

Dataset 1: PlantVillage (2152 Images)

0: Early Blight (1000 Images), 1: Late Blight (1000 Images), 2: Healthy (152 Images)

80:10:10 Split = 1728:192:232 Images

(90:5:5 Split = 1952:96:104 Images,
70:15:15 Split = 1504:320:328 Images,
60:20:20 Split = 1280:416:456 Images,
50:25:25 Split = 1088:544:520 Images)

Model 1: CNN

BASE MODEL

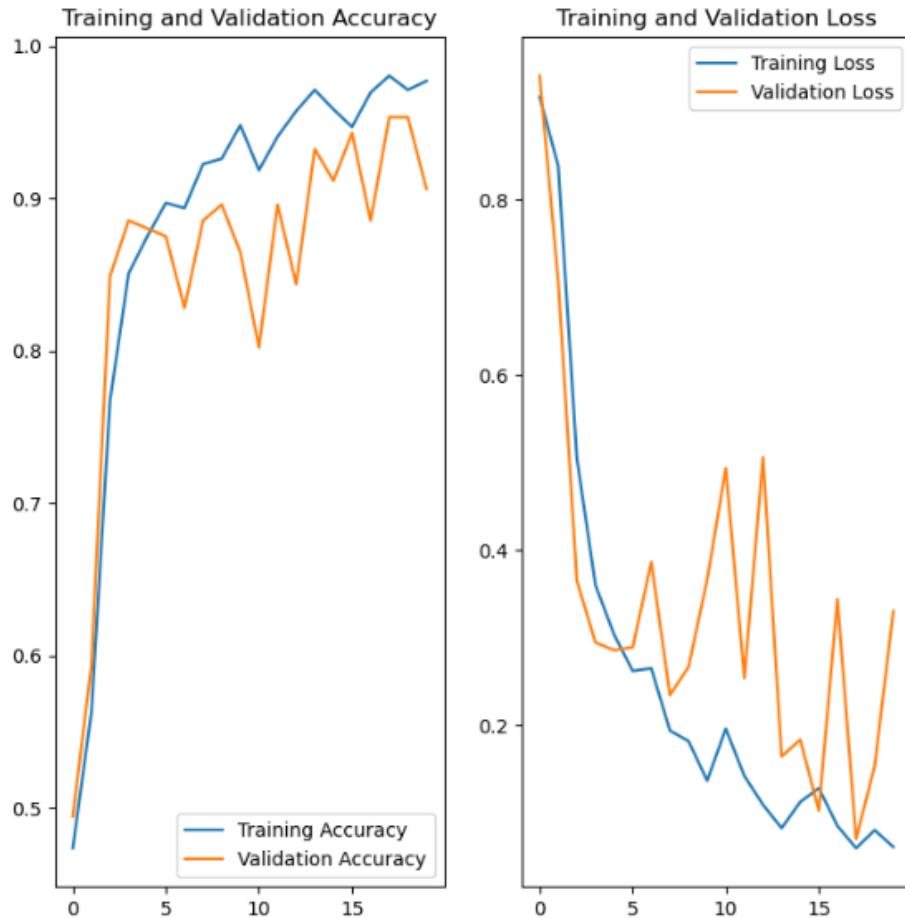
```
IMAGE_SIZE=256  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=20
```

```
scores=model.evaluate(test_ds)
scores

8/8 [=====] - 3s 234ms/step - loss: 0.2212 - accuracy: 0.9258
[0.2211941033601761, 0.92578125]
```

Average Time per Epoch = 71.30 s

history.history['loss']	history.history['accuracy']	history.history['val_loss']	history.history['val_accuracy']
[0.9176506996154785, 0.838766872882843, 0.5048757195472717, 0.35991528630256653, 0.30345433950424194, 0.2620077133178711, 0.26483413577079773, 0.19373342394828796, 0.1818256974220276, 0.1365627646446228, 0.19588078558444977, 0.14197923243045807, 0.10906356573104858, 0.08238974958658218, 0.11226004362106323, 0.12809668481349945, 0.08488276600837708, 0.05948496609926224, 0.08003996312618256, 0.06091196462512016]	[0.4739583432674408, 0.5630787014961243, 0.7673611044883728, 0.8506944179534912, 0.875, 0.8969907164573669, 0.8935185074806213, 0.9224537014961243, 0.9259259104728699, 0.9479166865348816, 0.9184027910232544, 0.9403935074806213, 0.9571759104728699, 0.9710648059844971, 0.958333134651184, 0.9467592835426331, 0.9693287014961243, 0.9803240895271301, 0.9710648059844971, 0.9768518805503845]	[0.9418085217475891, 0.7066646218299866, 0.3648606538772583, 0.29440852999687195, 0.2856326997280121, 0.28896021842956543, 0.3862188756465912, 0.2344036102294922, 0.26650315523147583, 0.366049200296402, 0.493345707654953, 0.2538715600967407, 0.506048858165741, 0.16428618133068085, 0.1833011507987976, 0.102436363697052, 0.34406232833862305, 0.07012739032506943, 0.15307815372943878, 0.330207496881485]	[0.4947916567325592, 0.59375, 0.8489583134651184, 0.8854166865348816, 0.8802083134651184, 0.875, 0.828125, 0.8854166865348816, 0.8958333134651184, 0.8645833134651184, 0.8020833134651184, 0.8958333134651184, 0.84375, 0.9322916865348816, 0.9114583134651184, 0.9427083134651184, 0.8854166865348816, 0.953125, 0.953125, 0.90625]



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.97%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.91%



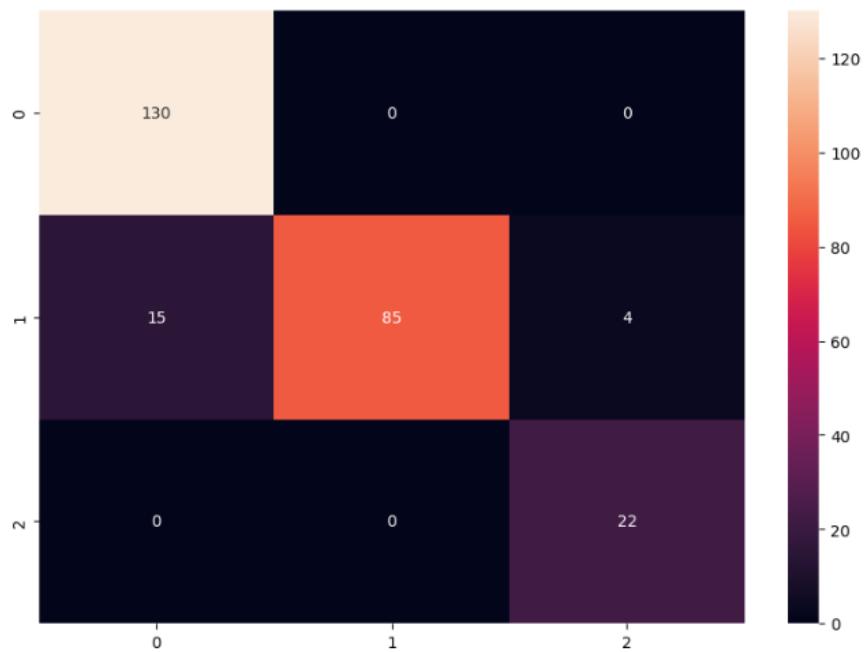
Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Early_blight,
Confidence: 86.79%



Classification Report:					
	precision	recall	f1-score	support	
0	0.90	1.00	0.95	130	
1	1.00	0.82	0.90	104	
2	0.85	1.00	0.92	22	
accuracy			0.93	256	
macro avg	0.91	0.94	0.92	256	
weighted avg	0.93	0.93	0.92	256	



NO. OF EPOCHS

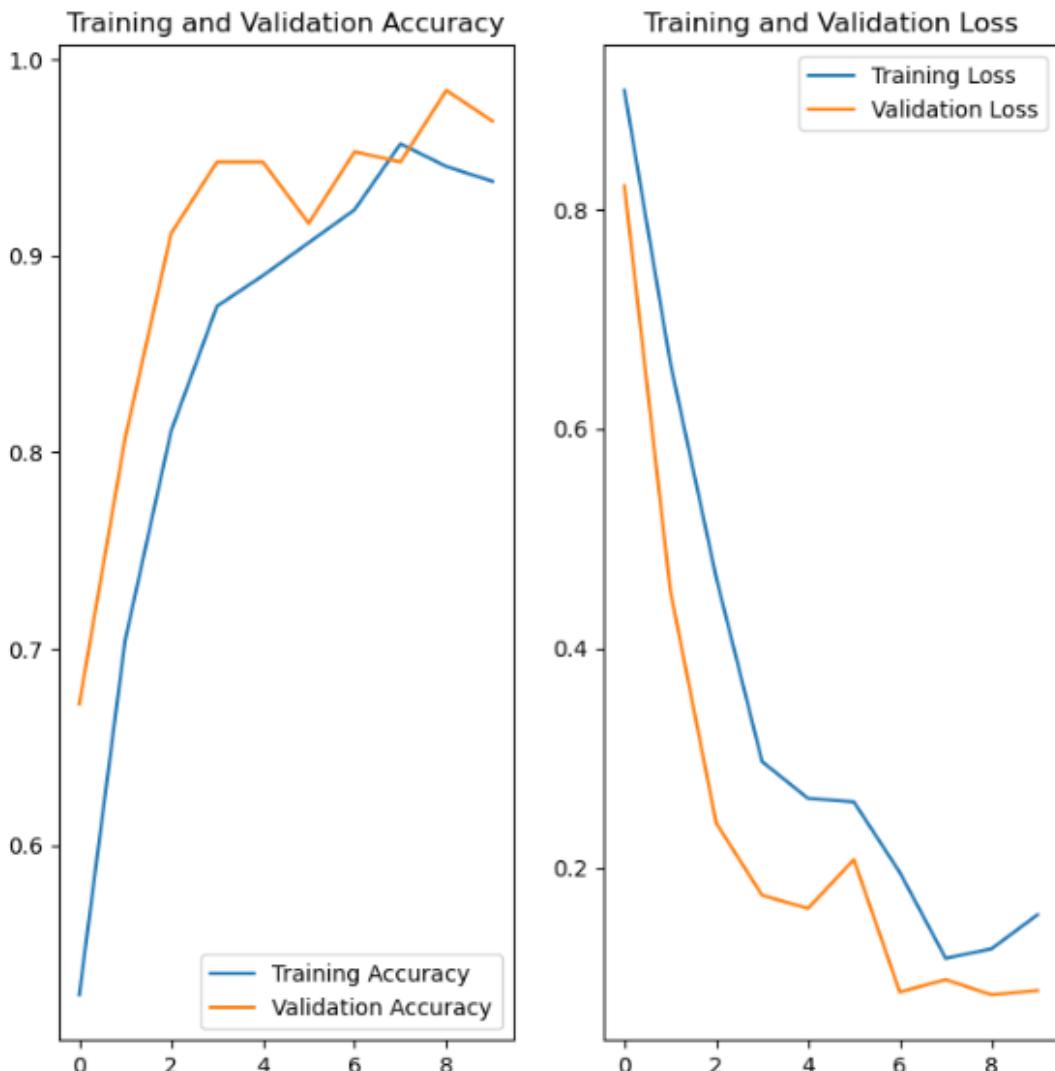
(a) 10

```
IMAGE_SIZE=256  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=10
```

```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 5s 424ms/step - loss: 0.1296 - accuracy: 0.9492  
[0.12957227230072021, 0.94921875]
```

Average Time per Epoch = 74.30 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 98.6%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.72%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.67%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.95%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.9%

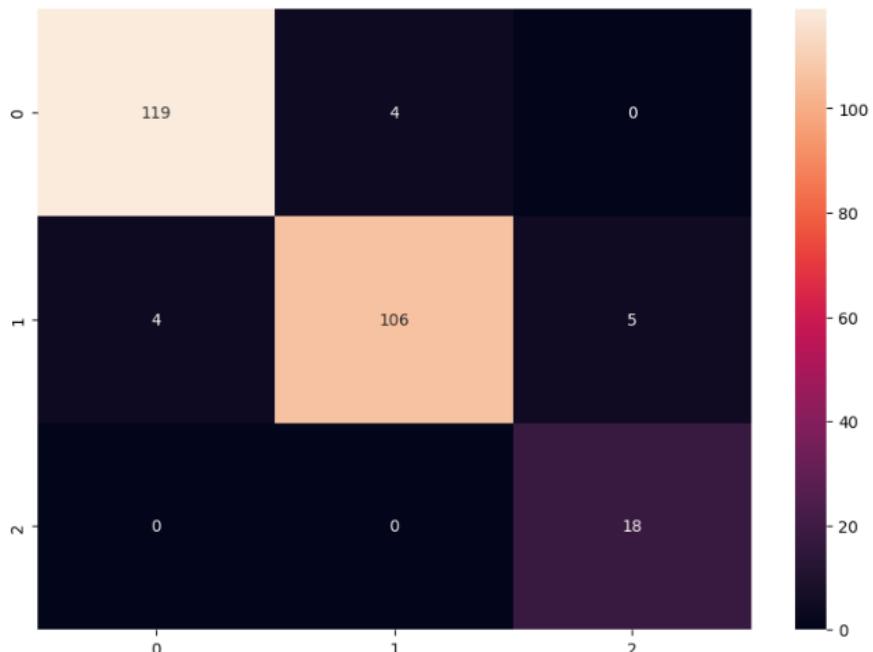


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 67.04%



Classification Report:

	precision	recall	f1-score	support
0	0.97	0.97	0.97	123
1	0.96	0.92	0.94	115
2	0.78	1.00	0.88	18
accuracy			0.95	256
macro avg	0.90	0.96	0.93	256
weighted avg	0.95	0.95	0.95	256

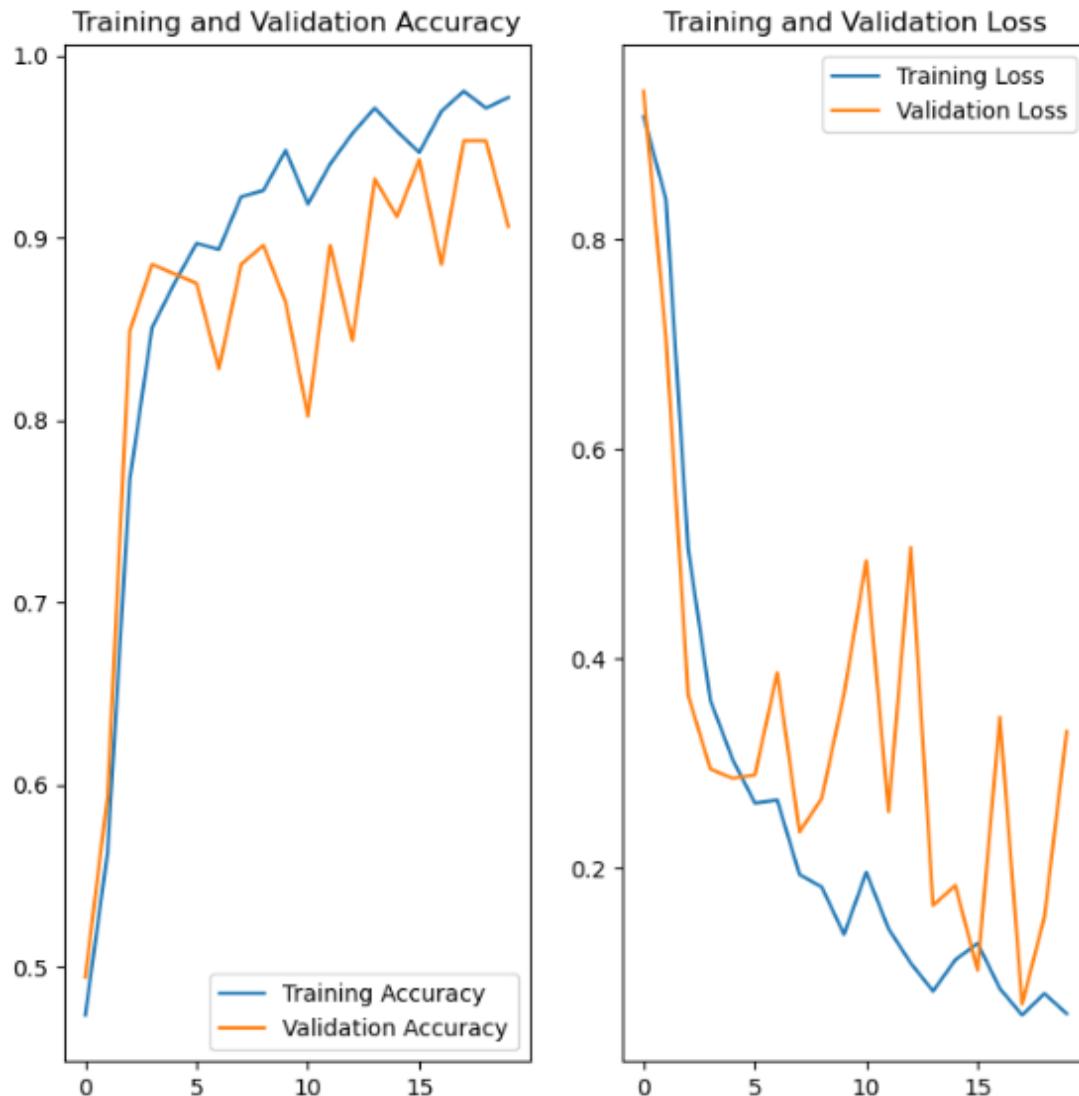


(b) 20

```
IMAGE_SIZE=256  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=20
```

```
scores=model.evaluate(test_ds)  
scores  
  
8/8 [=====] - 3s 234ms/step - loss: 0.2212 - accuracy: 0.9258  
[0.2211941033601761, 0.92578125]
```

Average Time per Epoch = 71.30 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.97%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.91%

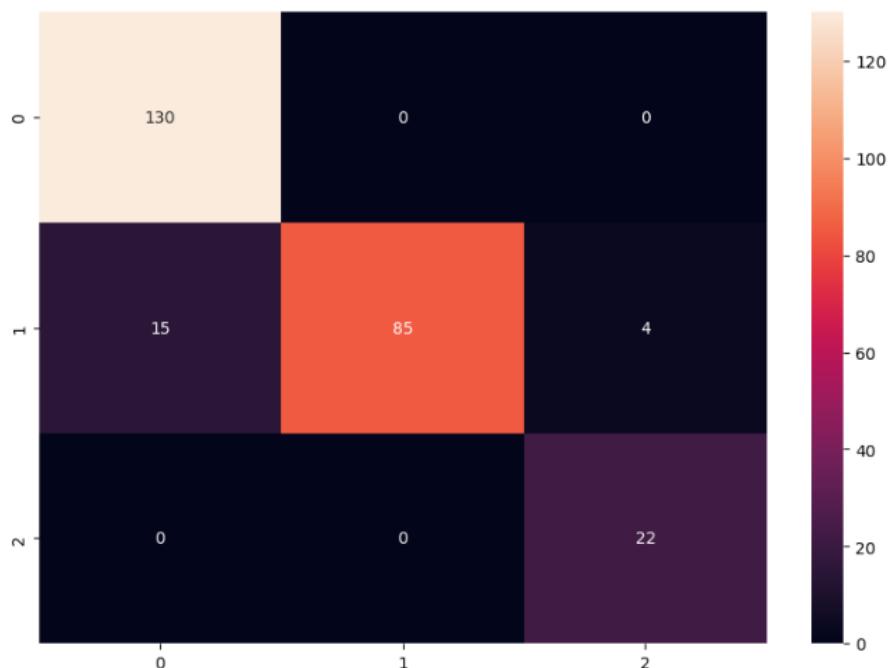


Actual: Potato_Late_blight,
Predicted: Potato_Early_blight,
Confidence: 86.79%



Classification Report:

	precision	recall	f1-score	support
0	0.90	1.00	0.95	130
1	1.00	0.82	0.90	104
2	0.85	1.00	0.92	22
accuracy			0.93	256
macro avg	0.91	0.94	0.92	256
weighted avg	0.93	0.93	0.92	256



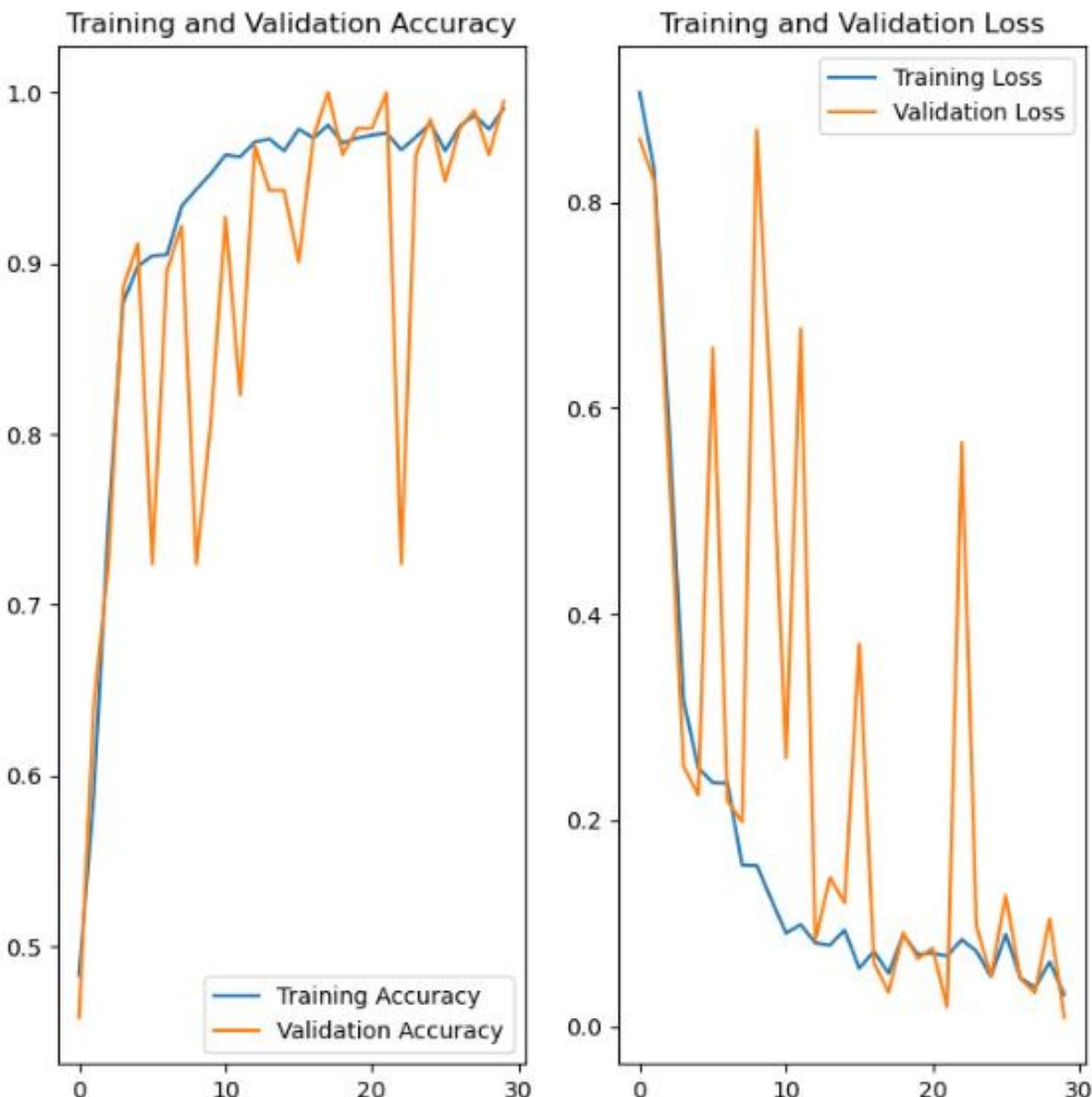
(c) 30

```
IMAGE_SIZE=256  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=30
```

```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 3s 226ms/step - loss: 0.0283 - accuracy: 0.9844  
[0.028254589065909386, 0.984375]
```

Average Time per Epoch = 70.57 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 96.87%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 93.31%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.98%

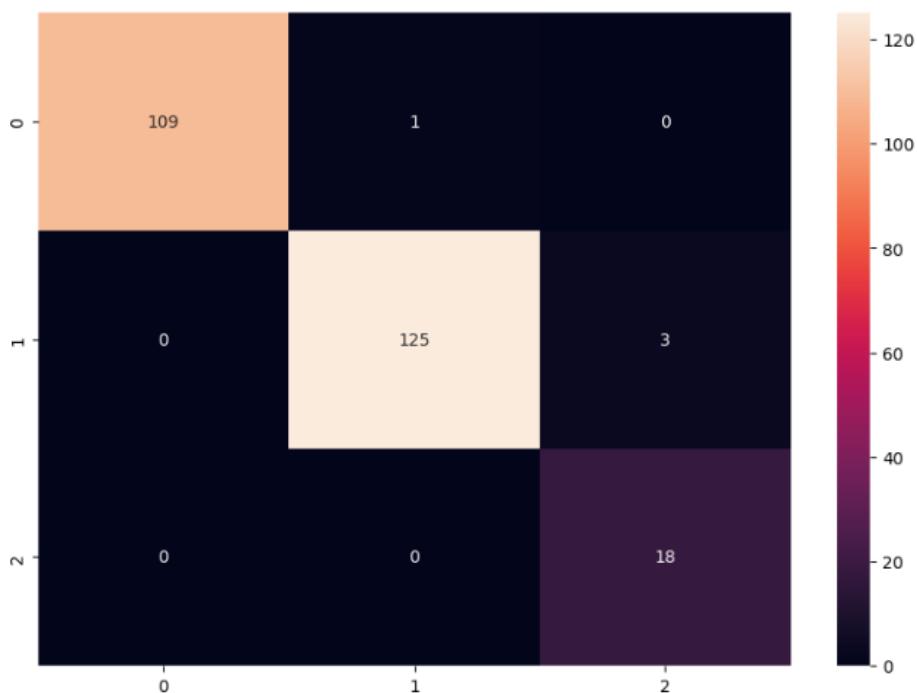


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	1.00	0.99	1.00	110
1	0.99	0.98	0.98	128
2	0.86	1.00	0.92	18
accuracy			0.98	256
macro avg	0.95	0.99	0.97	256
weighted avg	0.99	0.98	0.98	256



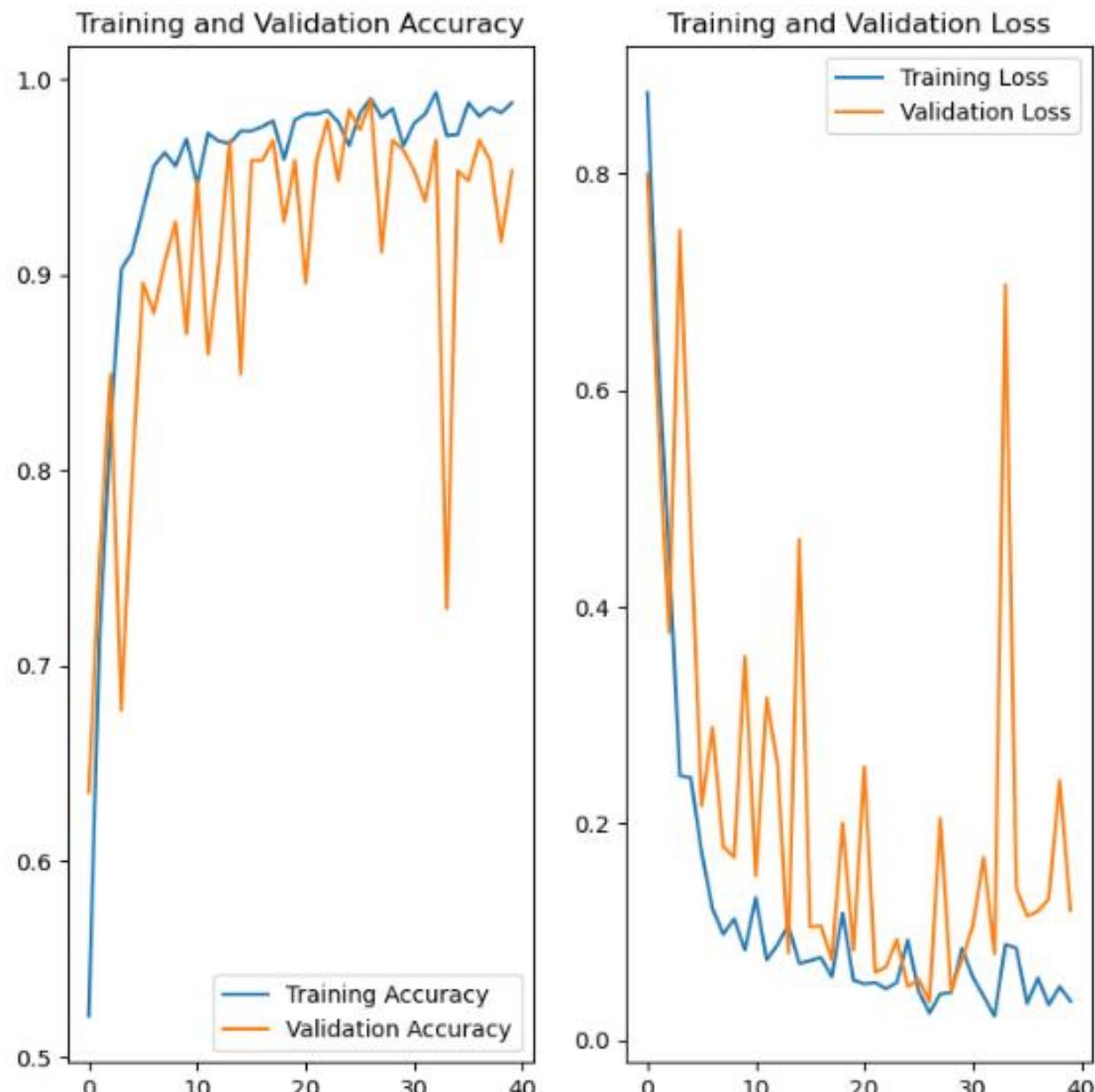
(d) 40

IMAGE_SIZE=256
BATCH_SIZE=32
CHANNELS=3
EPOCHS=40

```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 3s 239ms/step - loss: 0.0735 - accuracy: 0.9844  
[0.0734885036945343, 0.984375]
```

