jupyter Covid19 Last Checkpoint: 9 minutes ago (autosaved)

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Trusted | Python 3 (ipykernel)

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In [53]:
```
import cv2
from tensorflow import keras
from tensorflow.keras.preprocessing import image
from tensorflow.keras.models import Model, Sequential
from tensorflow.keras.layers import Input, Dense, Flatten, Dropout, BatchNormalization
from tensorflow.keras.layers import Conv2D, SeparableConv2D, MaxPool2D, LeakyReLU, Activation
from tensorflow.keras.optimizers import Adam
from tensorflow.keras.preprocessing.image import ImageDataGenerator
from tensorflow.keras.callbacks import ModelCheckpoint, ReduceLROnPlateau, EarlyStopping
from keras.utils import plot_model
import tensorflow as tf
import pandas as pd
import numpy as np
import seaborn as sns
from matplotlib import pyplot as plt
from sklearn.preprocessing import StandardScaler
from sklearn.model_selection import train_test_split
from sklearn.tree import DecisionTreeClassifier
from sklearn.metrics import accuracy_score
from sklearn.svm import SVC
from sklearn.linear_model import LogisticRegression
from sklearn import neighbors
from sklearn.ensemble import RandomForestClassifier
from sklearn.model_selection import cross_val_score
from sklearn.metrics import f1_score
from sklearn.metrics import confusion_matrix
from sklearn.tree import DecisionTreeClassifier
from sklearn.preprocessing import LabelEncoder
import os
import joblib
from dataprep.eda import *
```
executed in 13ms, finished 13:55:30 2023-03-27

In [28]:
```
train = ImageDataGenerator(rescale = 1./255,
                                   shear_range = 0.2,
                                   zoom_range = 0.2,
                                   horizontal_flip = True)
training_set = train.flow_from_directory('C:/Users/Mua/Downloads/data/xray_dataset_covid19/train/',
                                                 target_size = (64, 64),
                                                 batch_size = 2,
                                                 class_mode = 'binary')
```
executed in 63ms, finished 13:08:50 2023-03-27

```
Found 148 images belonging to 2 classes.
```

In [30]:
```
test = ImageDataGenerator(rescale = 1./255,
                                   shear_range = 0.2,
                                   zoom_range = 0.2,
                                   horizontal_flip = True)
testing_set = test.flow_from_directory('C:/Users/Mua/Downloads/data/xray_dataset_covid19/test/',
                                                 target_size = (64, 64),
                                                 batch_size = 2,
                                                 class_mode = 'binary')
```
executed in 36ms, finished 13:09:27 2023-03-27

```
Found 40 images belonging to 2 classes.
```

In [31]:
```
training_set.class_indices
```
executed in 21ms, finished 13:09:40 2023-03-27

Out[31]:
```
{'NORMAL': 0, 'PNEUMONIA': 1}
```

In [34]:
```
model = keras.models.Sequential([
    keras.layers.Conv2D(filters=64, kernel_size=(3,3), activation='relu', input_shape=(64,64,3)),
    keras.layers.MaxPooling2D((2, 2)),

    keras.layers.Conv2D(filters=64,kernel_size=(3,3),activation='relu'),
    keras.layers.MaxPooling2D((2, 2)),

    keras.layers.Flatten(input_shape=(64,64)),
    keras.layers.Dense(128,activation='relu'),
    keras.layers.Dense(64,activation='relu'),
    keras.layers.Dense(32,activation='relu'),
    keras.layers.Dropout(rate = 0.2),
    keras.layers.Dense(2,activation='softmax')

])
```
executed in 2.01s, finished 13:10:25 2023-03-27

In [36]:
```
model.compile(optimizer='adam',
             loss='sparse_categorical_crossentropy',
             metrics=['accuracy'])
```
executed in 52ms, finished 13:10:49 2023-03-27

