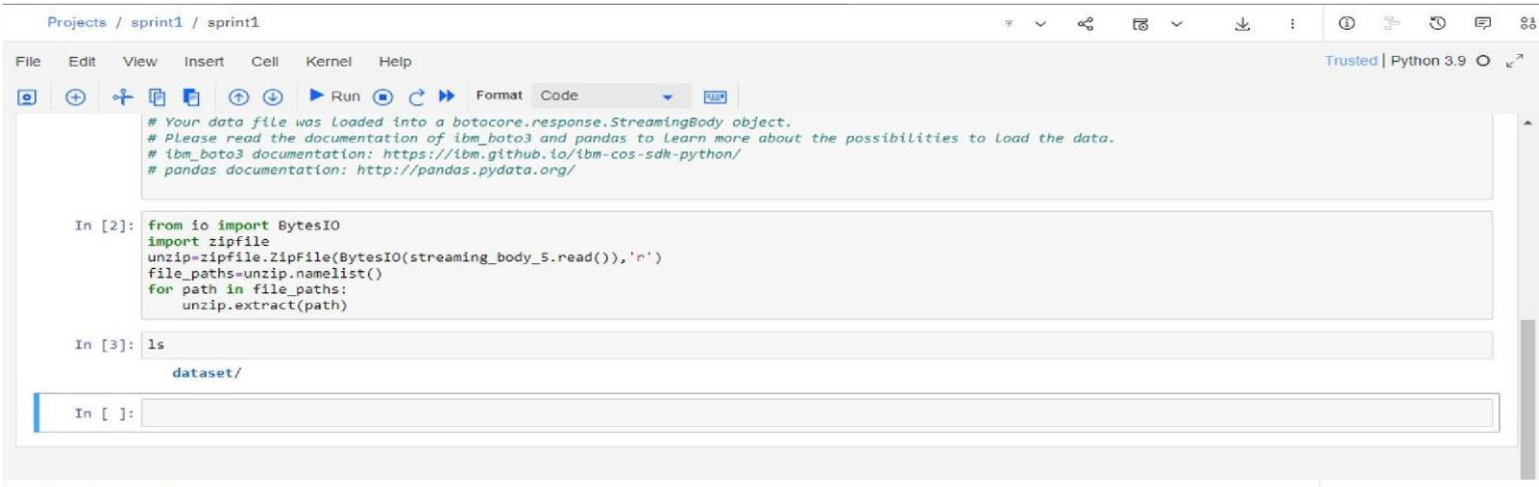
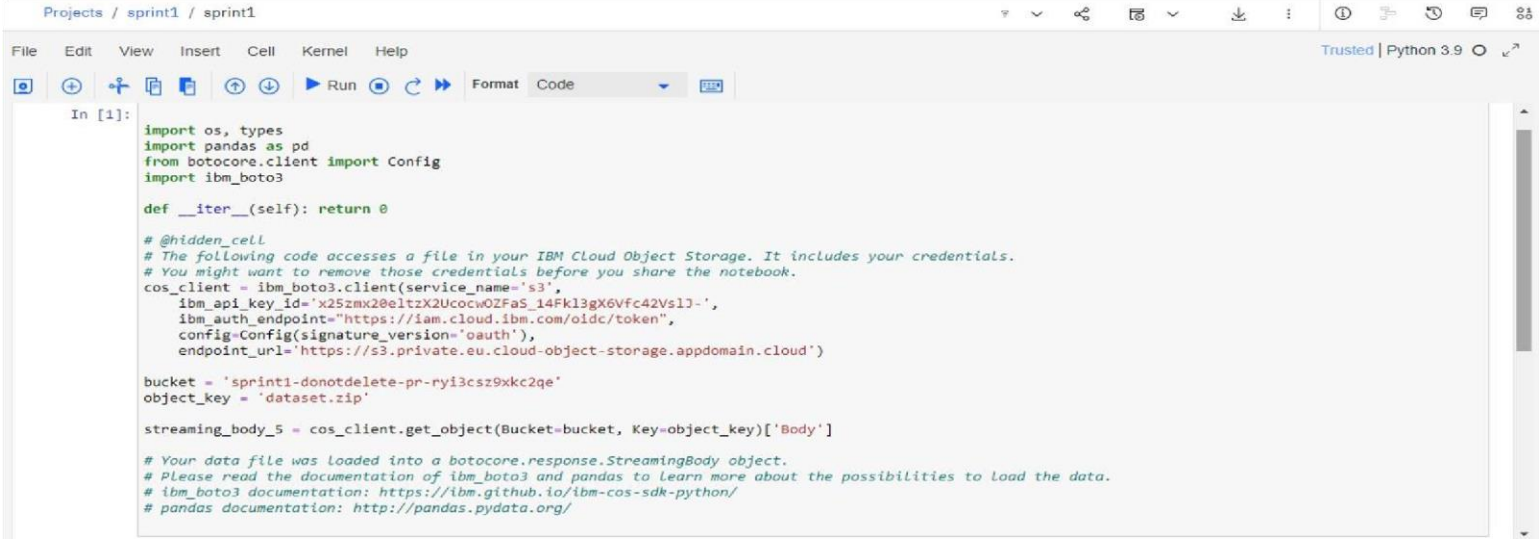
Project Development Phase Sprint - 2

