```
cd /content/sample_data/Test
```

```
/content/sample_data/Test
```

```
!kaggle datasets download -d jay7080dev/rice-plant-diseases-dataset
```

```
Dataset URL: https://www.kaggle.com/datasets/jay7080dev/rice-plant-diseases-dataset
License(s): Apache 2.0
Downloading rice-plant-diseases-dataset.zip to /content/sample_data/Test
100% 176M/176M [00:08<00:00, 25.0MB/s]
100% 176M/176M [00:08<00:00, 21.3MB/s]
```

```
!unzip /content/sample_data/Test/rice-plant-diseases-dataset.zip
```

```
  inflating: rice leaf diseases dataset/Leafsmut/BLAST9_159.jpg
  inflating: rice leaf diseases dataset/Leafsmut/BLAST9_160.jpg
```

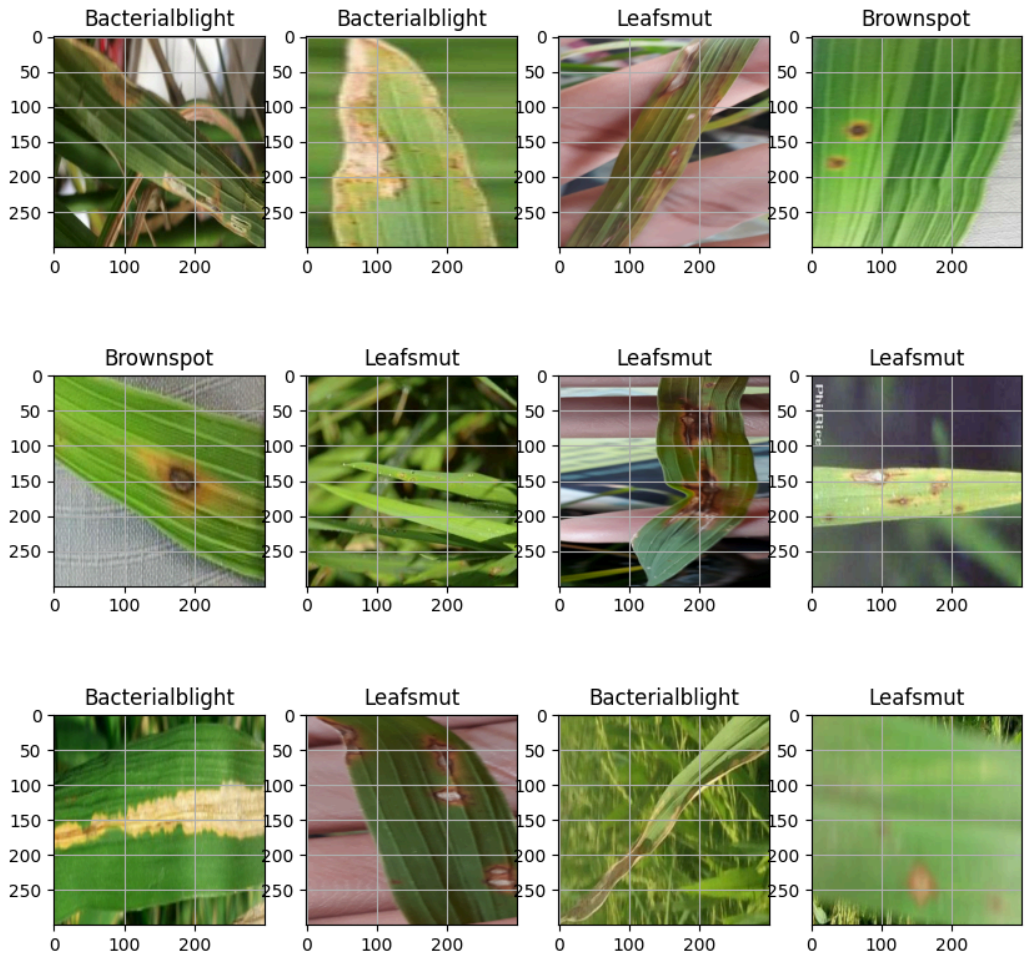
```
## importing essential Libraries

import os
import pandas as pd
import numpy as np
import sys
import seaborn as sb
import tensorflow as tf
from tensorflow.keras import layers, models, backend
import matplotlib.pyplot as plt

## batch specification
batch_size = 50
img_height = 300
img_width = 300


## loading training set
training_ds = tf.keras.preprocessing.image_dataset_from_directory(
    '/content/sample_data/Test/rice leaf diseases dataset',
    validation_split=0.2,
    subset= "training",
    seed=42,
    image_size= (img_height, img_width),
    batch_size=batch_size
)

## loading testing data
testing_ds = tf.keras.preprocessing.image_dataset_from_directory(
    '//content/sample_data/Test/rice leaf diseases dataset',
    validation_split=0.2,
    subset= "validation",
    seed=42,
    image_size= (img_height, img_width),
    batch_size=batch_size
)


class_names = training_ds.class_names
```

```
Found 4684 files belonging to 3 classes.
Using 3748 files for training.