In [37]:
```
model.fit(training_set,validation_data=testing_set, epochs=10)
```
executed in 2m 13s, finished 13:13:11 2023-03-27

```
Epoch 1/10
74/74 [==============================] - 20s 207ms/step - loss: 0.6818 - accuracy: 0.5541 - val_loss: 0.3077 - val_accurac
y: 0.9250
Epoch 2/10
74/74 [==============================] - 13s 181ms/step - loss: 0.6156 - accuracy: 0.7230 - val_loss: 0.3087 - val_accurac
y: 0.9750
Epoch 3/10
74/74 [==============================] - 15s 209ms/step - loss: 0.4967 - accuracy: 0.8243 - val_loss: 0.4737 - val_accurac
y: 0.8250
Epoch 4/10
74/74 [==============================] - 13s 169ms/step - loss: 0.4424 - accuracy: 0.8514 - val_loss: 0.4184 - val_accurac
y: 0.8750
Epoch 5/10
74/74 [==============================] - 12s 157ms/step - loss: 0.4705 - accuracy: 0.8108 - val_loss: 0.4637 - val_accurac
y: 0.8500
Epoch 6/10
74/74 [==============================] - 11s 155ms/step - loss: 0.3803 - accuracy: 0.8784 - val_loss: 0.1353 - val_accurac
y: 1.0000
Epoch 7/10
74/74 [==============================] - 12s 159ms/step - loss: 0.3517 - accuracy: 0.8649 - val_loss: 0.1230 - val_accurac
y: 0.9750
Epoch 8/10
74/74 [==============================] - 12s 159ms/step - loss: 0.2806 - accuracy: 0.9122 - val_loss: 0.1784 - val_accurac
y: 0.9500
Epoch 9/10
74/74 [==============================] - 12s 155ms/step - loss: 0.3552 - accuracy: 0.8514 - val_loss: 0.3048 - val_accurac
y: 0.9750
Epoch 10/10
74/74 [==============================] - 12s 158ms/step - loss: 0.3242 - accuracy: 0.8716 - val_loss: 0.1685 - val_accurac
y: 0.9250
```

Out[37]:
```
<keras.callbacks.History at 0x200e1a87b20>
```

In [39]:
```
joblib.dump(model,"covid_19 detection.joblob")
```
executed in 721ms, finished 13:14:04 2023-03-27

```
Keras weights file (<HDF5 file "variables.h5" (mode r+)>) saving:
...layers\conv2d
......vars
.........0
.........1
...layers\conv2d_1
......vars
.........0
.........1
...layers\dense
......vars
.........0
.........1
...layers\dense_1
......vars
.........0
.........1
...layers\dense_2
......vars
.........0
.........1
...layers\dense_3
......vars
.........0
.........1
...layers\dropout
......vars
...layers\flatten
......vars
...layers\max_pooling2d
......vars
...layers\max_pooling2d_1
......vars
...metrics\mean
......vars
.........0
.........1
...metrics\mean_metric_wrapper
......vars
.........0
.........1
...optimizer
......vars
.........0
.........1
.........10
.........11
.........12
.........13
.........14
.........15
.........16
.........17
.........18
.........19
.........2
.........20
.........21
.........22
.........23
.........24
.........3
.........4
.........5
.........6
.........7
.........8
.........9
...vars
Keras model archive saving:
File Name                                             Modified             Size
config.json                                    2023-03-27 13:14:03         4114
metadata.json                                  2023-03-27 13:14:03           64
variables.h5                                   2023-03-27 13:14:04     19901624
```

Out[39]:
```
['covid_19 detection.joblob']
```

In [40]:
```
model = joblib.load("covid_19 detection.joblob")
```
executed in 644ms, finished 13:14:28 2023-03-27

```
Keras model archive loading:
File Name                                             Modified             Size
config.json                                    2023-03-27 13:14:02         4114
metadata.json                                  2023-03-27 13:14:02           64
variables.h5                                   2023-03-27 13:14:04     19901624
Keras weights file (<HDF5 file "variables.h5" (mode r)>) loading:
...layers\conv2d
......vars
.........0
.........1
...layers\conv2d_1
......vars
.........0
.........1
...layers\dense
......vars
.........0
.........1
...layers\dense_1
......vars
.........0
.........1
...layers\dense_2
......vars
.........0
.........1
...layers\dense_3
......vars
.........0
.........1
...layers\dropout
......vars
...layers\flatten
......vars
...layers\max_pooling2d
......vars
...layers\max_pooling2d_1
......vars
...metrics\mean
......vars
.........0
.........1
...metrics\mean_metric_wrapper
......vars
.........0
.........1
...optimizer
......vars
.........0
.........1
.........10
.........11
.........12
.........13
.........14
.........15
.........16
.........17
.........18
.........19
.........2
.........20
.........21
.........22
.........23
.........24
.........3
.........4
.........5
.........6
.........7
.........8
.........9
...vars
```

In [41]:
```
def getlabel(x):
    for i in training_set.class_indices:
        if training_set.class_indices[i] == x:
            return i
```
executed in 7ms, finished 13:14:45 2023-03-27

In [42]:
```
def predict_image(path):
    img = image.load_img(path,target_size=(64,64))
    img = np.expand_dims(img, axis=0)
    p = model.predict(img)
    pred = [np.argmax(element) for element in p]
    print (plt.imshow(cv2.imread(path)))
    return getlabel(pred[0])
```
executed in 11ms, finished 13:14:59 2023-03-27

In [46]:
```
predict_image("C:/Users/Mua/Downloads/all-x-ray-pa-2.webp")
```
executed in 1.43s, finished 13:16:50 2023-03-27

