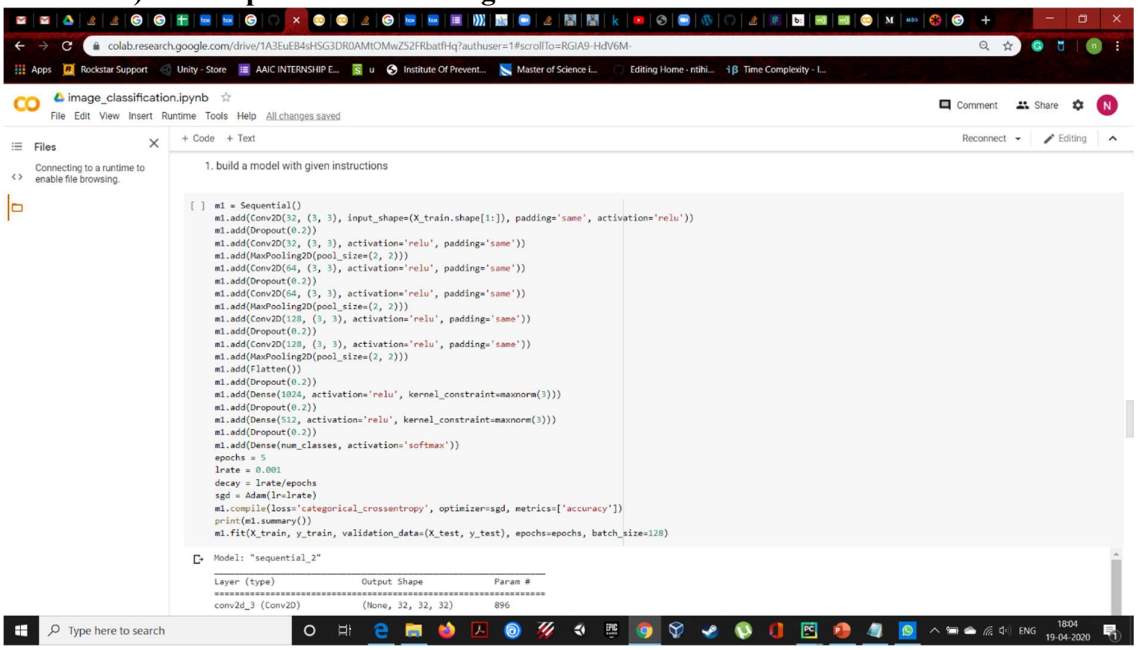
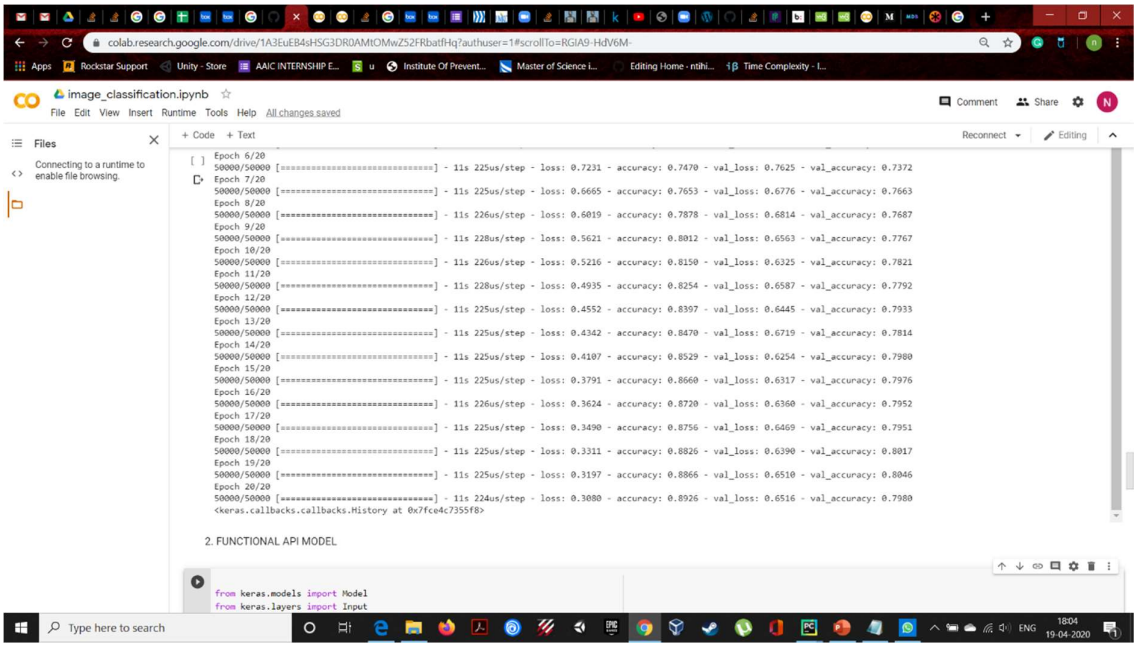
MICP4

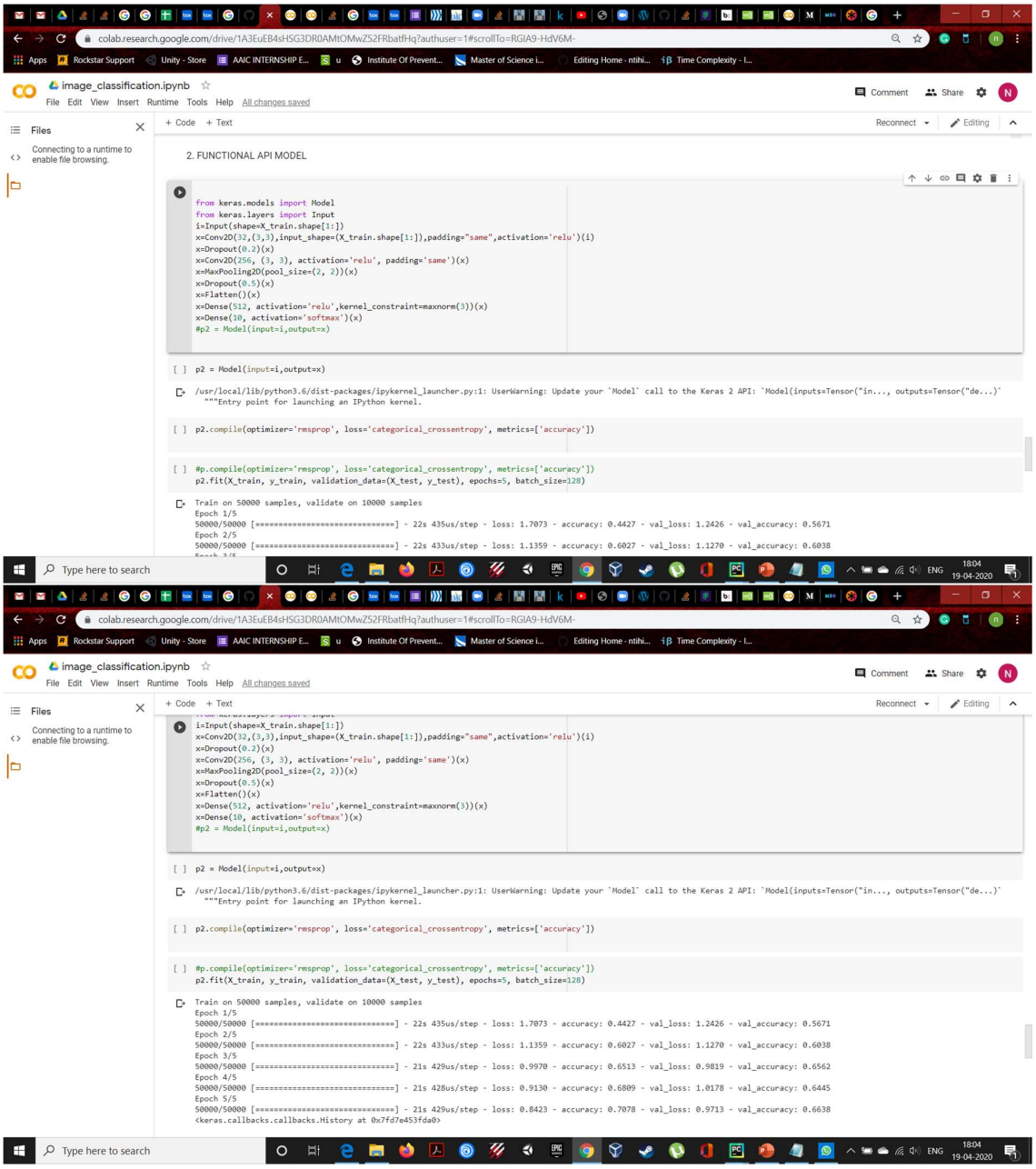
1. Follow the instruction below and then report how the performance changed. (apply all at once)Did the performance change?