Average Time per Epoch = 68.18 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.87%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 50.98%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.99%

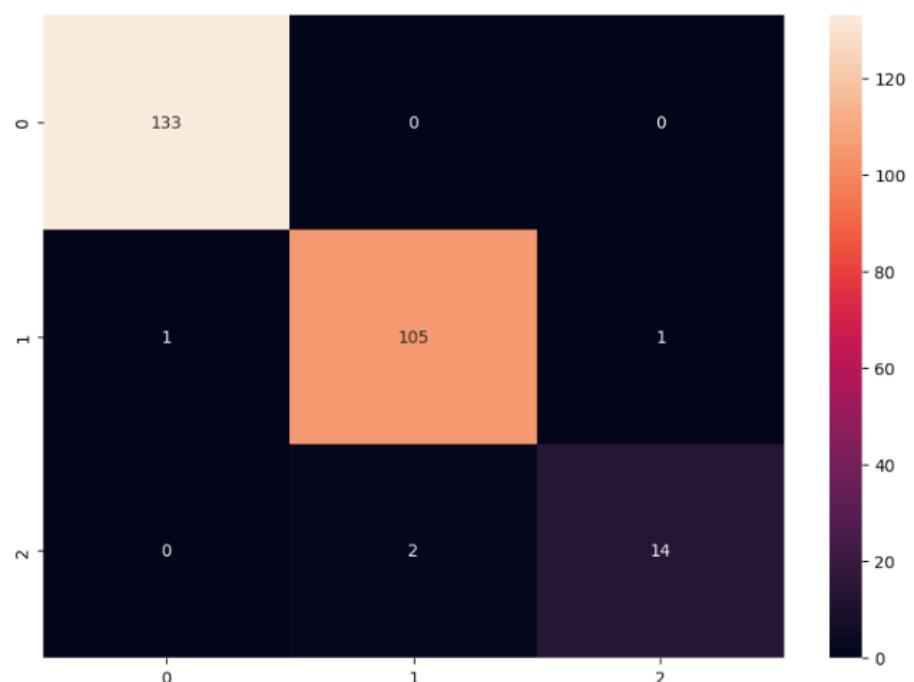


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	0.99	1.00	1.00	133
1	0.98	0.98	0.98	107
2	0.93	0.88	0.90	16
accuracy			0.98	256
macro avg	0.97	0.95	0.96	256
weighted avg	0.98	0.98	0.98	256



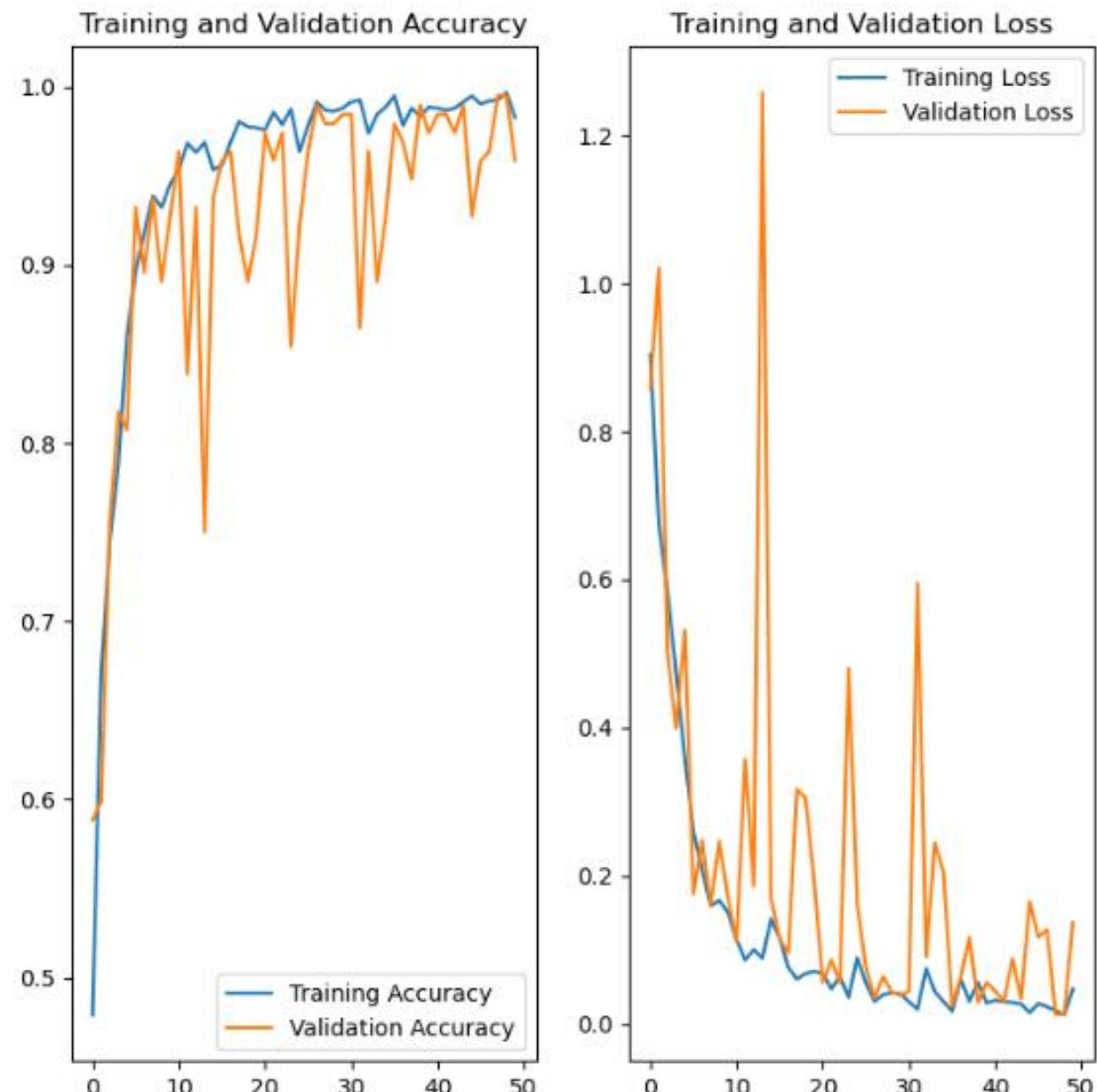
(e) 50

```
IMAGE_SIZE=256  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=50
```

```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 3s 228ms/step - loss: 0.1204 - accuracy: 0.9688  
[0.12038511782884598, 0.96875]
```

Average Time per Epoch = 70.34 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.98%



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 99.42%

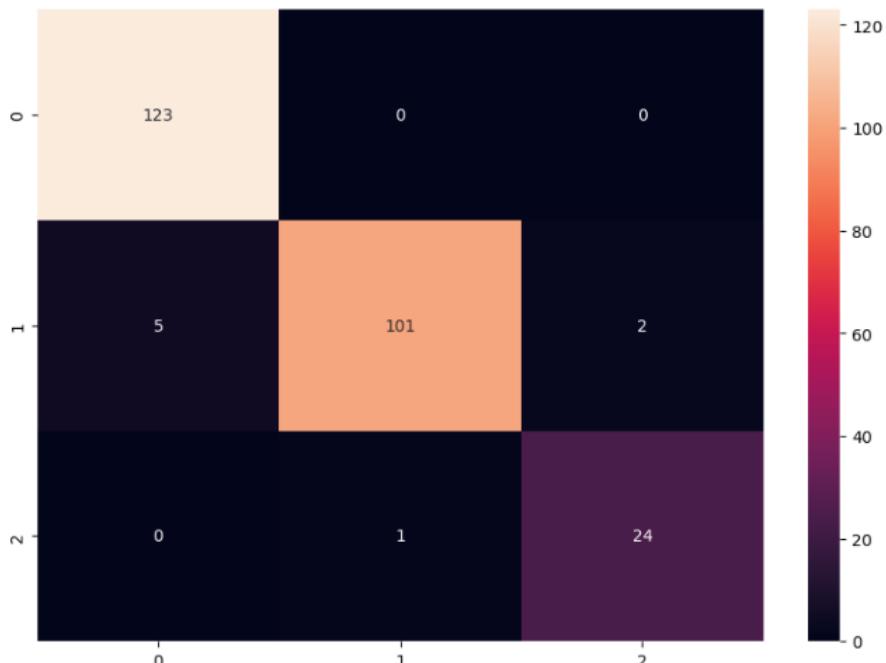


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	0.96	1.00	0.98	123
1	0.99	0.94	0.96	108
2	0.92	0.96	0.94	25
accuracy			0.97	256
macro avg	0.96	0.97	0.96	256
weighted avg	0.97	0.97	0.97	256



BATCH SIZE

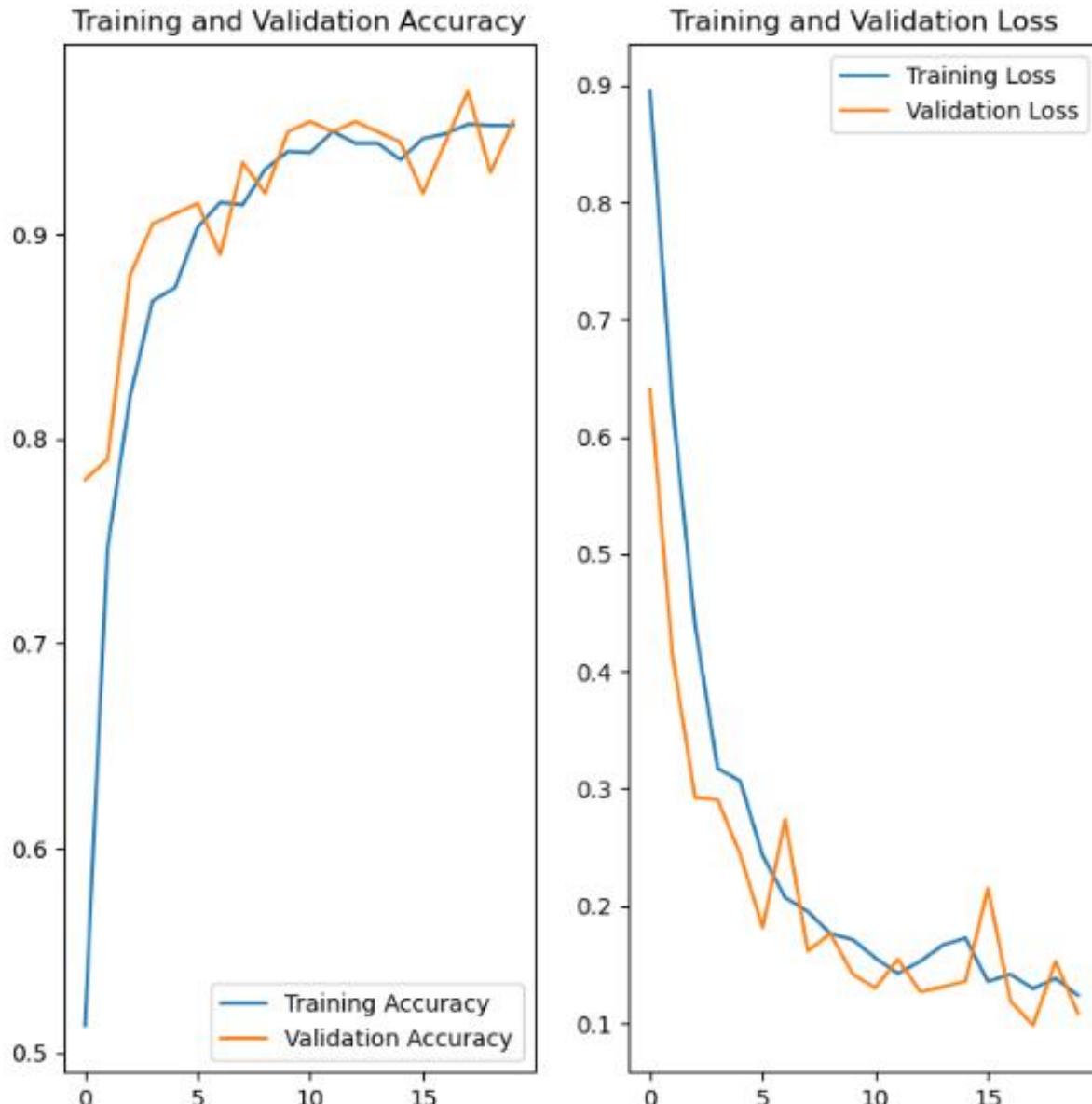
(a) 16

IMAGE_SIZE=256
BATCH_SIZE=16
CHANNELS=3
EPOCHS=20

```
scores=model.evaluate(test_ds)  
scores
```

```
14/14 [=====] - 2s 114ms/step - loss: 0.1242 - accuracy: 0.9509  
[0.1241571381688118, 0.9508928656578064]
```

Average Time per Epoch = 73.05 s



Actual: Potato_Late_blight,
Predicted: Potato_Early_blight,
Confidence: 51.88%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 83.54%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.95%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 61.63%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

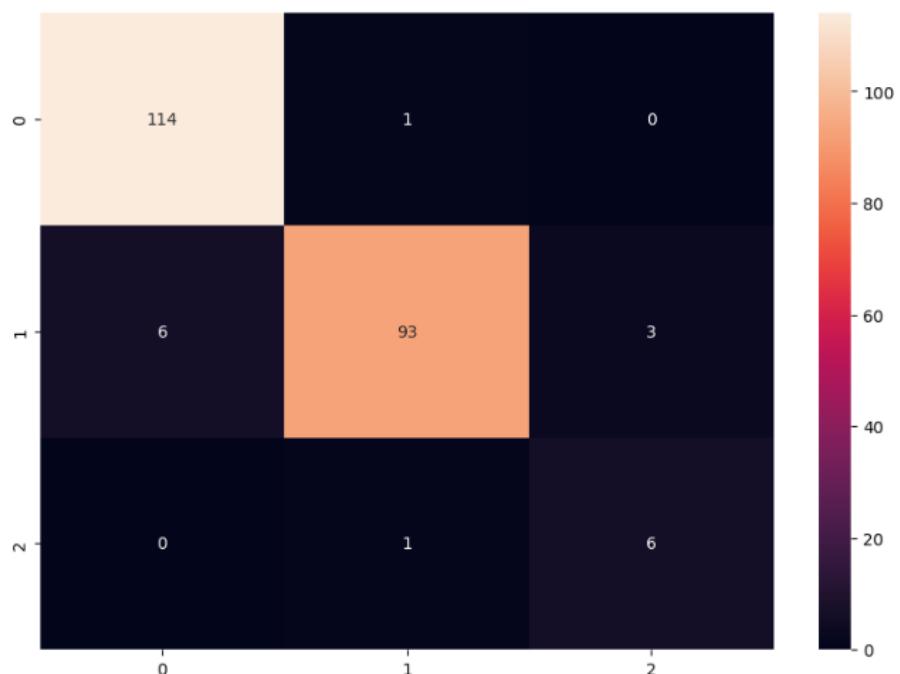


Actual: Potato_Late_blight,
Predicted: Potato_healthy,
Confidence: 88.77%



Classification Report:

	precision	recall	f1-score	support
0	0.95	0.99	0.97	115
1	0.98	0.91	0.94	102
2	0.67	0.86	0.75	7
accuracy			0.95	224
macro avg	0.87	0.92	0.89	224
weighted avg	0.95	0.95	0.95	224



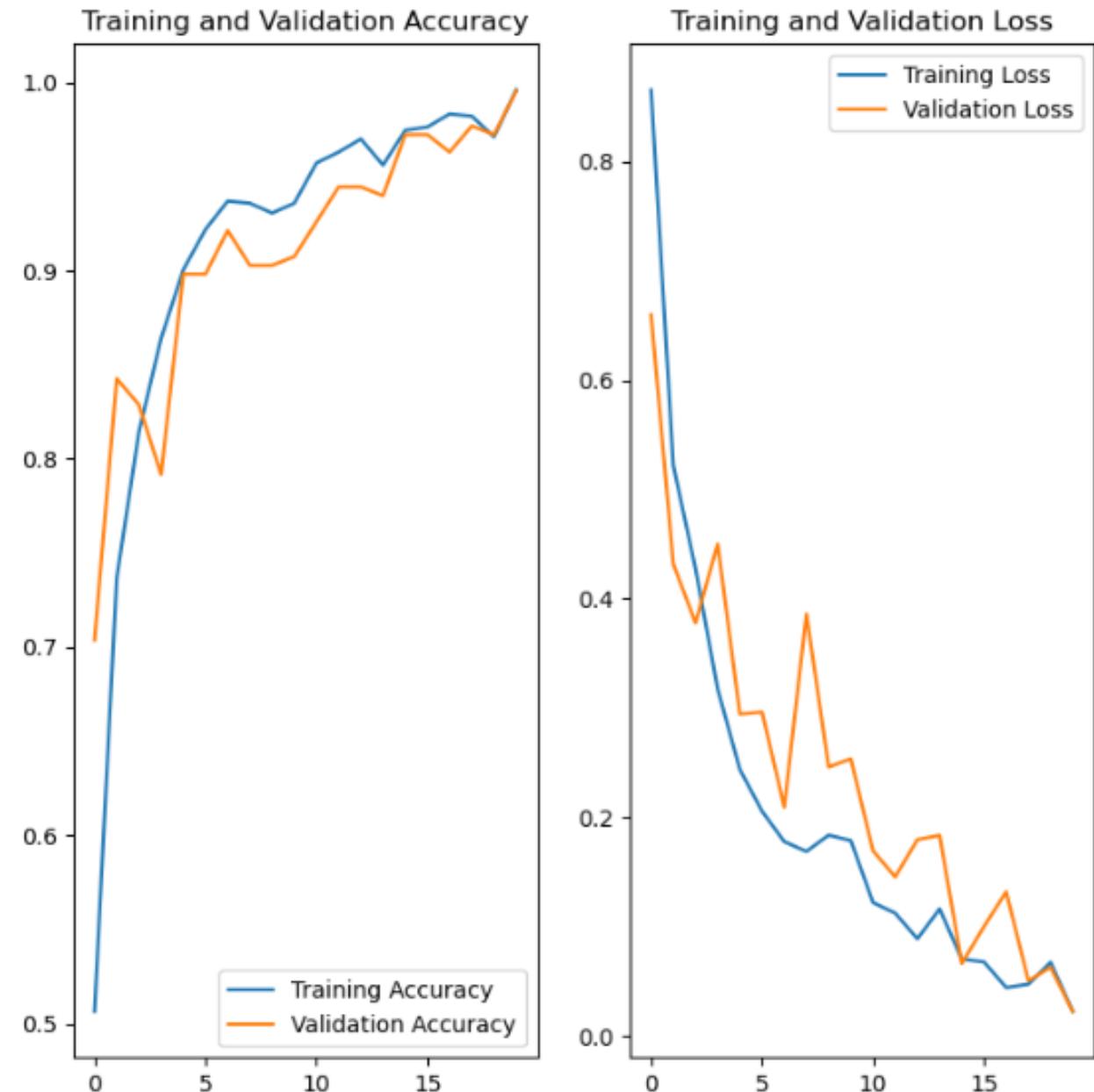
(b) 24

```
IMAGE_SIZE=256  
BATCH_SIZE=24  
CHANNELS=3  
EPOCHS=20
```

```
scores=model.evaluate(test_ds)  
scores
```

```
9/9 [=====] - 2s 168ms/step - loss: 0.0198 - accuracy: 0.9907  
[0.019836299121379852, 0.9907407164573669]
```

Average Time per Epoch = 76.75 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.99%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%

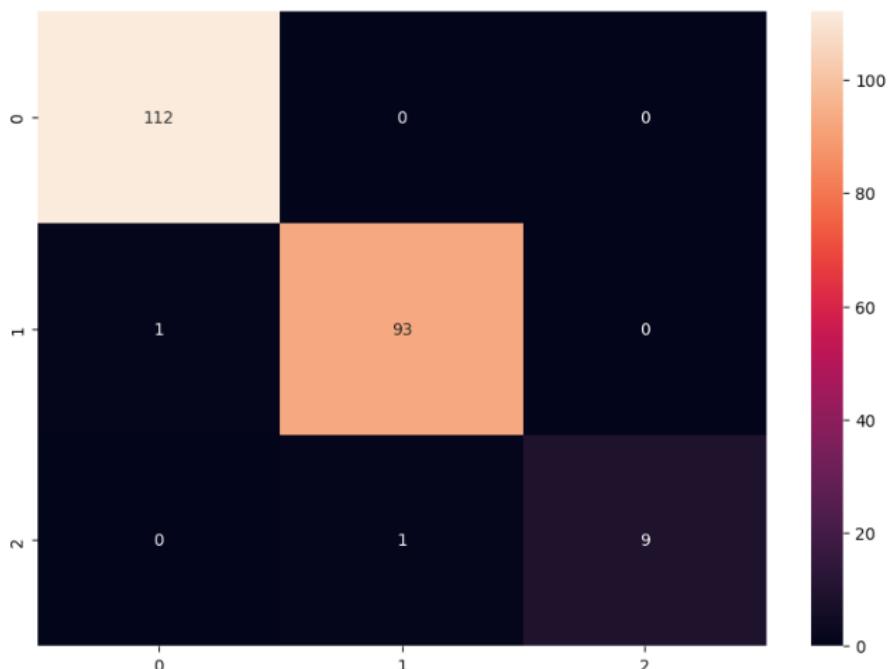


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.86%



Classification Report:

	precision	recall	f1-score	support
0	0.99	1.00	1.00	112
1	0.99	0.99	0.99	94
2	1.00	0.90	0.95	10
accuracy			0.99	216
macro avg	0.99	0.96	0.98	216
weighted avg	0.99	0.99	0.99	216



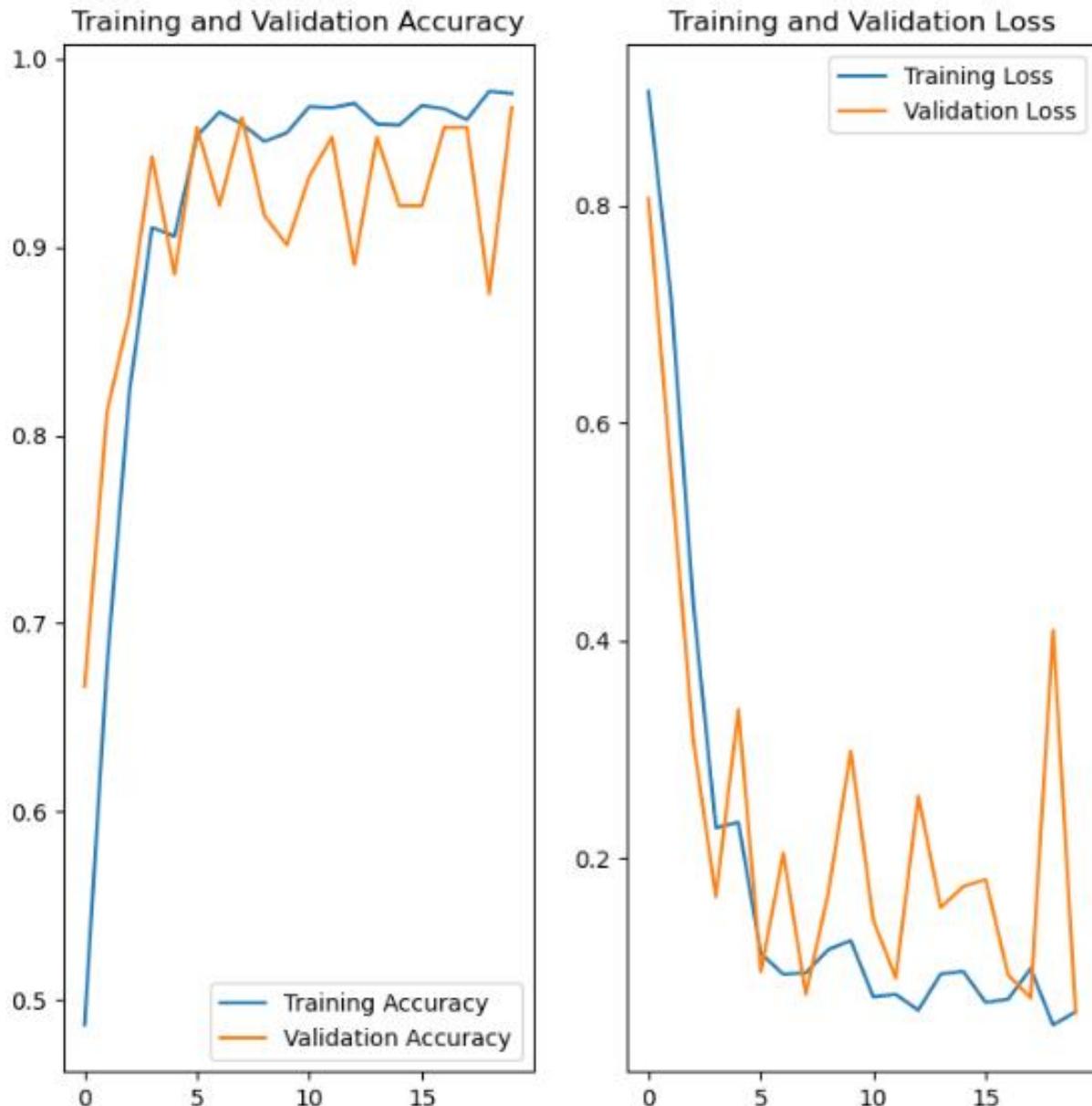
(c) 32

```
IMAGE_SIZE=256  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=20
```

```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 3s 237ms/step - loss: 0.0730 - accuracy: 0.9727  
[0.07297477126121521, 0.97265625]
```

Average Time per Epoch: 71.45 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 92.87%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



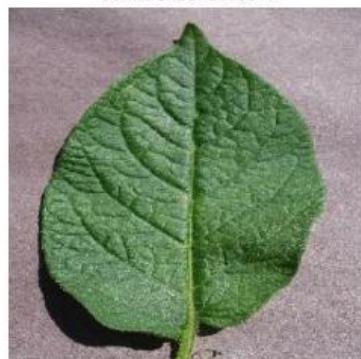
Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.73%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.99%



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 99.09%

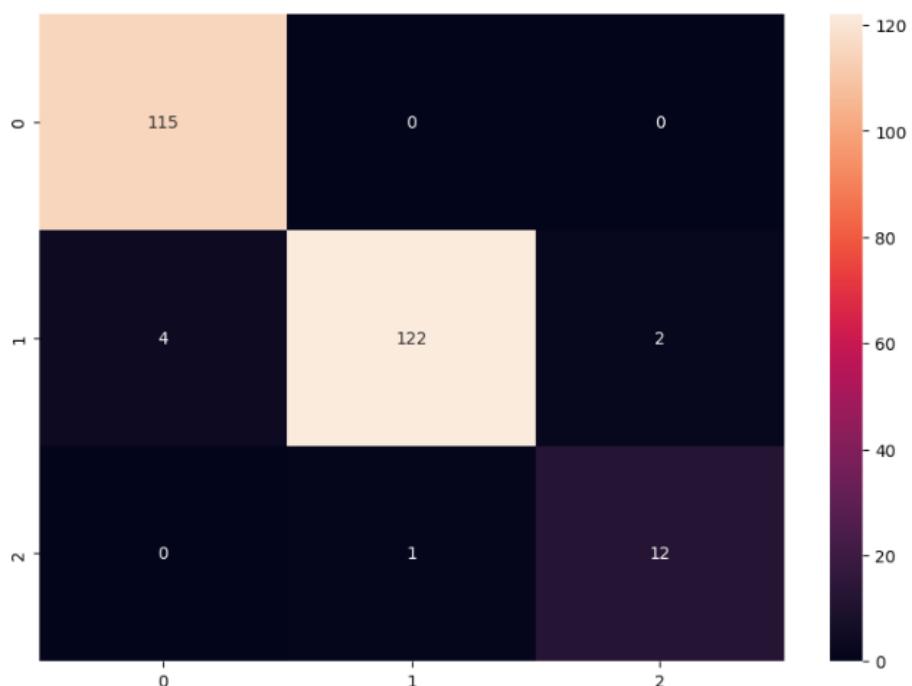


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.12%



Classification Report:

	precision	recall	f1-score	support
0	0.97	1.00	0.98	115
1	0.99	0.95	0.97	128
2	0.86	0.92	0.89	13
accuracy			0.97	256
macro avg	0.94	0.96	0.95	256
weighted avg	0.97	0.97	0.97	256