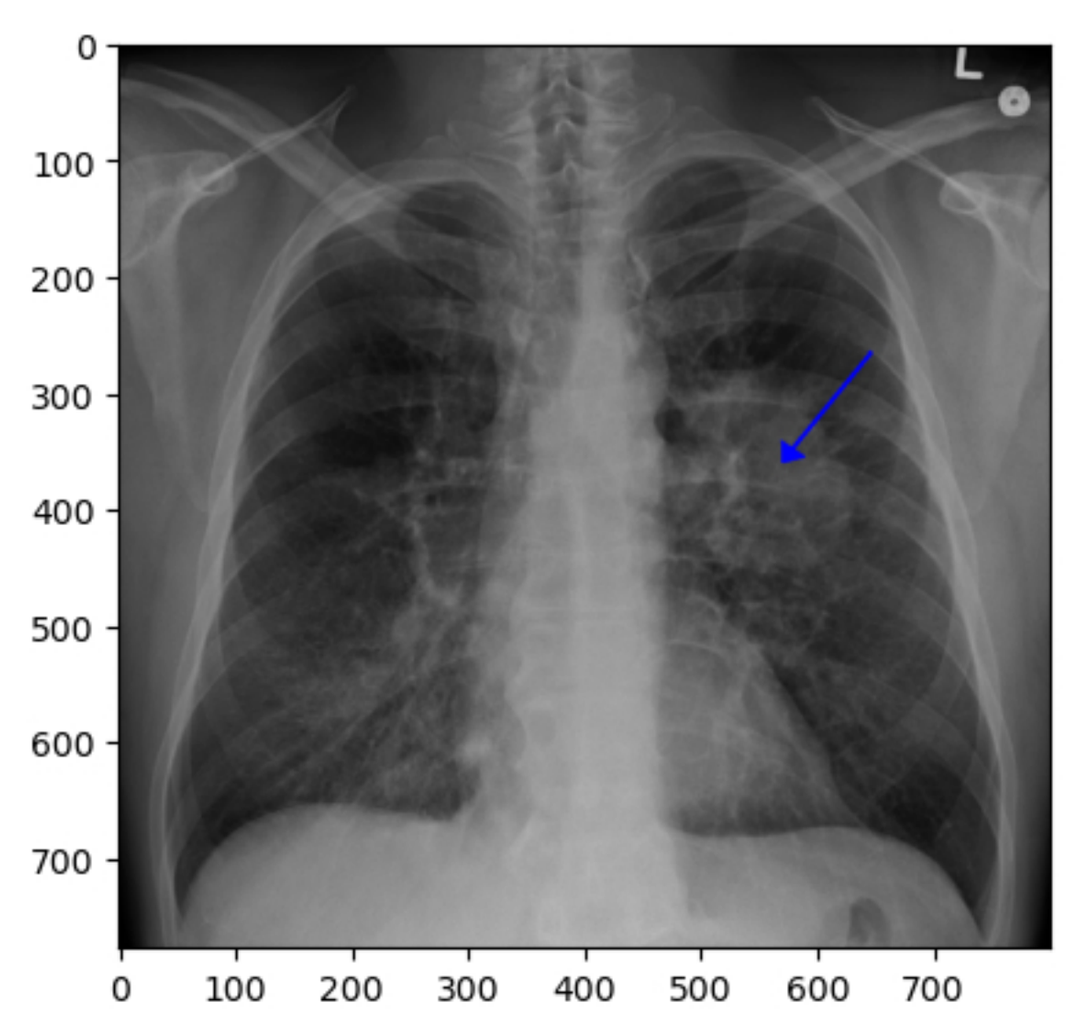
```
1/1 [==============================] - 0s 257ms/step
AxesImage(80,52.8;496x369.6)
```

Out[46]:
```
'PNEUMONIA'
```

In [47]:
```
predict_image("C:/Users/Mua/Downloads/LungCACXR.PNG")
```
executed in 627ms, finished 13:18:25 2023-03-27

```
1/1 [==============================] - 0s 43ms/step
AxesImage(80,52.8;496x369.6)
```

Out[47]:
```
'PNEUMONIA'
```



In [52]:
```
model.summary()
```
executed in 47ms, finished 13:54:42 2023-03-27

```
Model: "sequential"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 conv2d (Conv2D)             (None, 62, 62, 64)        1792

 max_pooling2d (MaxPooling2D  (None, 31, 31, 64)       0
 )

 conv2d_1 (Conv2D)           (None, 29, 29, 64)        36928

 max_pooling2d_1 (MaxPooling  (None, 14, 14, 64)       0
 2D)

 flatten (Flatten)           (None, 12544)             0

 dense (Dense)               (None, 128)               1605760

 dense_1 (Dense)             (None, 64)                8256

 dense_2 (Dense)             (None, 32)                2080

 dropout (Dropout)           (None, 32)                0

 dense_3 (Dense)             (None, 2)                 66

=================================================================
Total params: 1,654,882
Trainable params: 1,654,882
Non-trainable params: 0
_________________________________________________________________
```

In [ ]: