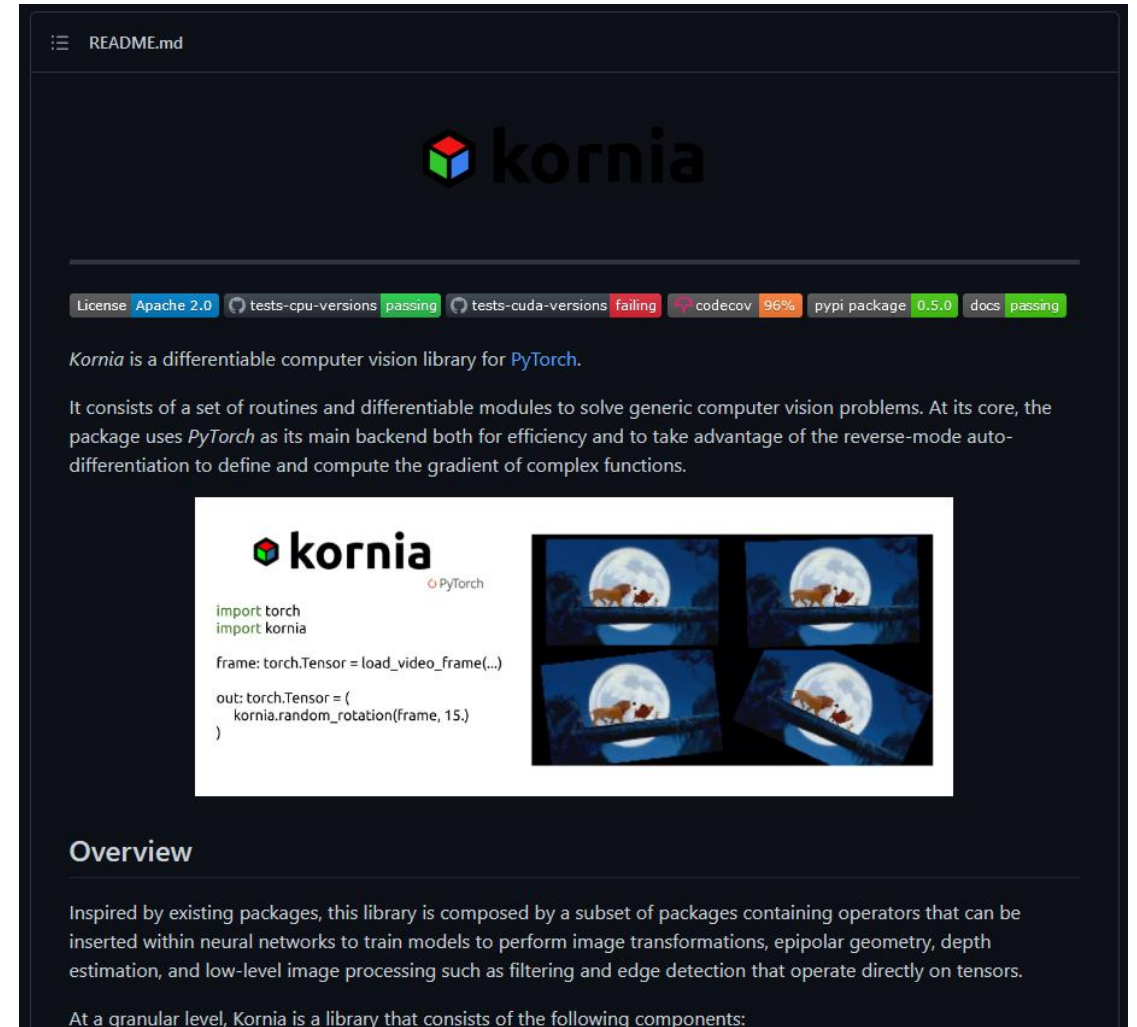


Project 2: CV



Framework: Kornia

- <https://github.com/kornia/kornia>
- Differentiable computer vision algorithms



The screenshot shows the README for the Kornia library on GitHub. At the top is the Kornia logo, a stylized cube. Below it is a horizontal bar with various status indicators: License (Apache 2.0), tests-cpu-versions (passing), tests-cuda-versions (failing), codecov (96%), pypi package (0.5.0), and docs (passing). The text describes Kornia as a differentiable computer vision library for PyTorch, consisting of routines and modules for solving generic computer vision problems. It uses PyTorch as its main backend. Below this is a code block showing how to use Kornia:

```
import torch
import kornia

frame: torch.Tensor = load_video_frame(...)

out: torch.Tensor = (
    kornia.random_rotation(frame, 15.)
)
```

 To the right of the code is a 2x2 grid of images showing a cow on a bridge, with the bottom-right image being a rotated version of the top-left. Below the code and images is the 'Overview' section, which states that Kornia is inspired by existing packages and is composed of a subset of packages containing operators for image transformations, epipolar geometry, depth estimation, and low-level image processing. It also mentions that at a granular level, Kornia consists of the following components:

Project 3: Graphs and points



Framework: Pytorch Geometric

- https://github.com/rusty1s/pytorch_geometric
- Neural networks on graphs and point clouds



Getting a good idea



master 11 branches 16 tags Go to file Add file Code

edgarriba update new kornia logo e36ca3d 2 days ago 1,533 commits

.circleci	upgrade ci workflow with pytorch 1.8 (#892)	29 days ago
.github	Create CODEOWNERS (#947)	2 days ago
docker	[Feat] Add tpu support for the losses module (#834)	3 months ago
docs	update new kornia logo	2 days ago
examples	Updated doc & example for augmentation (#583)	8 months ago
kornia	Fixed the issue of NaN gradients by adding epsilon in focal loss (#924)	2 days ago
packaging	remove pytorch version variable	8 months ago
test	Deprecate some augmentation functionals (#943)	2 days ago
tutorials	Fixed tests and docs (#654)	7 months ago
.codecov.yml	Create .codecov.yml (#735)	6 months ago
.gitconfig	reorganize color module	2 years ago
.gitignore	Update gitignore to avoid version.py	2 years ago
CHANGELOG.md	create CHANGELOG and update for 0.4.1 (#726)	6 months ago
CITATION.md	Create CITATION.md (#949)	2 days ago
CODE_OF_CONDUCT.md	add code of conduct file	2 years ago
CONTRIBUTING.rst	Update CONTRIBUTING.rst (#316)	17 months ago

About

Open Source Differentiable Computer Vision Library for PyTorch

kornia.org

machine-learning computer-vision image-processing pytorch

Readme

View license

Releases 16

Morphological operators, Dee... Latest 21 days ago

+ 15 releases

Packages

No packages published

Used by 290

+ 282

Summary



- Pick a framework (try running their notebooks/examples!):
 - Project 1: NLP
 - Project 2: CV
 - Project 3: Graphs and points
- Brainstorm a project. It does not have to be particularly big as you only have 4 full days for working on it
- Write a small (max 1 page) project description including:
 - What model do intend to implement
 - What data are you going to use
 - How you think the chosen framework can be incorporated

Checklist (also in todays readme)



- Create a git repository
- Make sure that all team members have write access to the github repository
- Create a dedicated environment for you project to keep track of your packages
- Create the initial file structure using cookiecutter
- Fill out the ``make_dataset.py`` file such that it downloads whatever data you need and
- Add a model file and a training script and get that running
- When you have something that works somewhat, remember at some point to do some profiling and see if you can optimize your code
- Remember to fill out the ``requirements.py`` file with whatever dependencies that you are using
- Write unit tests for some part of the codebase and calculate the
- Get some continuous integration running on the github repository
- Use either tensorboard or wandb to log training progress and other important metrics/artifacts in your code
- Remember to comply with good coding practices while doing the project

Hand-in



- By 17:00 today ONE group member should send an email to me (nsde@dtu.dk) with the following info
 - Link to github repository
 - Study number of all group members
 - Your project description

Exam format



Thursday 24/6 – internal evaluation by Nicki and Søren

- Group presentation
 - 7-10 minutes of powerpoint/reposatory showcase
 - 7-10 minutes of discussion
- What you will be evaluated on:
 - How well you have included what is though in the course
- What you will NOT be evaluated on
 - How epic your deep learning model is

Some good advice



1. Document everything

- Take screenshots of your work

2. Parallize work

- Many of the checkpoints are independent of each other

Meme of the day

**When someone asks why you never stops
talking about machine learning**