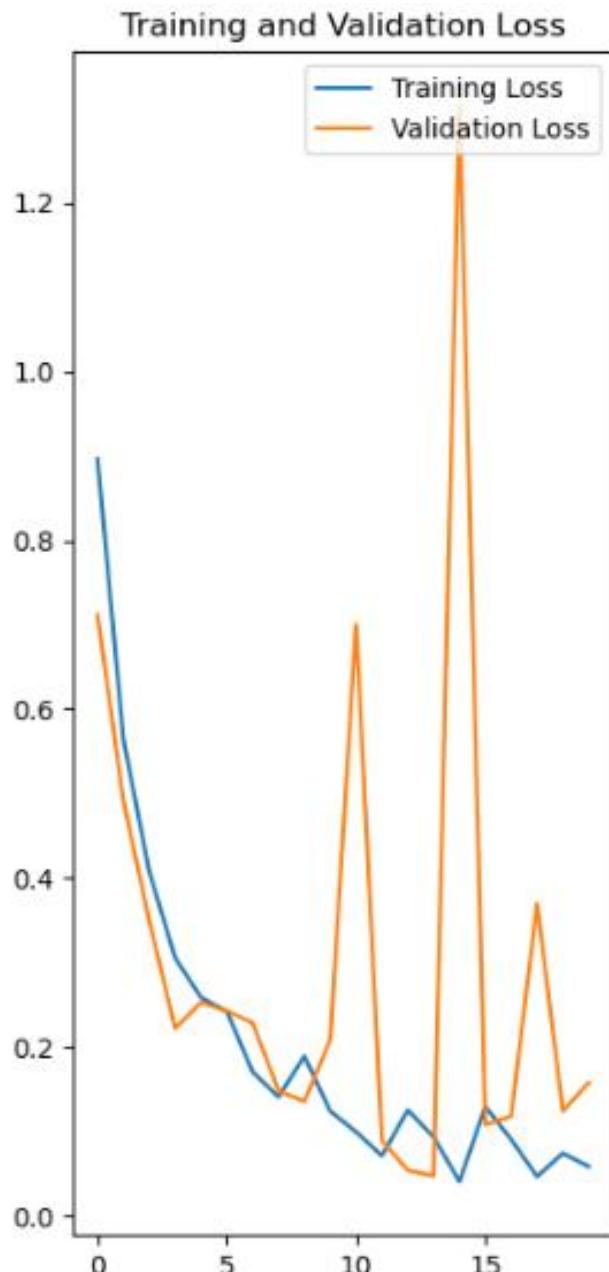
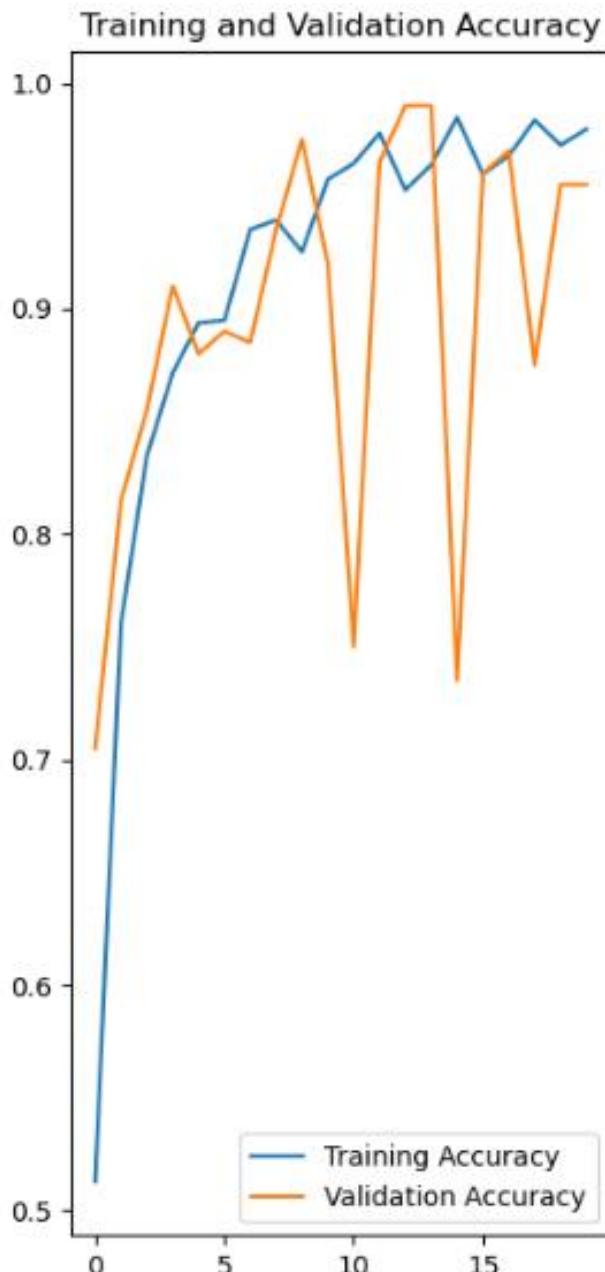
(d) 40

```
IMAGE_SIZE=256  
BATCH_SIZE=40  
CHANNELS=3  
EPOCHS=20
```

```
scores=model.evaluate(test_ds)  
scores
```

```
6/6 [=====] - 5s 526ms/step - loss: 0.1135 - accuracy: 0.9625  
[0.11351661384105682, 0.9624999761581421]
```

Average Time per Epoch: 83.70 s



Actual: Potato_Late_blight,
Predicted: Potato_healthy,
Confidence: 57.34%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 94.26%

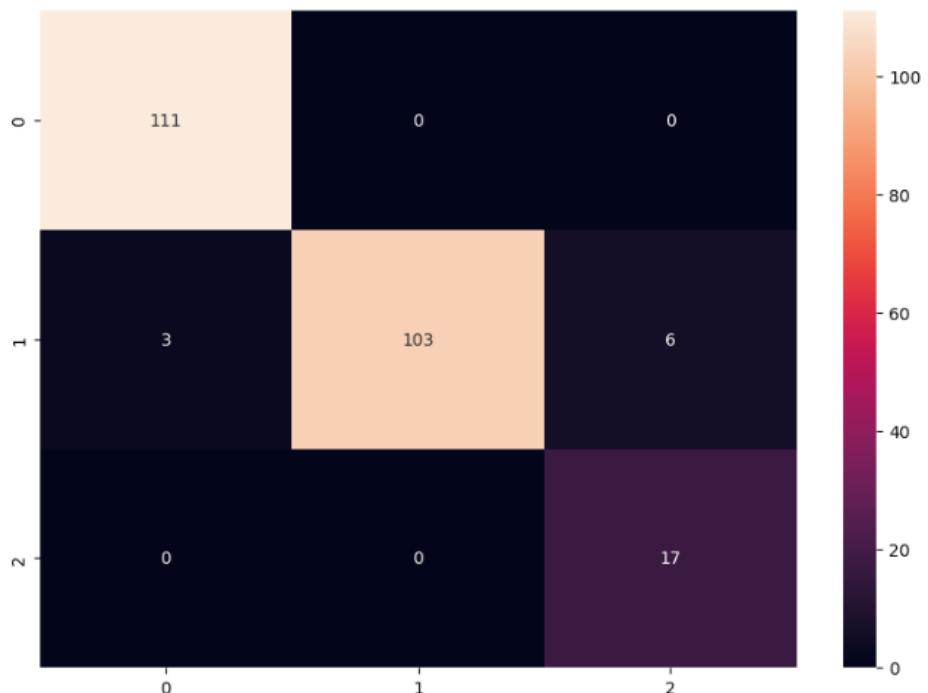


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.99%



Classification Report:

	precision	recall	f1-score	support
0	0.97	1.00	0.99	111
1	1.00	0.92	0.96	112
2	0.74	1.00	0.85	17
accuracy			0.96	240
macro avg	0.90	0.97	0.93	240
weighted avg	0.97	0.96	0.96	240



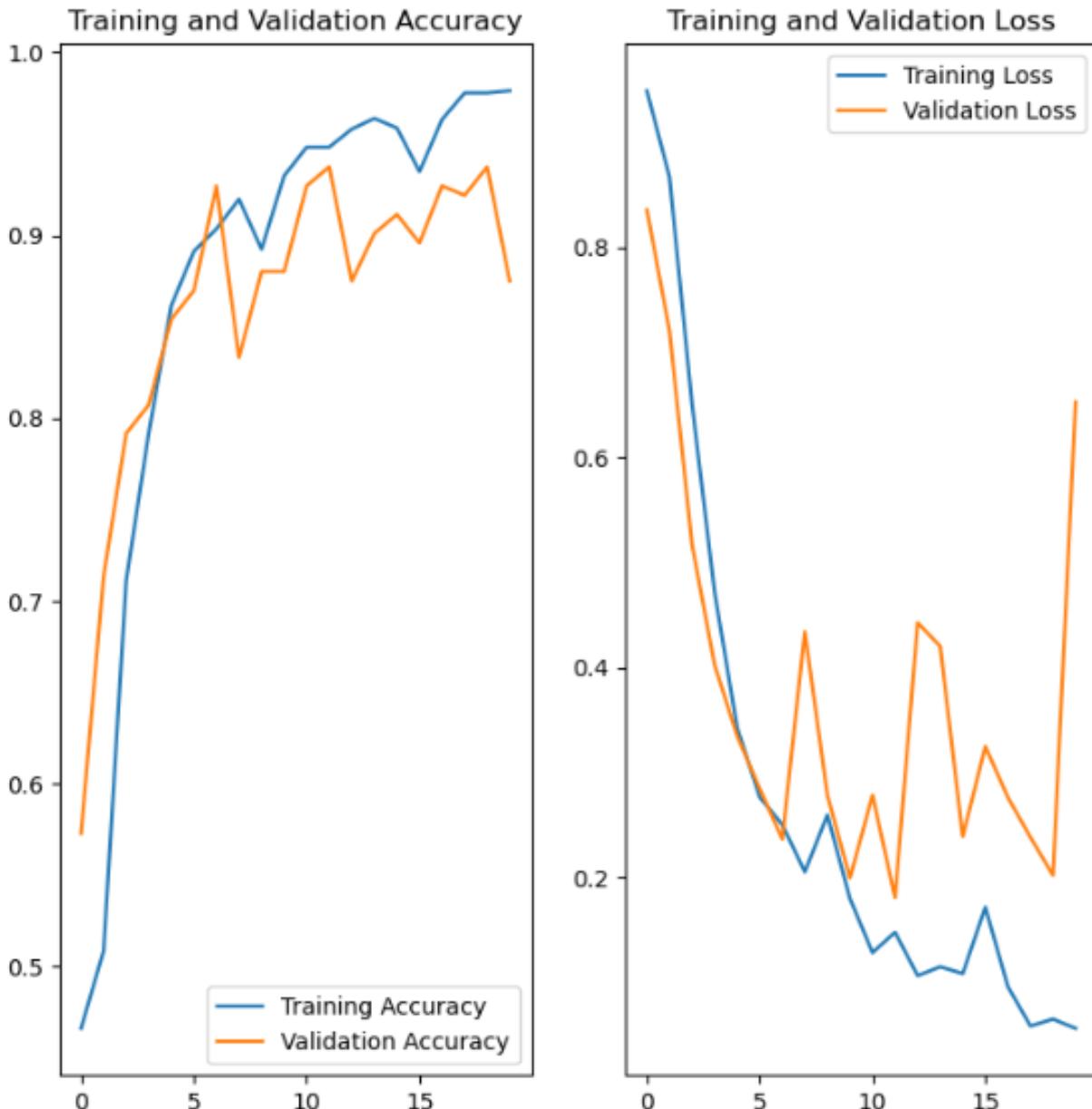
(e) 48

```
IMAGE_SIZE=256  
BATCH_SIZE=48  
CHANNELS=3  
EPOCHS=20
```

```
scores=model.evaluate(test_ds)  
scores
```

```
5/5 [=====] - 3s 355ms/step - loss: 0.7339 - accuracy: 0.8292  
[0.733871340751648, 0.8291666507720947]
```

Average Time per Epoch: 73.00 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.22%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.39%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 96.27%



Actual: Potato_Late_blight,
Predicted: Potato_Early_blight,
Confidence: 99.85%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 81.41%

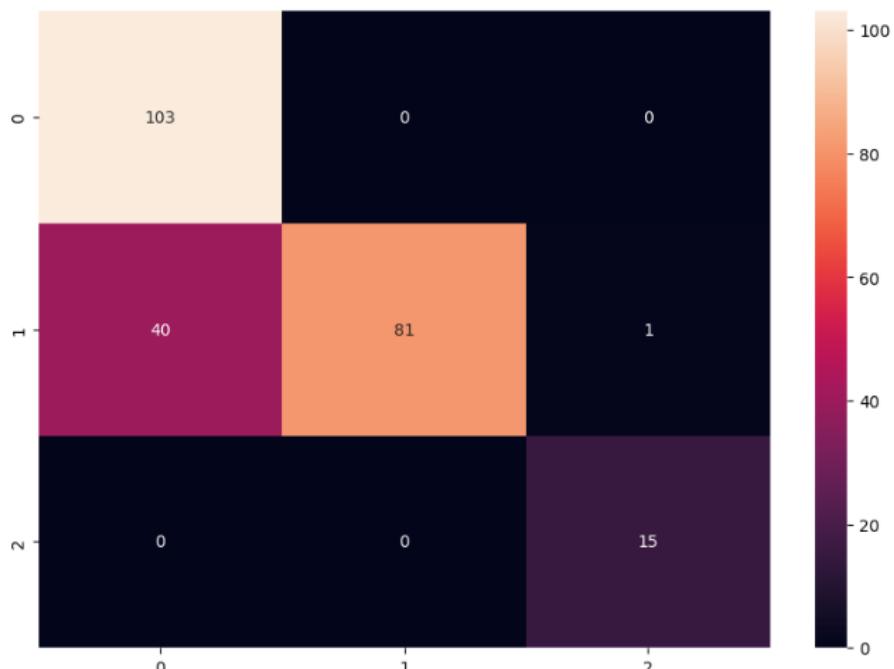


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	0.72	1.00	0.84	103
1	1.00	0.66	0.80	122
2	0.94	1.00	0.97	15
accuracy			0.83	240
macro avg	0.89	0.89	0.87	240
weighted avg	0.88	0.83	0.83	240



DATASET SPLIT RATIO

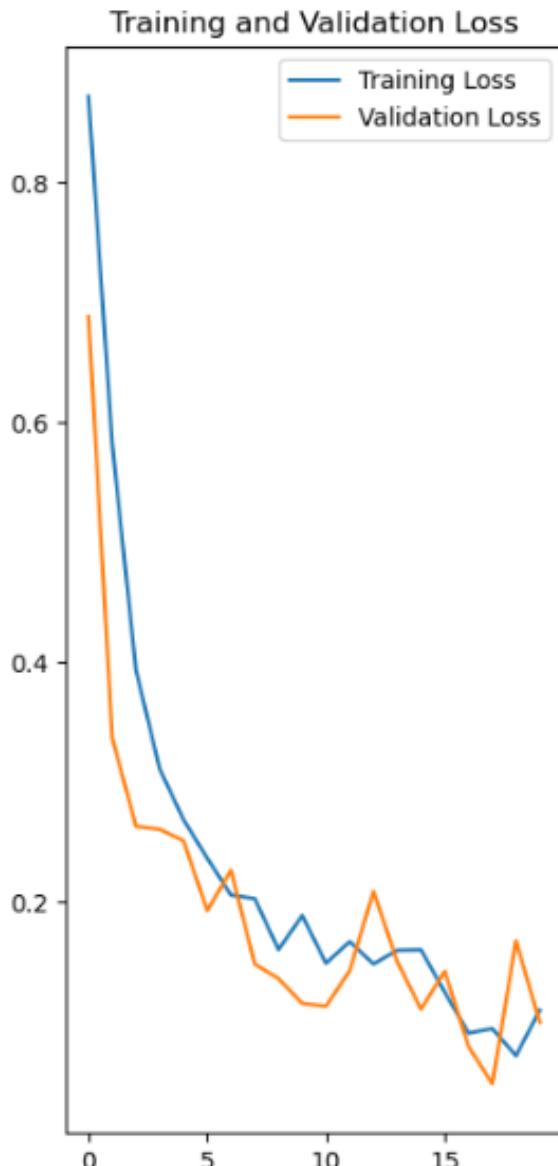
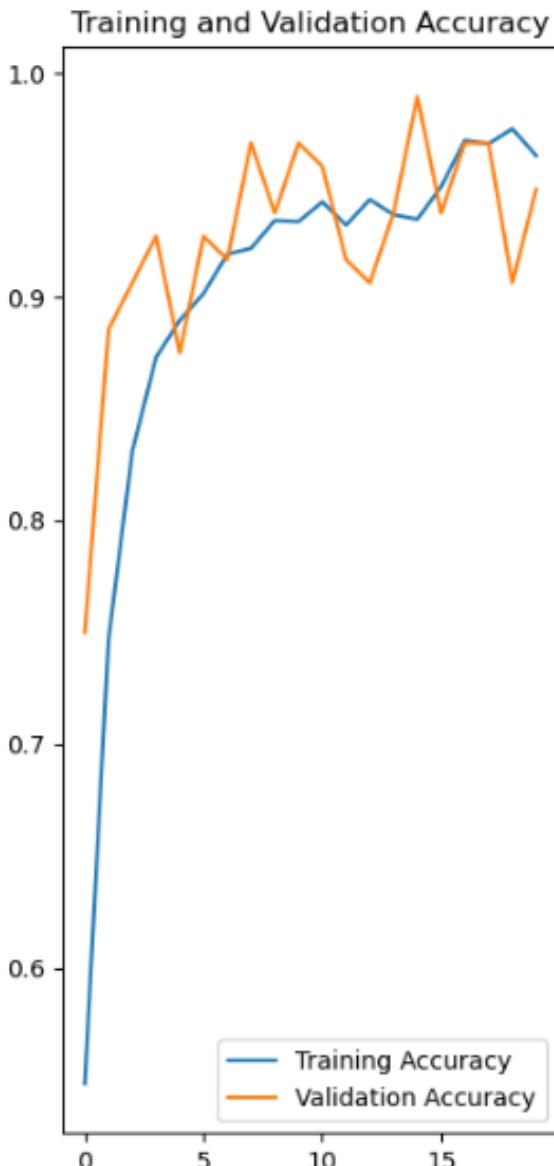
(a) 90:5:5

```
IMAGE_SIZE=256  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=20
```

```
scores=model.evaluate(test_ds)  
scores
```

```
4/4 [=====] - 2s 221ms/step - loss: 0.1881 - accuracy: 0.8984  
[0.18812009692192078, 0.8984375]
```

Average Time per Epoch: 81.50 s



Actual: Potato_Late_blight,
Predicted: Potato_Early_blight,
Confidence: 80.63%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.99%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.76%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 98.81%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.45%

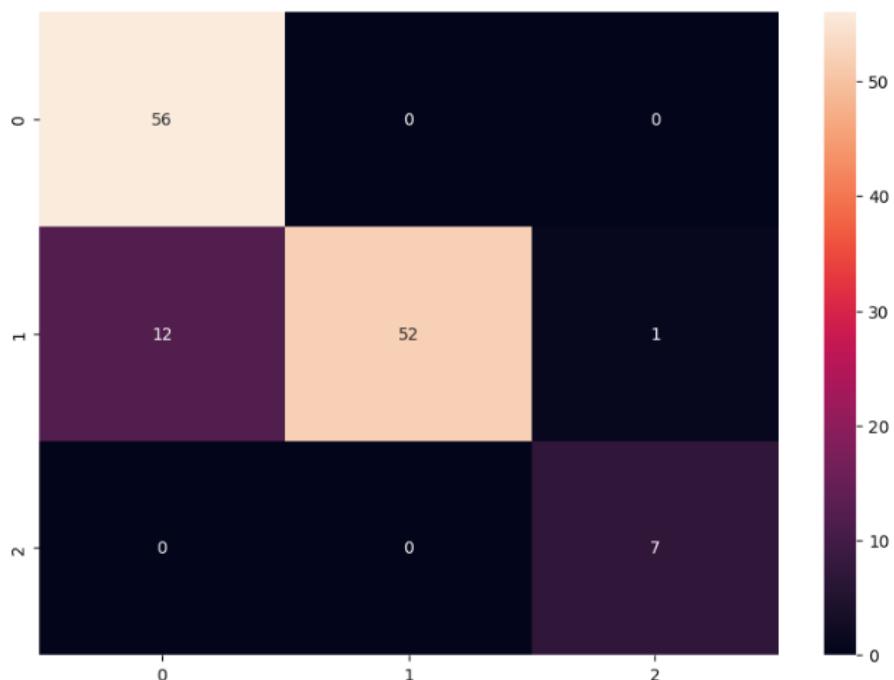


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 97.82%



Classification Report:

	precision	recall	f1-score	support
0	0.82	1.00	0.90	56
1	1.00	0.80	0.89	65
2	0.88	1.00	0.93	7
accuracy			0.90	128
macro avg	0.90	0.93	0.91	128
weighted avg	0.92	0.90	0.90	128



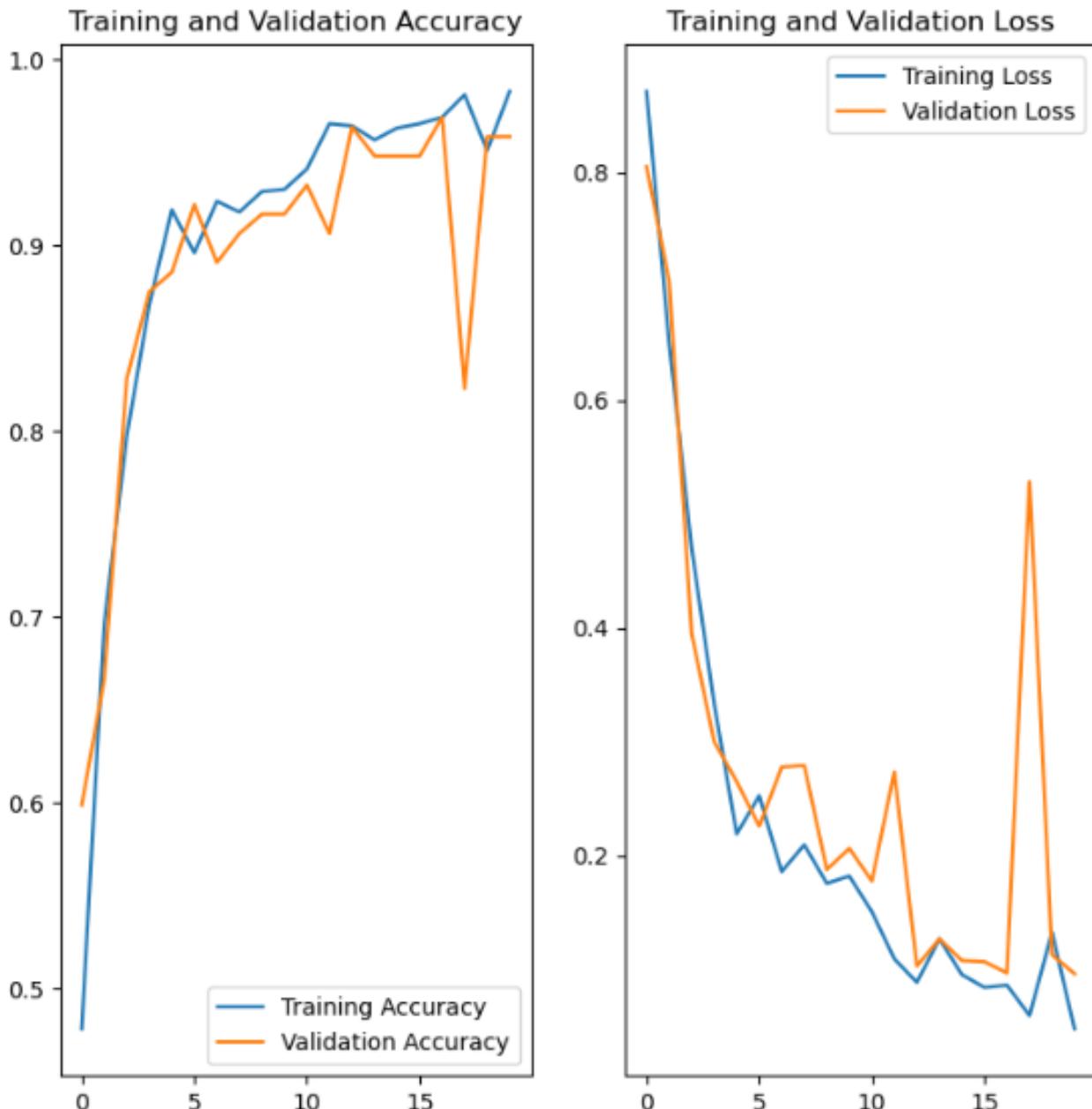
(b) 80:10:10

```
IMAGE_SIZE=256  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=20
```

```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 5s 242ms/step - loss: 0.1412 - accuracy: 0.9492  
[0.14118511974811554, 0.94921875]
```

Average Time per Epoch: 71.20 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 99.99%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 97.95%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.99%

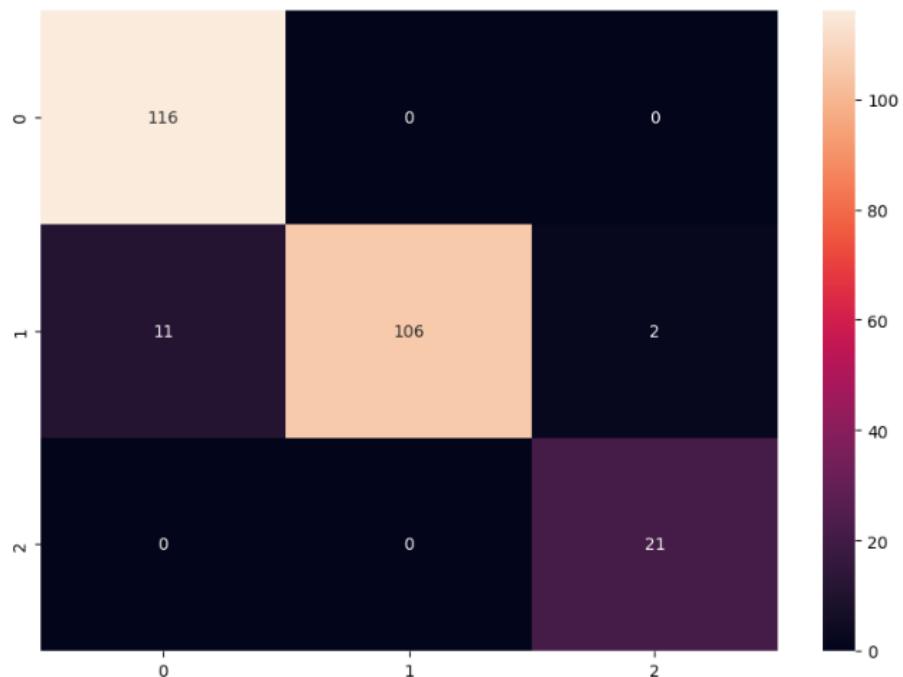


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	0.91	1.00	0.95	116
1	1.00	0.89	0.94	119
2	0.91	1.00	0.95	21
accuracy			0.95	256
macro avg	0.94	0.96	0.95	256
weighted avg	0.95	0.95	0.95	256



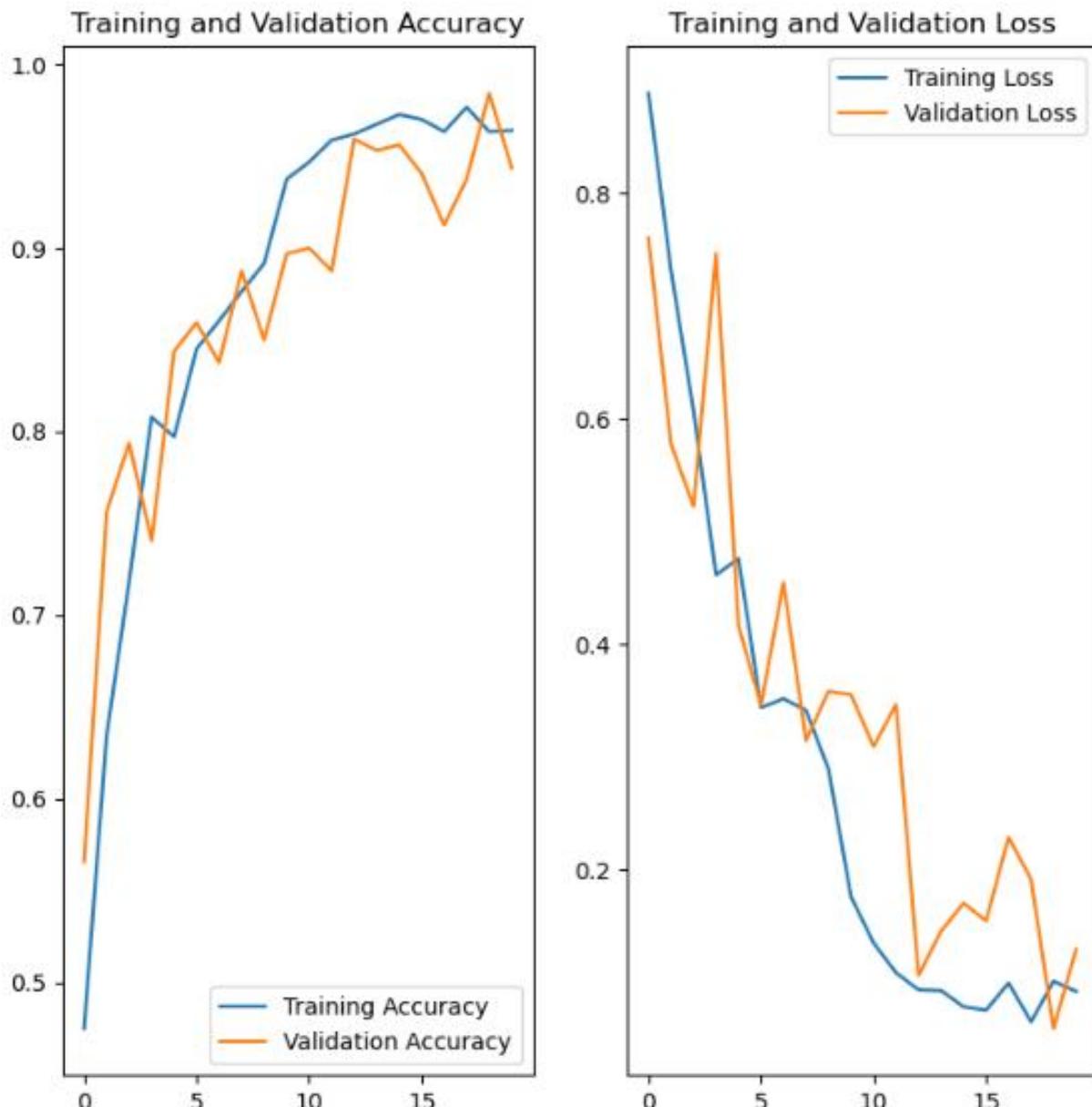
(c) 70:15:15

```
IMAGE_SIZE=256  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=20
```

```
scores=model.evaluate(test_ds)  
scores
```

```
11/11 [=====] - 3s 224ms/step - loss: 0.1144 - accuracy: 0.9517  
[0.11437445133924484, 0.9517045617103577]
```