Found 4684 files belonging to 3 classes.
Using 936 files for validation.
```

```
class_names
```

```
['Bacterialblight', 'Brownspot', 'Leafsmut']
```

```
plt.figure(figsize=(10, 10))
for images, labels in training_ds.take(1):
  for i in range(12):
    ax = plt.subplot(3, 4, i + 1)
    plt.imshow(images[i].numpy().astype("uint8"))
    plt.title(class_names[labels[i]])
    plt.grid(True)
```




```
model = models.Sequential([
layers.Rescaling(1./255, input_shape=(img_height, img_width,3)),
layers.Conv2D(20, 3, activation='relu'),
layers.MaxPooling2D(),
layers.Conv2D(20, 3, activation='relu'),
layers.MaxPooling2D(),
layers.Flatten(),
layers.Dense(16, activation='relu'),
layers.Dense(16, activation='relu'),
layers.Dense(len(class_names), activation='softmax')
])
```

```
model.compile(optimizer='adam',
loss=tf.keras.losses.SparseCategoricalCrossentropy(from_logits=False, reduction=tf.keras.losses.Reduction.NONE),
metrics=['accuracy'])
```

```
model.summary()
```

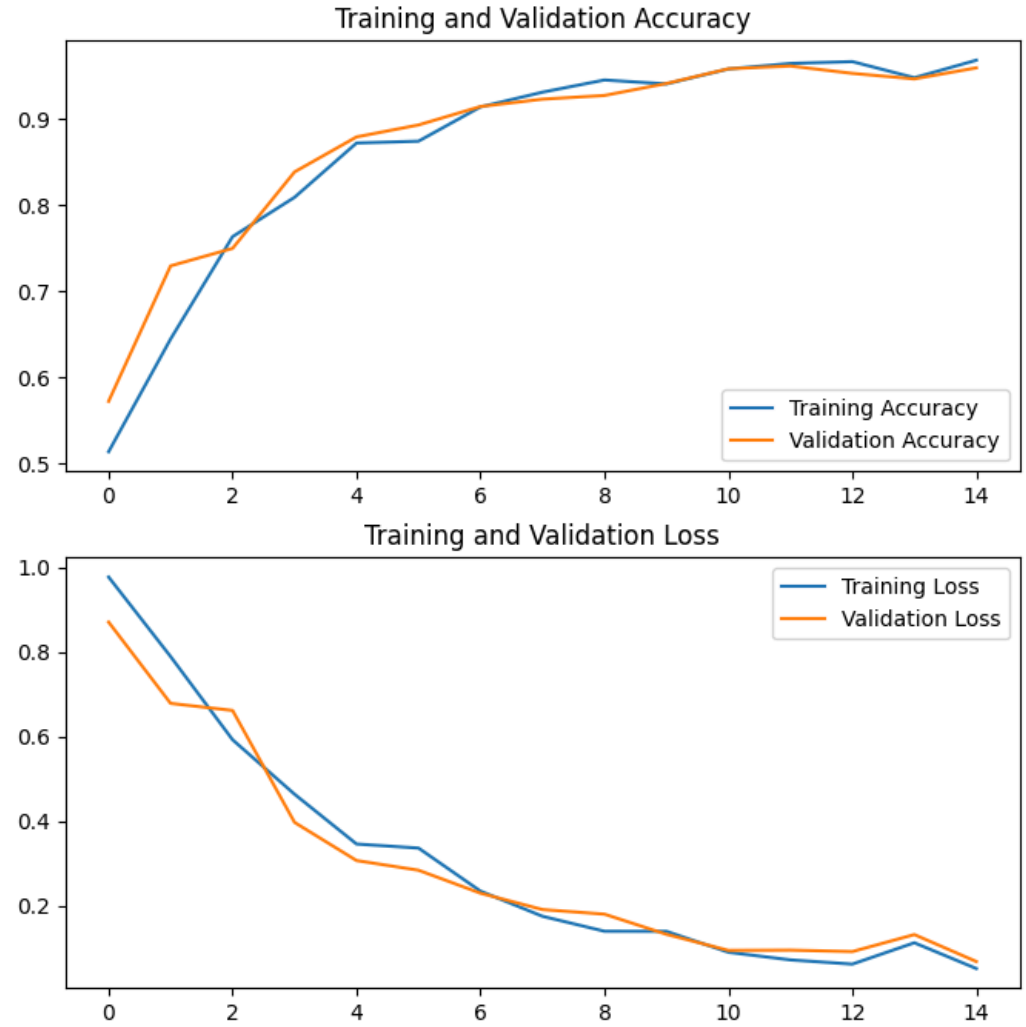
```
Model: "sequential"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 rescaling (Rescaling)       (None, 300, 300, 3)       0
```

```
 conv2d (Conv2D)             (None, 298, 298, 20)      560

 max_pooling2d (MaxPooling2  (None, 149, 149, 20)      0
 D)

 conv2d_1 (Conv2D)           (None, 147, 147, 20)      3620

 max_pooling2d_1 (MaxPoolin  (None, 73, 73, 20)        0
 g2D)

 flatten (Flatten)           (None, 106580)            0

 dense (Dense)               (None, 16)                1705296

 dense_1 (Dense)             (None, 16)                272

 dense_2 (Dense)             (None, 3)                 51

=================================================================
Total params: 1709799 (6.52 MB)
Trainable params: 1709799 (6.52 MB)
Non-trainable params: 0 (0.00 Byte)
_________________________________________________________________
```

```
epochs = 15
history = model.fit(
training_ds,
validation_data=testing_ds,
epochs=epochs
)
```

```
Epoch 1/15
75/75 [==============================] - 20s 159ms/step - loss: 0.9775 - accuracy: 0.5141 - val_loss: 0.8711 - val_ac
Epoch 2/15
75/75 [==============================] - 11s 132ms/step - loss: 0.7896 - accuracy: 0.6449 - val_loss: 0.6788 - val_ac
Epoch 3/15
75/75 [==============================] - 10s 128ms/step - loss: 0.5928 - accuracy: 0.7636 - val_loss: 0.6621 - val_ac
Epoch 4/15
75/75 [==============================] - 7s 92ms/step - loss: 0.4640 - accuracy: 0.8092 - val_loss: 0.3975 - val_accu
Epoch 5/15
75/75 [==============================] - 10s 121ms/step - loss: 0.3463 - accuracy: 0.8722 - val_loss: 0.3072 - val_ac
Epoch 6/15
75/75 [==============================] - 8s 104ms/step - loss: 0.3367 - accuracy: 0.8743 - val_loss: 0.2843 - val_acc
Epoch 7/15
