Project Development Phase
Model Performance Test

Date	10 November 2022
Team ID	PNT2022TMID33034
Project Name	Fertilizer Recommedation System For Disease Prediction
Maximum Marks	10 Marks

Model Performance Testing:

Project team shall fill the following information in model performance testing template.

Model summary-

Fruit

```
model.summary()
```

```
Model: "sequential"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 conv2d (Conv2D)             (None, 126, 126, 32)      896

 max_pooling2d (MaxPooling2D  (None, 63, 63, 32)       0
 )

 flatten (Flatten)           (None, 127008)            0

 dense (Dense)               (None, 300)               38102700

 dense_1 (Dense)             (None, 300)               90300

 dense_2 (Dense)             (None, 6)                 1806

=================================================================
Total params: 38,195,702
Trainable params: 38,195,702
Non-trainable params: 0
```

VEGETABLES

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

```
Model: "sequential"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 conv2d (Conv2D)             (None, 126, 126, 32)      896

 max_pooling2d (MaxPooling2D  (None, 63, 63, 32)       0
 )

 flatten (Flatten)           (None, 127008)            0

 dense (Dense)               (None, 300)               38102700

 dense_1 (Dense)             (None, 150)               45150

 dense_2 (Dense)             (None, 75)                11325

 dense_3 (Dense)             (None, 9)                 684

=================================================================
Total params: 38,160,755
Trainable params: 38,160,755
```

TRAINING ACCURACY-vegetable

In [25]:
```
img = image.load_img(r"/content/drive/MyDrive/project sp1/Dataset Plant Disease/Veg-dataset/Veg-dataset/train_set/Pepper,_bell___Bacterial_spot/024623
img
```

Out[25]:

In [27]:
```
x=image.img_to_array(img)
x=np.expand_dims(x,axis=0)
pred = np.argmax(model.predict(x),axis=1)

index=['Pepper,_bell___Bacterial_spot',
 'Pepper,_bell___healthy',
 'Potato___Early_blight',
 'Potato___Late_blight',
 'Potato___healthy',
 'Tomato___Bacterial_spot',
 'Tomato___Late_blight',
 'Tomato___Leaf_Mold',
 'Tomato___Septoria_leaf_spot']

index[pred[0]]
```

```
1/1 [==============================] - 0s 66ms/step
```

Out[27]:
```
'Pepper,_bell___healthy'
```

fruit

```
img = image.load_img(r"/content/drive/MyDrive/project sp1/Dataset Plant Disease/fruit-dataset/fruit-dataset/test/Apple___Black_rot/12e9d8e2-e5a4-4d4b-
img
```

```
x=image.img_to_array(img)
x=np.expand_dims(x,axis=0)
pred = np.argmax(model.predict(x),axis=1)
index=['Apple___Black_rot',
 'Apple___healthy',
 'Corn_(maize)___Northern_Leaf_Blight',
 'Corn_(maize)___healthy',
 'Peach___Bacterial_spot',
 'Peach___healthy']
index[pred[0]]
```

```
1/1 [==============================] - 0s 459ms/step
```

```
'Apple___Black_rot'
```

