test_1

October 7, 2021

1 Tester

[ ]:
```
import os
import cv2 as cv2
import numpy as np
import tensorflow as tf
from keras import models

DIRECTORY = '/home/hivini/learn/research/new-covid/'
DATASET_FOLDER = DIRECTORY + 'COVID-19_Radiography_Dataset'
IMG_SIZE = 150

model = models.load_model('/home/hivini/learn/research/new-covid/test/
 ↪data_aug_adam_val_92_83.h5')

# def readImages(files, name):
#     if os.path.exists(name):
#         return np.load(name, allow_pickle=True)
#     data = []
#     for path_im in files:
#         try:
#             img_arr = cv2.imread(path_im, cv2.IMREAD_GRAYSCALE)
#             resized_arr = cv2.resize(img_arr, (IMG_SIZE, IMG_SIZE))
#             data.append(resized_arr) # Reshaping images to preferred size
#         except Exception as e:
#             print(e)
#     arr = np.array(data, dtype='object')
#     np.save(name, arr)
#     return arr


# covid_filenames = tf.io.gfile.glob(DATASET_FOLDER + '/COVID/*')
# normal_filenames = tf.io.gfile.glob(DATASET_FOLDER + '/Normal/*')
# covid_images = readImages(covid_filenames, DIRECTORY + 'cxr_covid.npy')
# normal_images = readImages(normal_filenames, DIRECTORY + 'cxr_normal.npy')
# normal_images = normal_images[:covid_images.shape[0]]
# print(covid_images.shape)
```

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# print(normal_images.shape)
```

```
2021-10-07 18:48:15.842713: I
tensorflow/stream_executor/platform/default/dso_loader.cc:49] Successfully
opened dynamic library libcudart.so.10.1
2021-10-07 18:48:17.774576: I tensorflow/compiler/jit/xla_cpu_device.cc:41] Not
creating XLA devices, tf_xla_enable_xla_devices not set
2021-10-07 18:48:17.782327: I
tensorflow/stream_executor/platform/default/dso_loader.cc:49] Successfully
opened dynamic library libcuda.so.1
2021-10-07 18:48:18.075153: E
tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:927] could not open file to
read NUMA node: /sys/bus/pci/devices/0000:01:00.0/numa_node
Your kernel may have been built without NUMA support.
2021-10-07 18:48:18.075419: I
tensorflow/core/common_runtime/gpu/gpu_device.cc:1720] Found device 0 with
properties:
pciBusID: 0000:01:00.0 name: NVIDIA GeForce RTX 2080 with Max-Q Design
computeCapability: 7.5
coreClock: 1.215GHz coreCount: 46 deviceMemorySize: 8.00GiB
deviceMemoryBandwidth: 357.69GiB/s
2021-10-07 18:48:18.075490: I
tensorflow/stream_executor/platform/default/dso_loader.cc:49] Successfully
opened dynamic library libcudart.so.10.1
2021-10-07 18:48:18.087565: I
tensorflow/stream_executor/platform/default/dso_loader.cc:49] Successfully
opened dynamic library libcublas.so.10
2021-10-07 18:48:18.087657: I
tensorflow/stream_executor/platform/default/dso_loader.cc:49] Successfully
opened dynamic library libcublasLt.so.10
2021-10-07 18:48:18.097797: I
tensorflow/stream_executor/platform/default/dso_loader.cc:49] Successfully
opened dynamic library libcufft.so.10
2021-10-07 18:48:18.099035: I
tensorflow/stream_executor/platform/default/dso_loader.cc:49] Successfully
opened dynamic library libcurand.so.10
2021-10-07 18:48:18.111885: I
tensorflow/stream_executor/platform/default/dso_loader.cc:49] Successfully
opened dynamic library libcusolver.so.10
2021-10-07 18:48:18.115260: I
tensorflow/stream_executor/platform/default/dso_loader.cc:49] Successfully
opened dynamic library libcusparse.so.10
2021-10-07 18:48:18.134453: I
tensorflow/stream_executor/platform/default/dso_loader.cc:49] Successfully
opened dynamic library libcudnn.so.7
2021-10-07 18:48:18.135291: E
tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:927] could not open file to
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```
read NUMA node: /sys/bus/pci/devices/0000:01:00.0/numa_node
Your kernel may have been built without NUMA support.
2021-10-07 18:48:18.136233: E
tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:927] could not open file to
read NUMA node: /sys/bus/pci/devices/0000:01:00.0/numa_node
Your kernel may have been built without NUMA support.
2021-10-07 18:48:18.136496: I
tensorflow/core/common_runtime/gpu/gpu_device.cc:1862] Adding visible gpu
devices: 0
2021-10-07 18:48:18.137378: I tensorflow/core/platform/cpu_feature_guard.cc:142]
This TensorFlow binary is optimized with oneAPI Deep Neural Network Library
(oneDNN) to use the following CPU instructions in performance-critical
operations:  SSE4.1 SSE4.2 AVX AVX2 FMA
To enable them in other operations, rebuild TensorFlow with the appropriate
compiler flags.
2021-10-07 18:48:18.140517: E
tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:927] could not open file to
read NUMA node: /sys/bus/pci/devices/0000:01:00.0/numa_node
Your kernel may have been built without NUMA support.
2021-10-07 18:48:18.140757: I
tensorflow/core/common_runtime/gpu/gpu_device.cc:1720] Found device 0 with
properties:
pciBusID: 0000:01:00.0 name: NVIDIA GeForce RTX 2080 with Max-Q Design
computeCapability: 7.5
coreClock: 1.215GHz coreCount: 46 deviceMemorySize: 8.00GiB
deviceMemoryBandwidth: 357.69GiB/s
2021-10-07 18:48:18.140811: I
tensorflow/stream_executor/platform/default/dso_loader.cc:49] Successfully
opened dynamic library libcudart.so.10.1
2021-10-07 18:48:18.140850: I
tensorflow/stream_executor/platform/default/dso_loader.cc:49] Successfully
opened dynamic library libcublas.so.10
2021-10-07 18:48:18.140865: I
tensorflow/stream_executor/platform/default/dso_loader.cc:49] Successfully
opened dynamic library libcublasLt.so.10
2021-10-07 18:48:18.140878: I
tensorflow/stream_executor/platform/default/dso_loader.cc:49] Successfully
opened dynamic library libcufft.so.10
2021-10-07 18:48:18.140890: I
tensorflow/stream_executor/platform/default/dso_loader.cc:49] Successfully
opened dynamic library libcurand.so.10
2021-10-07 18:48:18.140902: I
tensorflow/stream_executor/platform/default/dso_loader.cc:49] Successfully
opened dynamic library libcusolver.so.10
2021-10-07 18:48:18.140915: I
tensorflow/stream_executor/platform/default/dso_loader.cc:49] Successfully
opened dynamic library libcusparse.so.10
2021-10-07 18:48:18.140927: I
```