Average Time per Epoch: 60.95 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 98.65%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 95.9%

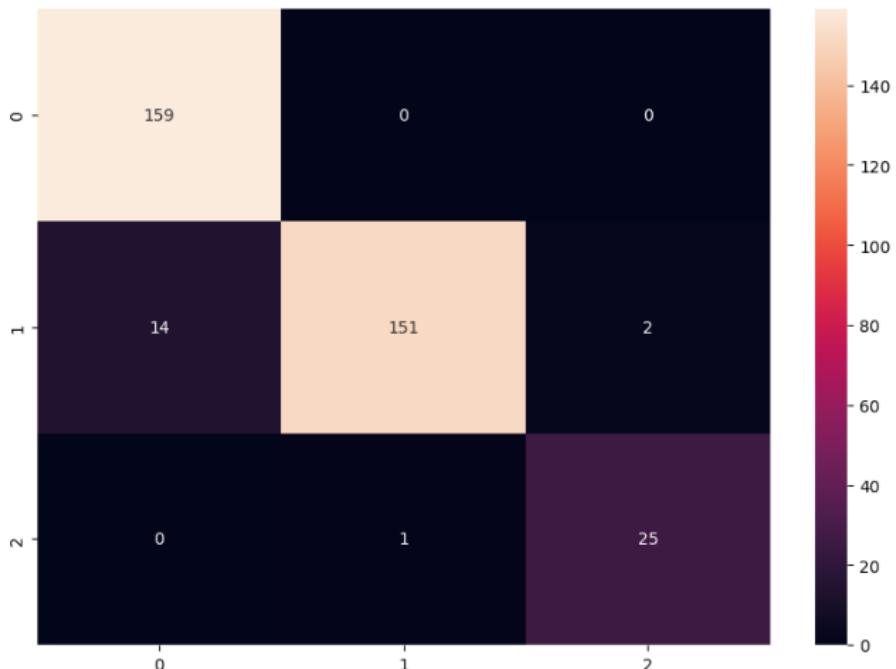


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 90.72%



Classification Report:

	precision	recall	f1-score	support
0	0.92	1.00	0.96	159
1	0.99	0.90	0.95	167
2	0.93	0.96	0.94	26
accuracy			0.95	352
macro avg	0.95	0.96	0.95	352
weighted avg	0.95	0.95	0.95	352



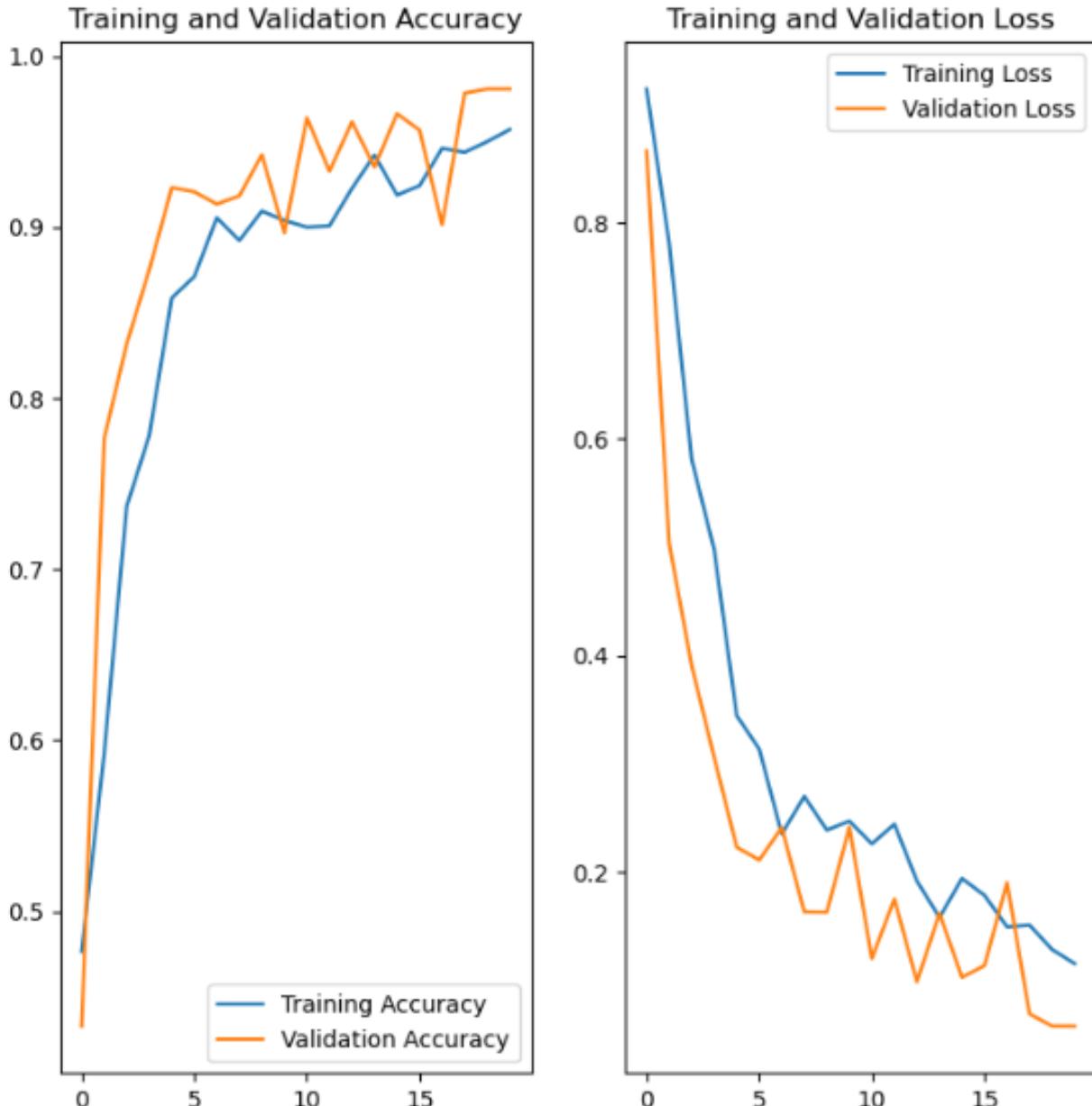
(d) 60:20:20

```
IMAGE_SIZE=256  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=20
```

```
scores=model.evaluate(test_ds)  
scores
```

```
15/15 [=====] - 4s 233ms/step - loss: 0.0922 - accuracy: 0.9604  
[0.09218290448188782, 0.9604166746139526]
```

Average Time per Epoch: 53.40 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 88.16%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.96%



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 99.61%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.99%



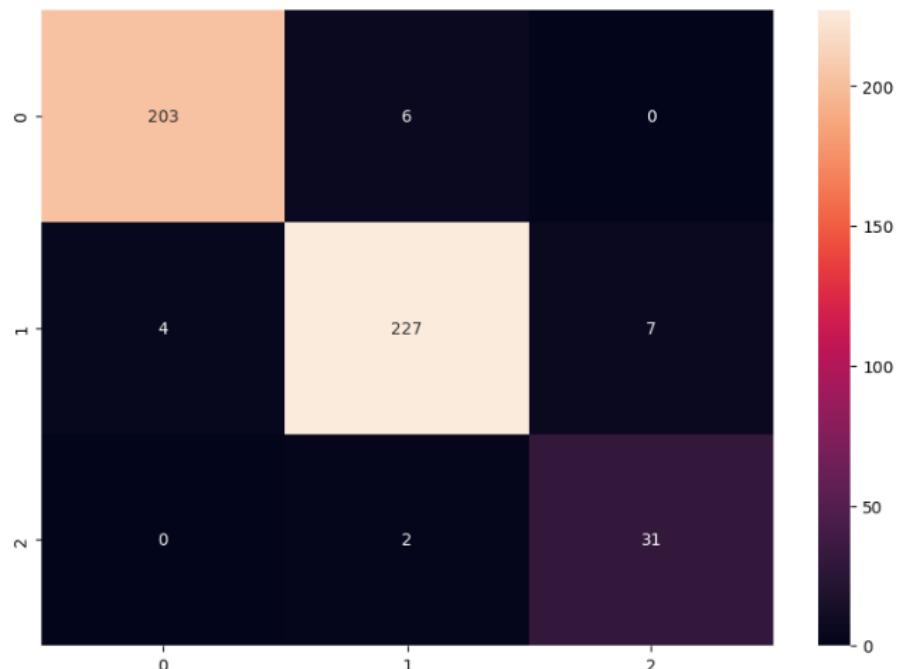
Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.84%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.44%



Classification Report:				
	precision	recall	f1-score	support
0	0.98	0.97	0.98	209
1	0.97	0.95	0.96	238
2	0.82	0.94	0.87	33
accuracy			0.96	480
macro avg	0.92	0.95	0.94	480
weighted avg	0.96	0.96	0.96	480



(e) 50:25:25

```
IMAGE_SIZE=256  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=20
```

```
scores=model.evaluate(test_ds)  
scores
```

```
17/17 [=====] - 5s 234ms/step - loss: 0.1538 - accuracy: 0.9393  
[0.1538049280643463, 0.939338207244873]
```

Average Time per Epoch: 49.45 s



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 99.87%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 93.63%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 51.34%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.96%



Actual: Potato_Early_blight,
Predicted: Potato_Late_blight,
Confidence: 85.12%

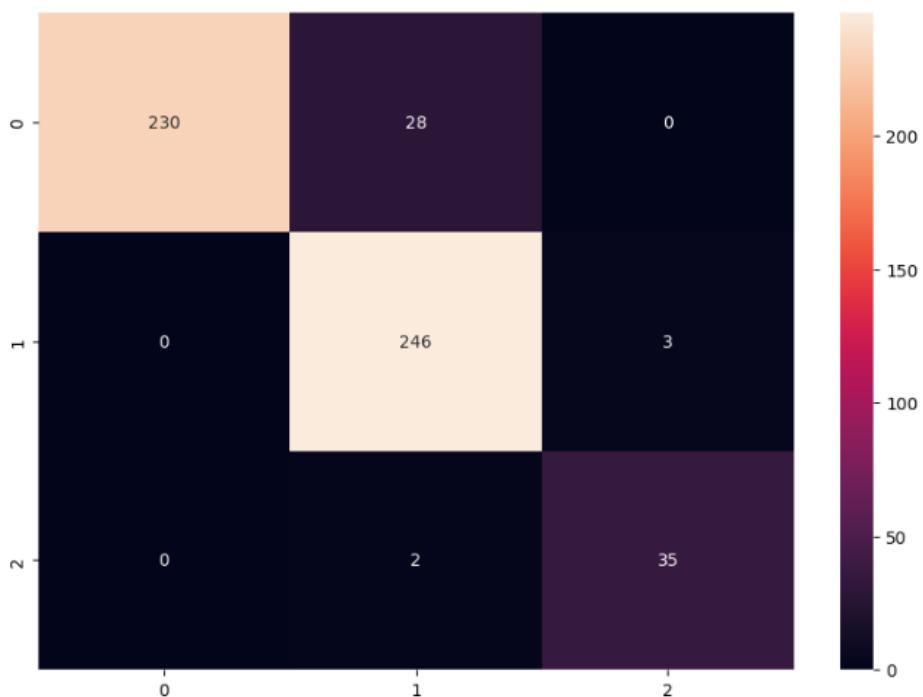


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.98%



Classification Report:

	precision	recall	f1-score	support
0	1.00	0.89	0.94	258
1	0.89	0.99	0.94	249
2	0.92	0.95	0.93	37
accuracy			0.94	544
macro avg	0.94	0.94	0.94	544
weighted avg	0.94	0.94	0.94	544



Model 2: ResNet50

BASE MODEL

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=5
```

```
scores=model.evaluate(test_ds)  
scores
```

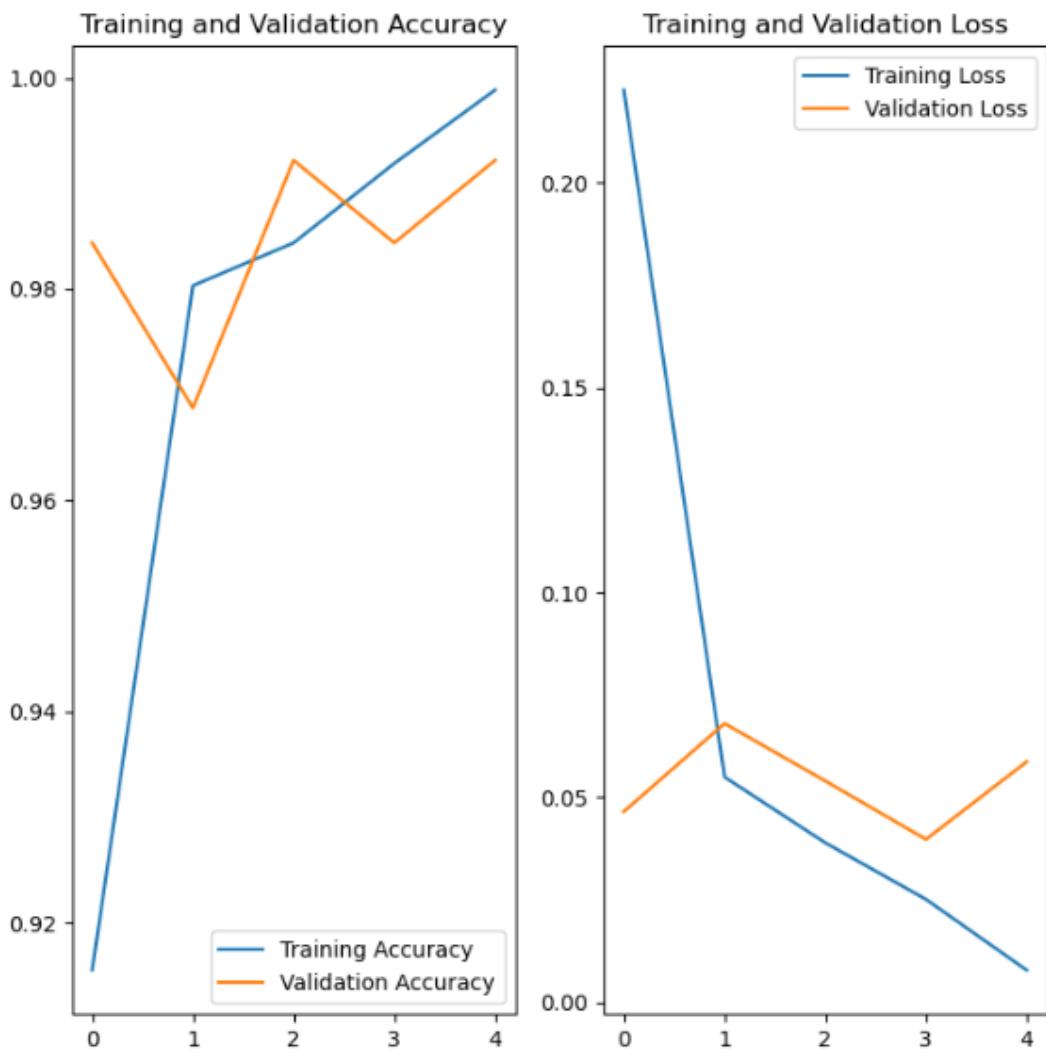
```
8/8 [=====] - 12s 1s/step - loss: 0.0046 - accuracy: 1.0000  
[0.0046167392283678055, 1.0]
```

Average Time per Epoch: 103.00 s

history.history['loss']	history.history['accuracy']	history.history['val_loss']
[0.22268621623516083, 0.054990872740745544, 0.03894481435418129, 0.02513871155679226, 0.007846430875360966]	[0.9155092835426331, 0.9803240895271301, 0.984375, 0.9918981194496155, 0.9988425970077515]	[0.046575333923101425, 0.06807098537683487, 0.05404365807771683, 0.039777688682079315, 0.05873579904437065]

```
history.history['val_accuracy']
```

```
[0.984375, 0.96875, 0.9921875, 0.984375, 0.9921875]
```



Actual: Potato__healthy,
Predicted: Potato__healthy,
Confidence: 99.95%



Actual: Potato__healthy,
Predicted: Potato__healthy,
Confidence: 99.82%



Actual: Potato__Late_blight,
Predicted: Potato__Late_blight,
Confidence: 100.0%



Actual: Potato__Late_blight,
Predicted: Potato__Late_blight,
Confidence: 100.0%



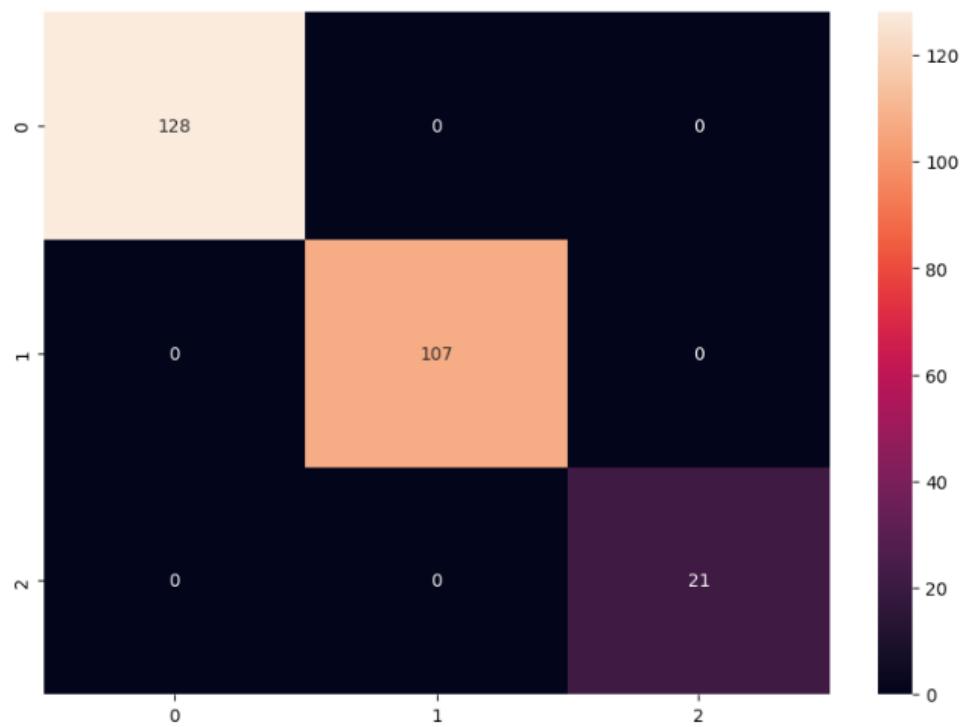
Actual: Potato__Early_blight,
Predicted: Potato__Early_blight,
Confidence: 100.0%



Actual: Potato__Early_blight,
Predicted: Potato__Early_blight,
Confidence: 100.0%



Classification Report:				
	precision	recall	f1-score	support
0	1.00	1.00	1.00	128
1	1.00	1.00	1.00	107
2	1.00	1.00	1.00	21
accuracy			1.00	256
macro avg	1.00	1.00	1.00	256
weighted avg	1.00	1.00	1.00	256



NO. OF EPOCHS

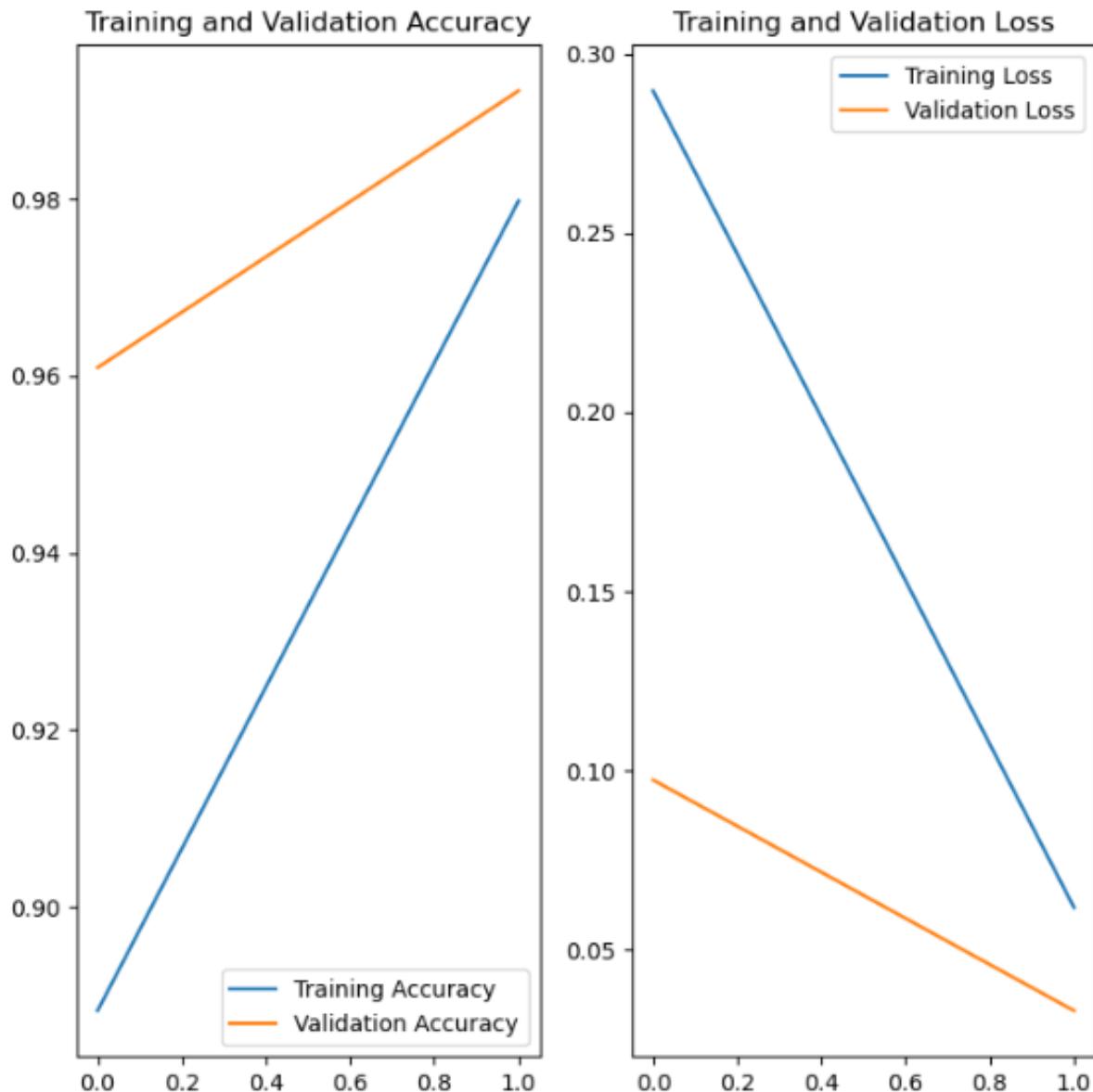
(a) 2

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=2
```

```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 15s 2s/step - loss: 0.0288 - accuracy: 0.9961  
[0.028818320482969284, 0.99609375]
```

Average Time per Epoch: 89.50 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.97%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.98%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.52%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 88.85%

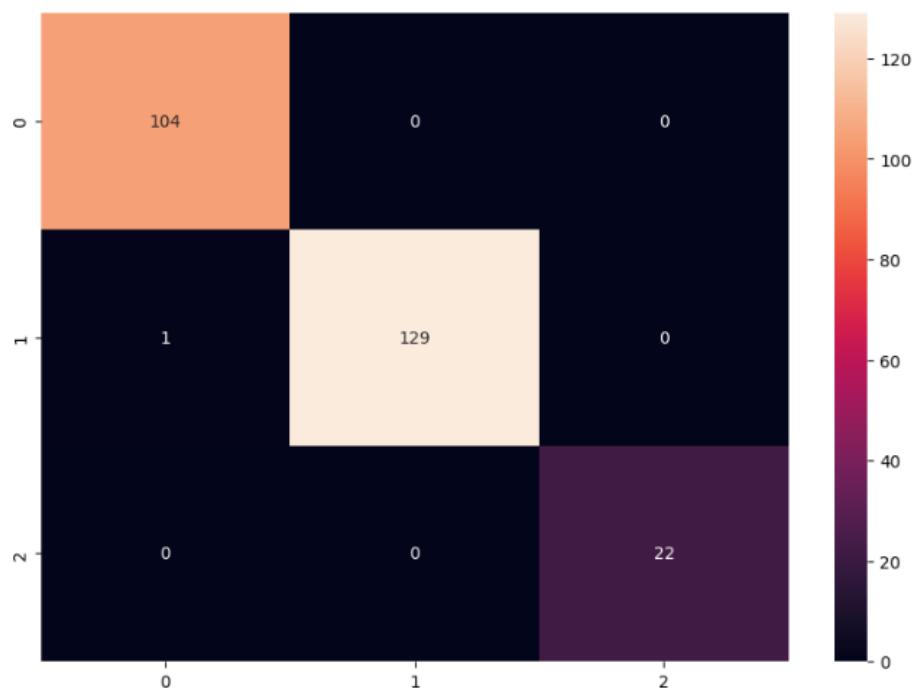


Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 90.03%



Classification Report:

	precision	recall	f1-score	support
0	0.99	1.00	1.00	104
1	1.00	0.99	1.00	130
2	1.00	1.00	1.00	22
accuracy			1.00	256
macro avg	1.00	1.00	1.00	256
weighted avg	1.00	1.00	1.00	256



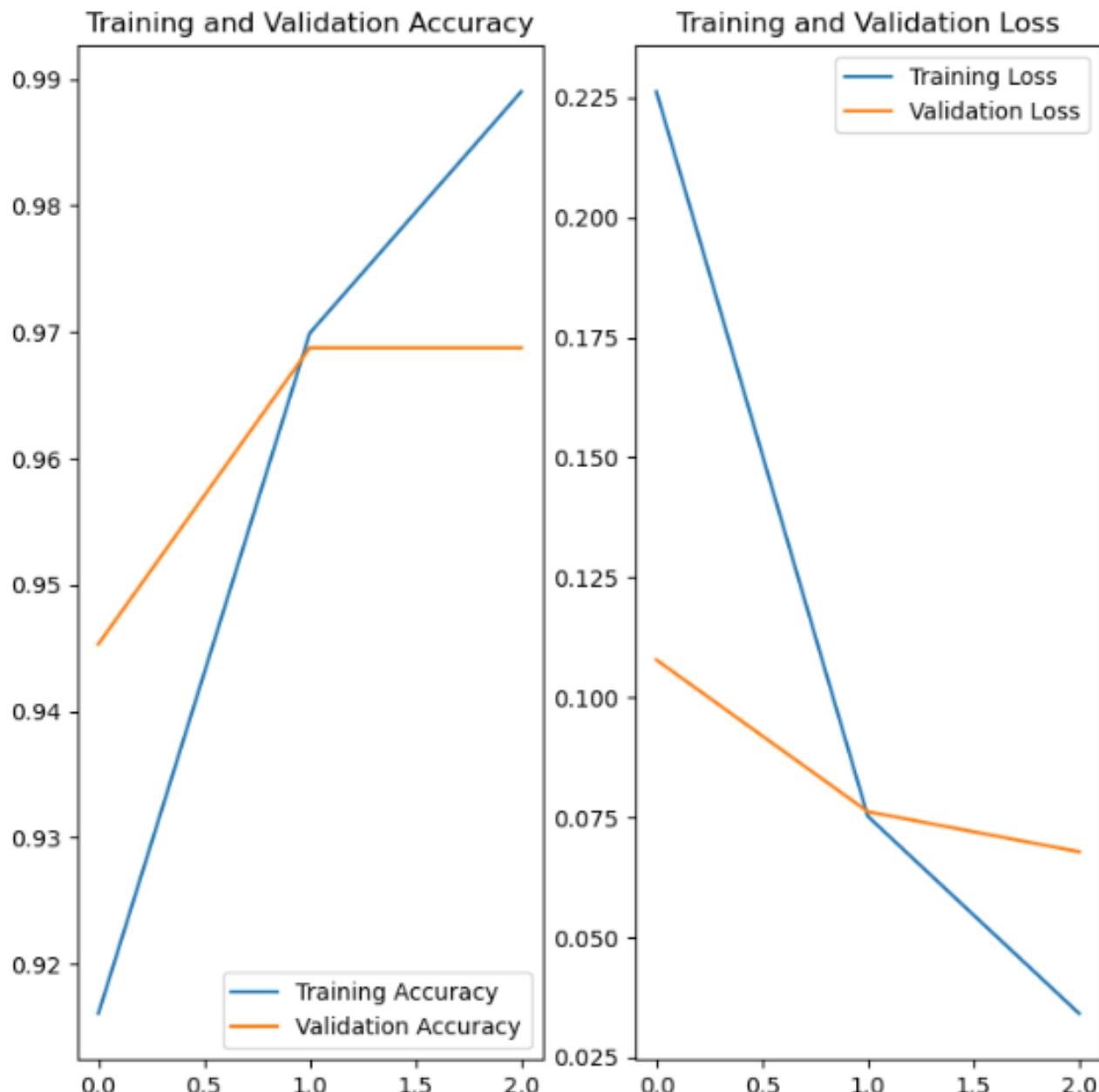
(b) 3

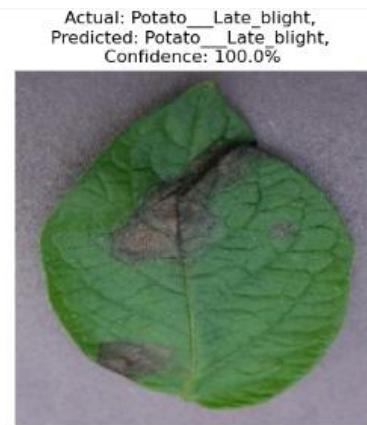
```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=3
```

```
scores=model.evaluate(test_ds)  
scores
```

