21.05.25

OPENCAMPUS.sh

Machine Learning With TensorFlow

CNNS IN TENSORFLOW PART II

- QUIZ
- ASSIGNMENTS
- OPEN DISCUSSION
- INPUT

QUIZ

CNNs in TensorFlow Part II

https://forms.office.com/e/0GvZ9GXGe8

ASSIGNMENTS (WEEK 3 & 4)

ASSIGNMENTS NEXT WEEK?

OPEN DISCUSSION I

- What is the relationship or difference between loss and accuracy?
- What is the relationship or difference between a batch and an epoch and what is the effect of choosing a smaller or larger batch size?

OPEN DISCUSSION II

- Would you fine-tune all layers of a pre-trained model or just the head added specifically for your task?

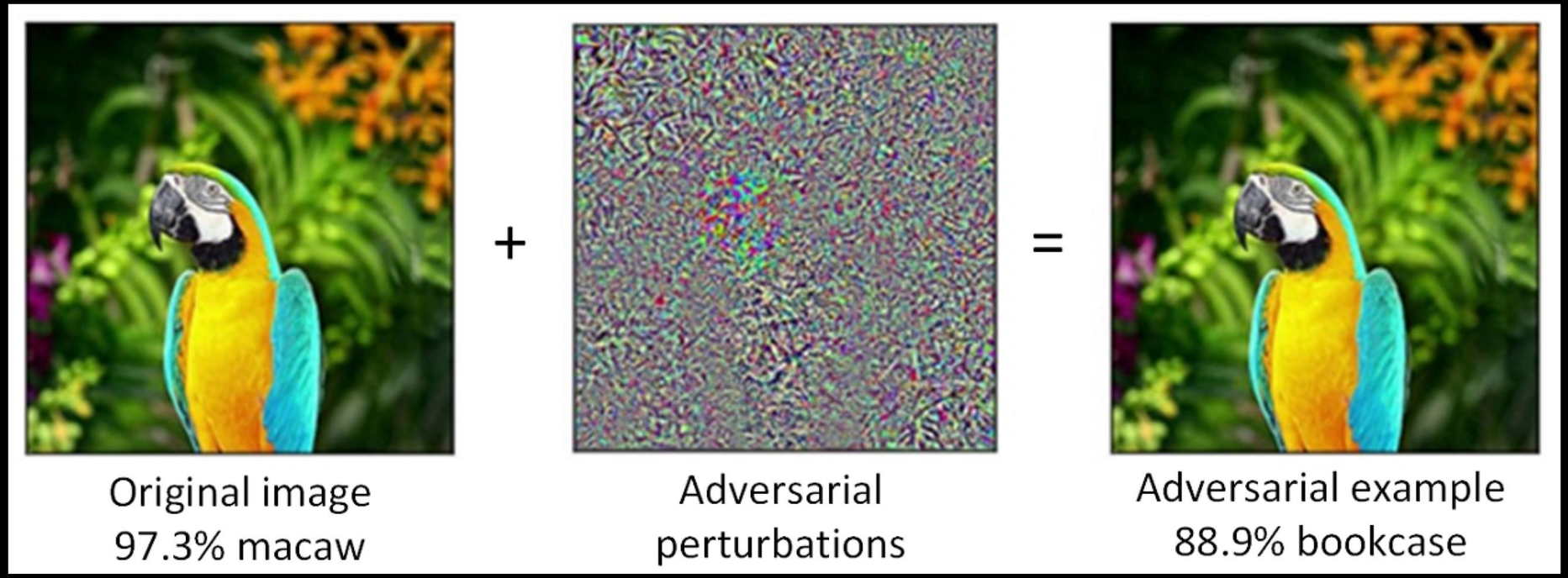
- In the notebook on „Cats vs. Dogs“ the training accuracy is always lower than the validation accuracy.
  What are possible reasons?

KEY CNN CONCEPTS (IN COMPUTER VISION)

- **Kernel**: a matrix of weights applied across the input image (slid over the image: only ever applied to a small part of the image at a time)
- **Stride**: number of pixels by which the kernel moves across the image
- **Padding**: extra pixels (usually zeros) added around the image so the kernel can slide over the edges of the image
- **Feature map**: 2D output from applying one filter over the image
- **Pooling**: reduces information from multiple pixels to a single value

ADVERSARIAL ATTACKS

- Neural Networks do not „see“ the same way that humans do
- See adversarial attacks (Shi et al., 2020):



DATASET CHARACTERISTICS

DATASET CHARACTERISTICS

- Write down key points on the most important aspects of how your data was collected
- What are potential biases?
- Are there outliers in the dataset?
- For classification tasks: Are the classes balanced?
- Are there potential data augmentation approaches you can use?