```
tensorflow/stream_executor/platform/default/dso_loader.cc:49] Successfully
opened dynamic library libcudnn.so.7
2021-10-07 18:48:18.141676: E
tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:927] could not open file to
read NUMA node: /sys/bus/pci/devices/0000:01:00.0/numa_node
Your kernel may have been built without NUMA support.
2021-10-07 18:48:18.142621: E
tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:927] could not open file to
read NUMA node: /sys/bus/pci/devices/0000:01:00.0/numa_node
Your kernel may have been built without NUMA support.
2021-10-07 18:48:18.142886: I
tensorflow/core/common_runtime/gpu/gpu_device.cc:1862] Adding visible gpu
devices: 0
2021-10-07 18:48:18.143045: I
tensorflow/stream_executor/platform/default/dso_loader.cc:49] Successfully
opened dynamic library libcudart.so.10.1
2021-10-07 18:48:19.277792: I
tensorflow/core/common_runtime/gpu/gpu_device.cc:1261] Device interconnect
StreamExecutor with strength 1 edge matrix:
2021-10-07 18:48:19.277818: I
tensorflow/core/common_runtime/gpu/gpu_device.cc:1267]      0
2021-10-07 18:48:19.277849: I
tensorflow/core/common_runtime/gpu/gpu_device.cc:1280] 0:   N
2021-10-07 18:48:19.278867: E
tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:927] could not open file to
read NUMA node: /sys/bus/pci/devices/0000:01:00.0/numa_node
Your kernel may have been built without NUMA support.
2021-10-07 18:48:19.278995: I
tensorflow/core/common_runtime/gpu/gpu_device.cc:1489] Could not identify NUMA
node of platform GPU id 0, defaulting to 0.  Your kernel may not have been built
with NUMA support.
2021-10-07 18:48:19.279512: E
tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:927] could not open file to
read NUMA node: /sys/bus/pci/devices/0000:01:00.0/numa_node
Your kernel may have been built without NUMA support.
2021-10-07 18:48:19.280072: E
tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:927] could not open file to
read NUMA node: /sys/bus/pci/devices/0000:01:00.0/numa_node
Your kernel may have been built without NUMA support.
2021-10-07 18:48:19.280217: I
tensorflow/core/common_runtime/gpu/gpu_device.cc:1406] Created TensorFlow device
(/job:localhost/replica:0/task:0/device:GPU:0 with 6575 MB memory) -> physical
GPU (device: 0, name: NVIDIA GeForce RTX 2080 with Max-Q Design, pci bus id:
0000:01:00.0, compute capability: 7.5)
2021-10-07 18:48:19.280997: I tensorflow/compiler/jit/xla_gpu_device.cc:99] Not
creating XLA devices, tf_xla_enable_xla_devices not set
```

[ ]:
```
# classes = ['covid', 'normal', 'viral_pneumonia']
# TEST_DATASET = '/home/hivini/learn/research/covid-test/chest_xray'