VALIDATION ACCURACY-vegetable

In [19]:

```
model.fit_generator(x_train,steps_per_epoch=89,epochs=20,validation_data=x_test,validation_steps=27)
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:1: UserWarning: `Model.fit_generator` is deprecated and will be removed in a future versio
n. Please use `Model.fit`, which supports generators.
  """Entry point for launching an IPython kernel.
Epoch 1/20
89/89 [==============================] - 240s 3s/step - loss: 2.5226 - accuracy: 0.2177 - val_loss: 1.8249 - val_accuracy: 0.4259
Epoch 2/20
89/89 [==============================] - 219s 2s/step - loss: 1.6819 - accuracy: 0.3975 - val_loss: 1.5049 - val_accuracy: 0.4907
Epoch 3/20
89/89 [==============================] - 209s 2s/step - loss: 1.2938 - accuracy: 0.5618 - val_loss: 1.4205 - val_accuracy: 0.4907
Epoch 4/20
89/89 [==============================] - 192s 2s/step - loss: 1.2039 - accuracy: 0.5660 - val_loss: 1.0881 - val_accuracy: 0.6065
Epoch 5/20
89/89 [==============================] - 183s 2s/step - loss: 1.2170 - accuracy: 0.5660 - val_loss: 1.0996 - val_accuracy: 0.5787
Epoch 6/20
89/89 [==============================] - 179s 2s/step - loss: 1.0703 - accuracy: 0.6222 - val_loss: 1.0568 - val_accuracy: 0.6204
Epoch 7/20
89/89 [==============================] - 162s 2s/step - loss: 1.0685 - accuracy: 0.6138 - val_loss: 0.8573 - val_accuracy: 0.6435
Epoch 8/20
89/89 [==============================] - 161s 2s/step - loss: 0.9593 - accuracy: 0.6587 - val_loss: 0.8314 - val_accuracy: 0.7315
Epoch 9/20
89/89 [==============================] - 146s 2s/step - loss: 0.9818 - accuracy: 0.6573 - val_loss: 0.7584 - val_accuracy: 0.6806
Epoch 10/20
89/89 [==============================] - 143s 2s/step - loss: 0.8468 - accuracy: 0.6966 - val_loss: 0.7613 - val_accuracy: 0.7361
Epoch 11/20
89/89 [==============================] - 125s 1s/step - loss: 0.8783 - accuracy: 0.6756 - val_loss: 0.7331 - val_accuracy: 0.7315
Epoch 12/20
89/89 [==============================] - 120s 1s/step - loss: 0.7728 - accuracy: 0.7247 - val_loss: 0.9489 - val_accuracy: 0.6991
Epoch 13/20
89/89 [==============================] - 111s 1s/step - loss: 0.7743 - accuracy: 0.7233 - val_loss: 0.7495 - val_accuracy: 0.7176
Epoch 14/20
89/89 [==============================] - 107s 1s/step - loss: 0.6912 - accuracy: 0.7331 - val_loss: 0.9009 - val_accuracy: 0.6991
Epoch 15/20
89/89 [==============================] - 102s 1s/step - loss: 0.8056 - accuracy: 0.7219 - val_loss: 0.7490 - val_accuracy: 0.7361
Epoch 16/20
89/89 [==============================] - 96s 1s/step - loss: 0.8044 - accuracy: 0.7261 - val_loss: 0.5688 - val_accuracy: 0.7731
Epoch 17/20
89/89 [==============================] - 93s 1s/step - loss: 0.7830 - accuracy: 0.7275 - val_loss: 0.8252 - val_accuracy: 0.7176
Epoch 18/20
89/89 [==============================] - 86s 967ms/step - loss: 0.7168 - accuracy: 0.7472 - val_loss: 0.8073 - val_accuracy: 0.6713
Epoch 19/20
89/89 [==============================] - 86s 968ms/step - loss: 0.7550 - accuracy: 0.7360 - val_loss: 0.5416 - val_accuracy: 0.7963
Epoch 20/20
89/89 [==============================] - 82s 916ms/step - loss: 0.7503 - accuracy: 0.7261 - val_loss: 0.5579 - val_accuracy: 0.8194
```

```
model.fit_generator(x_train,steps_per_epoch=5384//8,validation_data=x_test,validation_steps=1686//8,epochs=10)
```

```
Epoch 1/10
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:1: UserWarning: `Model.fit_generator` is deprecated and will be removed in a future versio
n. Please use `Model.fit`, which supports generators.
  """Entry point for launching an IPython kernel.
673/673 [==============================] - 292s 434ms/step - loss: 0.1311 - accuracy: 0.9595 - val_loss: 0.1762 - val_accuracy: 0.9494
Epoch 2/10
673/673 [==============================] - ETA: 0s - loss: 0.0956 - accuracy: 0.9694Epoch 3/10
673/673 [==============================] - 298s 442ms/step - loss: 0.1395 - accuracy: 0.9539 - val_loss: 0.2333 - val_accuracy: 0.9387
Epoch 4/10
673/673 [==============================] - 294s 436ms/step - loss: 0.1273 - accuracy: 0.9599 - val_loss: 0.1742 - val_accuracy: 0.9512
Epoch 5/10
673/673 [==============================] - 291s 433ms/step - loss: 0.1086 - accuracy: 0.9671 - val_loss: 0.1495 - val_accuracy: 0.9595
Epoch 6/10
673/673 [==============================] - 289s 429ms/step - loss: 0.0992 - accuracy: 0.9673 - val_loss: 0.1884 - val_accuracy: 0.9405
Epoch 7/10
673/673 [==============================] - 292s 434ms/step - loss: 0.0878 - accuracy: 0.9712 - val_loss: 0.4864 - val_accuracy: 0.9214
Epoch 8/10
673/673 [==============================] - 286s 425ms/step - loss: 0.0723 - accuracy: 0.9798 - val_loss: 0.2890 - val_accuracy: 0.9202
Epoch 9/10
673/673 [==============================] - 286s 425ms/step - loss: 0.0877 - accuracy: 0.9723 - val_loss: 0.2377 - val_accuracy: 0.9298
Epoch 10/10
673/673 [==============================] - 284s 422ms/step - loss: 0.0878 - accuracy: 0.9751 - val_loss: 0.2440 - val_accuracy: 0.9405
```