Date	5 November 2022
Team ID	PNT2022TMID03631
Project Name	A Gesture - Based Tool for Sterile Browsing of Radiology Images
Marks	4 Marks

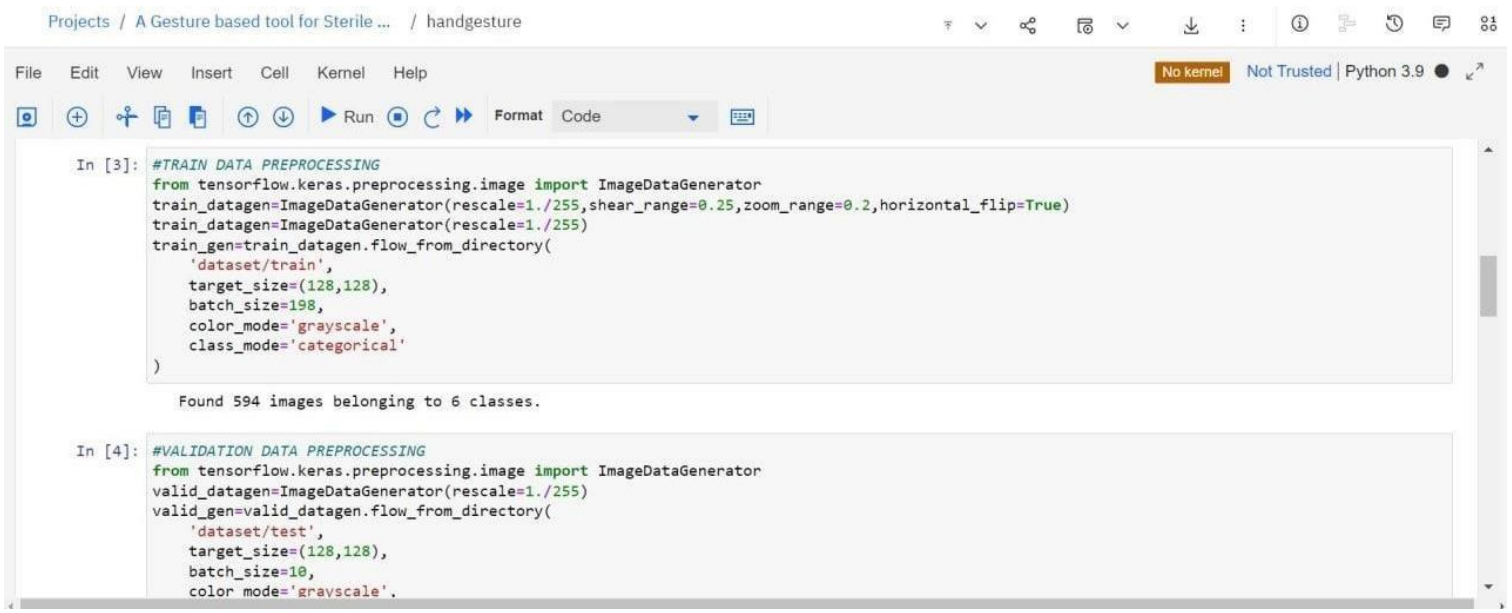


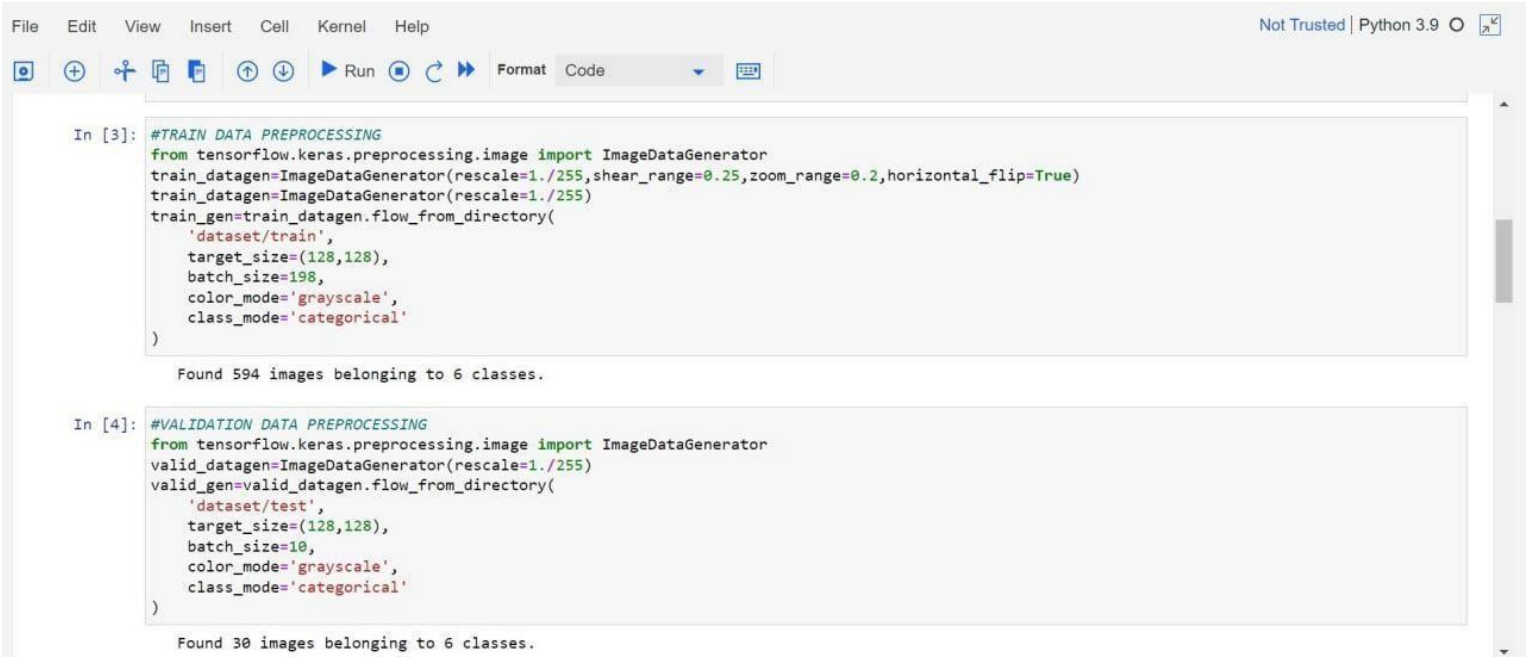


IBM Watson Studio:

Sprint 1:

Sprint 2:


Projects / A Gesture based tool for Sterile ... / handgesture
File Edit View Insert Cell Kernel Help
No kernel Not Trusted | Python 3.9
Run Format Code
In [3]:
#TRAIN DATA PREPROCESSING
from tensorflow.keras.preprocessing.image import ImageDataGenerator
train_datagen=ImageDataGenerator(rescale=1./255,shear_range=0.25,zoom_range=0.2,horizontal_flip=True)
train_datagen=ImageDataGenerator(rescale=1./255)
train_gen=train_datagen.flow_from_directory(
'dataset/train',
target_size=(128,128),
batch_size=198,
color_mode='grayscale',
class_mode='categorical'
)
Found 594 images belonging to 6 classes.
In [4]:
#VALIDATION DATA PREPROCESSING
from tensorflow.keras.preprocessing.image import ImageDataGenerator
valid_datagen=ImageDataGenerator(rescale=1./255)
valid_gen=valid_datagen.flow_from_directory(
'dataset/test',
target_size=(128,128),
batch_size=10,
color_mode='grayscale',


File Edit View Insert Cell Kernel Help
Not Trusted | Python 3.9
Run Format Code
In [3]:
#TRAIN DATA PREPROCESSING
from tensorflow.keras.preprocessing.image import ImageDataGenerator
train_datagen=ImageDataGenerator(rescale=1./255,shear_range=0.25,zoom_range=0.2,horizontal_flip=True)
train_datagen=ImageDataGenerator(rescale=1./255)
train_gen=train_datagen.flow_from_directory(
'dataset/train',
target_size=(128,128),
batch_size=198,
color_mode='grayscale',
class_mode='categorical'
)
Found 594 images belonging to 6 classes.
In [4]:
#VALIDATION DATA PREPROCESSING
from tensorflow.keras.preprocessing.image import ImageDataGenerator
valid_datagen=ImageDataGenerator(rescale=1./255)
valid_gen=valid_datagen.flow_from_directory(
'dataset/test',
target_size=(128,128),
batch_size=10,
color_mode='grayscale',
class_mode='categorical'
)
Found 30 images belonging to 6 classes.

File Edit View Insert Cell Kernel Help

Not Trusted | Python 3.9

Run Format Code

In [5]:
```
#CONVOLUTION NEURAL NETWORK MODEL
import tensorflow as tf
print(tf.__version__)
model=tf.keras.Sequential([
                tf.keras.layers.Conv2D(16,(3,3),activation='relu',input_shape=(128,128,1)),
                tf.keras.layers.MaxPooling2D(2,2),
                tf.keras.layers.Conv2D(32,(3,3),activation='relu'),
                tf.keras.layers.MaxPooling2D(2,2),
                tf.keras.layers.Conv2D(16,(3,3),activation='relu'),
                tf.keras.layers.MaxPooling2D(2,2),
                tf.keras.layers.Flatten(),
                tf.keras.layers.Dense(512,activation='relu'),
                tf.keras.layers.Dense(6,activation='softmax')
])
```

```
2.7.2
```

In [6]:
```
#LOSS FUNCTION AND OPTIMIZER
model.compile(loss='categorical_crossentropy',optimizer='Adam',metrics=['Accuracy'])
```

In [7]:
```
model.summary()
```

```
Model: "sequential"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 conv2d (Conv2D)             (None, 126, 126, 16)      160
```

File Edit View Insert Cell Kernel Help

Not Trusted | Python 3.9

Run Format Code

```
Model: "sequential"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 conv2d (Conv2D)             (None, 126, 126, 16)      160

 max_pooling2d (MaxPooling2D  (None, 63, 63, 16)       0
 )

 conv2d_1 (Conv2D)           (None, 61, 61, 32)        4640

 max_pooling2d_1 (MaxPooling  (None, 30, 30, 32)       0
 2D)

 conv2d_2 (Conv2D)           (None, 28, 28, 16)        4624

 max_pooling2d_2 (MaxPooling  (None, 14, 14, 16)       0
 2D)

 flatten (Flatten)           (None, 3136)              0

 dense (Dense)               (None, 512)               1606144

 dense_1 (Dense)             (None, 6)                 3078

=================================================================
Total params: 1,618,646
Trainable params: 1,618,646
```