# def testImage(path):
#     img_arr = cv2.imread(path, cv2.IMREAD_GRAYSCALE)
#     resized_arr = cv2.resize(img_arr, (IMG_SIZE, IMG_SIZE))
#     resized_arr = resized_arr / 255.
#     img = np.reshape(resized_arr, [1, IMG_SIZE, IMG_SIZE, 1])
#     c = model.predict(img)
#     return np.argmax(c)

# normal_files = tf.io.gfile.glob(TEST_DATASET + '/NORMAL/*')
# pneumonia_files = tf.io.gfile.glob(TEST_DATASET + '/PNEUMONIA/VIRUS-*')

# correct = 0
# for f in normal_files:
#     if correct == 1000:
#         break
#     c = testImage(f)
#     # normal
#     if (c == 1):
#         correct += 1

# print('Correct: ', correct)
# print('Total: ', len(normal_files))
# print('Percent: ', (correct / len(normal_files)))


# img_arr = cv2.imread(TEST_DATASET + '/NORMAL/NORMAL-4512-0001.jpeg', cv2.
 ↪IMREAD_GRAYSCALE)
# resized_arr = cv2.resize(img_arr, (IMG_SIZE, IMG_SIZE))
# resized_arr = resized_arr / 255.
# # print(resized_arr)
# img = np.reshape(resized_arr, [1, IMG_SIZE, IMG_SIZE, 1])
# c = model.predict(img)
# print(np.argmax(c))
```

[ ]:
```
from keras.preprocessing.image import ImageDataGenerator

test_datagen = ImageDataGenerator(rescale=1./255)
train_datagen = ImageDataGenerator(rescale=1./255)
validation_datagen = ImageDataGenerator(rescale=1./255)

train_generator = train_datagen.flow_from_directory(
    '/home/hivini/learn/research/new-covid/small_dataset/train',
    target_size=(150, 150),
    batch_size=32,
```

```
    class_mode='categorical',
    color_mode='grayscale'
)

validation_generator = validation_datagen.flow_from_directory(
    '/home/hivini/learn/research/new-covid/small_dataset/validation',
    target_size=(150, 150),
    batch_size=32,
    class_mode='categorical',
    color_mode='grayscale'
)

test_generator = test_datagen.flow_from_directory(
    '/home/hivini/learn/research/new-covid/small_dataset/test',
    target_size=(150, 150),
    batch_size=32,
    class_mode='categorical',
    color_mode='grayscale'
)
```

```
Found 10606 images belonging to 3 classes.
Found 2273 images belonging to 3 classes.
Found 2274 images belonging to 3 classes.
```

[ ]:
```
test_loss, test_acc = model.evaluate(test_generator)
print("Loss on test set: ", test_loss)
print("Accuracy on test set: ", test_acc)
```

```
72/72 [==============================] - 4s 50ms/step - loss: 0.1480 - accuracy:
0.9420
Loss on test set:  0.1480049341917038
Accuracy on test set:  0.9419525265693665
```

[ ]:
```
test_loss, test_acc = model.evaluate(train_generator)
print("Loss on train set: ", test_loss)
print("Accuracy on train set: ", test_acc)
```

```
332/332 [==============================] - 24s 72ms/step - loss: 0.1296 -
accuracy: 0.9517
Loss on train set:  0.12961836159229279
Accuracy on train set:  0.951725423336029
```

[ ]:
```
test_loss, test_acc = model.evaluate(validation_generator)
print("Loss on validation set: ", test_loss)
print("Accuracy on validation set: ", test_acc)
```

```
72/72 [==============================] - 11s 152ms/step - loss: 0.1577 -
accuracy: 0.9384
```

```
Loss on validation set:  0.1576768308877945
Accuracy on validation set:  0.9384073615074158
```