

IBM Project Name: Real-Time Communication System Powered by AI for Specially AbledTEAM ID:

PNT2022TMID30422

Image Preprocessing

!pip install tensorflow==2.7.1

Looking in indexes: <https://pypi.org/simple>, <https://us-python.pkg.dev/colab-wheels/public/simple/>

Collecting tensorflow==2.7.1

Downloading tensorflow-2.7.1-cp37-cp37m-manylinux2010\_x86\_64.whl (495.0 MB)

 495.0 MB 33 kB/s

Requirement already satisfied: absl-py>=0.4.0 in /usr/local/lib/python3.7/dist-packages (from tensorflow==2.7.1) (1.3.0)

Requirement already satisfied: wheel<1.0,>=0.32.0 in /usr/local/lib/python3.7/dist-packages (from tensorflow==2.7.1) (0.38.3)

Requirement already satisfied: termcolor>=1.1.0 in /usr/local/lib/python3.7/dist-packages (from tensorflow==2.7.1) (2.1.0)

Requirement already satisfied: google-pasta>=0.1.1 in /usr/local/lib/python3.7/dist-packages (from tensorflow==2.7.1) (0.2.0)

Requirement already satisfied: numpy>=1.14.5 in /usr/local/lib/python3.7/dist-packages (from tensorflow==2.7.1) (1.21.6)

Requirement already satisfied: tensorflow-io-gcs-filesystem>=0.21.0 in /usr/local/lib/python3.7/dist-packages (from tensorflow==2.7.1) (0.27.0)

Requirement already satisfied: tensorboard~=2.6 in /usr/local/lib/python3.7/dist-packages (from tensorflow==2.7.1) (2.9.1)

Requirement already satisfied: wrapt>=1.11.0 in /usr/local/lib/python3.7/dist-packages (from tensorflow==2.7.1) (1.14.1)

Requirement already satisfied: astunparse>=1.6.0 in /usr/local/lib/python3.7/dist-packages (from tensorflow==2.7.1) (1.6.3)

Requirement already satisfied: opt-einsum>=2.3.2 in /usr/local/lib/python3.7/dist-packages (from tensorflow==2.7.1) (3.3.0)

Requirement already satisfied: protobuf<3.9.2 in /usr/local/lib/python3.7/dist-packages (from tensorflow==2.7.1) (3.19.6)

Requirement already satisfied: keras-preprocessing<1.1.1 in /usr/local/lib/python3.7/dist-packages (from tensorflow==2.7.1) (1.1.2)

Collecting tensorflow-estimator<2.8,~>2.7.0rc0

Downloading tensorflow\_estimator-2.7.0-py2.py3-none-any.whl (463 kB)

 463 kB 56.8 MB/sCollecting

keras<2.8,~>2.7.0rc0

Downloading keras-2.7.0-py2.py3-none-any.whl (1.3 MB)

 1.3 MB 53.7 MB/s

Requirement already satisfied: six<1.12.0 in /usr/local/lib/python3.7/dist-packages (from tensorflow==2.7.1) (1.15.0)

Requirement already satisfied: h5py<2.9.0 in /usr/local/lib/python3.7/dist-packages (from tensorflow==2.7.1) (3.1.0)

Requirement already satisfied: flatbuffers<3.0,~>1.12 in /usr/local/lib/python3.7/dist-packages (from tensorflow==2.7.1) (1.12)

Requirement already satisfied: typing-extensions<3.6.6 in /usr/local/lib/python3.7/dist-packages (from tensorflow==2.7.1) (4.1.1)

Requirement already satisfied: grpcio<2.0,~>1.24.3 in /usr/local/lib/python3.7/dist-packages (from tensorflow==2.7.1) (1.50.0)

Requirement already satisfied: libclang<9.0.1 in /usr/local/lib/python3.7/dist-packages (from tensorflow==2.7.1) (14.0.6)

Requirement already satisfied: gast<0.5.0,~>0.2.1 in /usr/local/lib/python3.7/dist-packages (from tensorflow==2.7.1) (0.4.0)

Requirement already satisfied: cached-property in /usr/local/lib/python3.7/dist-packages (from h5py>2.9.0->tensorflow==2.7.1) (1.5.2)

Requirement already satisfied: requests<3,~>2.21.0 in /usr/local/lib/python3.7/dist-packages (from tensorboard~>2.6->tensorflow==2.7.1) (2.23.0)

Requirement already satisfied: setuptools<41.0.0 in /usr/local/lib/python3.7/dist-packages (from tensorboard~>2.6->tensorflow==2.7.1) (57.4.0)

Requirement already satisfied: tensorboard-data-server<0.7.0,>=0.6.0 in /usr/local/lib/python3.7/dist-packages (from tensorboard~=2.6->tensorflow==2.7.1) (0.6.1)

Requirement already satisfied: tensorboard-plugin-wit>=1.6.0 in /usr/local/lib/python3.7/dist-packages (from tensorboard~=2.6->tensorflow==2.7.1) (1.8.1)