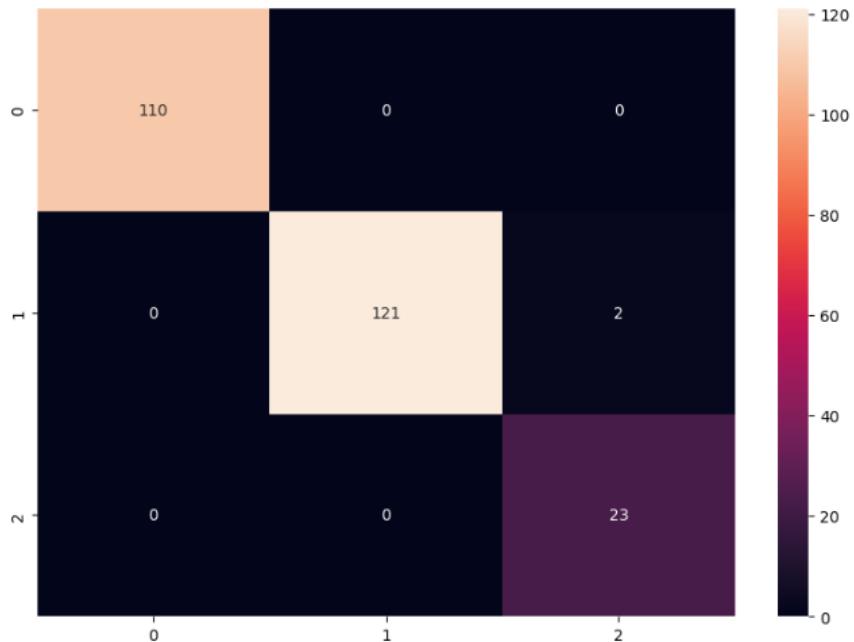
```
8/8 [=====] - 12s 1s/step - loss: 0.0172 - accuracy: 0.9922  
[0.017224997282028198, 0.9921875]
```

Average Time per Epoch: 92.00 s





Classification Report:				
	precision	recall	f1-score	support
0	1.00	1.00	1.00	110
1	1.00	0.98	0.99	123
2	0.92	1.00	0.96	23
accuracy			0.99	256
macro avg	0.97	0.99	0.98	256
weighted avg	0.99	0.99	0.99	256



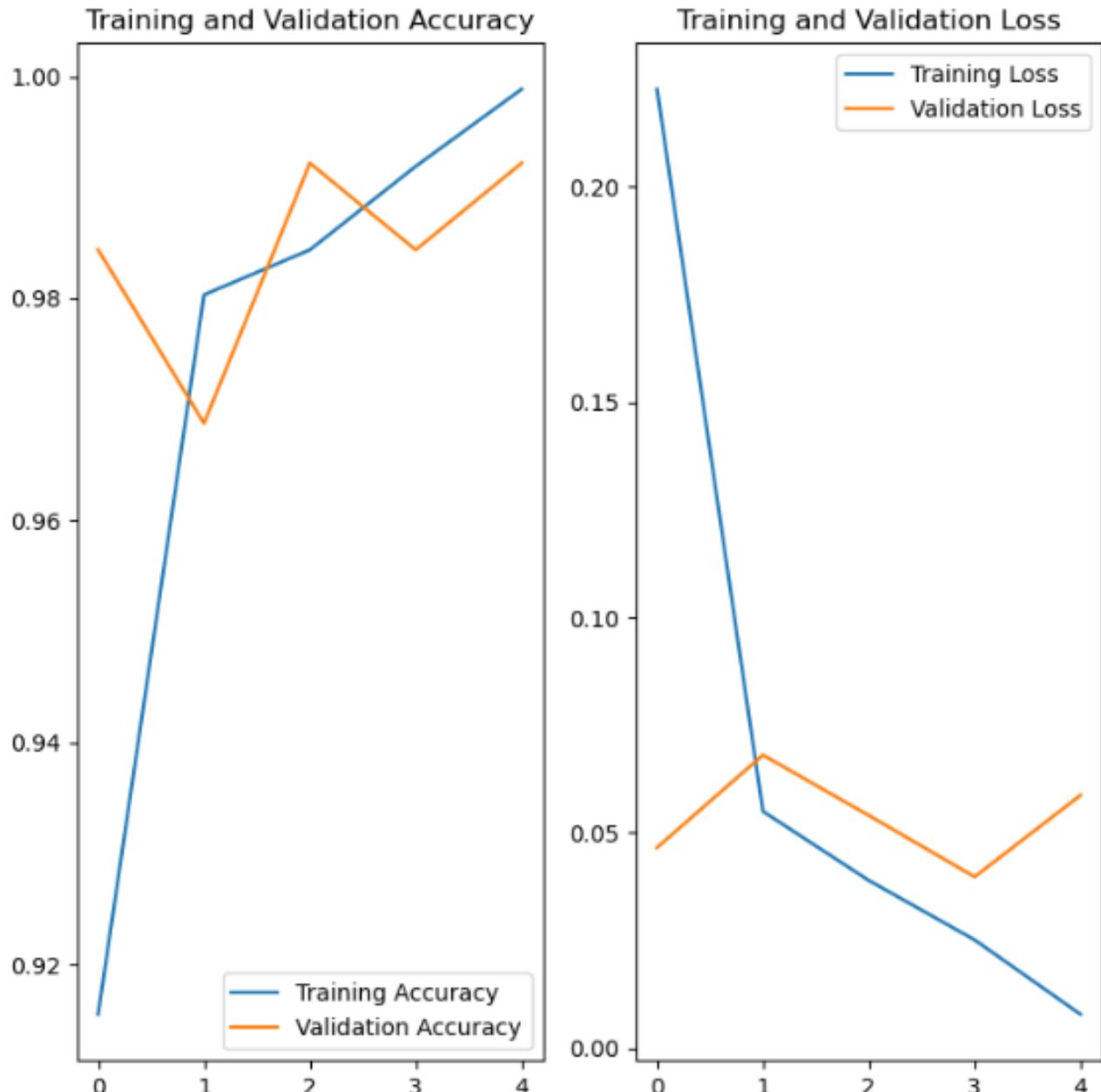
(c) 5

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=5
```

```
scores=model.evaluate(test_ds)  
scores
```

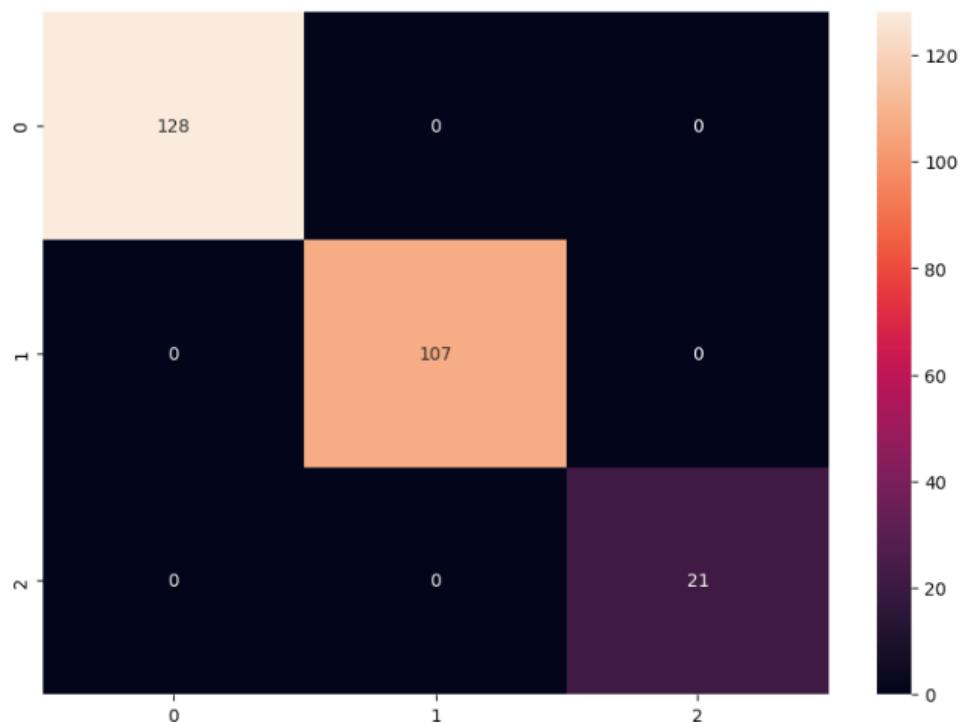
```
8/8 [=====] - 12s 1s/step - loss: 0.0046 - accuracy: 1.0000  
[0.0046167392283678055, 1.0]
```

Average Time per Epoch: 103.00 s





Classification Report:					
	precision	recall	f1-score	support	
0	1.00	1.00	1.00	128	
1	1.00	1.00	1.00	107	
2	1.00	1.00	1.00	21	
accuracy			1.00	256	
macro avg	1.00	1.00	1.00	256	
weighted avg	1.00	1.00	1.00	256	



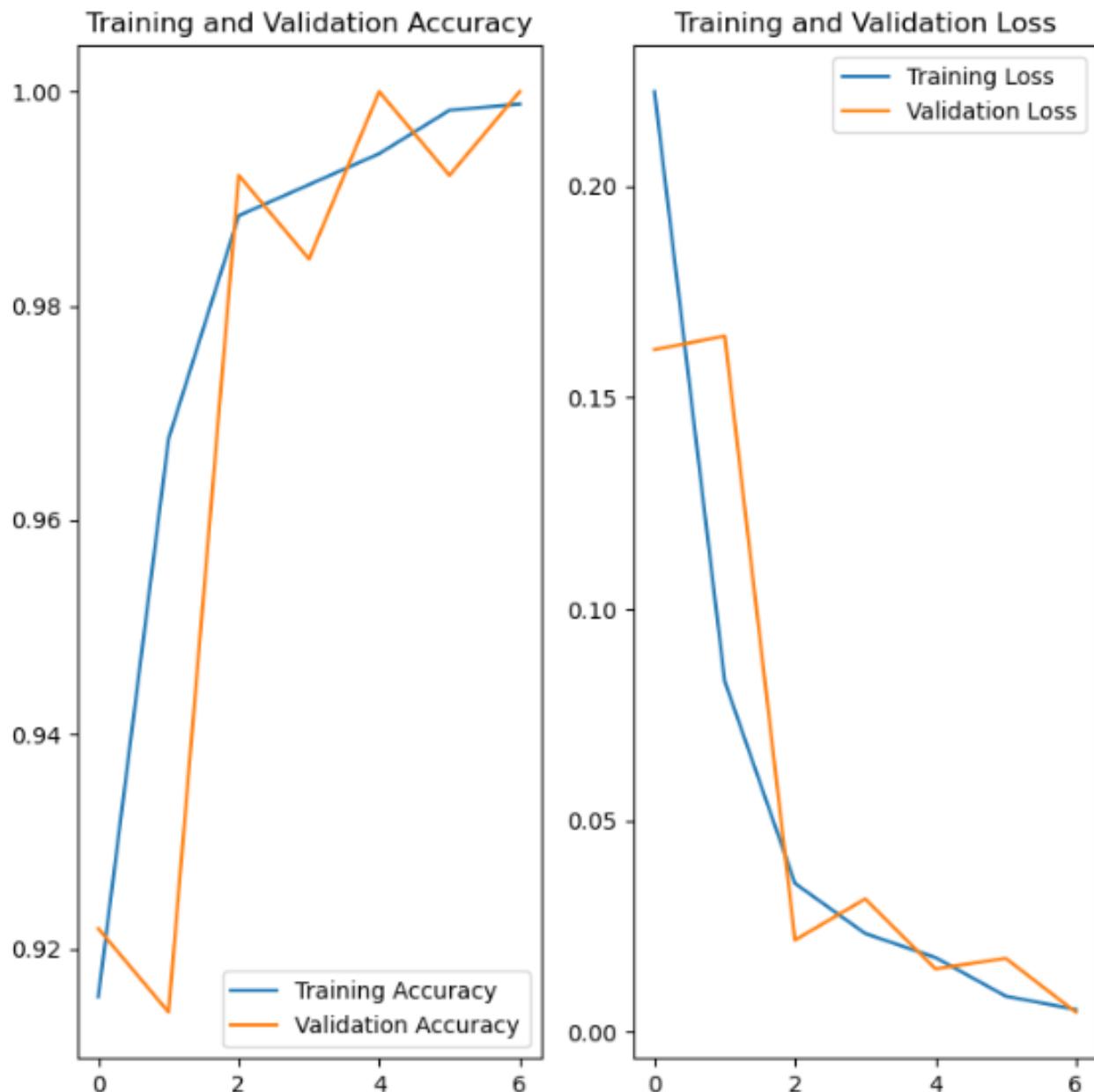
(d) 7

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=7
```

```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 11s 1s/step - loss: 0.0026 - accuracy: 1.0000  
[0.002622253028675914, 1.0]
```

Average Time per Epoch: 104.28 s



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 99.84%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

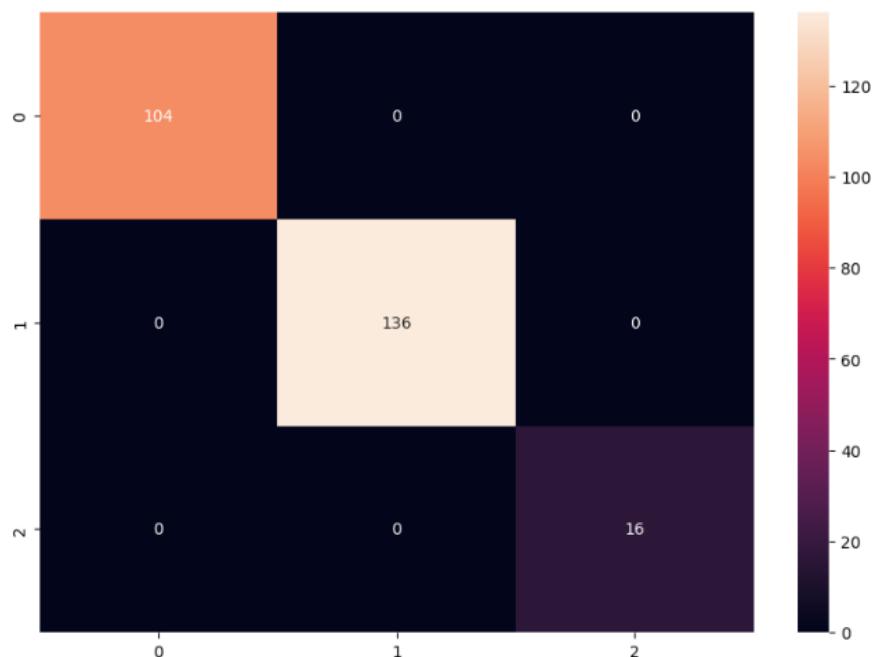


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	1.00	1.00	1.00	104
1	1.00	1.00	1.00	136
2	1.00	1.00	1.00	16
accuracy			1.00	256
macro avg	1.00	1.00	1.00	256
weighted avg	1.00	1.00	1.00	256



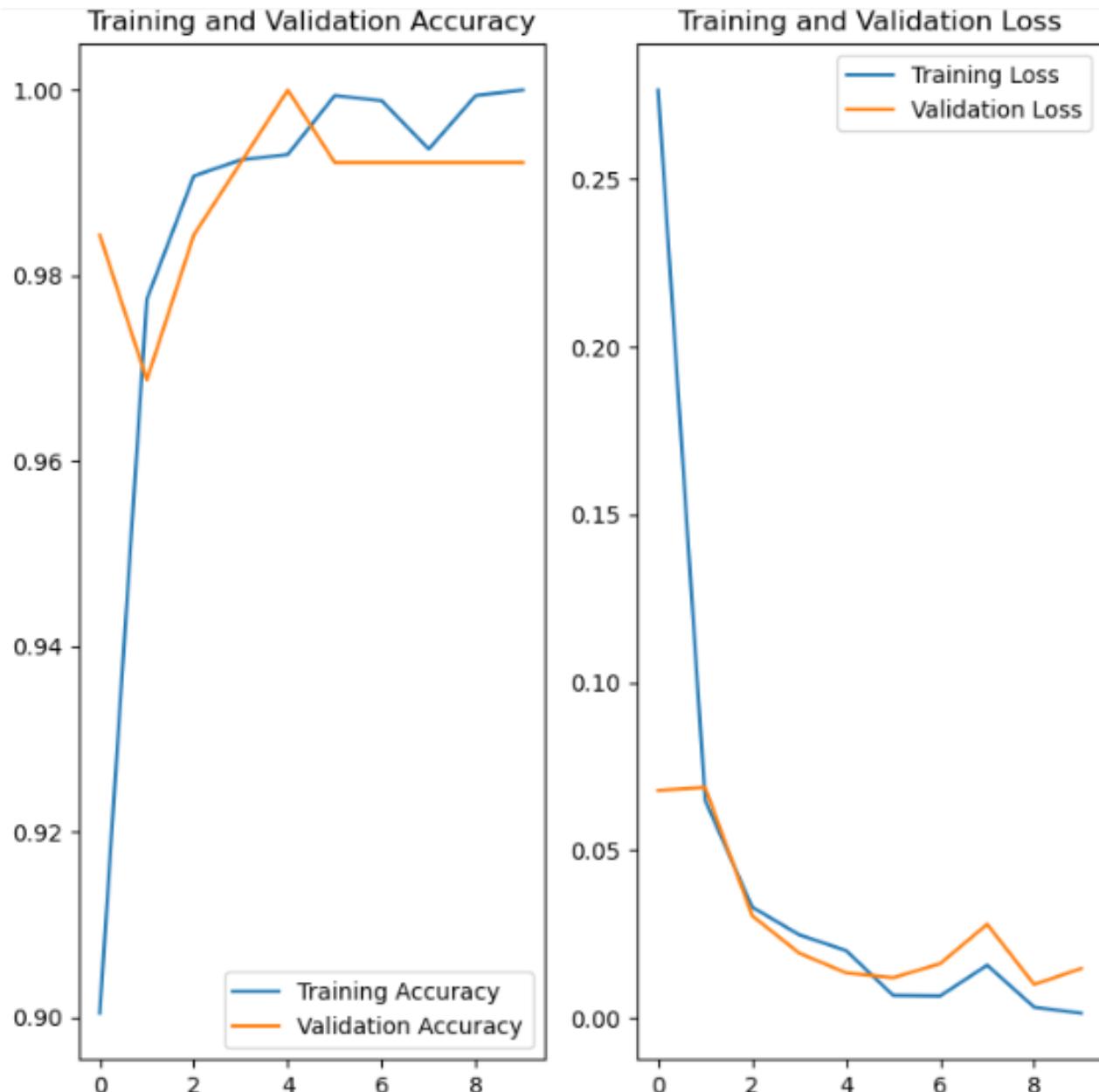
(e) 10

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=10
```

```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 12s 1s/step - loss: 0.0108 - accuracy: 0.9961  
[0.01084268931299448, 0.99609375]
```

Average Time per Epoch: 99.00 s



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 99.91%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.99%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



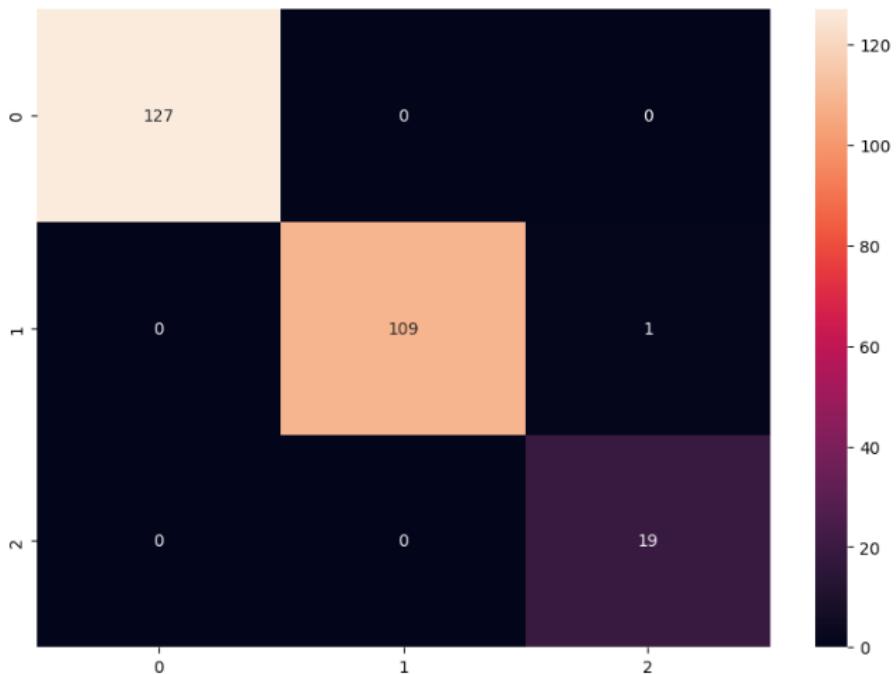
Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Classification Report:					
	precision	recall	f1-score	support	
0	1.00	1.00	1.00	127	
1	1.00	0.99	1.00	110	
2	0.95	1.00	0.97	19	
accuracy			1.00	256	
macro avg	0.98	1.00	0.99	256	
weighted avg	1.00	1.00	1.00	256	



BATCH SIZE

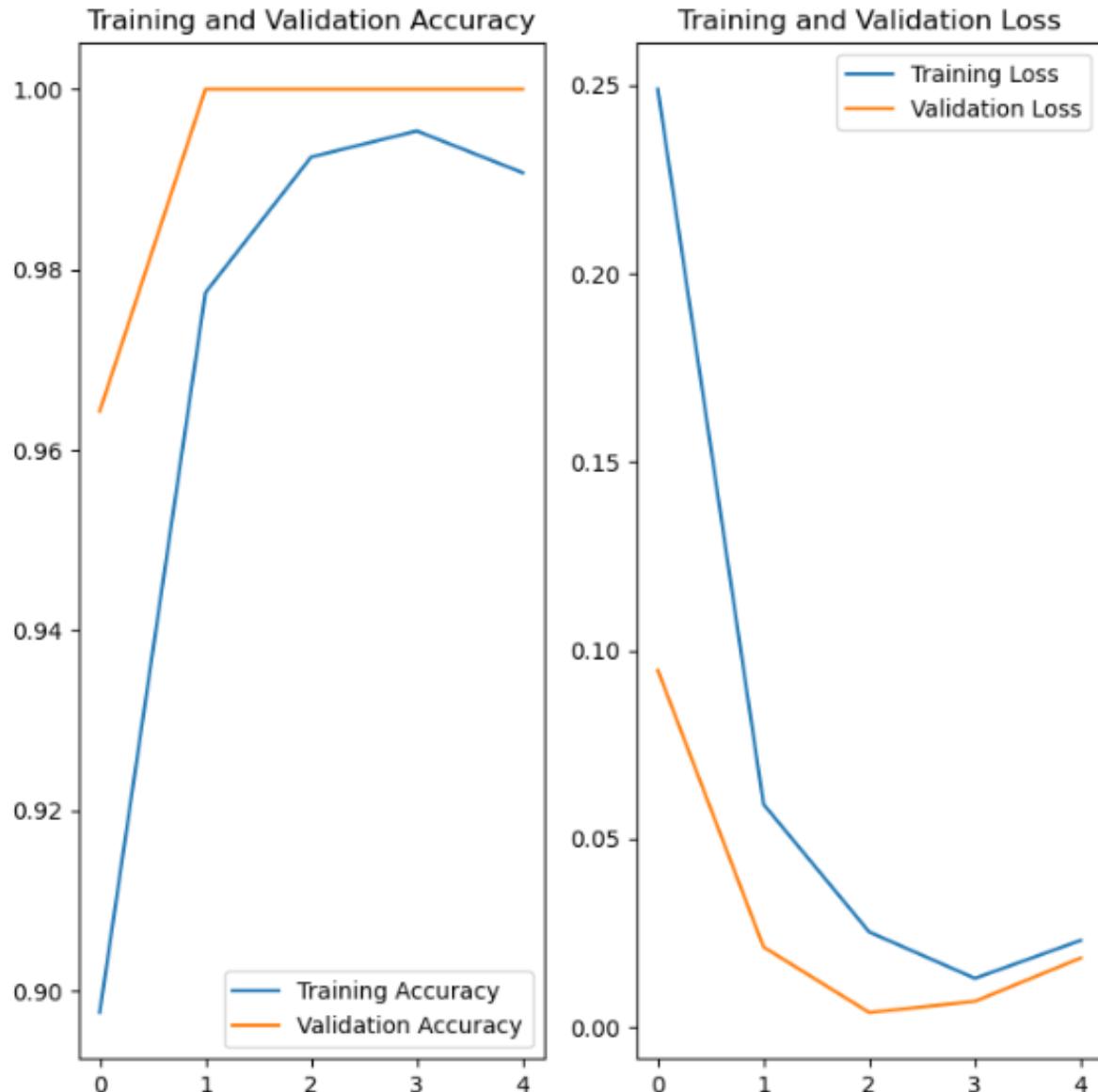
(a) 16

IMAGE_SIZE=224
BATCH_SIZE=16
CHANNELS=3
EPOCHS=5

```
scores=model.evaluate(test_ds)  
scores
```

```
14/14 [=====] - 18s 1s/step - loss: 0.0283 - accuracy: 0.9955  
[0.028342369943857193, 0.9955357313156128]
```

Average Time per Epoch: 115.20 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.84%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.33%



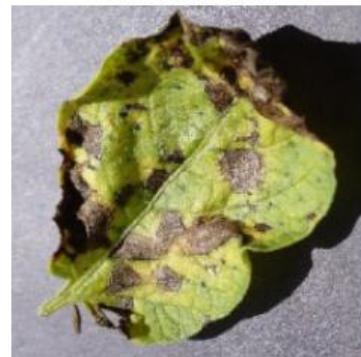
Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.23%



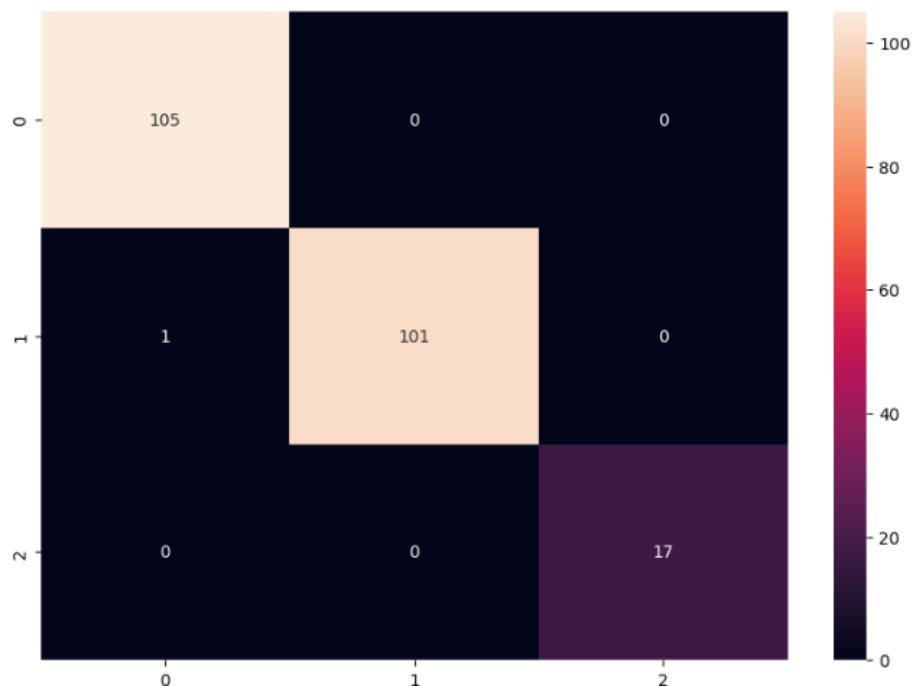
Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.98%



Classification Report:					
	precision	recall	f1-score	support	
0	0.99	1.00	1.00	105	
1	1.00	0.99	1.00	102	
2	1.00	1.00	1.00	17	
accuracy			1.00	224	
macro avg	1.00	1.00	1.00	224	
weighted avg	1.00	1.00	1.00	224	

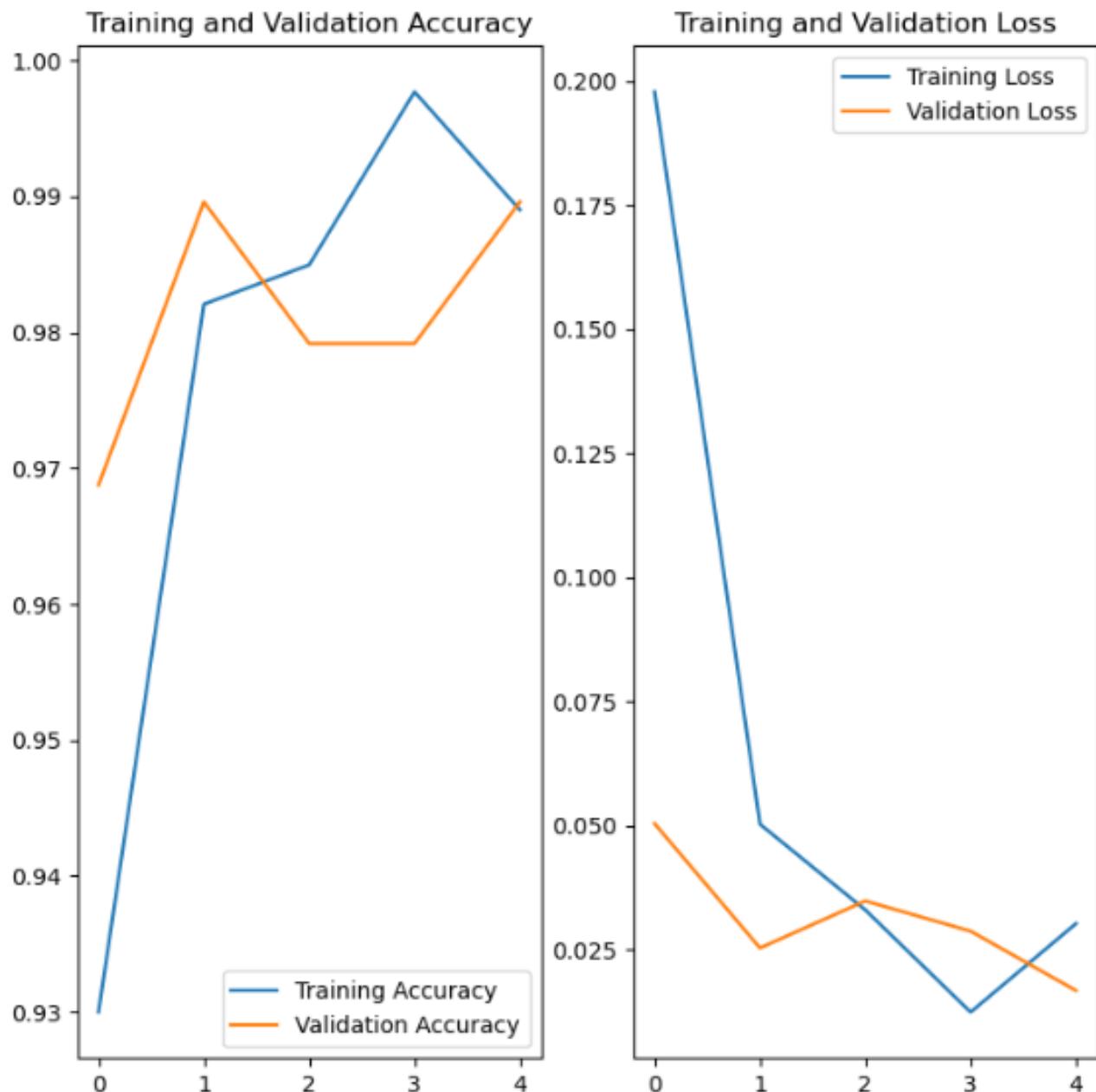


(b) 24

```
IMAGE_SIZE=224  
BATCH_SIZE=24  
CHANNELS=3  
EPOCHS=5
```

```
scores=model.evaluate(test_ds)  
scores  
  
9/9 [=====] - 10s 1s/step - loss: 0.0152 - accuracy: 0.9907  
[0.015177826397120953, 0.9907407164573669]
```

Average Time per Epoch: 107.80 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.99%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.97%

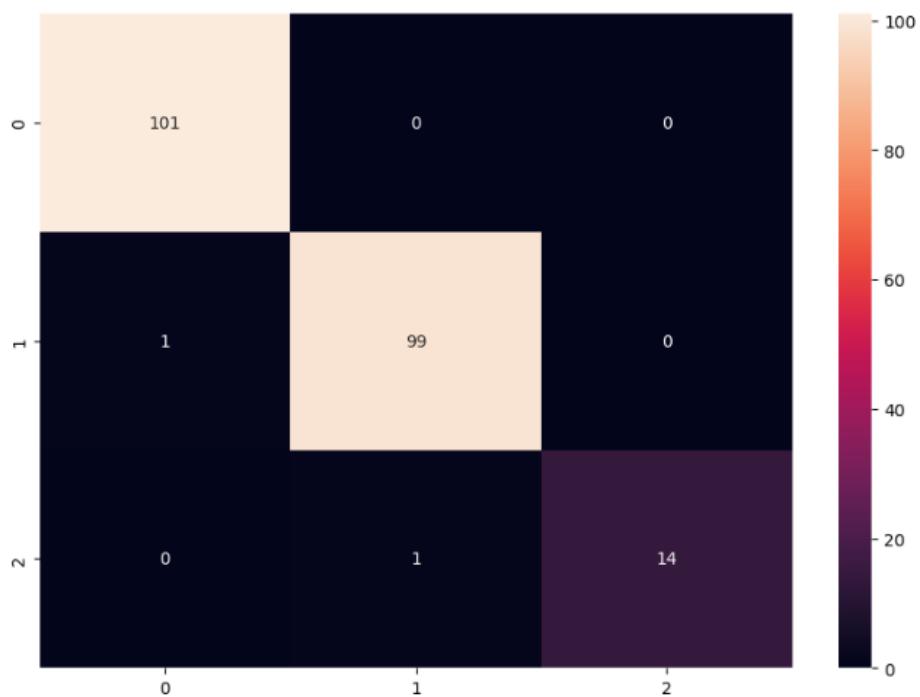


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	0.99	1.00	1.00	101
1	0.99	0.99	0.99	100
2	1.00	0.93	0.97	15
accuracy			0.99	216
macro avg	0.99	0.97	0.98	216
weighted avg	0.99	0.99	0.99	216



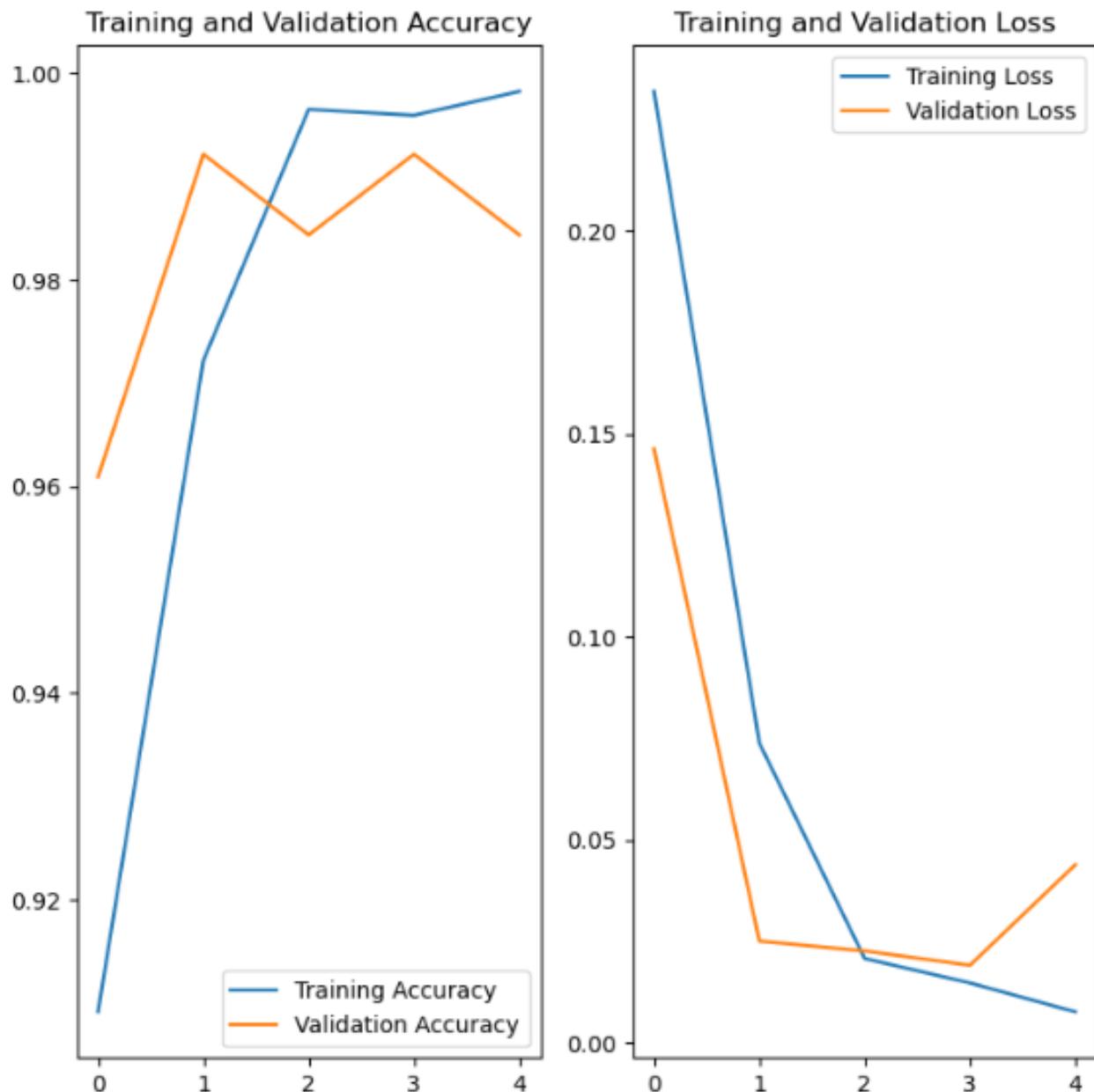
(c) 32

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=5
```

```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 12s 1s/step - loss: 0.0193 - accuracy: 0.9922  
[0.019332775846123695, 0.9921875]
```

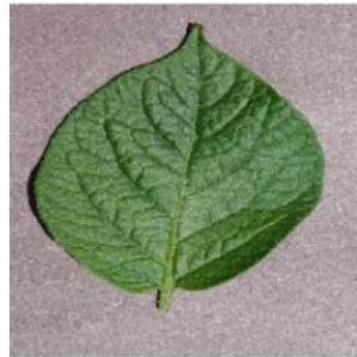
Average Time per Epoch: 113.60 s



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 99.98%



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.95%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%

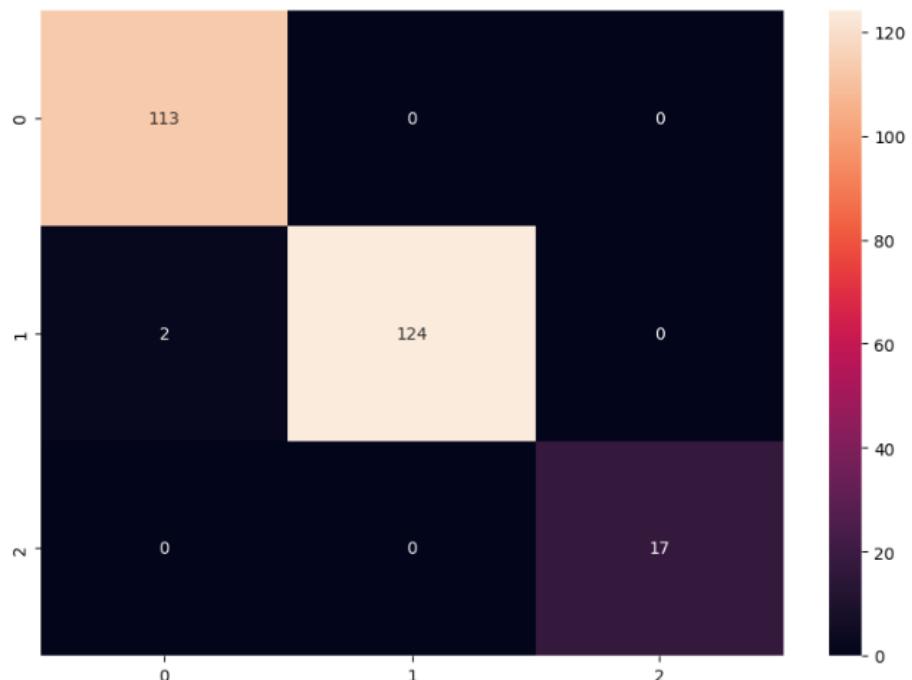


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	0.98	1.00	0.99	113
1	1.00	0.98	0.99	126
2	1.00	1.00	1.00	17
accuracy			0.99	256
macro avg	0.99	0.99	0.99	256
weighted avg	0.99	0.99	0.99	256



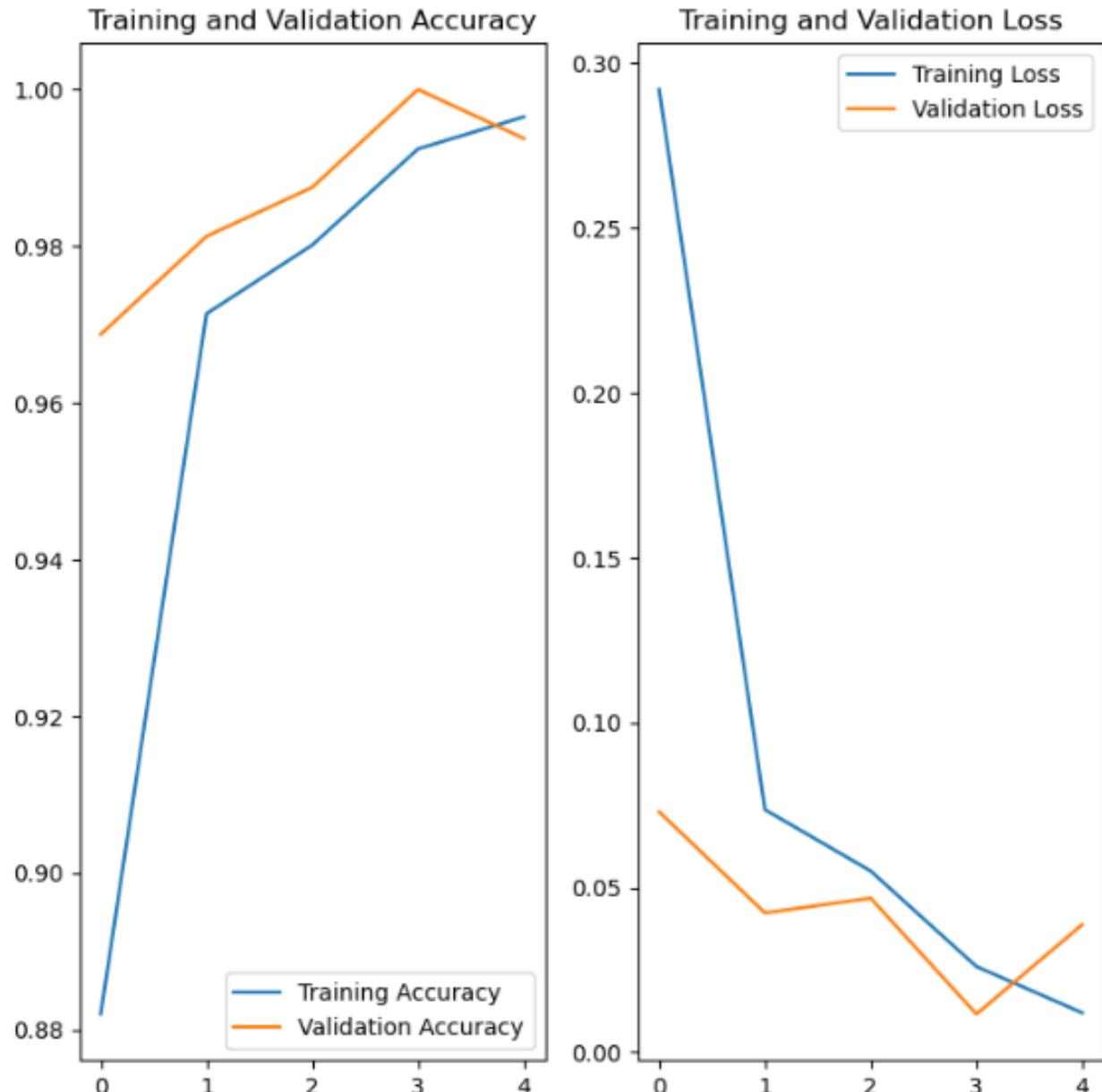
(d) 40

```
IMAGE_SIZE=224  
BATCH_SIZE=40  
CHANNELS=3  
EPOCHS=5
```

```
scores=model.evaluate(test_ds)  
scores
```

```
6/6 [=====] - 11s 2s/step - loss: 0.0178 - accuracy: 0.9958  
[0.017805853858590126, 0.9958333373069763]
```

Average Time per Epoch: 114.80 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.99%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.99%



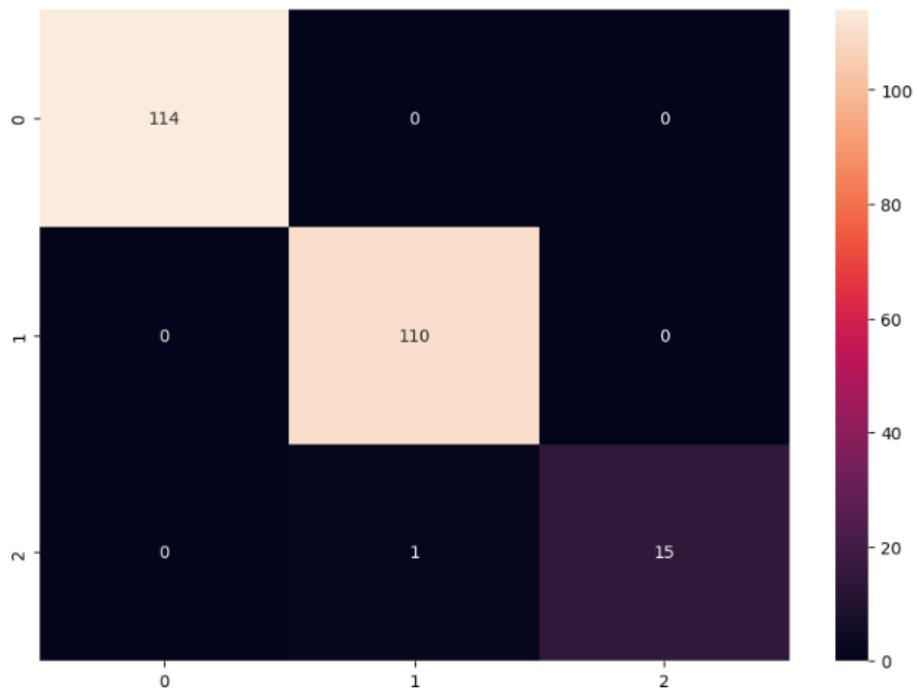
Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.97%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.5%



Classification Report:					
	precision	recall	f1-score	support	
0	1.00	1.00	1.00	114	
1	0.99	1.00	1.00	110	
2	1.00	0.94	0.97	16	
accuracy			1.00	240	
macro avg	1.00	0.98	0.99	240	
weighted avg	1.00	1.00	1.00	240	



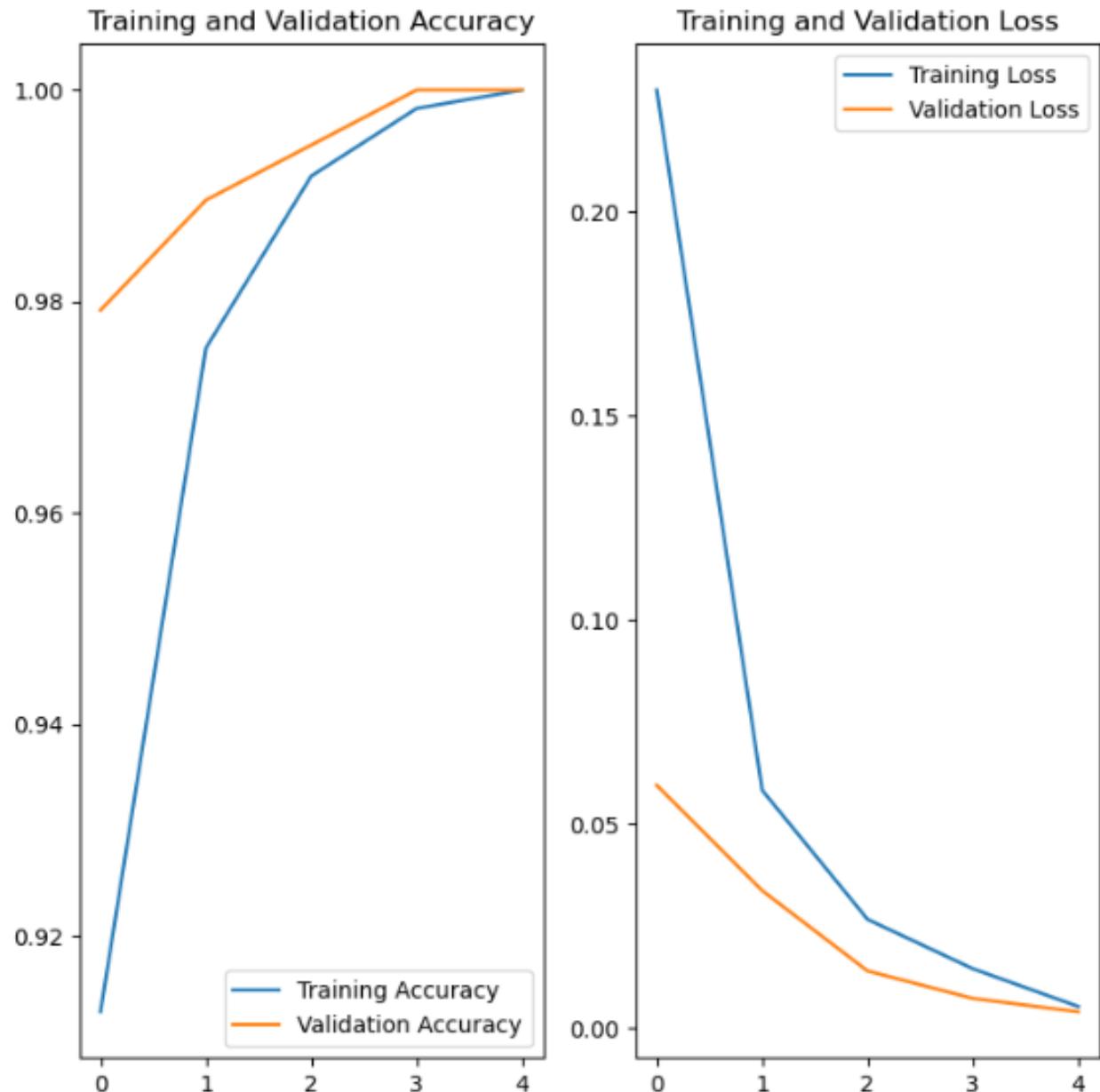
(e) 48

```
IMAGE_SIZE=224  
BATCH_SIZE=48  
CHANNELS=3  
EPOCHS=5
```

```
scores=model.evaluate(test_ds)  
scores
```

```
5/5 [=====] - 14s 3s/step - loss: 0.0313 - accuracy: 0.9958  
[0.03132975473999977, 0.9958333373069763]
```

Average Time per Epoch: 113.60 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.98%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.99%



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 99.99%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

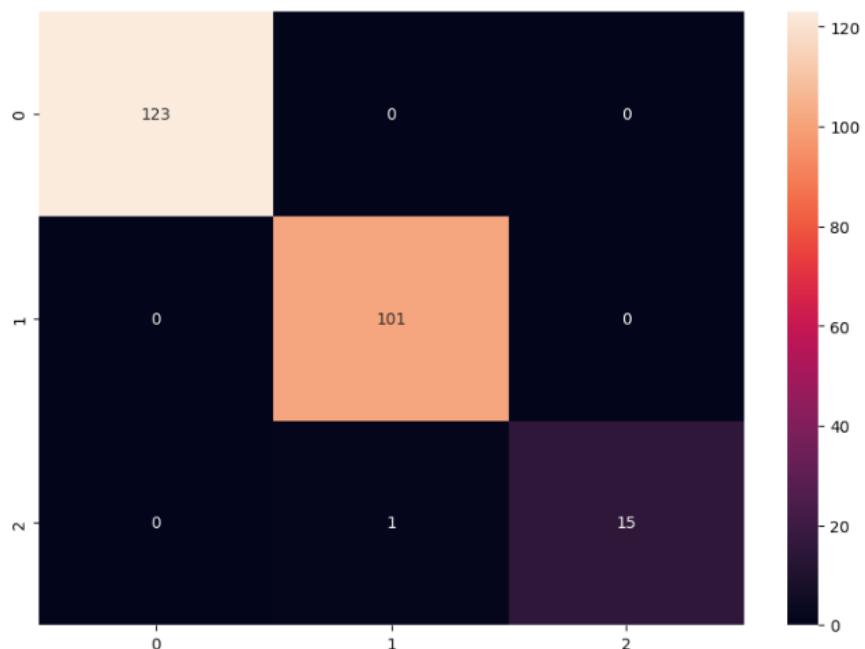


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.99%



Classification Report:

	precision	recall	f1-score	support
0	1.00	1.00	1.00	123
1	0.99	1.00	1.00	101
2	1.00	0.94	0.97	16
accuracy			1.00	240
macro avg	1.00	0.98	0.99	240
weighted avg	1.00	1.00	1.00	240



DATASET SPLIT RATIO

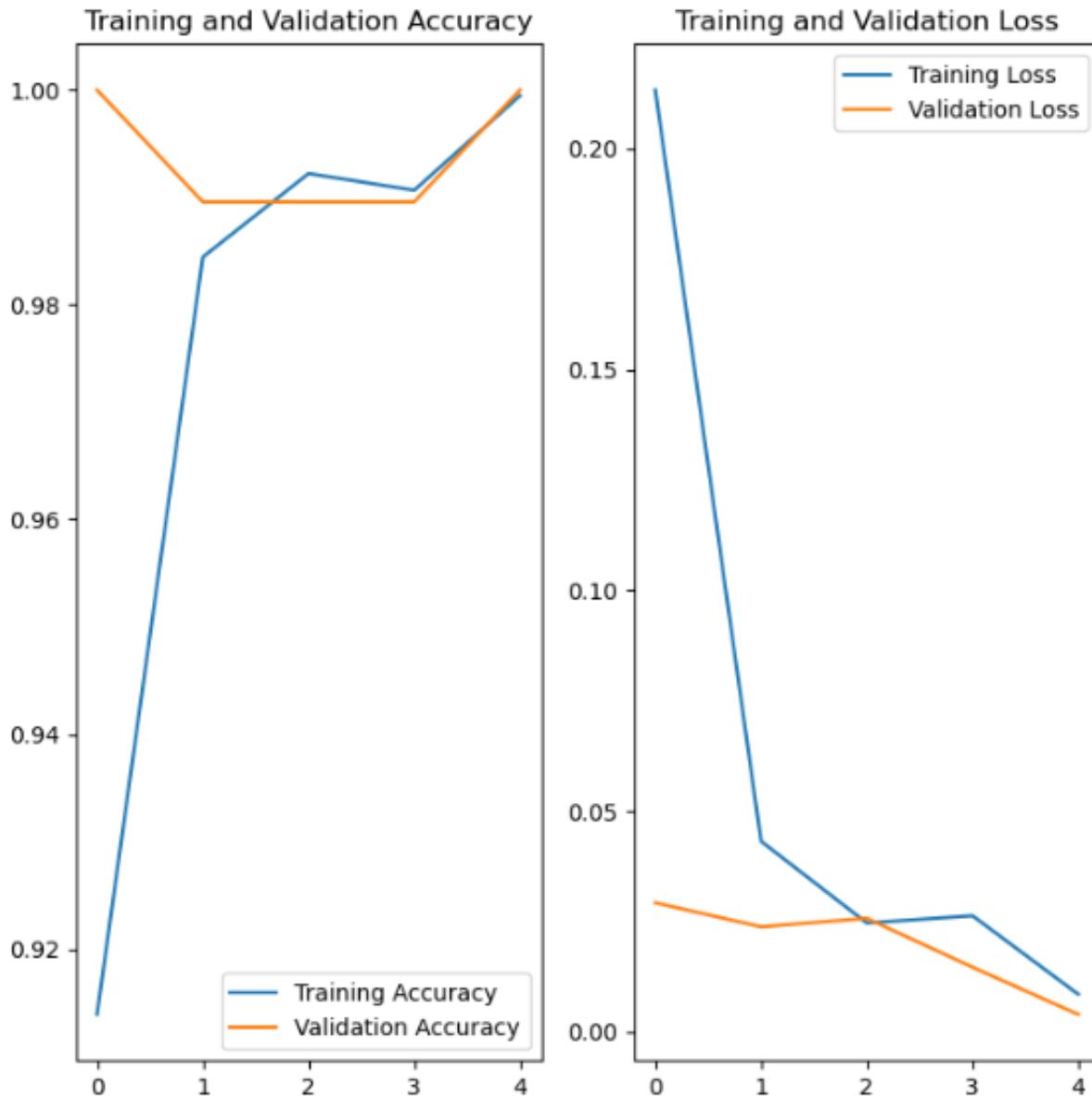
(a) 90:5:5

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=5
```

```
scores=model.evaluate(test_ds)  
scores
```

```
4/4 [=====] - 16s 3s/step - loss: 0.0049 - accuracy: 1.0000  
[0.004902062471956015, 1.0]
```

Average Time per Epoch: 241.20 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.99%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 93.23%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

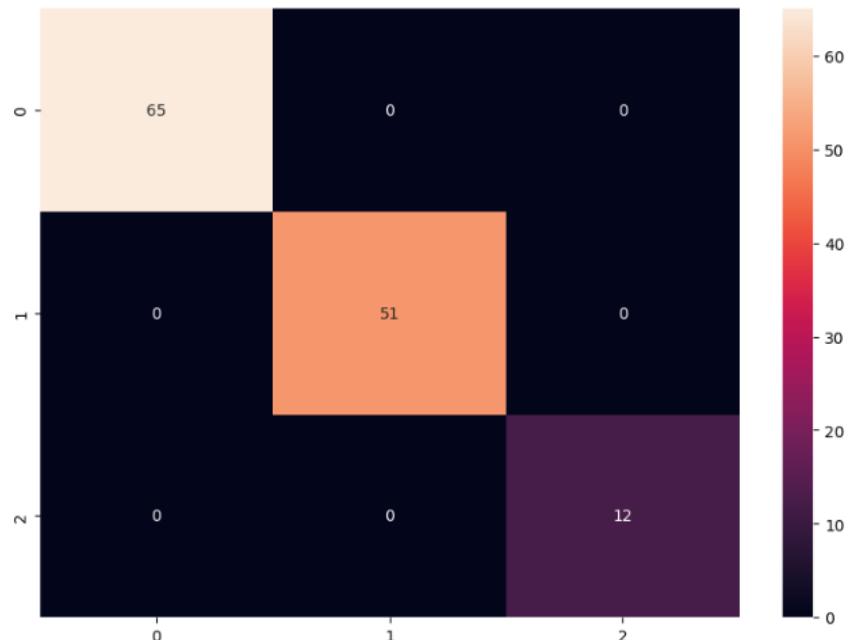


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	1.00	1.00	1.00	65
1	1.00	1.00	1.00	51
2	1.00	1.00	1.00	12
accuracy			1.00	128
macro avg	1.00	1.00	1.00	128
weighted avg	1.00	1.00	1.00	128



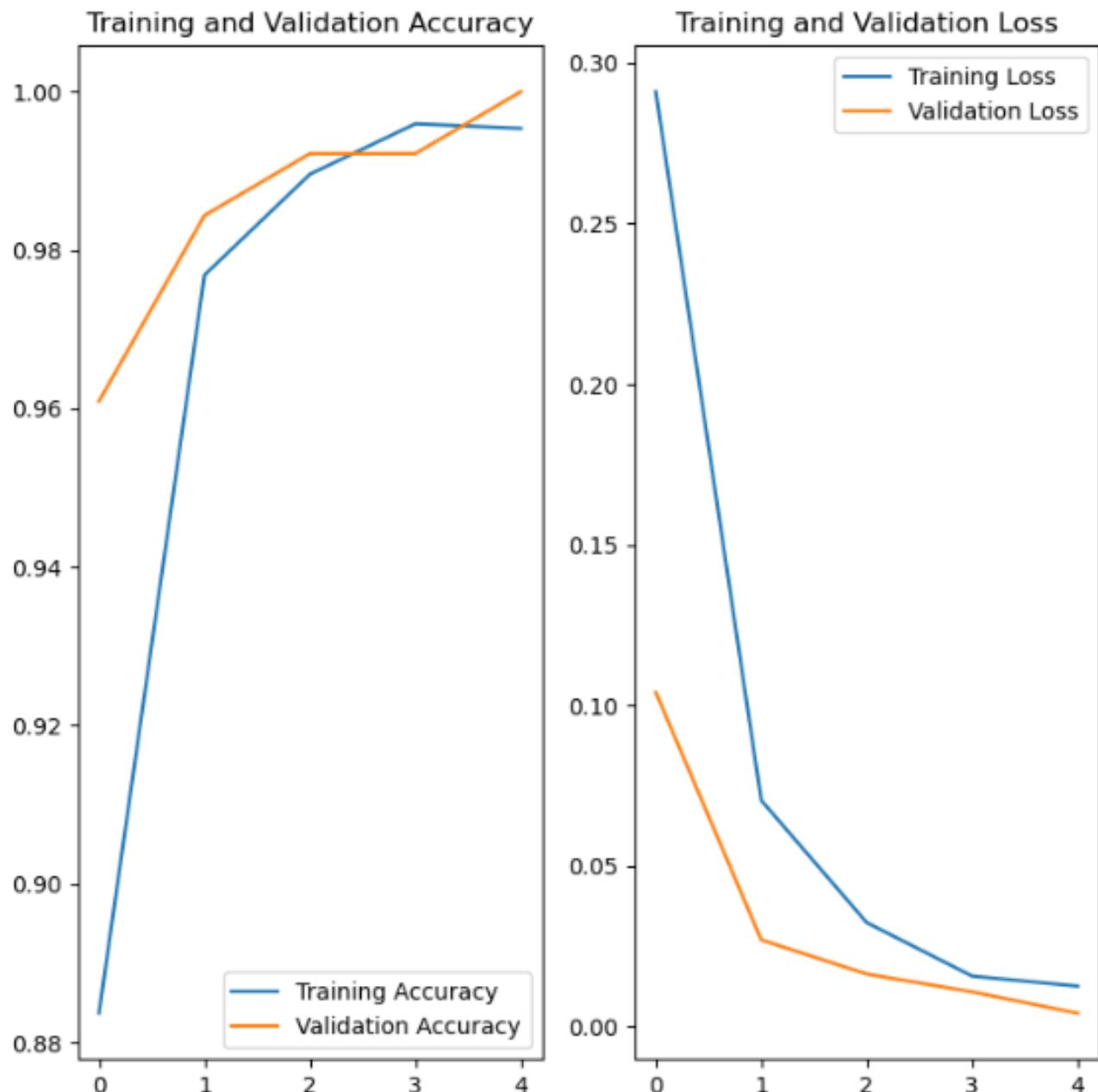
(b) 80:10:10

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=5
```

```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 12s 1s/step - loss: 0.0159 - accuracy: 0.9961  
[0.01590554602444172, 0.99609375]
```

Average Time per Epoch: 135.40 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.98%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.99%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

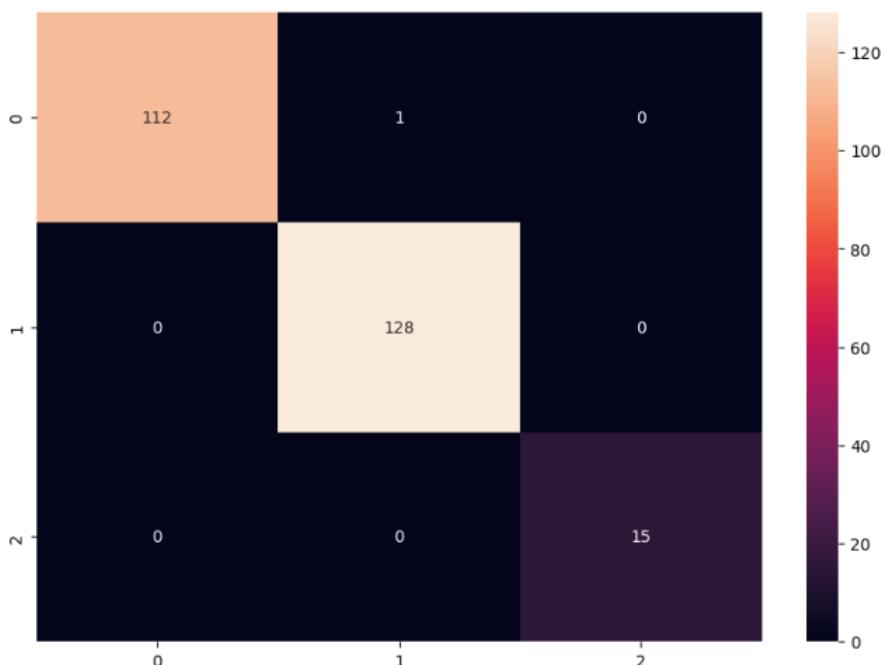


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	1.00	0.99	1.00	113
1	0.99	1.00	1.00	128
2	1.00	1.00	1.00	15
accuracy			1.00	256
macro avg	1.00	1.00	1.00	256
weighted avg	1.00	1.00	1.00	256



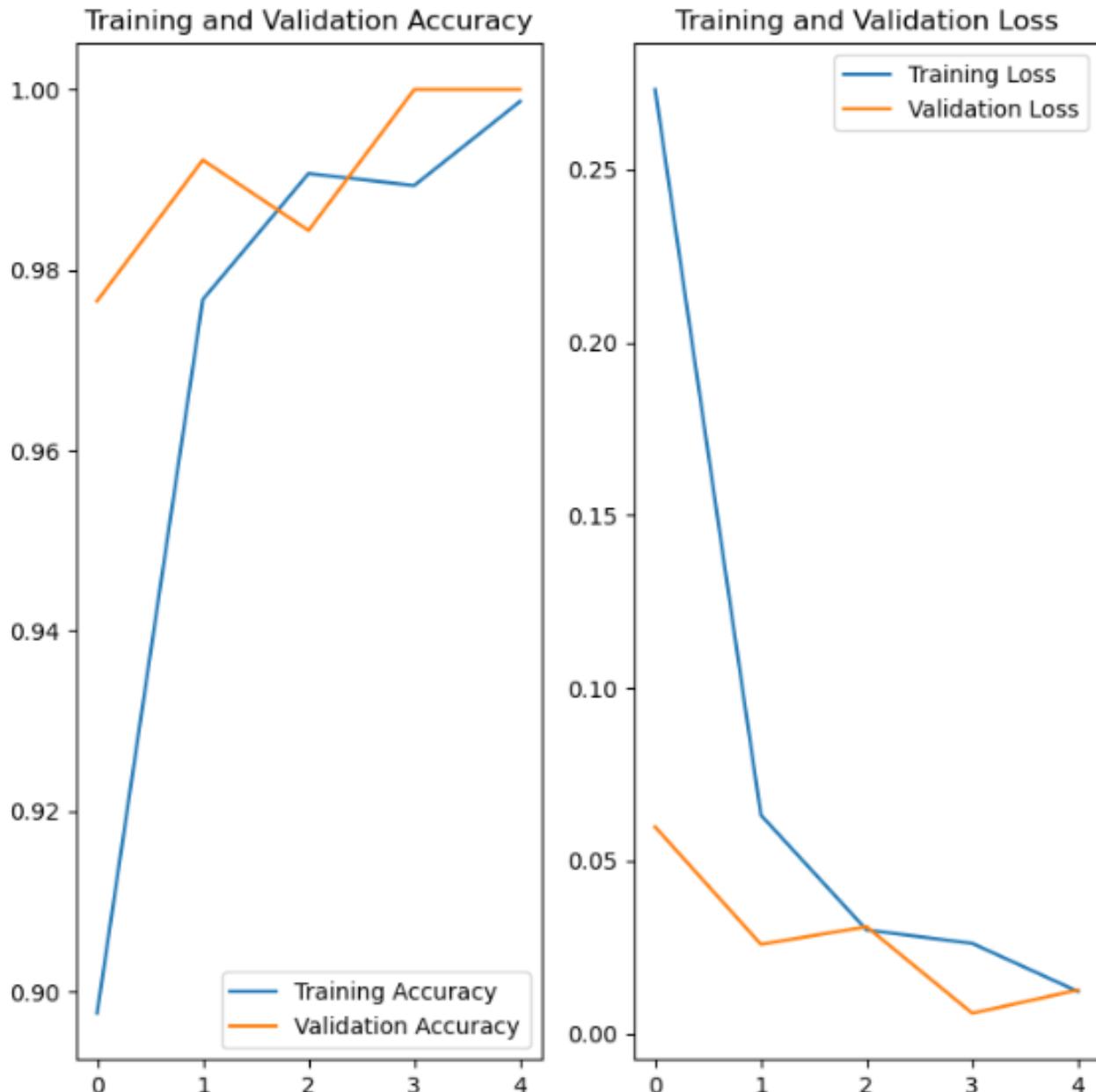
(c) 70:15:15

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=5
```

```
scores=model.evaluate(test_ds)  
scores
```

```
11/11 [=====] - 16s 1s/step - loss: 0.0082 - accuracy: 1.0000  
[0.008159132674336433, 1.0]
```

Average Time per Epoch: 115.80 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.95%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.1%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%

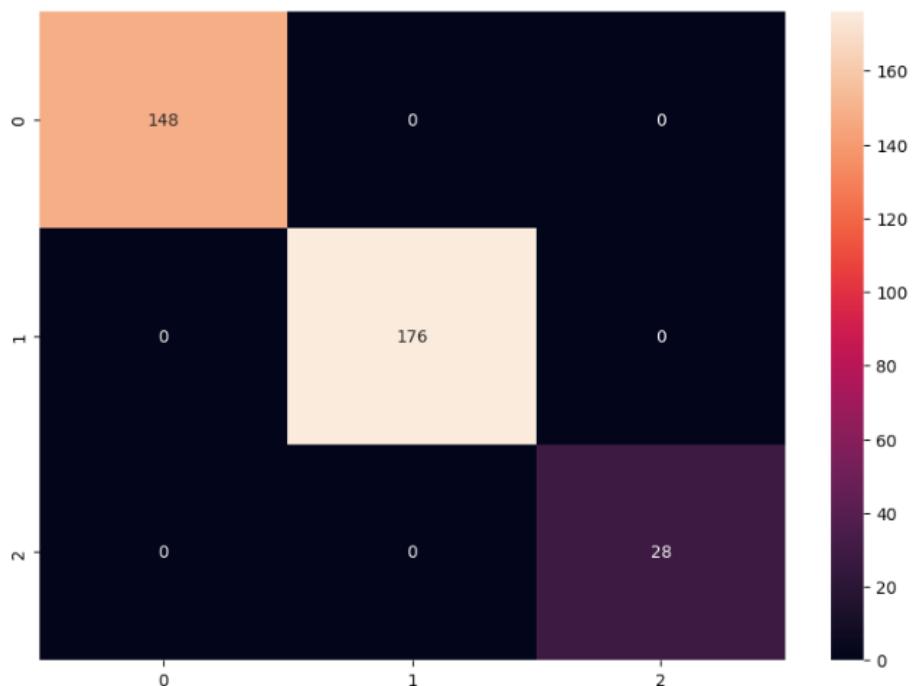


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.98%



Classification Report:

	precision	recall	f1-score	support
0	1.00	1.00	1.00	148
1	1.00	1.00	1.00	176
2	1.00	1.00	1.00	28
accuracy			1.00	352
macro avg	1.00	1.00	1.00	352
weighted avg	1.00	1.00	1.00	352



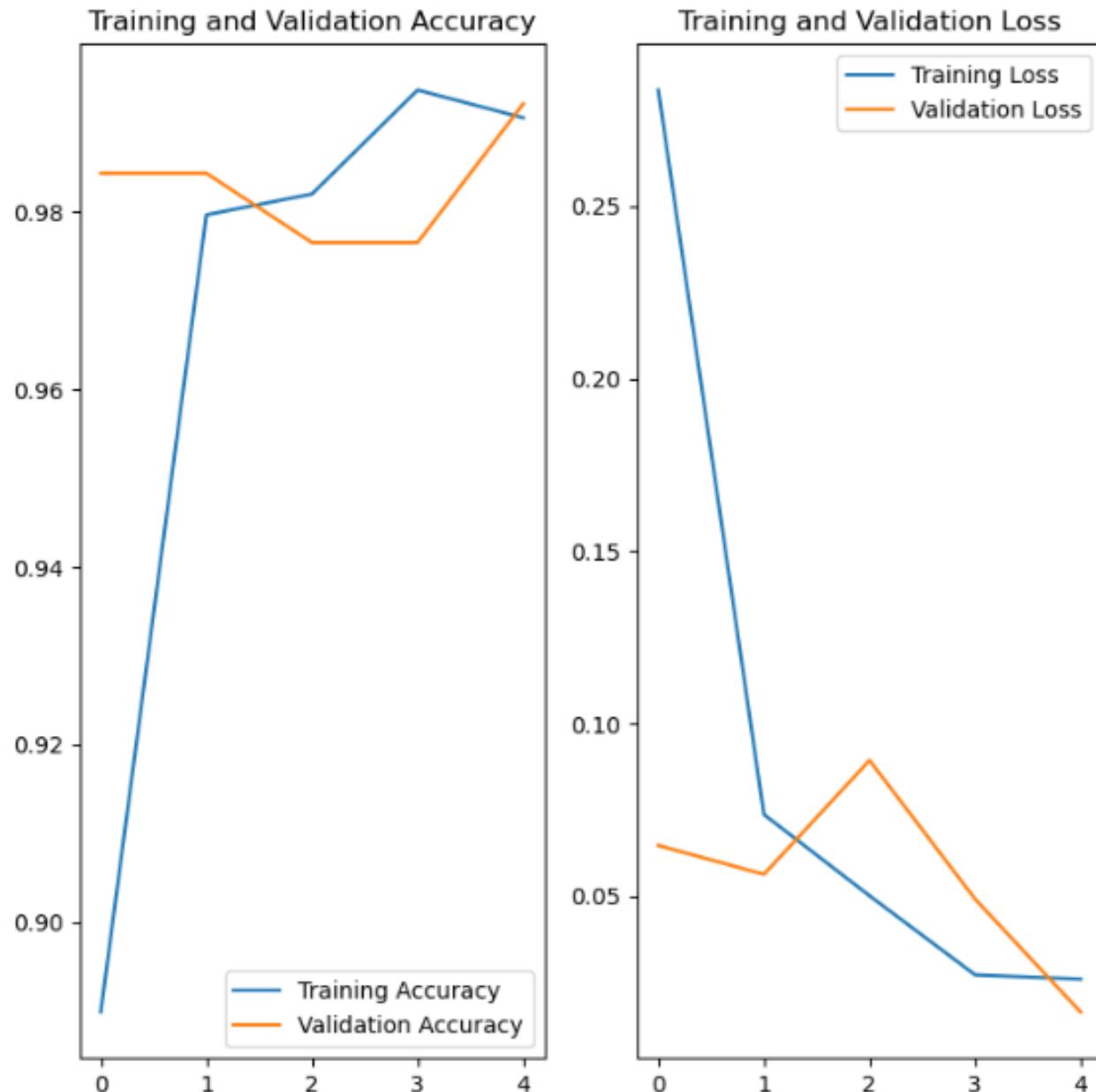
(d) 60:20:20

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=5
```

```
scores=model.evaluate(test_ds)  
scores
```

```
15/15 [=====] - 34s 2s/step - loss: 0.0229 - accuracy: 0.9958  
[0.02292979508638382, 0.9958333373069763]
```

Average Time per Epoch: 89.80 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.76%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.94%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.97%

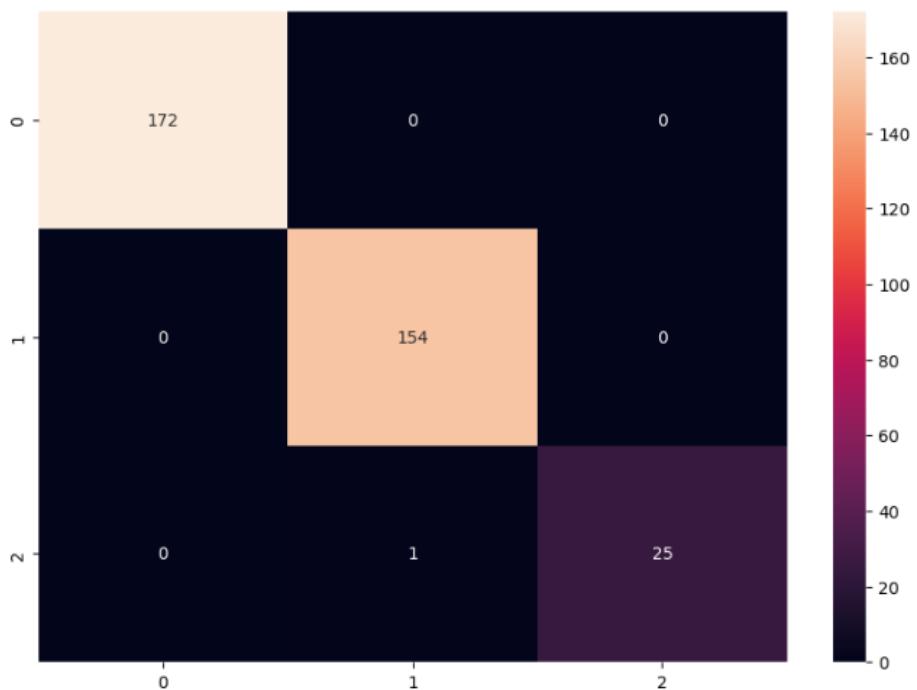


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.98%



Classification Report:

	precision	recall	f1-score	support
0	1.00	1.00	1.00	172
1	0.99	1.00	1.00	154
2	1.00	0.96	0.98	26
accuracy			1.00	352
macro avg	1.00	0.99	0.99	352
weighted avg	1.00	1.00	1.00	352



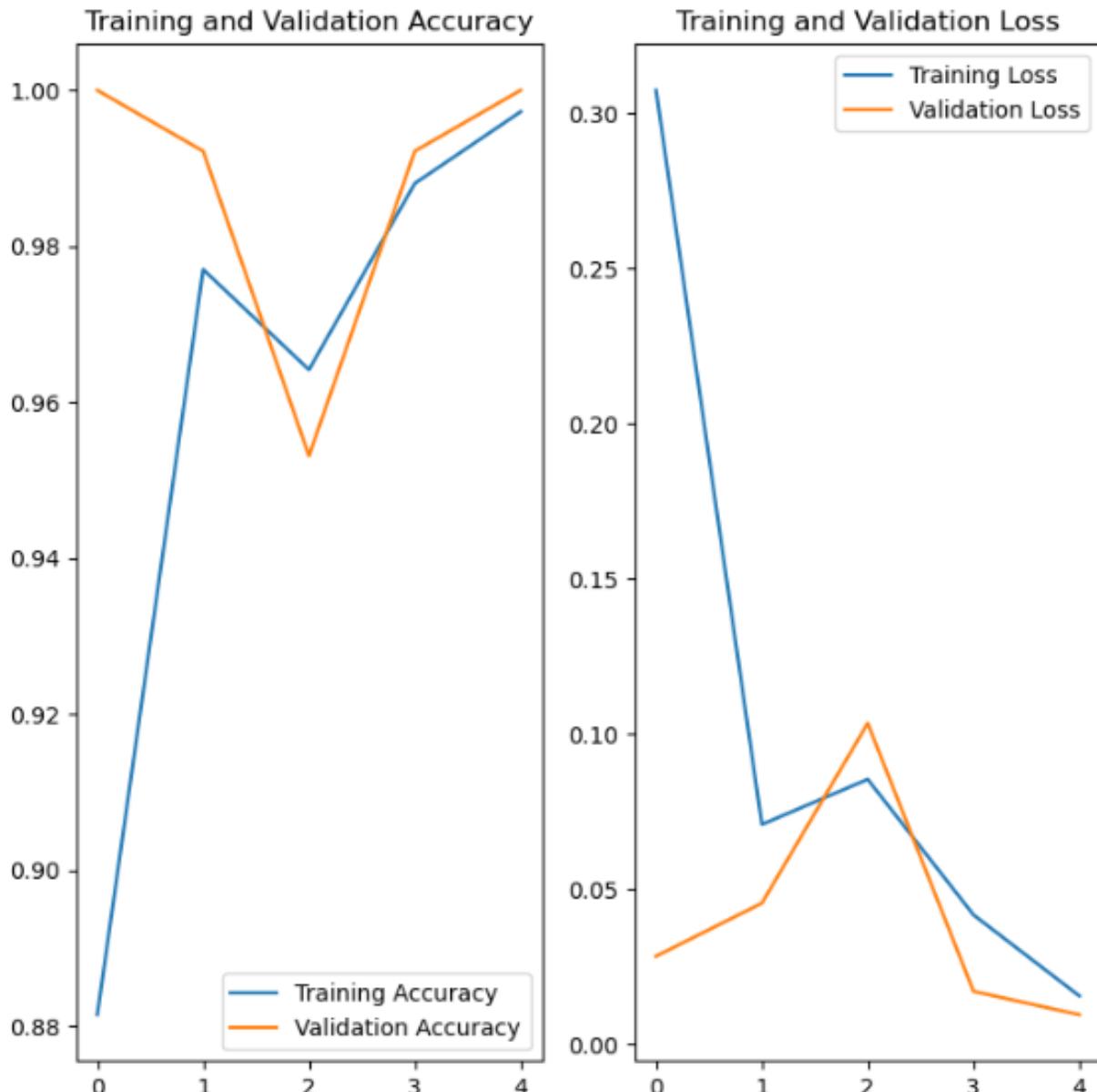
(e) 50:25:25

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=5
```

```
scores=model.evaluate(test_ds)  
scores
```

```
17/17 [=====] - 40s 2s/step - loss: 0.0315 - accuracy: 0.9871  
[0.031538620591163635, 0.9871323704719543]
```

Average Time per Epoch: 79.80 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.84%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.95%

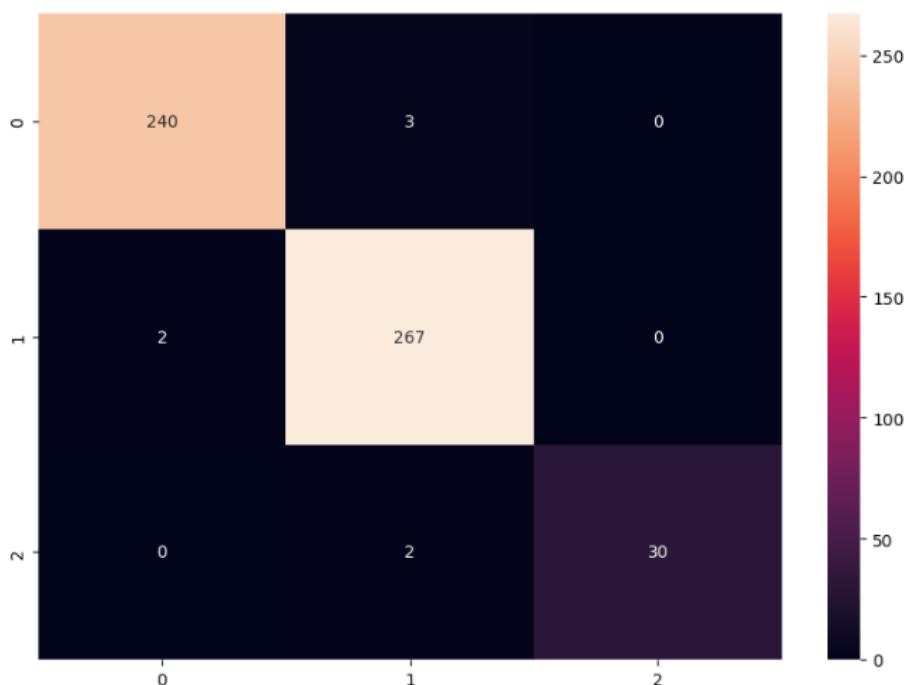


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.36%



Classification Report:

	precision	recall	f1-score	support
0	0.99	0.99	0.99	243
1	0.98	0.99	0.99	269
2	1.00	0.94	0.97	32
accuracy			0.99	544
macro avg	0.99	0.97	0.98	544
weighted avg	0.99	0.99	0.99	544



Model 3: VGG16

BASE MODEL

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=5
```

```
scores=model_from_vgg16.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 42s 5s/step - loss: 0.1107 - accuracy: 0.9922  
[0.1107415184378624, 0.9921875]
```

Average Time per Epoch: 301.80 s

```
history2.history['loss']
```

```
[5.130033493041992,  
 0.6242343783378601,  
 0.0751977413892746,  
 0.05096747353672981,  
 0.026253389194607735]
```

```
history2.history['accuracy']
```