File Edit View Insert Cell Kernel Help

Not Trusted | Python 3.9

Run Format Code

In [8]:
```
#TRAINING THE MODEL
trainmodel=model.fit(
    train_gen,
    steps_per_epoch=3,
    epochs=20,
    validation_data=valid_gen,
    validation_steps=3,
)
```

```
Epoch 1/20
3/3 [==============================] - 6s 2s/step - loss: 1.7762 - Accuracy: 0.2003 - val_loss: 1.6875 - val_Accuracy: 0.2667
Epoch 2/20
3/3 [==============================] - 6s 2s/step - loss: 1.6189 - Accuracy: 0.4327 - val_loss: 1.4747 - val_Accuracy: 0.4000
Epoch 3/20
3/3 [==============================] - 6s 2s/step - loss: 1.3585 - Accuracy: 0.6515 - val_loss: 1.2633 - val_Accuracy: 0.5667
Epoch 4/20
3/3 [==============================] - 6s 2s/step - loss: 1.0766 - Accuracy: 0.6515 - val_loss: 0.9468 - val_Accuracy: 0.8333
Epoch 5/20
3/3 [==============================] - 6s 2s/step - loss: 0.8148 - Accuracy: 0.7273 - val_loss: 0.9268 - val_Accuracy: 0.7000
Epoch 6/20
3/3 [==============================] - 6s 2s/step - loss: 0.6414 - Accuracy: 0.7694 - val_loss: 0.6724 - val_Accuracy: 0.7667
Epoch 7/20
3/3 [==============================] - 6s 2s/step - loss: 0.4723 - Accuracy: 0.8519 - val_loss: 0.6585 - val_Accuracy: 0.6667
Epoch 8/20
3/3 [==============================] - 6s 2s/step - loss: 0.3796 - Accuracy: 0.8636 - val_loss: 0.5784 - val_Accuracy: 0.8667
Epoch 9/20
3/3 [==============================] - 6s 2s/step - loss: 0.2983 - Accuracy: 0.9226 - val_loss: 0.7214 - val_Accuracy: 0.7333
Epoch 10/20
3/3 [==============================] - 6s 2s/step - loss: 0.2561 - Accuracy: 0.9242 - val_loss: 0.5249 - val_Accuracy: 0.8667
Epoch 11/20
3/3 [==============================] - 6s 2s/step - loss: 0.2160 - Accuracy: 0.9276 - val_loss: 0.6461 - val_Accuracy: 0.7667
Epoch 12/20
3/3 [==============================] - 6s 2s/step - loss: 0.1949 - Accuracy: 0.9293 - val_loss: 0.7166 - val_Accuracy: 0.7667
Epoch 13/20
3/3 [==============================] - 6s 2s/step - loss: 0.1745 - Accuracy: 0.9461 - val_loss: 0.6339 - val_Accuracy: 0.8333
Epoch 14/20
3/3 [==============================] - 6s 2s/step - loss: 0.1319 - Accuracy: 0.9613 - val_loss: 0.5087 - val_Accuracy: 0.9000
Epoch 15/20
3/3 [==============================] - 6s 2s/step - loss: 0.1055 - Accuracy: 0.9663 - val_loss: 0.7516 - val_Accuracy: 0.8000
Epoch 16/20
3/3 [==============================] - 6s 2s/step - loss: 0.0914 - Accuracy: 0.9731 - val_loss: 0.5083 - val_Accuracy: 0.9000
Epoch 17/20
3/3 [==============================] - 6s 2s/step - loss: 0.0810 - Accuracy: 0.9764 - val_loss: 0.7712 - val_Accuracy: 0.8333
Epoch 18/20
3/3 [==============================] - 6s 2s/step - loss: 0.0508 - Accuracy: 0.9899 - val_loss: 0.5598 - val_Accuracy: 0.9000
```