Requirement already satisfied: markdown>=2.6.8 in /usr/local/lib/python3.7/dist-packages (from tensorboard~=2.6->tensorflow==2.7.1) (3.4.1)

Requirement already satisfied: google-auth<3,>=1.6.3 in /usr/local/lib/python3.7/dist-packages (from tensorboard~=2.6->tensorflow==2.7.1) (2.14.1)

Requirement already satisfied: google-auth-oauthlib<0.5,>=0.4.1 in /usr/local/lib/python3.7/dist-packages (from tensorboard~=2.6->tensorflow==2.7.1) (0.4.6)

Requirement already satisfied: werkzeug>=1.0.1 in /usr/local/lib/python3.7/dist-packages (from tensorboard~=2.6->tensorflow==2.7.1) (1.0.1)

Requirement already satisfied: cachetools<6.0,>=2.0.0 in /usr/local/lib/python3.7/dist-packages (from google-auth<3,>=1.6.3->tensorboard~=2.6->tensorflow==2.7.1) (5.2.0)

Requirement already satisfied: pyasn1-modules>=0.2.1 in /usr/local/lib/python3.7/dist-packages (from google-auth<3,>=1.6.3->tensorboard~=2.6->tensorflow==2.7.1) (0.2.8)

Requirement already satisfied: rsa<5,>=3.1.4 in /usr/local/lib/python3.7/dist-packages (from google-auth<3,>=1.6.3->tensorboard~=2.6->tensorflow==2.7.1) (4.9)

Requirement already satisfied: requests-oauthlib>=0.7.0 in /usr/local/lib/python3.7/dist-packages (from google-auth-oauthlib<0.5,>=0.4.1->tensorboard~=2.6->tensorflow==2.7.1) (1.3.1)

Requirement already satisfied: importlib-metadata>=4.4 in /usr/local/lib/python3.7/dist-packages (from markdown>=2.6.8->tensorboard~=2.6->tensorflow==2.7.1) (4.13.0)

Requirement already satisfied: zipp>=0.5 in /usr/local/lib/python3.7/dist-packages (from importlib-metadata>=4.4->markdown>=2.6.8->tensorboard~=2.6->tensorflow==2.7.1) (3.10.0)

Requirement already satisfied: pyasn1<0.5.0,>=0.4.6 in /usr/local/lib/python3.7/dist-packages (from pyasn1-modules>=0.2.1->google-auth<3,>=1.6.3->tensorboard~=2.6->tensorflow==2.7.1) (0.4.8)

Requirement already satisfied: chardet<4,>=3.0.2 in /usr/local/lib/python3.7/dist-packages (from requests<3,>=2.21.0->tensorboard~=2.6->tensorflow==2.7.1) (3.0.4)

Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.7/dist-packages (from requests<3,>=2.21.0->tensorboard~=2.6->tensorflow==2.7.1) (2022.9.24)

Requirement already satisfied: urllib3!=1.25.0,!=1.25.1,<1.26,>=1.21.1 in /usr/local/lib/python3.7/dist-packages (from requests<3,>=2.21.0->tensorboard~=2.6->tensorflow==2.7.1) (1.24.3)

Requirement already satisfied: idna<3,>=2.5 in /usr/local/lib/python3.7/dist-packages (from requests<3,>=2.21.0->tensorboard~=2.6->tensorflow==2.7.1) (2.10)

Requirement already satisfied: oauthlib>=3.0.0 in /usr/local/lib/python3.7/dist-packages (from requests-oauthlib>=0.7.0->google-auth-oauthlib<0.5,>=0.4.1->tensorboard~=2.6->tensorflow==2.7.1) (3.2.2)

Installing collected packages: tensorflow-estimator, keras, tensorflow

Attempting uninstall: tensorflow-estimator

Found existing installation: tensorflow-estimator 2.9.0

Uninstalling tensorflow-estimator-2.9.0:

Successfully uninstalled tensorflow-estimator-2.9.0

Attempting uninstall: keras

Found existing installation: keras 2.9.0

Uninstalling keras-2.9.0:

Successfully uninstalled keras-2.9.0

Attempting uninstall: tensorflow

Found existing installation: tensorflow 2.9.2

Uninstalling tensorflow-2.9.2:

Successfully uninstalled tensorflow-2.9.2

Successfully installed keras-2.7.0 tensorflow-2.7.1 tensorflow-estimator-2.7.0

IMAGE DATA GENERATOR AND LIBRARY

```
from tensorflow.keras.preprocessing.image import ImageDataGenerator#
```

Training Datagen

```
train_datagen =
```

```
ImageDataGenerator(rescale=1/255,zoom_range=0.2,horizontal_flip=True,vertical_flip=False)
```

```
# Testing Datagen

test_datagen = ImageDataGenerator(rescale=1/255)

import tensorflow as tf

import os

from tensorflow.keras.models import Sequential

from tensorflow.keras.layers import Dense, Conv2D, Flatten, Dropout, MaxPooling2Dfrom
tensorflow.keras.preprocessing.image import ImageDataGenerator

import numpy as np

import matplotlib.pyplot as plt

import IPython.display as display

from PIL import Image

import pathlib
```