Yes, the performance has changed. The model got it best fit in minimal epochs as we can see for only 20 epochs the model got overfitted

2. Change the previous model into Keras API model.



```
2. FUNCTIONAL API MODEL

from keras.models import Model
from keras.layers import Input
i=Input(shape=X_train.shape[1:])
x=Conv2D(32,(3,3),input_shape=(X_train.shape[1:]),padding="same",activation='relu')(i)
x=Dropout(0.2)(x)
x=Conv2D(256, (3, 3), activation='relu', padding='same')(x)
x=MaxPooling2D(pool_size=(2, 2))(x)
x=Dropout(0.5)(x)
x=Flatten()(x)
x=Dense(512, activation='relu',kernel_constraint=maxnorm(3))(x)
x=Dense(10, activation='softmax')(x)
#p2 = Model(input=i,output=x)

[ ] p2 = Model(input=i,output=x)

/usr/local/lib/python3.6/dist-packages/ipykernel_launcher.py:1: UserWarning: Update your `Model` call to the Keras 2 API: `Model(inputs=Tensor("in..., outputs=Tensor("de...)`
  """Entry point for launching an IPython kernel.

[ ] p2.compile(optimizer='rmsprop', loss='categorical_crossentropy', metrics=['accuracy'])

[ ] #p.compile(optimizer='rmsprop', loss='categorical_crossentropy', metrics=['accuracy'])
    p2.fit(X_train, y_train, validation_data=(X_test, y_test), epochs=5, batch_size=128)

Train on 50000 samples, validate on 10000 samples
Epoch 1/5
50000/50000 [==============================] - 22s 435us/step - loss: 1.7073 - accuracy: 0.4427 - val_loss: 1.2426 - val_accuracy: 0.5671
Epoch 2/5
50000/50000 [==============================] - 22s 433us/step - loss: 1.1359 - accuracy: 0.6027 - val_loss: 1.1270 - val_accuracy: 0.6038
```



```
2. FUNCTIONAL API MODEL

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Epoch 2/5
50000/50000 [==============================] - 22s 433us/step - loss: 1.1359 - accuracy: 0.6027 - val_loss: 1.1270 - val_accuracy: 0.6038
Epoch 3/5
50000/50000 [==============================] - 21s 429us/step - loss: 0.9970 - accuracy: 0.6513 - val_loss: 0.9819 - val_accuracy: 0.6562
Epoch 4/5
50000/50000 [==============================] - 21s 428us/step - loss: 0.9130 - accuracy: 0.6809 - val_loss: 1.0178 - val_accuracy: 0.6445
Epoch 5/5
50000/50000 [==============================] - 21s 429us/step - loss: 0.8423 - accuracy: 0.7078 - val_loss: 0.9713 - val_accuracy: 0.6638
<keras.callbacks.callbacks.History at 0x7fd7e453fda0>
```
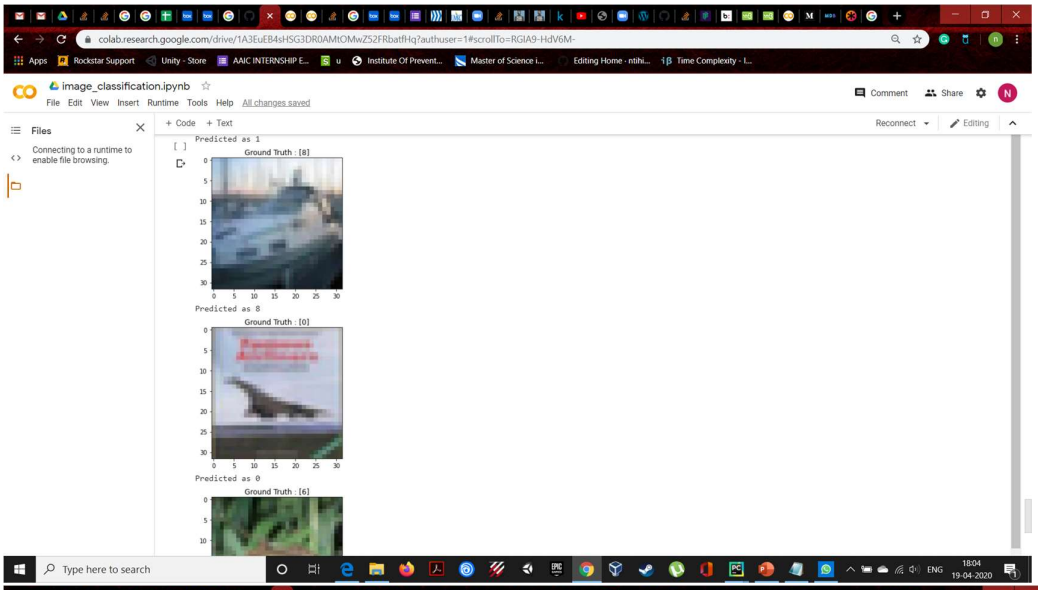

3. predict the first 4 image of the test data. Then, print the actual label for those 4 images (label means the probability associated with them) to check if the model predicted correctly or not


colab.research.google.com/drive/1A3EuEB4sHSG3DR0AMtOMwZ52FRbatfHq?authuser=1#scrollTo=RGIA9-HdV6M-
image_classification.ipynb
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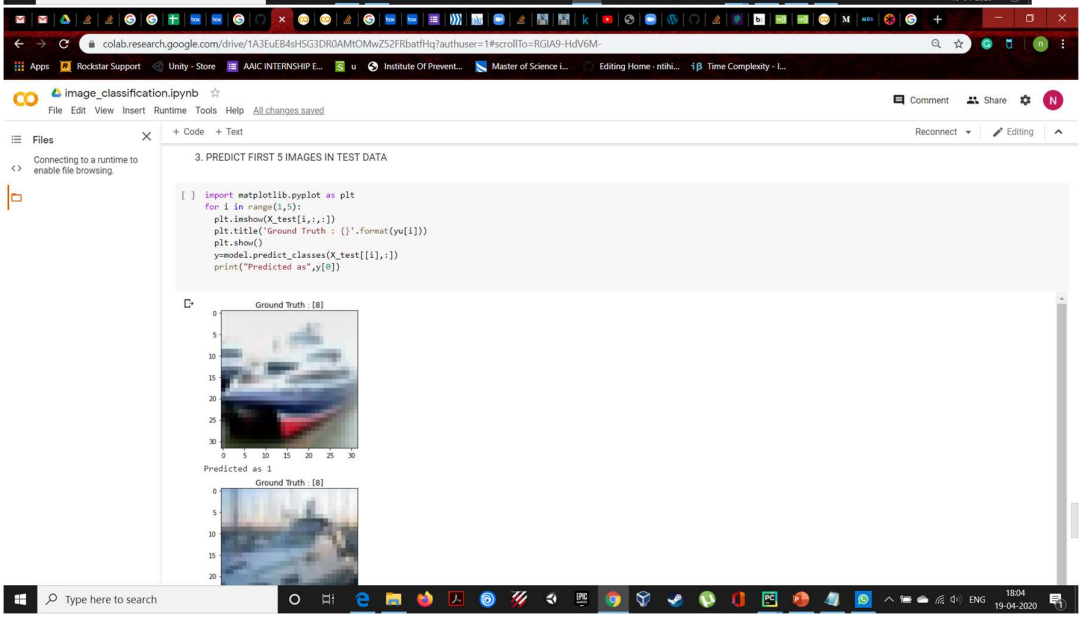
Predicted as 1
Ground Truth : [8]
Predicted as 8
Ground Truth : [0]
Predicted as 0
Ground Truth : [6]
Type here to search
ENG
18:04
19-04-2020


colab.research.google.com/drive/1A3EuEB4sHSG3DR0AMtOMwZ52FRbatfHq?authuser=1#scrollTo=RGIA9-HdV6M-
image_classification.ipynb
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3. PREDICT FIRST 5 IMAGES IN TEST DATA
import matplotlib.pyplot as plt
for i in range(1,5):
plt.imshow(X_test[i,:,:])
plt.title('Ground Truth : {}'.format(yu[i]))
plt.show()
y=model.predict_classes(X_test[[i],:])
print("Predicted as",y[0])
Ground Truth : [8]
Predicted as 1
Ground Truth : [8]
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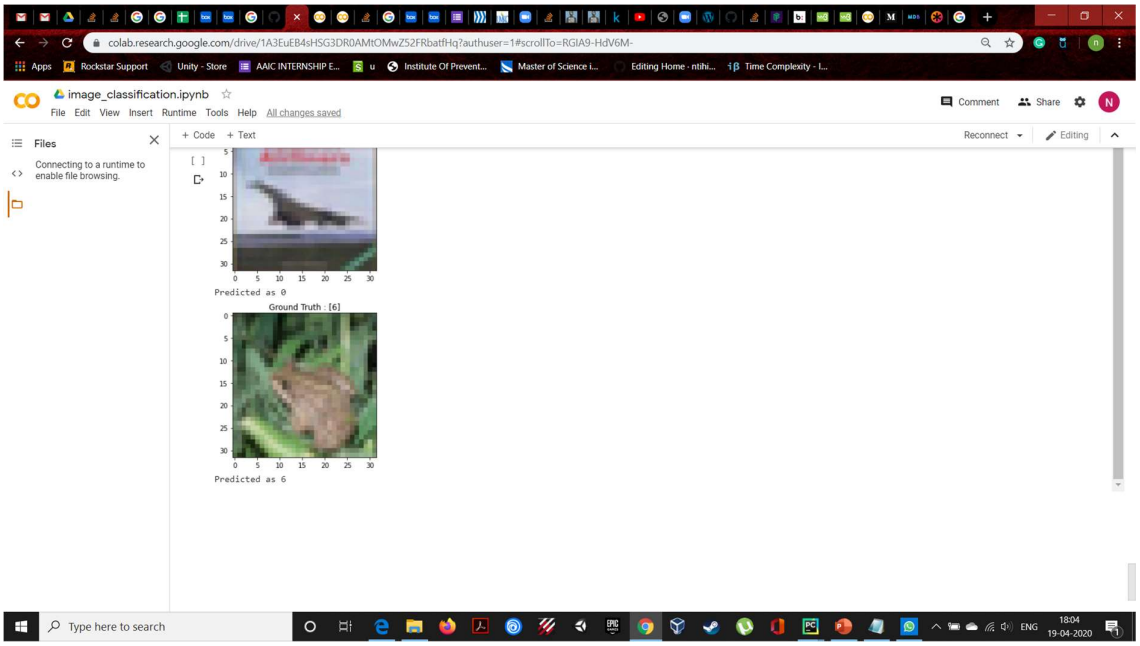
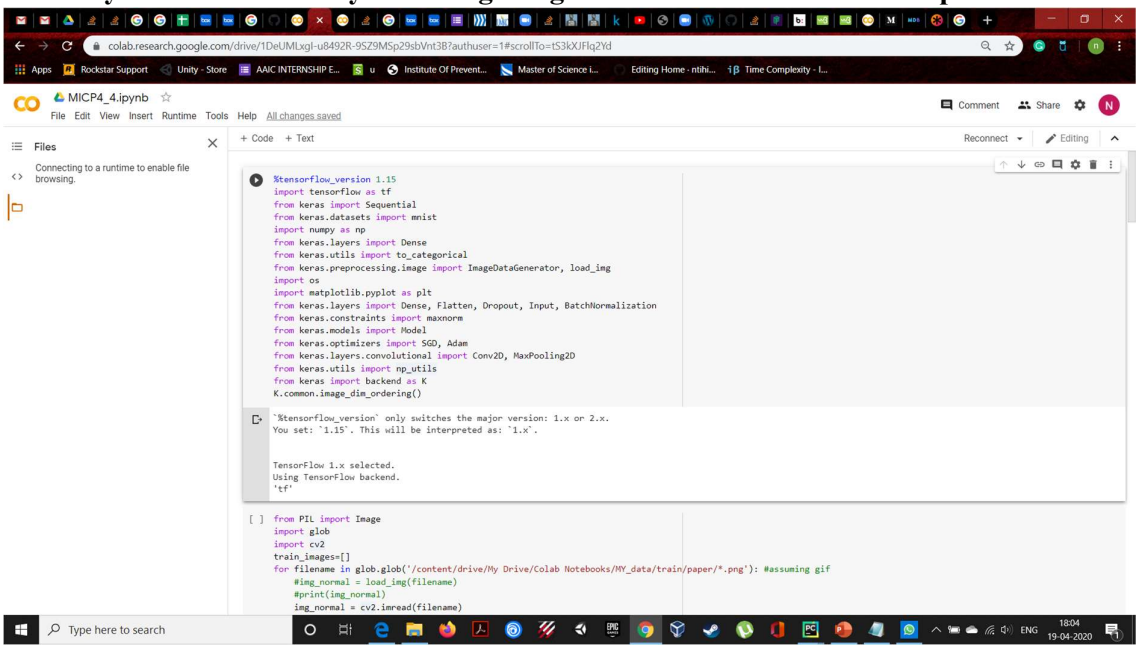
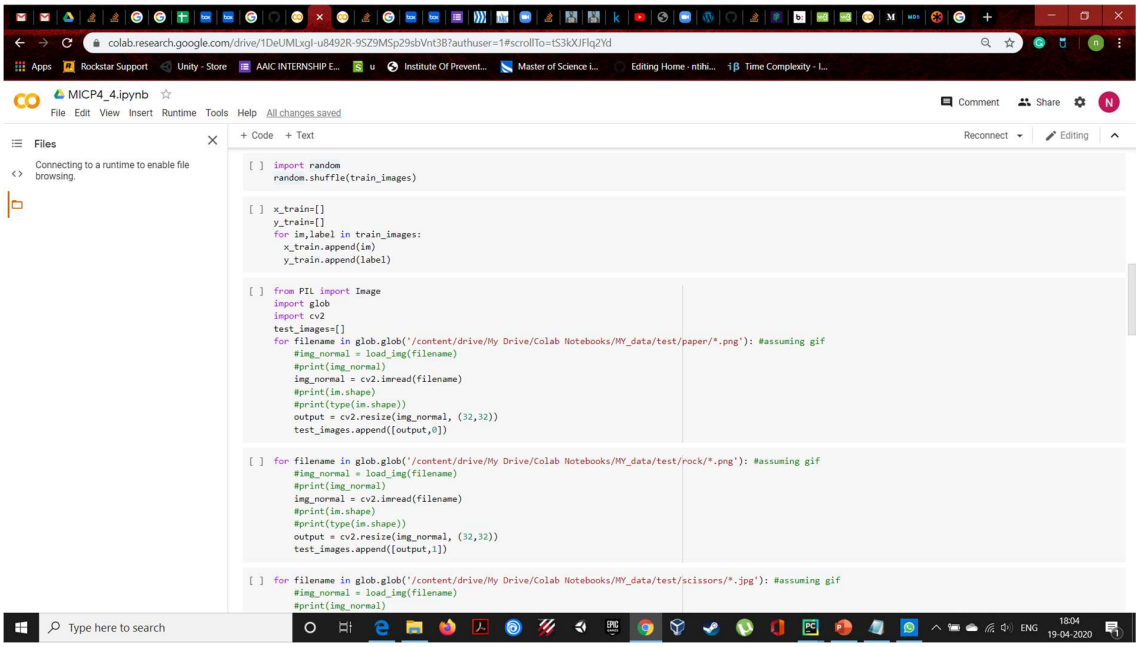