FIRST DATA INSPECTION

- df.head(), df.tail():
  Display the first/last rows
- df.sample():
  Display a random sample of rows
- df.shape:
  Gives the number of rows and columns
- df.info():
  Summary of the data frame (including missing values, data types)

DESCRIPTIVE STATISTICS

- df.describe():
  Statistical summary of the numerical columns

- df.isnull():
  Checks for missing values (NULL / NA / nan)

VISUALIZATIONS

- Scatter plots
- Bar charts
- Histograms
- …

PROJECTS MILESTONES

- 24.04. Project pitches
- 01.05. Further Project Proposals and Discussions in Mattermost
- 08.05. Form Groups
- 15.05. Literature Review (*Submission Deadline: 18.05.*)
- 22.05. Dataset Characteristics
- 05.06. Definition of Model Evaluation
- 12.06. Baseline Model Estimation (*Submission Deadline: 15.06.*)
- 22.06. Individual Feedback Sessions
- 03.07. Project Presentations, Part I
- 10.07. Project Presentations, Part II

RESOURCES FOR DATASETS AND MODELS

TensorFlow Install Learn API Resources Community Why TensorFlow Search English GitHub Sign in

Hub

Overview Guide Tutorials API Models ↗

TensorFlow Hub is a repository of trained machine learning models.

TensorFlow Hub is a repository of trained machine learning models ready for fine-tuning and deployable anywhere. Reuse trained models like BERT and Faster R-CNN with just a few lines of code.

See the guide
Learn about how to use TensorFlow Hub and how it works.

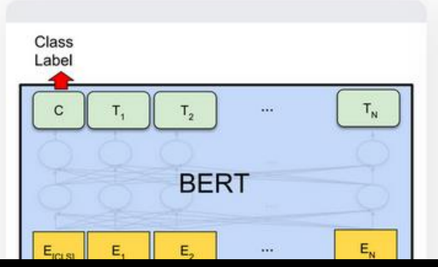
See tutorials
Tutorials show you end-to-end examples using TensorFlow Hub.

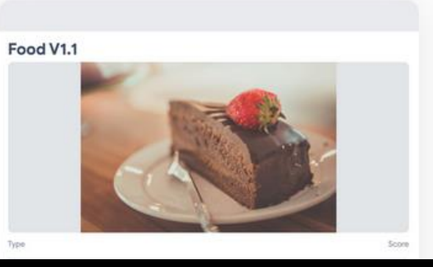
See models
Find trained TF, TFLite, and TF.js models for your use case.

```
!pip install --upgrade tensorflow_hub

import tensorflow_hub as hub

model = hub.KerasLayer("https://tfhub.dev/google/nnlm-en-dim128/2")
embeddings = model(["The rain in Spain.", "falls",
                    "mainly", "In the plain!"])

print(embeddings.shape)  #(4,128)
```

Models

Find trained models from the TensorFlow community on tfhub.dev





https://www.tensorflow.org/hub

Top New Greatest

Trending Research

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SAMURAI: Adapting Segment Anything Model for Zero-Shot Visual Tracking with Motion-Aware Memory

★ 4,895

14.04 stars / hour

yangchris11/samurai • PyTorch • 18 Nov 2024

The Segment Anything Model 2 (SAM 2) has demonstrated strong performance in object segmentation tasks but faces challenges in visual object tracking, particularly when managing crowded scenes with fast-moving or self-occluding objects.