75/75 [==============================] - 8s 107ms/step - loss: 0.2349 - accuracy: 0.9141 - val_loss: 0.2300 - val_acc
Epoch 8/15
75/75 [==============================] - 8s 99ms/step - loss: 0.1754 - accuracy: 0.9312 - val_loss: 0.1913 - val_accu
Epoch 9/15
75/75 [==============================] - 10s 126ms/step - loss: 0.1401 - accuracy: 0.9453 - val_loss: 0.1805 - val_ac
Epoch 10/15
75/75 [==============================] - 9s 119ms/step - loss: 0.1398 - accuracy: 0.9408 - val_loss: 0.1328 - val_acc
Epoch 11/15
75/75 [==============================] - 7s 93ms/step - loss: 0.0903 - accuracy: 0.9581 - val_loss: 0.0948 - val_accu
Epoch 12/15
75/75 [==============================] - 8s 102ms/step - loss: 0.0723 - accuracy: 0.9645 - val_loss: 0.0954 - val_acc
Epoch 13/15
75/75 [==============================] - 11s 138ms/step - loss: 0.0623 - accuracy: 0.9666 - val_loss: 0.0919 - val_ac
Epoch 14/15
75/75 [==============================] - 8s 103ms/step - loss: 0.1128 - accuracy: 0.9480 - val_loss: 0.1321 - val_acc
Epoch 15/15
75/75 [==============================] - 8s 104ms/step - loss: 0.0518 - accuracy: 0.9682 - val_loss: 0.0684 - val_acc
```

```
acc = history.history['accuracy']
val_acc = history.history['val_accuracy']
loss = history.history['loss']
val_loss = history.history['val_loss']

plt.figure(figsize=(8, 8))
plt.subplot(2, 1, 1)
plt.plot(range(epochs), acc, label='Training Accuracy')
plt.plot(range(epochs), val_acc, label='Validation Accuracy')
plt.legend(loc='lower right')
plt.title('Training and Validation Accuracy')

plt.subplot(2, 1, 2)
plt.plot(range(epochs), loss, label='Training Loss')
plt.plot(range(epochs), val_loss, label='Validation Loss')
plt.legend(loc='upper right')
plt.title('Training and Validation Loss')
plt.show()

# Display the maximum validation accuracy
print("Maximum Validation Accuracy:", max(val_acc))
```




```
Maximum Validation Accuracy: 0.9615384340286255
```

```
AccuracyVector = []
plt.figure(figsize=(30, 20))
for images, labels in testing_ds.take(1):
    predictions = model.predict(images)
    predlabel = []
    prdlbl = []

    for mem in predictions:
        predlabel.append(class_names[np.argmax(mem)])
        prdlbl.append(np.argmax(mem))

    AccuracyVector = np.array(prdlbl) == labels
    for i in range(20):
        ax = plt.subplot(5, 4, i + 1)
        plt.imshow(images[i].numpy().astype("uint8"))
        plt.title('Pred: '+ predlabel[i]+' actl:'+class_names[labels[i]] )
        plt.axis('off')
        plt.grid(True)
```

```
2/2 [==============================] - 1s 263ms/step
```


```
model.save('riceplantdetectionmodel.h5',include_optimizer=True)
```

```
/usr/local/lib/python3.10/dist-packages/keras/src/engine/training.py:3103: UserWarning: You are saving your model as
  saving_api.save_model(
```

```
Start coding or generate with AI.
```