For the first image it has predicted wrong .

4.Build your own dataset by collecting images from the internet for exampl



e:


colab.research.google.com/drive/1DeUMLxgI-u8492R-9SZ9MSp29sbVnt3B?authuser=1#scrollTo=tS3kXJFlq2Yd
MICP4_4.ipynb
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Editing
[ ] import random
random.shuffle(train_images)
[ ] x_train=[]
y_train=[]
for im,label in train_images:
x_train.append(im)
y_train.append(label)
[ ] from PIL import Image
import glob
import cv2
test_images=[]
for filename in glob.glob('/content/drive/My Drive/Colab Notebooks/MY_data/test/paper/*.png'): #assuming gif
#img_normal = load_img(filename)
#print(img_normal)
img_normal = cv2.imread(filename)
#print(im.shape)
#print(type(im.shape))
output = cv2.resize(img_normal, (32,32))
test_images.append([output,0])
[ ] for filename in glob.glob('/content/drive/My Drive/Colab Notebooks/MY_data/test/rock/*.png'): #assuming gif
#img_normal = load_img(filename)
#print(img_normal)
img_normal = cv2.imread(filename)
#print(im.shape)
#print(type(im.shape))
output = cv2.resize(img_normal, (32,32))
test_images.append([output,1])
[ ] for filename in glob.glob('/content/drive/My Drive/Colab Notebooks/MY_data/test/scissors/*.jpg'): #assuming gif
#img_normal = load_img(filename)
#print(img_normal)
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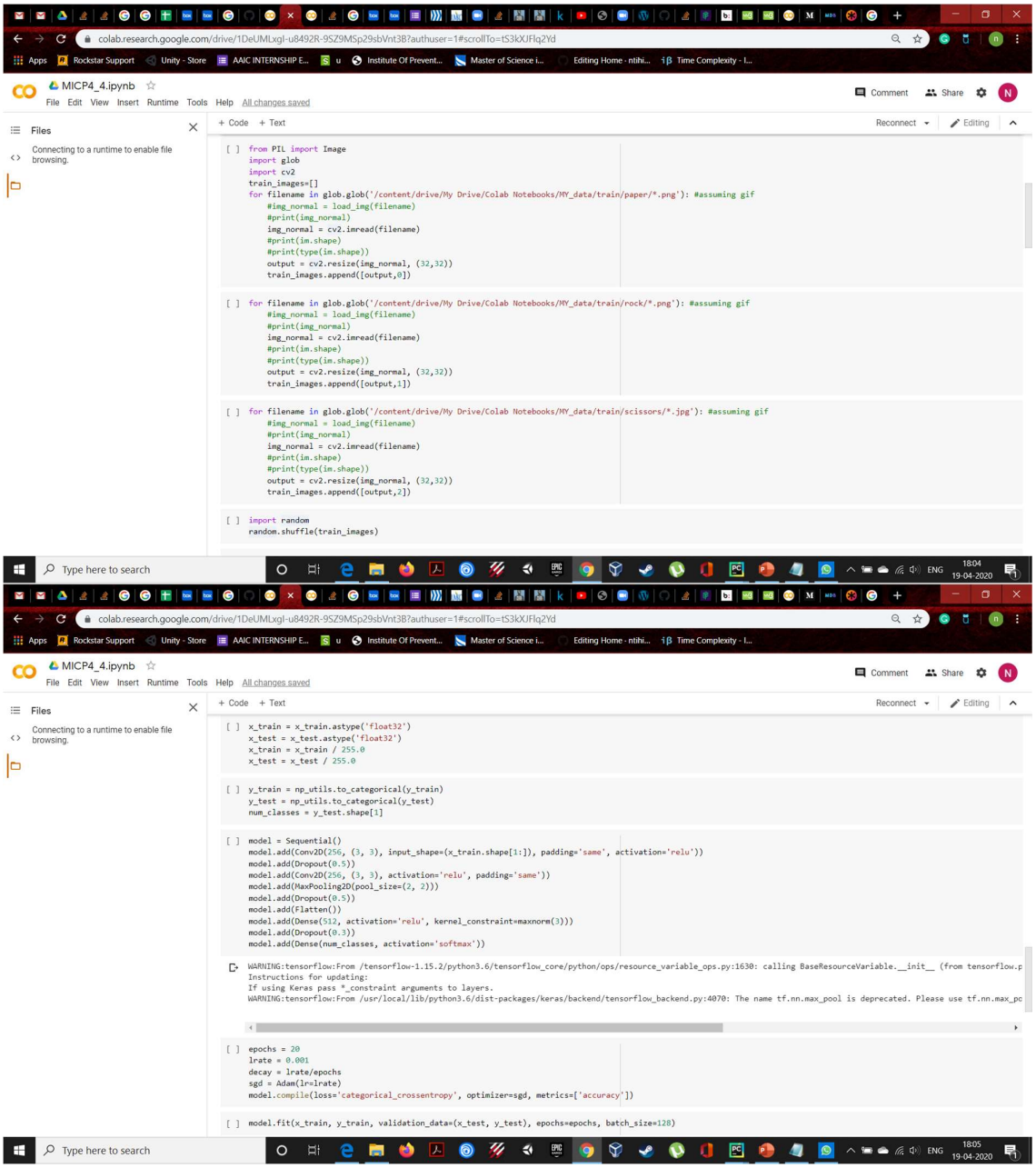

