

# Tensorflow Data Augmentation

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[1]: pip install tensorflow
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Requirement already satisfied: tensorflow in c:\users\mvass\anaconda3\lib\site-packages (2.16.1)
Requirement already satisfied: tensorflow-intel==2.16.1 in c:\users\mvass\anaconda3\lib\site-packages (from tensorflow) (2.16.1)
Requirement already satisfied: absl-py>=1.0.0 in c:\users\mvass\anaconda3\lib\site-packages (from tensorflow-intel==2.16.1->tensorflow) (2.1.0)
Requirement already satisfied: astunparse>=1.6.0 in c:\users\mvass\anaconda3\lib\site-packages (from tensorflow-intel==2.16.1->tensorflow) (1.6.3)
Requirement already satisfied: flatbuffers>=23.5.26 in c:\users\mvass\anaconda3\lib\site-packages (from tensorflow-intel==2.16.1->tensorflow) (24.3.25)
Requirement already satisfied: gast!=0.5.0,!0.5.1,!0.5.2,>=0.2.1 in c:\users\mvass\anaconda3\lib\site-packages (from tensorflow-intel==2.16.1->tensorflow) (0.5.4)
Requirement already satisfied: google-pasta>=0.1.1 in c:\users\mvass\anaconda3\lib\site-packages (from tensorflow-intel==2.16.1->tensorflow) (0.2.0)
Requirement already satisfied: h5py>=3.10.0 in c:\users\mvass\anaconda3\lib\site-packages (from tensorflow-intel==2.16.1->tensorflow) (3.11.0)
Requirement already satisfied: libclang>=13.0.0 in c:\users\mvass\anaconda3\lib\site-packages (from tensorflow-intel==2.16.1->tensorflow) (18.1.1)
Requirement already satisfied: ml-dtypes~=0.3.1 in c:\users\mvass\anaconda3\lib\site-packages (from tensorflow-intel==2.16.1->tensorflow) (0.3.2)
Requirement already satisfied: opt-einsum>=2.3.2 in c:\users\mvass\anaconda3\lib\site-packages (from tensorflow-intel==2.16.1->tensorflow) (3.3.0)
Requirement already satisfied: packaging in c:\users\mvass\anaconda3\lib\site-packages (from tensorflow-intel==2.16.1->tensorflow) (23.1)
Requirement already satisfied: protobuf!=4.21.0,!4.21.1,!4.21.2,!4.21.3,!4.21.4,!4.21.5,<5.0.0dev,>=3.20.3 in c:\users\mvass\anaconda3\lib\site-packages (from tensorflow-
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intel==2.16.1->tensorflow) (3.20.3)
Requirement already satisfied: requests<3,>=2.21.0 in
c:\users\mvass\anaconda3\lib\site-packages (from tensorflow-
intel==2.16.1->tensorflow) (2.31.0)
Requirement already satisfied: setuptools in c:\users\mvass\anaconda3\lib\site-
packages (from tensorflow-intel==2.16.1->tensorflow) (68.2.2)
Requirement already satisfied: six>=1.12.0 in c:\users\mvass\anaconda3\lib\site-
packages (from tensorflow-intel==2.16.1->tensorflow) (1.16.0)
Requirement already satisfied: termcolor>=1.1.0 in
c:\users\mvass\anaconda3\lib\site-packages (from tensorflow-
intel==2.16.1->tensorflow) (2.4.0)
Requirement already satisfied: typing-extensions>=3.6.6 in
c:\users\mvass\anaconda3\lib\site-packages (from tensorflow-
intel==2.16.1->tensorflow) (4.9.0)
Requirement already satisfied: wrapt>=1.11.0 in
c:\users\mvass\anaconda3\lib\site-packages (from tensorflow-
intel==2.16.1->tensorflow) (1.14.1)
Requirement already satisfied: grpcio<2.0,>=1.24.3 in
c:\users\mvass\anaconda3\lib\site-packages (from tensorflow-
intel==2.16.1->tensorflow) (1.64.1)
Requirement already satisfied: tensorboard<2.17,>=2.16 in
c:\users\mvass\anaconda3\lib\site-packages (from tensorflow-
intel==2.16.1->tensorflow) (2.16.2)
Requirement already satisfied: keras>=3.0.0 in
c:\users\mvass\anaconda3\lib\site-packages (from tensorflow-
intel==2.16.1->tensorflow) (3.3.3)
Requirement already satisfied: tensorflow-io-gcs-filesystem>=0.23.1 in
c:\users\mvass\anaconda3\lib\site-packages (from tensorflow-
intel==2.16.1->tensorflow) (0.31.0)
Requirement already satisfied: numpy<2.0.0,>=1.23.5 in
c:\users\mvass\anaconda3\lib\site-packages (from tensorflow-
intel==2.16.1->tensorflow) (1.26.4)
Requirement already satisfied: wheel<1.0,>=0.23.0 in
c:\users\mvass\anaconda3\lib\site-packages (from astunparse>=1.6.0->tensorflow-
intel==2.16.1->tensorflow) (0.41.2)
Requirement already satisfied: rich in c:\users\mvass\anaconda3\lib\site-
packages (from keras>=3.0.0->tensorflow-intel==2.16.1->tensorflow) (13.3.5)
Requirement already satisfied: namex in c:\users\mvass\anaconda3\lib\site-
packages (from keras>=3.0.0->tensorflow-intel==2.16.1->tensorflow) (0.0.8)
Requirement already satisfied: optree in c:\users\mvass\anaconda3\lib\site-
packages (from keras>=3.0.0->tensorflow-intel==2.16.1->tensorflow) (0.11.0)
Requirement already satisfied: charset-normalizer<4,>=2 in
c:\users\mvass\anaconda3\lib\site-packages (from
requests<3,>=2.21.0->tensorflow-intel==2.16.1->tensorflow) (2.0.4)
Requirement already satisfied: idna<4,>=2.5 in
c:\users\mvass\anaconda3\lib\site-packages (from
requests<3,>=2.21.0->tensorflow-intel==2.16.1->tensorflow) (3.4)
Requirement already satisfied: urllib3<3,>=1.21.1 in

