Date	**05.11.2022**
Team ID	**PNT2022TMID25651**
Project Name	**FERTILIZERS RECOMMENDATION SYSTEM FOR DISEASE PREDICTION**

Train And Save The Model

Compile the model

```
model.compile(optimizer='adam', loss = "categorical_crossentropy" , metrics =['accuracy'])
```

Model.Summary()

Can be used to see all parameters and shapes in each layer in our models.

```
model.summary()
```

Fit and save the model

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

The weights are to be saved for future use. The weights are saved in as .h5 file using save().

```
model.save("fruit.h5"
```

Output:

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

Non-trainable params: 0

_____

Epoch 1/20

89/89 [==============================] - 52s 576ms/step - loss: 2.4956 - accuracy: 0.2686 - val_loss: 246.3766 - val_accuracy: 0.3426

Epoch 2/20

89/89 [==============================] - 44s 498ms/step - loss: 1.2983 - accuracy: 0.5468 - val_loss: 651.4410 - val_accuracy: 0.2894

Epoch 3/20

89/89 [==============================] - 42s 469ms/step - loss: 0.9406 - accuracy: 0.6735 - val_loss: 1125.0737 - val_accuracy: 0.2442

Epoch 4/20

89/89 [==============================] - 39s 440ms/step - loss: 0.7779 - accuracy: 0.7300 - val_loss: 1022.7507 - val_accuracy: 0.2847

Epoch 5/20

89/89 [==============================] - 41s 462ms/step - loss: 0.7470 - accuracy: 0.7465 - val_loss: 1396.1002 - val_accuracy: 0.2581

Epoch 6/20

89/89 [==============================] - 45s 510ms/step - loss: 0.6462 - accuracy: 0.7718 - val_loss: 1383.3610 - val_accuracy: 0.2616

Epoch 7/20

89/89 [==============================] - 34s 387ms/step - loss: 0.5867 - accuracy: 0.7928 - val_loss: 1626.8010 - val_accuracy: 0.1771

Epoch 8/20

89/89 [==============================] - 45s 504ms/step - loss: 0.5461 - accuracy: 0.8058 - val_loss: 1733.9170 - val_accuracy: 0.2014

Epoch 9/20

89/89 [==============================] - 55s 617ms/step - loss: 0.4965 - accuracy: 0.8283 - val_loss: 2105.0442 - val_accuracy: 0.2523

Epoch 10/20

89/89 [==============================] - 55s 617ms/step - loss: 0.5316 - accuracy: 0.8125 - val_loss: 1585.0485 - val_accuracy: 0.2766

Epoch 11/20

89/89 [==============================] - 52s 577ms/step - loss: 0.5039 - accuracy: 0.8258 - val_loss: 1588.1725 - val_accuracy: 0.3032

Epoch 12/20

89/89 [==============================] - 51s 571ms/step - loss: 0.4196 - accuracy: 0.8546 - val_loss: 2111.2288 - val_accuracy: 0.2824

Epoch 13/20

89/89 [==============================] - 52s 582ms/step - loss: 0.4402 - accuracy: 0.8504 - val_loss: 1728.3689 - val_accuracy: 0.2824

Epoch 14/20

89/89 [==============================] - 51s 568ms/step - loss: 0.4035 - accuracy: 0.8560 - val_loss: 1953.9325 - val_accuracy: 0.2477

Epoch 15/20

89/89 [==============================] - 52s 578ms/step - loss: 0.3994 - accuracy: 0.8606 - val_loss: 1739.5107 - val_accuracy: 0.2894

Epoch 16/20

89/89 [==============================] - 51s 575ms/step - loss: 0.3509 - accuracy: 0.8754 - val_loss: 1912.0873 - val_accuracy: 0.3252

Epoch 17/20

89/89 [==============================] - 50s 561ms/step -
loss: 0.3818 - accuracy: 0.8606 - val_loss: 1777.9532 - val_accuracy:0.3125

Epoch 18/20

89/89 [==============================] - 50s 565ms/step -
loss: 0.3416 - accuracy: 0.8810 - val_loss: 2017.1232 - val_accuracy:0.2801

Epoch 19/20

89/89 [==============================] - 51s 574ms/step -
loss: 0.3515 - accuracy: 0.8743 - val_loss: 1423.0455 - val_accuracy:0.3530

Epoch 20/20

89/89 [==============================] - 50s 560ms/step -
loss: 0.3514 - accuracy: 0.8761 - val_loss: 1466.1351 - val_accuracy:0.3218