colab.research.google.com/drive/1DeUMLxgI-u8492R-9SZ9MSp29sbVnt3B?authuser=1#scrollTo=tS3kXJFlq2Yd

MICP4_4.ipynb

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```
[ ] from PIL import Image
    import glob
    import cv2
    train_images=[]
    for filename in glob.glob('/content/drive/My Drive/Colab Notebooks/MY_data/train/paper/*.png'): #assuming gif
        #img_normal = load_img(filename)
        #print(img_normal)
        img_normal = cv2.imread(filename)
        #print(im.shape)
        #print(type(im.shape))
        output = cv2.resize(img_normal, (32,32))
        train_images.append([output,0])
```

```
[ ] for filename in glob.glob('/content/drive/My Drive/Colab Notebooks/MY_data/train/rock/*.png'): #assuming gif
        #img_normal = load_img(filename)
        #print(img_normal)
        img_normal = cv2.imread(filename)
        #print(im.shape)
        #print(type(im.shape))
        output = cv2.resize(img_normal, (32,32))
        train_images.append([output,1])
```

```
[ ] for filename in glob.glob('/content/drive/My Drive/Colab Notebooks/MY_data/train/scissors/*.jpg'): #assuming gif
        #img_normal = load_img(filename)
        #print(img_normal)
        img_normal = cv2.imread(filename)
        #print(im.shape)
        #print(type(im.shape))
        output = cv2.resize(img_normal, (32,32))
        train_images.append([output,2])
```

```
[ ] import random
    random.shuffle(train_images)
```

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MICP4_4.ipynb

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```
[ ] x_train = x_train.astype('float32')
    x_test = x_test.astype('float32')
    x_train = x_train / 255.0
    x_test = x_test / 255.0
```

```
[ ] y_train = np_utils.to_categorical(y_train)
    y_test = np_utils.to_categorical(y_test)
    num_classes = y_test.shape[1]
```

```
[ ] model = Sequential()
    model.add(Conv2D(256, (3, 3), input_shape=(x_train.shape[1:]), padding='same', activation='relu'))
    model.add(Dropout(0.5))
    model.add(Conv2D(256, (3, 3), activation='relu', padding='same'))
    model.add(MaxPooling2D(pool_size=(2, 2)))
    model.add(Dropout(0.5))
    model.add(Flatten())
    model.add(Dense(512, activation='relu', kernel_constraint=maxnorm(3)))
    model.add(Dropout(0.3))
    model.add(Dense(num_classes, activation='softmax'))
```

```
WARNING:tensorflow:From /tensorflow-1.15.2/python3.6/tensorflow_core/python/ops/resource_variable_ops.py:1630: calling BaseResourceVariable.__init__ (from tensorflow.p
Instructions for updating:
If using Keras pass *_constraint arguments to layers.
WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow_backend.py:4070: The name tf.nn.max_pool is deprecated. Please use tf.nn.max_pc
```

```
[ ] epochs = 20
    lrate = 0.001
    decay = lrate/epochs
    sgd = Adam(lr=lrate)
    model.compile(loss='categorical_crossentropy', optimizer=sgd, metrics=['accuracy'])
```

```
[ ] model.fit(x_train, y_train, validation_data=(x_test, y_test), epochs=epochs, batch_size=128)
```

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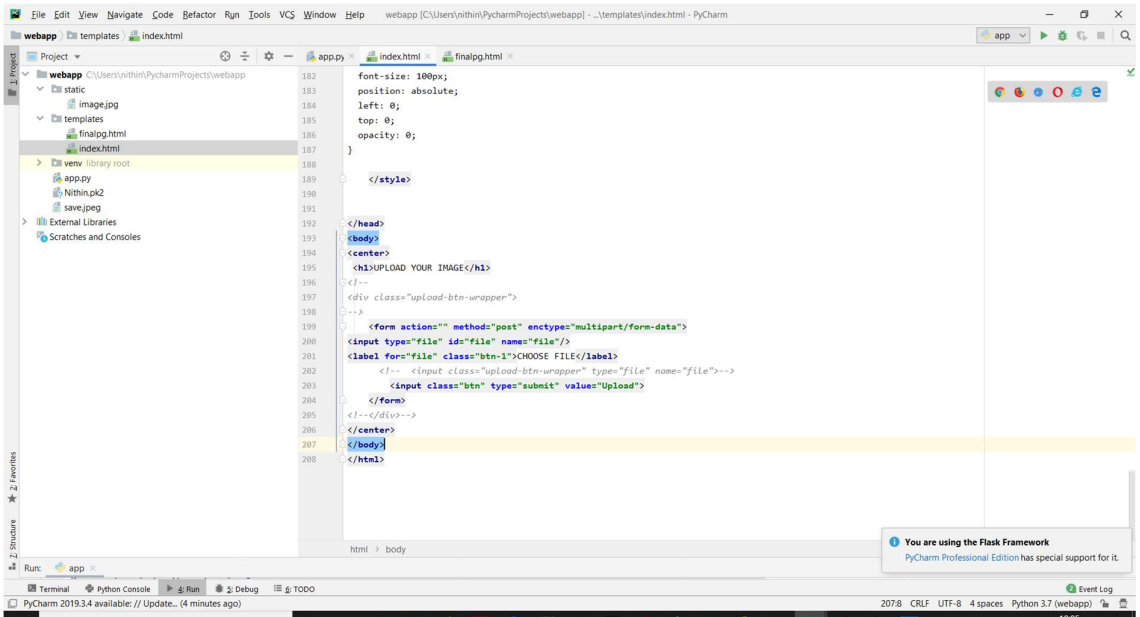
File Edit View Navigate Code Refactor Run Tools VCS Window Help
webapp [C:\Users\nithin\PycharmProjects\webapp] - ...\templates\index.html - PyCharm
webapp templates index.html
app
Project
app.py index.html finalpg.html
webapp C:\Users\nithin\PycharmProjects\webapp
static
image.jpg
templates
finalpg.html
index.html
venv library root
app.py
Nithin.pk2
save.jpeg
External Libraries
Scratches and Consoles
font-size: 100px;
position: absolute;
left: 0;
top: 0;
opacity: 0;
}
</style>
</head>
<body>