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c:\users\mvass\anaconda3\lib\site-packages (from
requests<3,>=2.21.0->tensorflow-intel==2.16.1->tensorflow) (2.0.7)
Requirement already satisfied: certifi>=2017.4.17 in
c:\users\mvass\anaconda3\lib\site-packages (from
requests<3,>=2.21.0->tensorflow-intel==2.16.1->tensorflow) (2024.2.2)
Requirement already satisfied: markdown>=2.6.8 in
c:\users\mvass\anaconda3\lib\site-packages (from
tensorboard<2.17,>=2.16->tensorflow-intel==2.16.1->tensorflow) (3.4.1)
Requirement already satisfied: tensorboard-data-server<0.8.0,>=0.7.0 in
c:\users\mvass\anaconda3\lib\site-packages (from
tensorboard<2.17,>=2.16->tensorflow-intel==2.16.1->tensorflow) (0.7.2)
Requirement already satisfied: werkzeug>=1.0.1 in
c:\users\mvass\anaconda3\lib\site-packages (from
tensorboard<2.17,>=2.16->tensorflow-intel==2.16.1->tensorflow) (2.2.3)
Requirement already satisfied: MarkupSafe>=2.1.1 in
c:\users\mvass\anaconda3\lib\site-packages (from
werkzeug>=1.0.1->tensorboard<2.17,>=2.16->tensorflow-intel==2.16.1->tensorflow)
(2.1.3)
Requirement already satisfied: markdown-it-py<3.0.0,>=2.2.0 in
c:\users\mvass\anaconda3\lib\site-packages (from rich->keras>=3.0.0->tensorflow-
intel==2.16.1->tensorflow) (2.2.0)
Requirement already satisfied: pygments<3.0.0,>=2.13.0 in
c:\users\mvass\anaconda3\lib\site-packages (from rich->keras>=3.0.0->tensorflow-
intel==2.16.1->tensorflow) (2.15.1)
Requirement already satisfied: mdurl~=0.1 in c:\users\mvass\anaconda3\lib\site-
packages (from markdown-it-py<3.0.0,>=2.2.0->rich->keras>=3.0.0->tensorflow-
intel==2.16.1->tensorflow) (0.1.0)
Note: you may need to restart the kernel to use updated packages.