Ranked #1 on **Visual Object Tracking on GOT-10k**

Visual Object Tracking Visual Tracking

Paper

Code

OminiControl: Minimal and Universal Control for Diffusion Transformer

★ 506

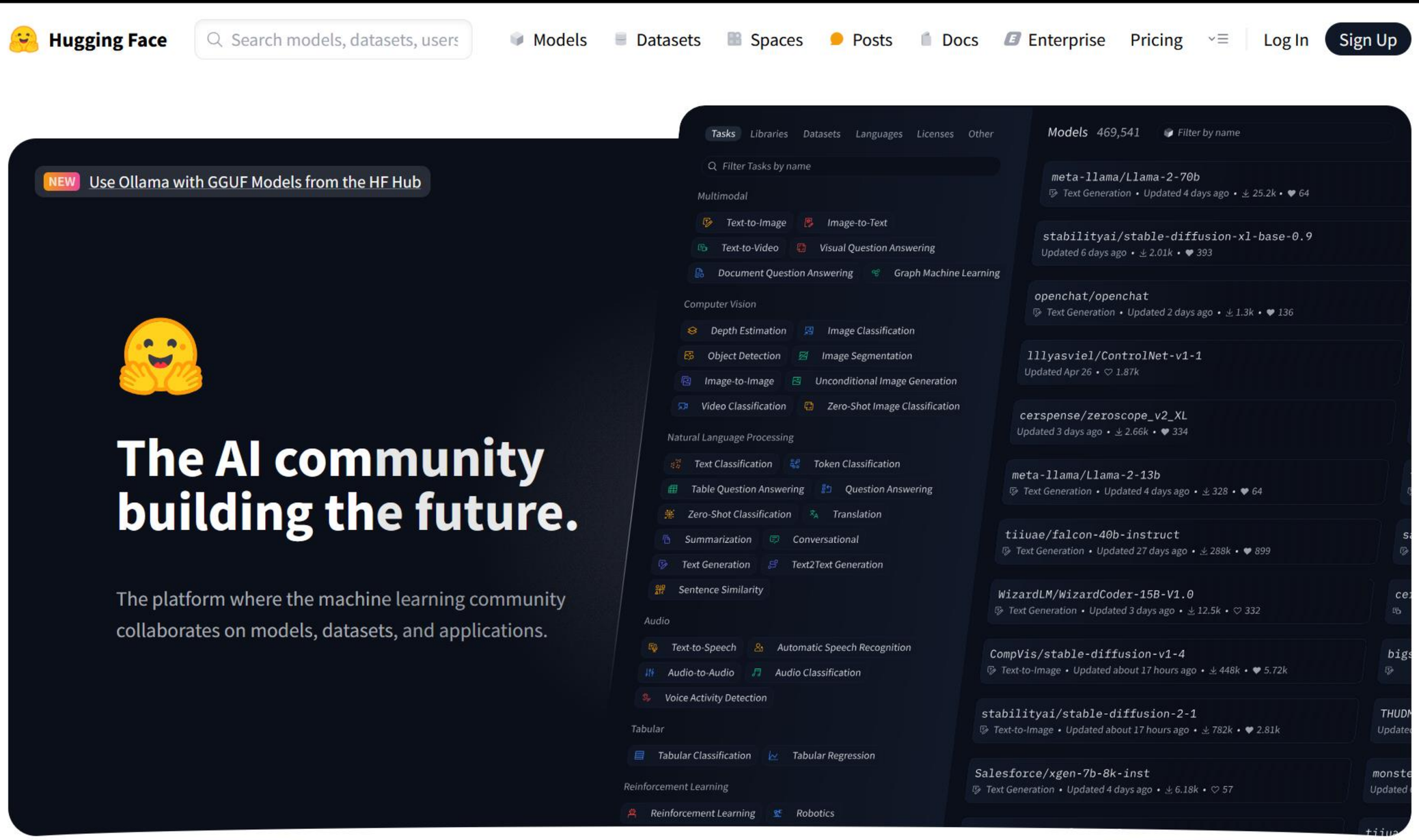
3.97 stars / hour

Yuanshi9815/OminiControl • PyTorch • 22 Nov 2024

In this paper, we introduce OminiControl, a highly versatile and parameter-efficient framework that integrates image conditions into pre-trained Diffusion Transformer (DiT) models.

Paper

Code


Hugging Face
Search models, datasets, users
Models
Datasets
Spaces
Posts
Docs
Enterprise
Pricing
Log In
Sign Up
NEW
Use Ollama with GGUF Models from the HF Hub
The AI community building the future.
The platform where the machine learning community collaborates on models, datasets, and applications.
Tasks
Libraries
Datasets
Languages
Licenses
Other
Filter Tasks by name
Multimodal
Text-to-Image
Image-to-Text
Text-to-Video
Visual Question Answering
Document Question Answering
Graph Machine Learning
Computer Vision
Depth Estimation
Image Classification
Object Detection
Image Segmentation
Image-to-Image
Unconditional Image Generation
Video Classification
Zero-Shot Image Classification
Natural Language Processing
Text Classification
Token Classification
Table Question Answering
Question Answering
Zero-Shot Classification
Translation
Summarization
Conversational
Text Generation
Text2Text Generation
Sentence Similarity
Audio
Text-to-Speech
Automatic Speech Recognition
Audio-to-Audio
Audio Classification
Voice Activity Detection
Tabular
Tabular Classification
Tabular Regression
Reinforcement Learning
Reinforcement Learning
Robotics
Models 469,541
Filter by name
meta-llama/Llama-2-70b
Text Generation • Updated 4 days ago • 25.2k • 64
stabilityai/stable-diffusion-xl-base-0.9
Updated 6 days ago • 2.01k • 393
openchat/openchat
Text Generation • Updated 2 days ago • 1.3k • 136
lllyasviel/ControlNet-v1-1
Updated Apr 26 • 1.87k
cerspense/zeroscope_v2_XL
Updated 3 days ago • 2.66k • 334
meta-llama/Llama-2-13b
Text Generation • Updated 4 days ago • 328 • 64
tiiuae/falcon-40b-instruct
Text Generation • Updated 27 days ago • 288k • 899
WizardLM/WizardCoder-15B-V1.0
Text Generation • Updated 3 days ago • 12.5k • 332
CompVis/stable-diffusion-v1-4
Text-to-Image • Updated about 17 hours ago • 448k • 5.72k
stabilityai/stable-diffusion-2-1
Text-to-Image • Updated about 17 hours ago • 782k • 2.81k
Salesforce/xgen-7b-8k-inst
Text Generation • Updated 4 days ago • 6.18k • 57

TASKS UNTIL NEXT WEEK

- Complete of week 1 and week 2 of the course Natural Language Processing in TensorFlow
- Complete the exercise provided in the course handbook.
- Decide on the metrics you will use to evaluate your models. Justify why your choice is appropriate for your task.