<h1>UPLOAD YOUR IMAGE</h1>
<!--

-->
<form action="" method="post" enctype="multipart/form-data">
<input type="file" id="file" name="file"/>
<label for="file" class="btn-1">CHOOSE FILE</label>
<!-- <input class="upload-btn-wrapper" type="file" name="file">-->
<input class="btn" type="submit" value="Upload">
</form>
<!--</div>-->

</body>
</html>
html body
You are using the Flask Framework
PyCharm Professional Edition has special support for it.
Run: app
Terminal Python Console 4: Run 5: Debug 6: TODO
Event Log
PyCharm 2019.3.4 available: // Update... (4 minutes ago)
207:8 CRLF UTF-8 4 spaces Python 3.7 (webapp)
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ENG
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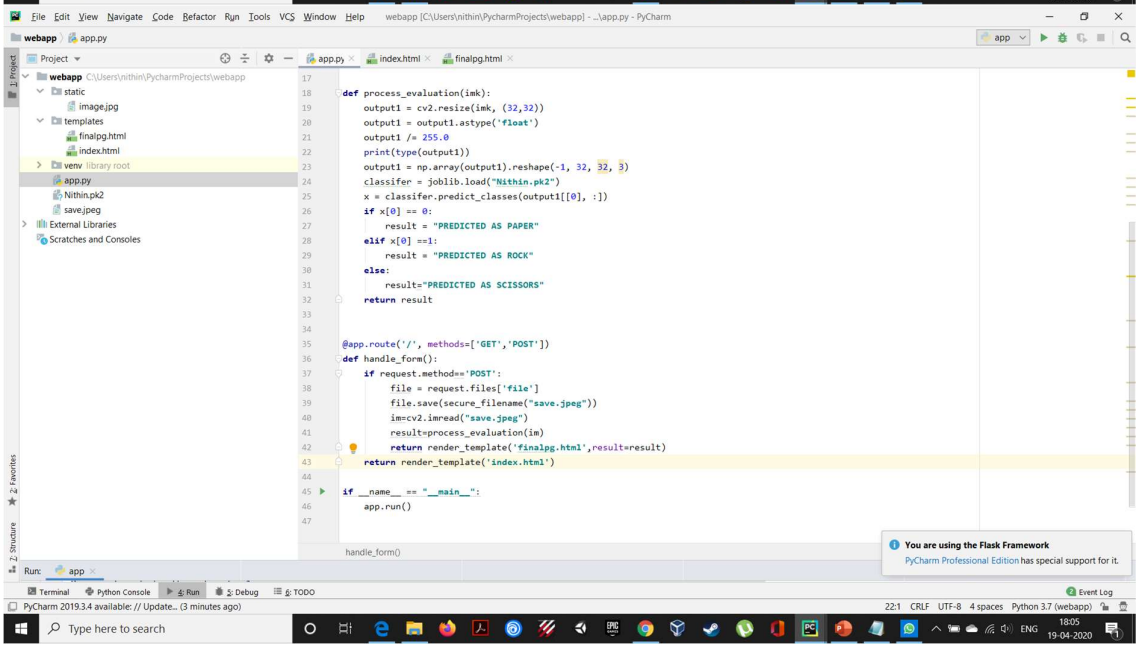
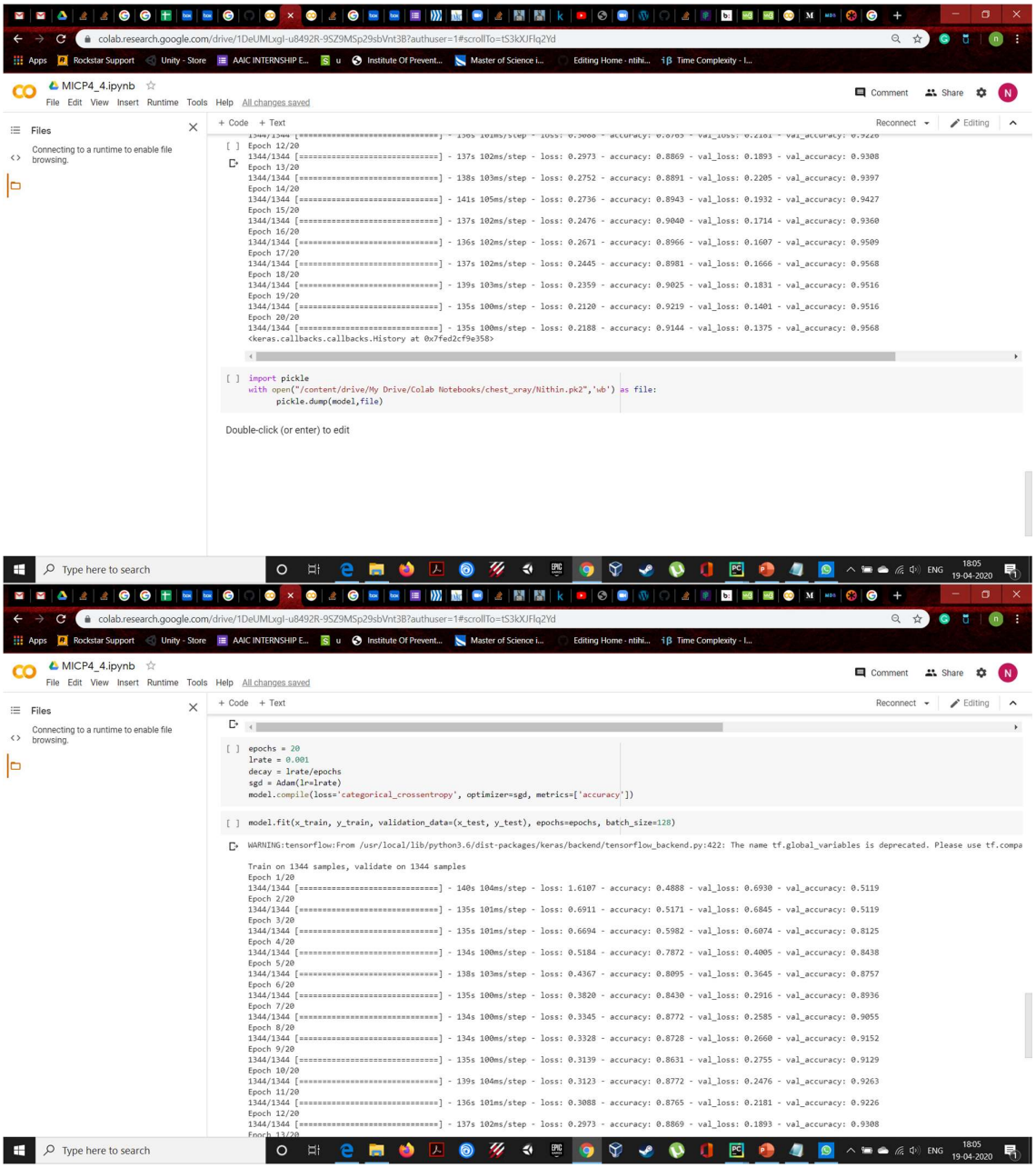
19-04-2020