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[2]: import git
import os
import numpy as np
from tensorflow.keras.preprocessing.image import ImageDataGenerator,
    img_to_array, load_img
import random

```

```

[3]: # Packages Install
!pip install gitpython

# Cloning repository
repo_url = 'https://github.com/dylanseychell/COTSDataset.git'
repo_dir = 'COTSDataset' # Directory to clone the repository into

# Checking if the repository directory already exists
if not os.path.exists(repo_dir):
    # Cloning repository
    git.Repo.clone_from(repo_url, repo_dir)

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    print("Repository cloned successfully.")
else:
    print("Repository already cloned.")

# Defining paths
part1_single_objects = os.path.join(repo_dir, "Part 1 - Single Objects")
part2_multiple_objects = os.path.join(repo_dir, "Part 2 - Multiple Objects")
part3_complex_background = os.path.join(repo_dir, "Part 3 - Complex Background")

print("Repository cloned successfully.")

```

Requirement already satisfied: gitpython in c:\users\mvass\anaconda3\lib\site-packages (3.1.37)

Requirement already satisfied: gitdb<5,>=4.0.1 in c:\users\mvass\anaconda3\lib\site-packages (from gitpython) (4.0.7)

Requirement already satisfied: smmap<5,>=3.0.1 in c:\users\mvass\anaconda3\lib\site-packages (from gitdb<5,>=4.0.1->gitpython) (4.0.0)

Repository cloned successfully.

Repository cloned successfully.

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[4]: # Define paths
image_path = 'COTSDATASET'
tf_augmented_path = 'CVPICS_TF'
os.makedirs(tf_augmented_path, exist_ok=True)

image_files = [f for f in os.listdir(image_path) if f.lower().endswith(('png', 'jpg', 'jpeg'))]
random_images = random.sample(image_files, 5)
print(f"Selected images: {random_images}")

tf_datagen = ImageDataGenerator(
    rotation_range=40,
    width_shift_range=0.2,
    height_shift_range=0.2,
    shear_range=0.2,
    zoom_range=0.2,
    horizontal_flip=True,
    fill_mode='nearest'
)

for image_file in random_images:
    img = load_img(os.path.join(image_path, image_file))
    x = img_to_array(img)
    x = x.reshape((1,) + x.shape)
    i = 0

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    for batch in tf_datagen.flow(x, batch_size=1,
    ↪save_to_dir=tf_augmented_path, save_prefix=f'tf_aug_{os.path.
    ↪splitext(image_file)[0]}', save_format='jpeg'):
        i += 1
        if i >= 3:
            break

print("saved to", tf_augmented_path)

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ValueError                                Traceback (most recent call last)
Cell In[4], line 7
      4 os.makedirs(tf_augmented_path, exist_ok=True)
      6 image_files = [f for f in os.listdir(image_path) if f.lower().
    ↪endswith(('png', 'jpg', 'jpeg'))]
----> 7 random_images = random.sample(image_files, 5)
      8 print(f"Selected images: {random_images}")
     10 tf_datagen = ImageDataGenerator(
     11     rotation_range=40,
     12     width_shift_range=0.2,
    (...)
     17     fill_mode='nearest'
     18 )

File ~\anaconda3\Lib\random.py:456, in Random.sample(self, population, k, count)
     454 randbelow = self._randbelow
     455 if not 0 <= k <= n:
--> 456     raise ValueError("Sample larger than population or is negative")
     457 result = [None] * k
     458 setsize = 21          # size of a small set minus size of an empty list

ValueError: Sample larger than population or is negative

```

Output:

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Selected images:      ['homodeus_depth8.png',      'shooter_glass2_colour.jpeg',      'mac-
book_depth16.png',      'dslr_colour.jpeg',      'cmt_mug_depth8_nofill.png']      saved      to
C:/Users/jacob/Desktop/CVPICS_TFFF

```