File Edit View Navigate Code Refactor Run Tools VCS Window Help
webapp [C:\Users\nithin\PycharmProjects\webapp] - ...\app.py - PyCharm
webapp app.py
app
Project
app.py index.html finalpg.html
webapp C:\Users\nithin\PycharmProjects\webapp
static
image.jpg
templates
finalpg.html
index.html
venv library root
app.py
Nithin.pk2
save.jpeg
External Libraries
Scratches and Consoles
def process_evaluation(imk):
output1 = cv2.resize(imk, (32,32))
output1 = output1.astype('float')
output1 /= 255.0
print(type(output1))
output1 = np.array(output1).reshape(-1, 32, 32, 3)
classifer = joblib.load("Nithin.pk2")
x = classifer.predict_classes(output1[[0], :])
if x[0] == 0:
result = "PREDICTED AS PAPER"
elif x[0] ==1:
result = "PREDICTED AS ROCK"
else:
result="PREDICTED AS SCISSORS"
return result
@app.route('/', methods=['GET','POST'])
def handle_form():
if request.method=='POST':
file = request.files['file']
file.save(secure_filename("save.jpeg"))
im=cv2.imread("save.jpeg")
result=process_evaluation(im)
return render_template('finalpg.html',result=result)
return render_template('index.html')
if __name__ == "__main__":
app.run()
handle_form()
You are using the Flask Framework
PyCharm Professional Edition has special support for it.
Run: app
Terminal Python Console 4: Run 5: Debug 6: TODO
Event Log
PyCharm 2019.3.4 available: // Update... (3 minutes ago)
22:1 CRLF UTF-8 4 spaces Python 3.7 (webapp)
Type here to search
ENG
18:05
19-04-2020


colab.research.google.com/drive/1DeUMLxgI-u8492R-9SZ9MSp29sbVnt3B?authuser=1#scrollTo=tS3kXJFlq2Yd
MICP4_4.ipynb
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Epoch 12/20
1344/1344 [==============================] - 137s 102ms/step - loss: 0.2973 - accuracy: 0.8869 - val_loss: 0.1893 - val_accuracy: 0.9308
Epoch 13/20
1344/1344 [==============================] - 138s 103ms/step - loss: 0.2752 - accuracy: 0.8891 - val_loss: 0.2205 - val_accuracy: 0.9397
Epoch 14/20
1344/1344 [==============================] - 141s 105ms/step - loss: 0.2736 - accuracy: 0.8943 - val_loss: 0.1932 - val_accuracy: 0.9427
Epoch 15/20
1344/1344 [==============================] - 137s 102ms/step - loss: 0.2476 - accuracy: 0.9040 - val_loss: 0.1714 - val_accuracy: 0.9360
Epoch 16/20
1344/1344 [==============================] - 136s 102ms/step - loss: 0.2671 - accuracy: 0.8966 - val_loss: 0.1607 - val_accuracy: 0.9509
Epoch 17/20
1344/1344 [==============================] - 137s 102ms/step - loss: 0.2445 - accuracy: 0.8981 - val_loss: 0.1666 - val_accuracy: 0.9568
Epoch 18/20
1344/1344 [==============================] - 139s 103ms/step - loss: 0.2359 - accuracy: 0.9025 - val_loss: 0.1831 - val_accuracy: 0.9516
Epoch 19/20
1344/1344 [==============================] - 135s 100ms/step - loss: 0.2120 - accuracy: 0.9219 - val_loss: 0.1401 - val_accuracy: 0.9516
Epoch 20/20
1344/1344 [==============================] - 135s 100ms/step - loss: 0.2188 - accuracy: 0.9144 - val_loss: 0.1375 - val_accuracy: 0.9568
<keras.callbacks.callbacks.History at 0x7fed2cf9e358>
import pickle
with open("/content/drive/My Drive/Colab Notebooks/chest_xray/Nithin.pk2",'wb') as file:
pickle.dump(model,file)
Double-click (or enter) to edit

colab.research.google.com/drive/1DeUMLxgI-u8492R-9SZ9MSp29sbVnt3B?authuser=1#scrollTo=tS3kXJFlq2Yd
MICP4_4.ipynb
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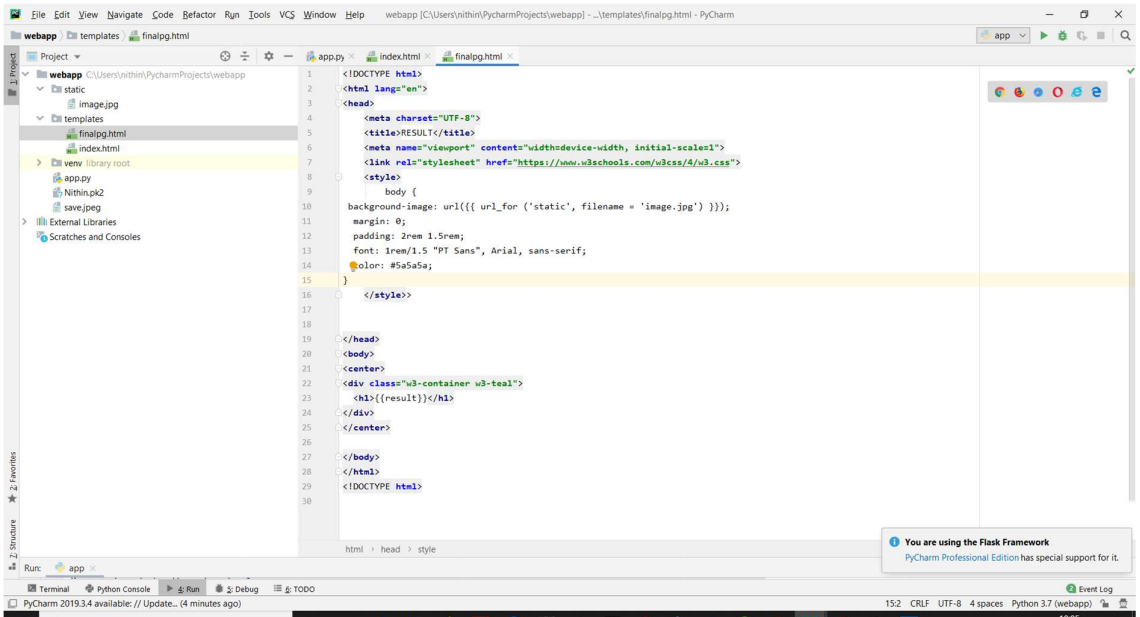
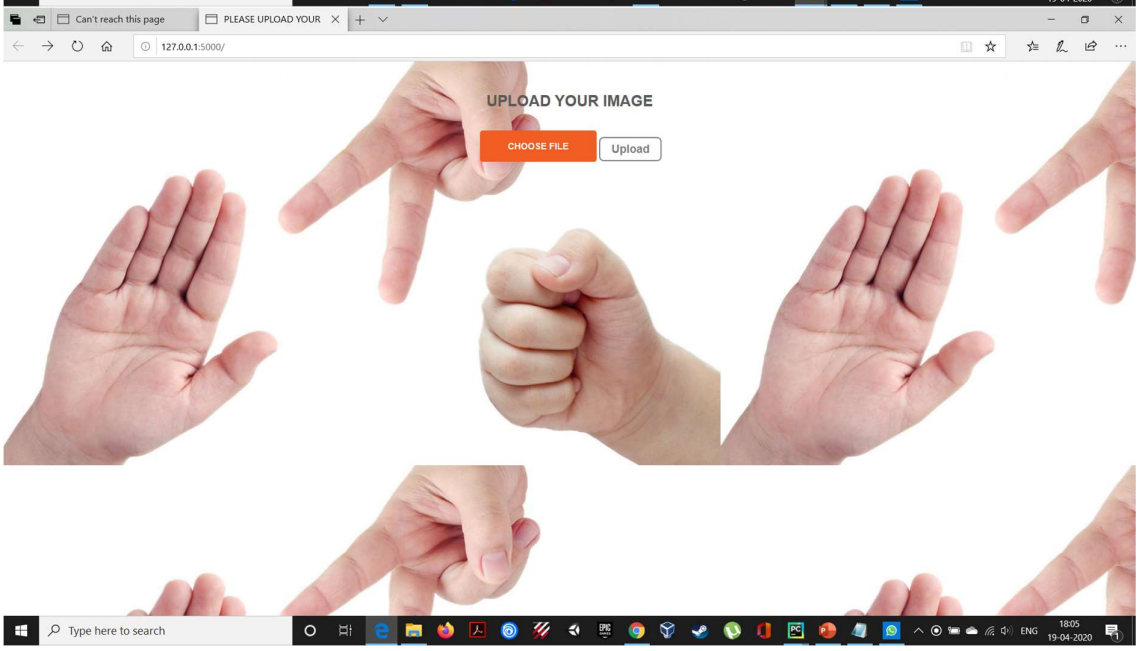
Editing
Files
Connecting to a runtime to enable file browsing.
+ Code + Text
epochs = 20
lrate = 0.001
decay = lrate/epochs
sgd = Adam(lr=lrate)
model.compile(loss='categorical_crossentropy', optimizer=sgd, metrics=['accuracy'])
model.fit(x_train, y_train, validation_data=(x_test, y_test), epochs=epochs, batch_size=128)
WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow_backend.py:422: The name tf.global_variables is deprecated. Please use tf.compa
Train on 1344 samples, validate on 1344 samples
Epoch 1/20
1344/1344 [==============================] - 140s 104ms/step - loss: 1.6107 - accuracy: 0.4888 - val_loss: 0.6930 - val_accuracy: 0.5119
Epoch 2/20
1344/1344 [==============================] - 135s 101ms/step - loss: 0.6911 - accuracy: 0.5171 - val_loss: 0.6845 - val_accuracy: 0.5119
Epoch 3/20
1344/1344 [==============================] - 135s 101ms/step - loss: 0.6694 - accuracy: 0.5982 - val_loss: 0.6074 - val_accuracy: 0.8125
Epoch 4/20
1344/1344 [==============================] - 134s 100ms/step - loss: 0.5184 - accuracy: 0.7872 - val_loss: 0.4005 - val_accuracy: 0.8438
Epoch 5/20
1344/1344 [==============================] - 138s 103ms/step - loss: 0.4367 - accuracy: 0.8095 - val_loss: 0.3645 - val_accuracy: 0.8757
Epoch 6/20
1344/1344 [==============================] - 135s 100ms/step - loss: 0.3820 - accuracy: 0.8430 - val_loss: 0.2916 - val_accuracy: 0.8936
Epoch 7/20
1344/1344 [==============================] - 134s 100ms/step - loss: 0.3345 - accuracy: 0.8772 - val_loss: 0.2585 - val_accuracy: 0.9055
Epoch 8/20
1344/1344 [==============================] - 134s 100ms/step - loss: 0.3328 - accuracy: 0.8728 - val_loss: 0.2660 - val_accuracy: 0.9152
Epoch 9/20
1344/1344 [==============================] - 135s 100ms/step - loss: 0.3139 - accuracy: 0.8631 - val_loss: 0.2755 - val_accuracy: 0.9129
Epoch 10/20
1344/1344 [==============================] - 139s 104ms/step - loss: 0.3123 - accuracy: 0.8772 - val_loss: 0.2476 - val_accuracy: 0.9263
Epoch 11/20
1344/1344 [==============================] - 136s 101ms/step - loss: 0.3088 - accuracy: 0.8765 - val_loss: 0.2181 - val_accuracy: 0.9226
Epoch 12/20
1344/1344 [==============================] - 137s 102ms/step - loss: 0.2973 - accuracy: 0.8869 - val_loss: 0.1893 - val_accuracy: 0.9308


File Edit View Navigate Code Refactor Run Tools VCS Window Help
webapp [C:\Users\nithin\PycharmProjects\webapp] - ...\templates\finalpg.html - PyCharm
webapp templates finalpg.html
app
Project
app.py index.html finalpg.html
webapp C:\Users\nithin\PycharmProjects\webapp
static
image.jpg
templates
finalpg.html
index.html
venv library root
app.py
Nithin.pk2
save.jpeg
External Libraries
Scratches and Consoles
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<title>RESULT</title>
<meta name="viewport" content="width=device-width, initial-scale=1">
<link rel="stylesheet" href="https://www.w3schools.com/w3css/4/w3.css">
<style>
body {
background-image: url({{ url_for ('static', filename = 'image.jpg') }});
margin: 0;
padding: 2rem 1.5rem;
font: 1rem/1.5 "PT Sans", Arial, sans-serif;
color: #5a5a5a;
}
</style>
</head>
<body>

<h1>{{result}}</h1>

</body>
</html>
<!DOCTYPE html>
html › head › style
You are using the Flask Framework
PyCharm Professional Edition has special support for it.
Run: app
Terminal Python Console 4: Run 5: Debug 6: TODO
Event Log
PyCharm 2019.3.4 available: // Update... (4 minutes ago)
15:2 CRLF UTF-8 4 spaces Python 3.7 (webapp)
Type here to search
ENG 18:05 19-04-2020


Can't reach this page
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127.0.0.1:5000/
UPLOAD YOUR IMAGE
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BY,

DUKKIPATI SRI SAI NITHIN CHOWDARY

CLASS ID: 04