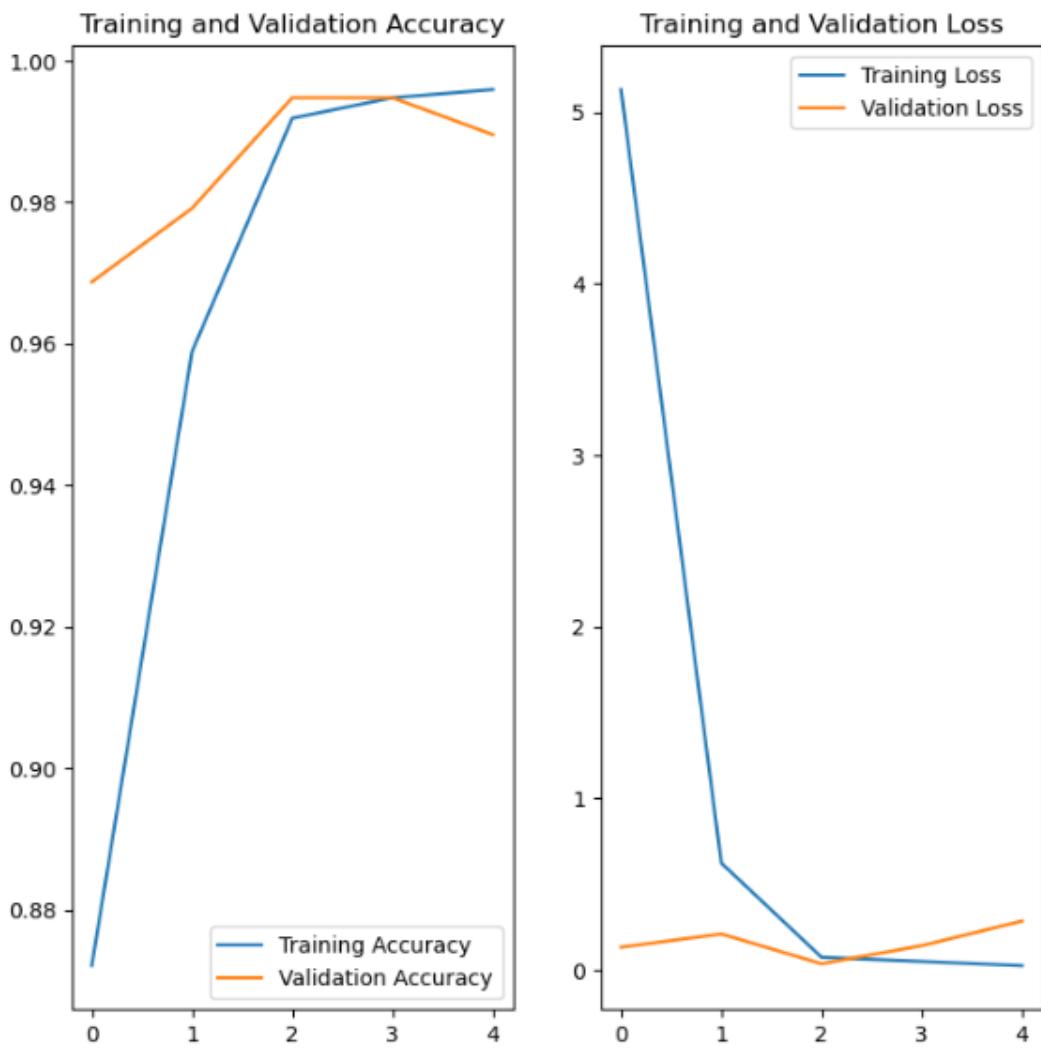
```
[0.8721064925193787,  
 0.9589120149612427,  
 0.9918981194496155,  
 0.9947916865348816,  
 0.9959490895271301]
```

```
history2.history['val_loss']
```

```
[0.13384953141212463,  
 0.21119703352451324,  
 0.03744502365589142,  
 0.14299698173999786,  
 0.2864302396774292]
```

```
history2.history['val_accuracy']
```

```
[0.96875,  
 0.9791666865348816,  
 0.9947916865348816,  
 0.9947916865348816,  
 0.9895833134651184]
```



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



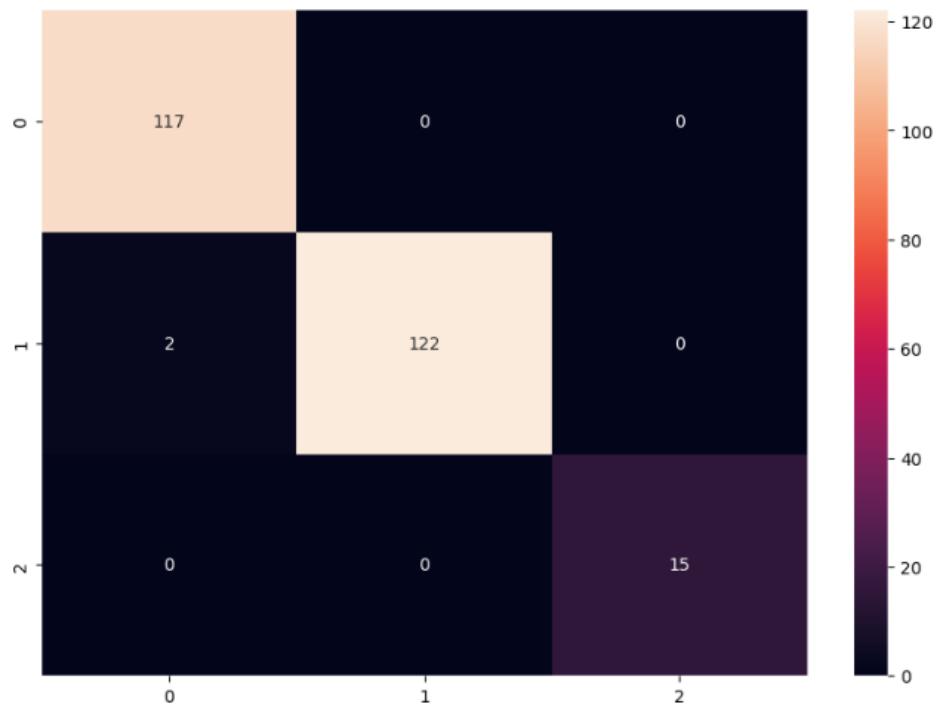
Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:				
	precision	recall	f1-score	support
0	0.98	1.00	0.99	117
1	1.00	0.98	0.99	124
2	1.00	1.00	1.00	15
accuracy			0.99	256
macro avg	0.99	0.99	0.99	256
weighted avg	0.99	0.99	0.99	256



NO. OF EPOCHS

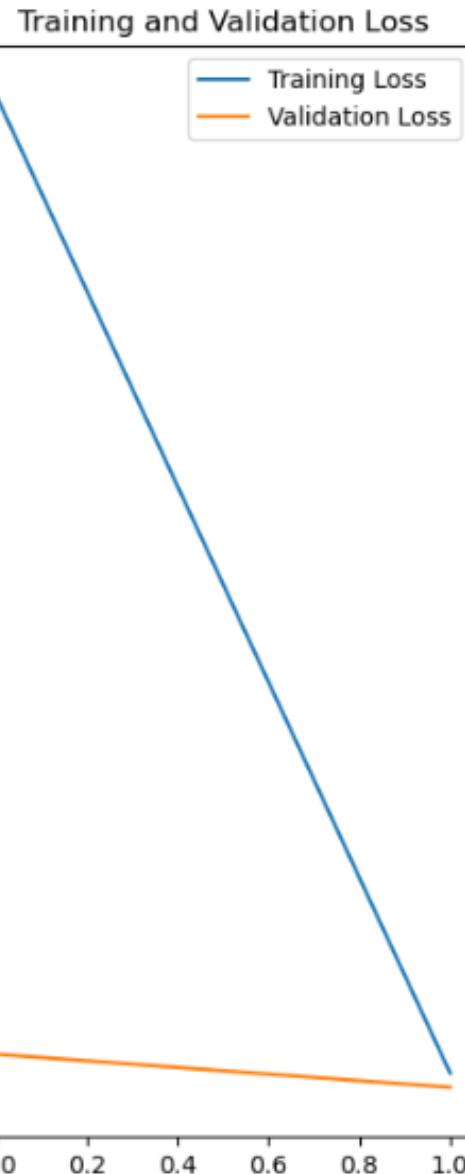
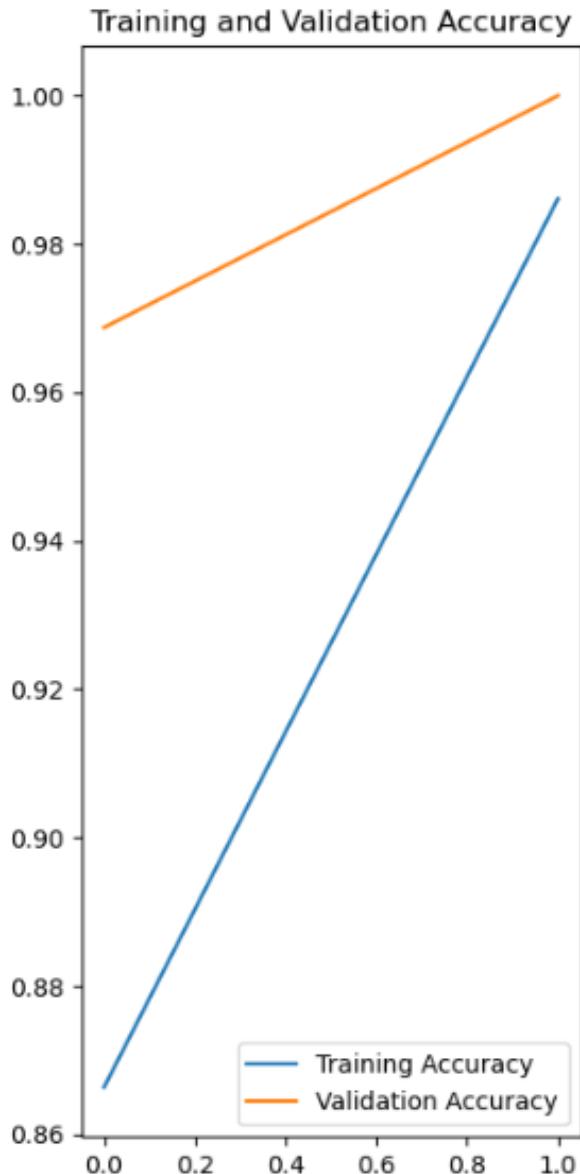
(a) 2

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=2
```

```
scores=model_from_vgg16.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 72s 8s/step - loss: 0.1066 - accuracy: 0.9805  
[0.1065879762172699, 0.98046875]
```

Average Time per Epoch: 574.00 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%

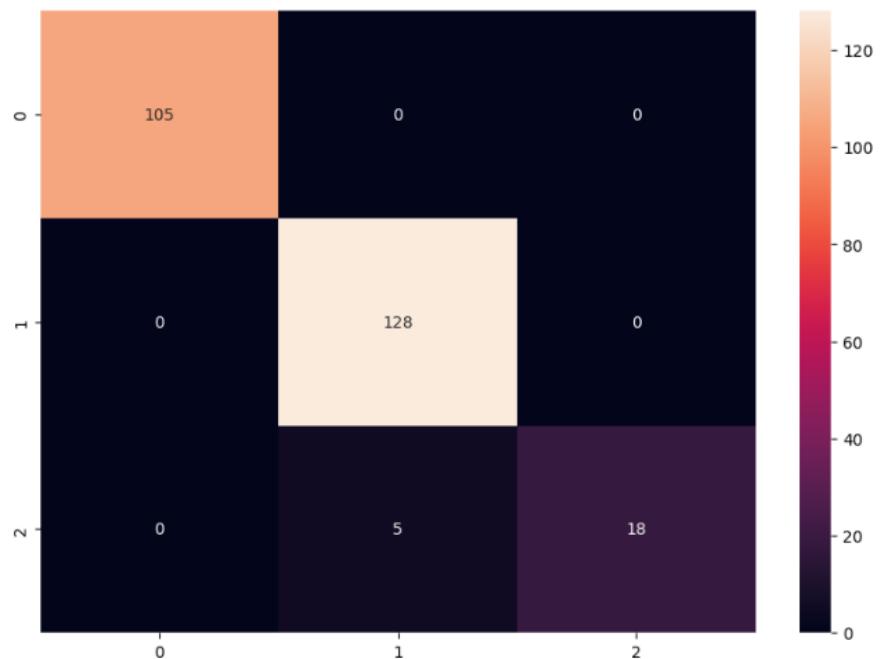


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	1.00	1.00	1.00	105
1	0.96	1.00	0.98	128
2	1.00	0.78	0.88	23
accuracy			0.98	256
macro avg	0.99	0.93	0.95	256
weighted avg	0.98	0.98	0.98	256



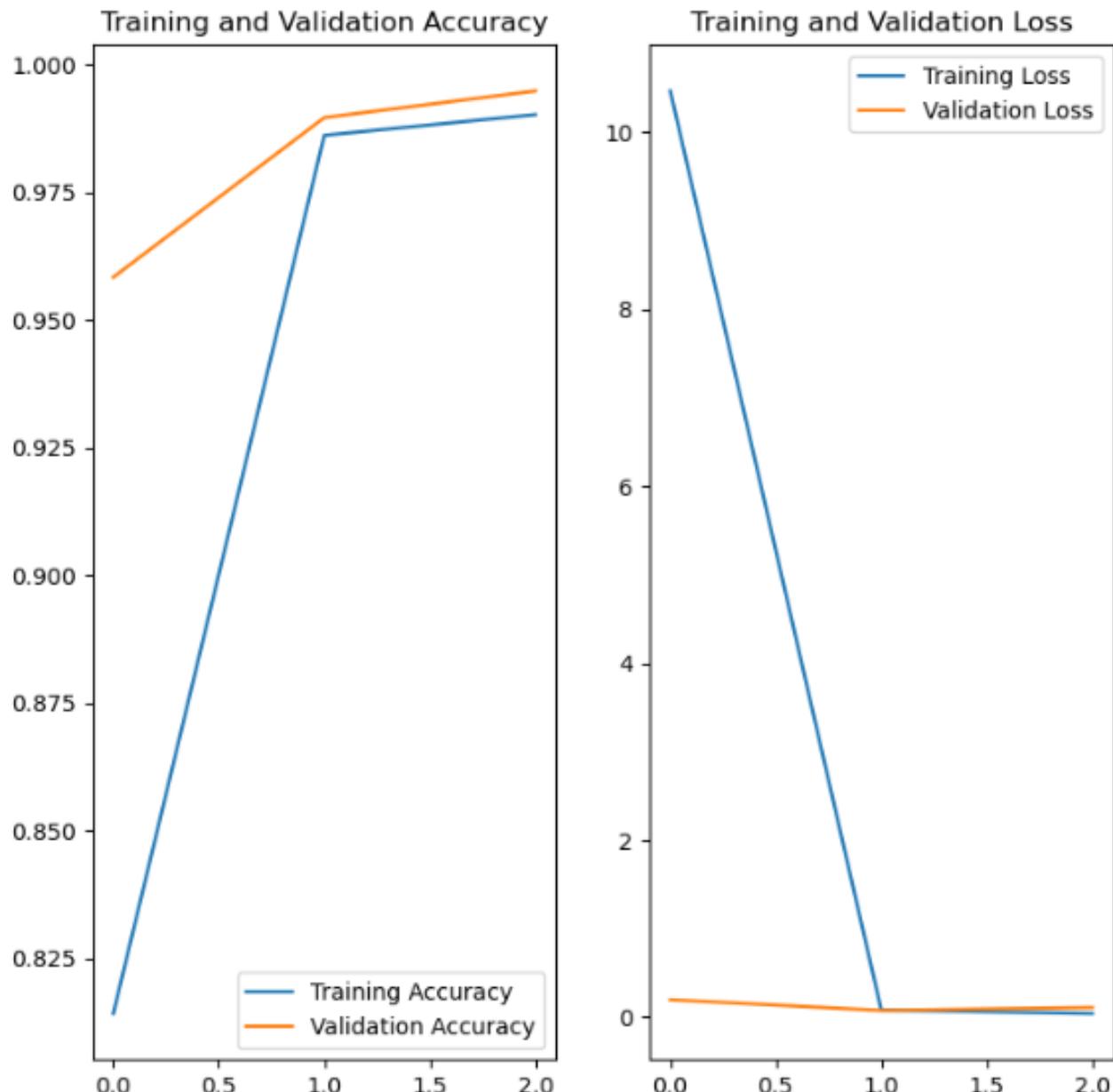
(b) 3

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=3
```

```
scores=model_from_vgg16.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 37s 4s/step - loss: 0.0604 - accuracy: 0.9883  
[0.06042011082172394, 0.98828125]
```

Average Time per Epoch: 270.67 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

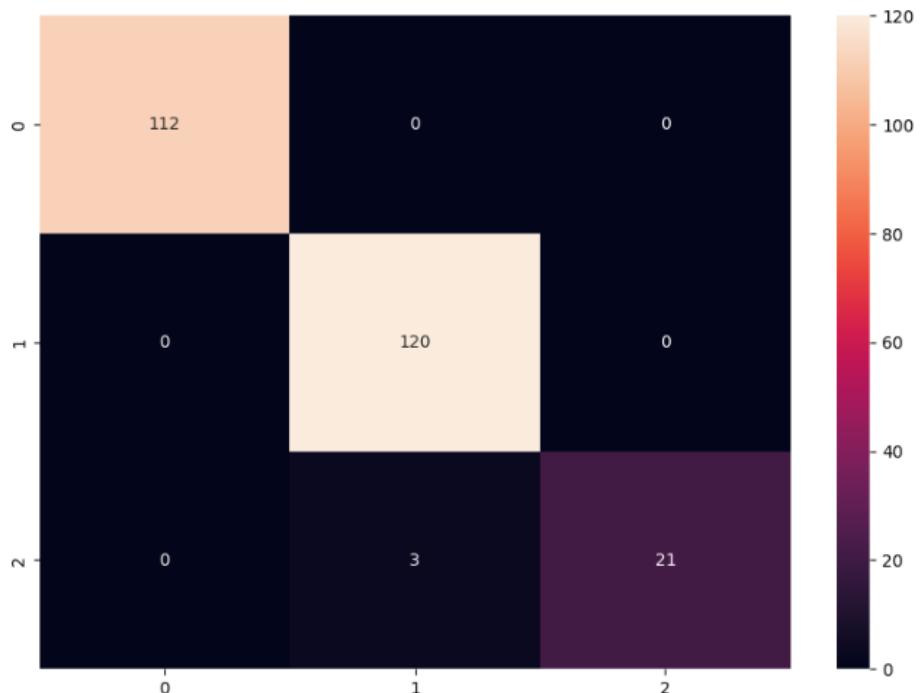


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	1.00	1.00	1.00	112
1	0.98	1.00	0.99	120
2	1.00	0.88	0.93	24
accuracy			0.99	256
macro avg	0.99	0.96	0.97	256
weighted avg	0.99	0.99	0.99	256



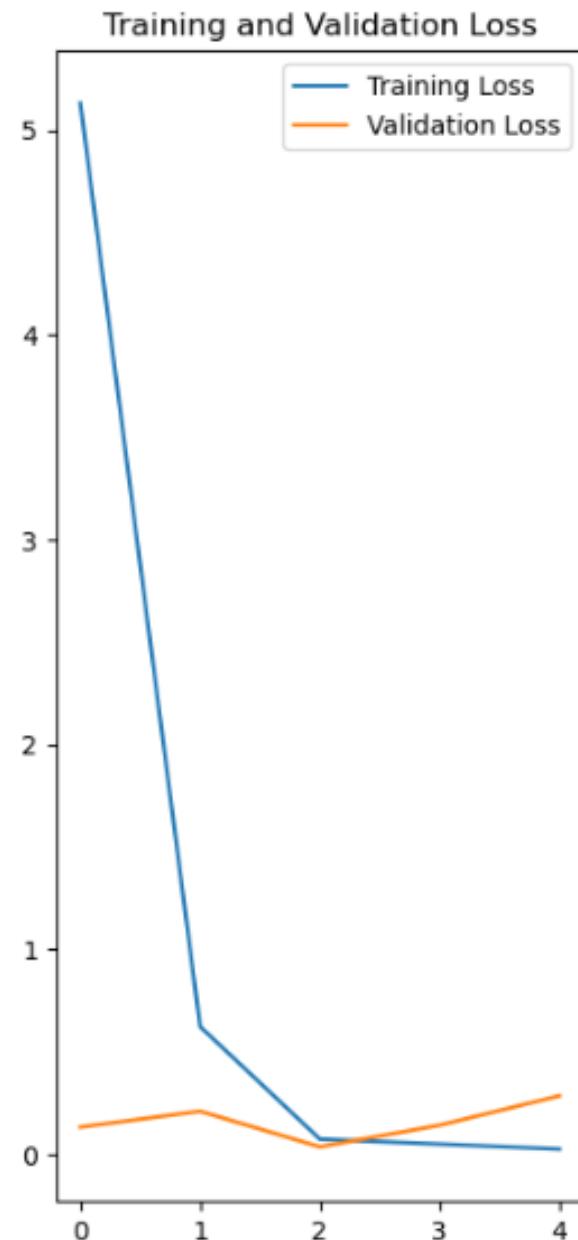
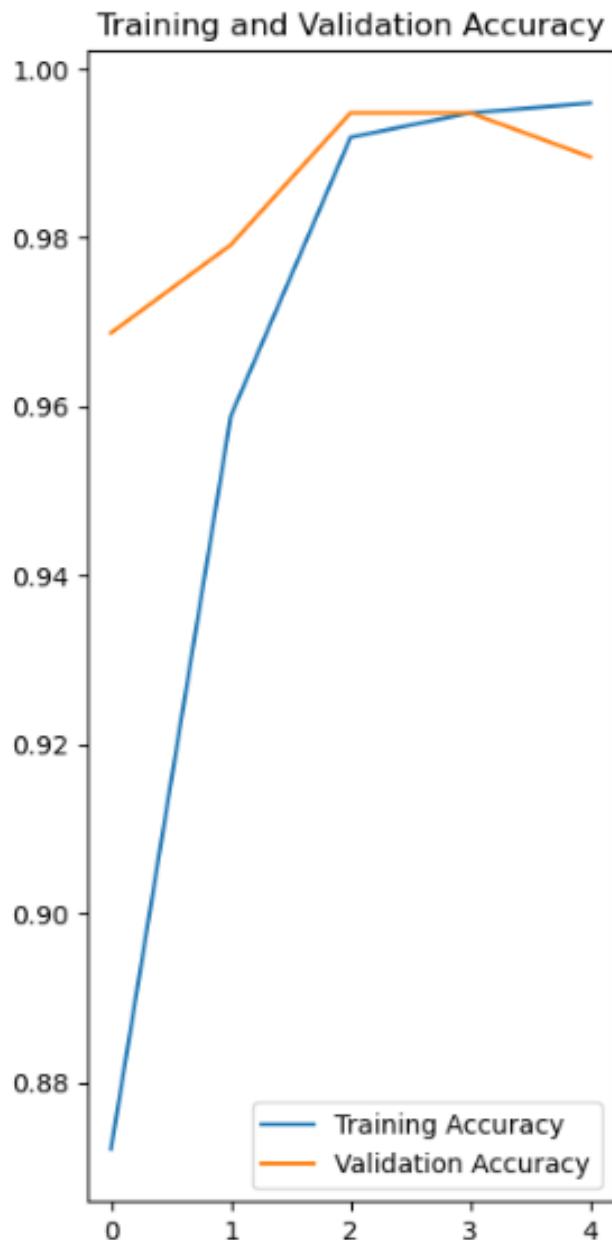
(c) 5

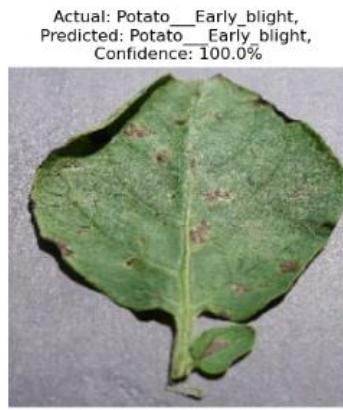
```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=5
```

```
scores=model_from_vgg16.evaluate(test_ds)  
scores
```

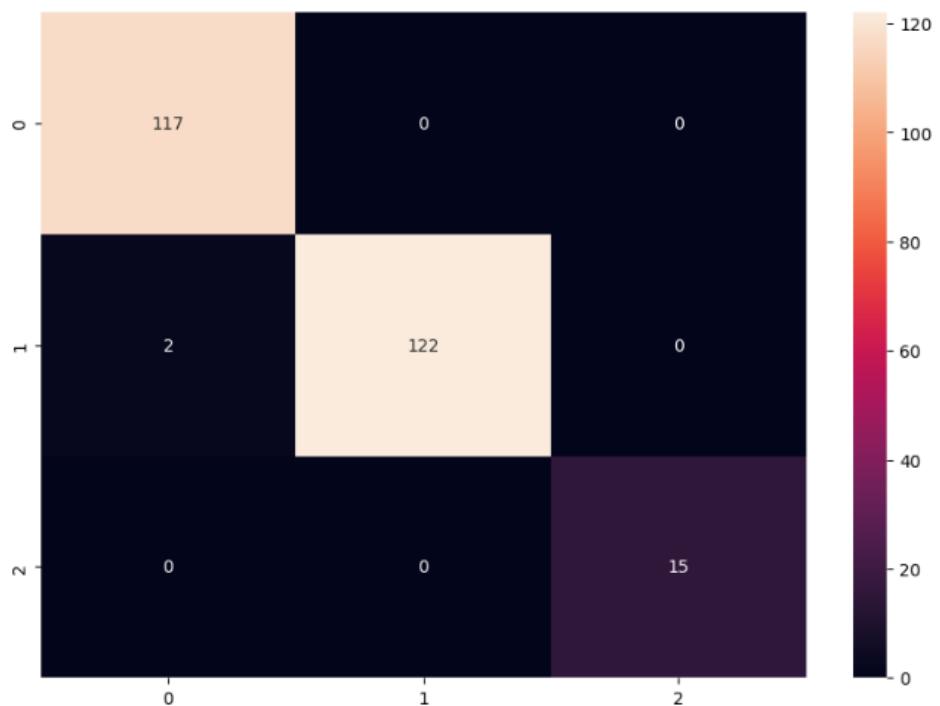
```
8/8 [=====] - 42s 5s/step - loss: 0.1107 - accuracy: 0.9922  
[0.1107415184378624, 0.9921875]
```

Average Time per Epoch: 301.80 s





Classification Report:					
	precision	recall	f1-score	support	
0	0.98	1.00	0.99	117	
1	1.00	0.98	0.99	124	
2	1.00	1.00	1.00	15	
accuracy			0.99	256	
macro avg	0.99	0.99	0.99	256	
weighted avg	0.99	0.99	0.99	256	



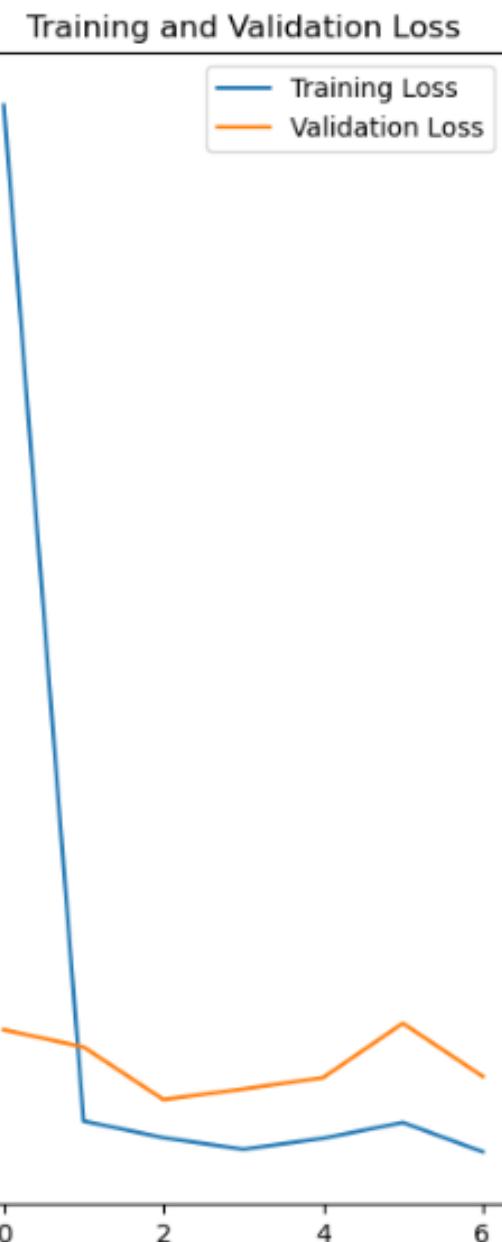
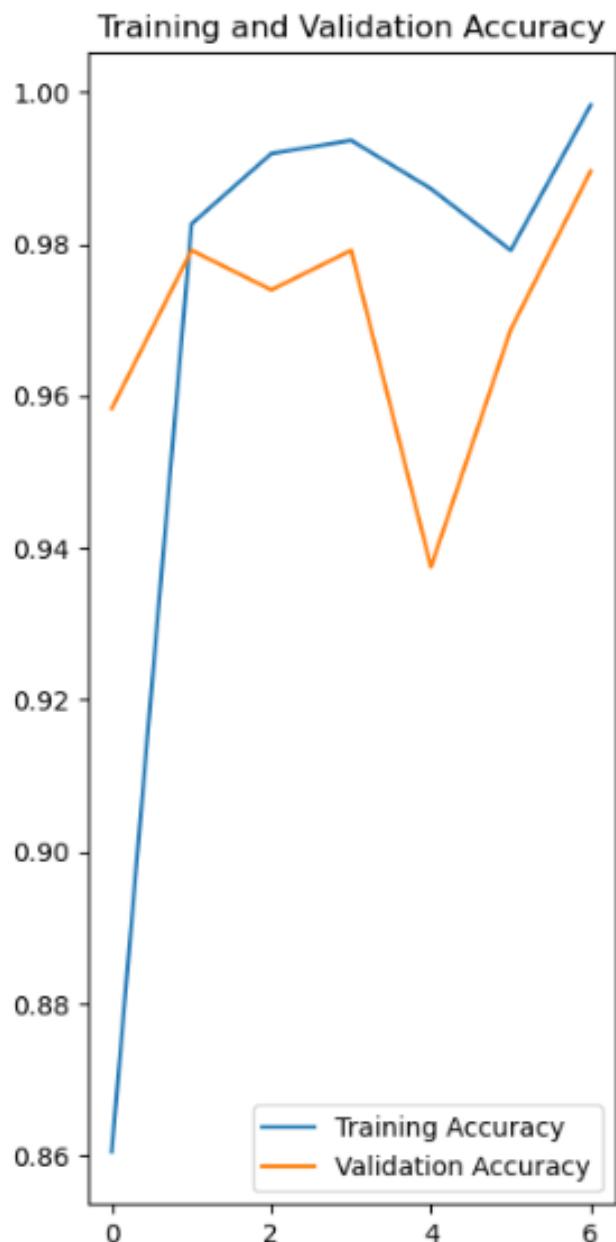
(d) 7

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=7
```

```
scores=model_from_vgg16.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 31s 4s/step - loss: 0.1656 - accuracy: 0.9883  
[0.1656436175107956, 0.98828125]
```

Average Time per Epoch: 306.86 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

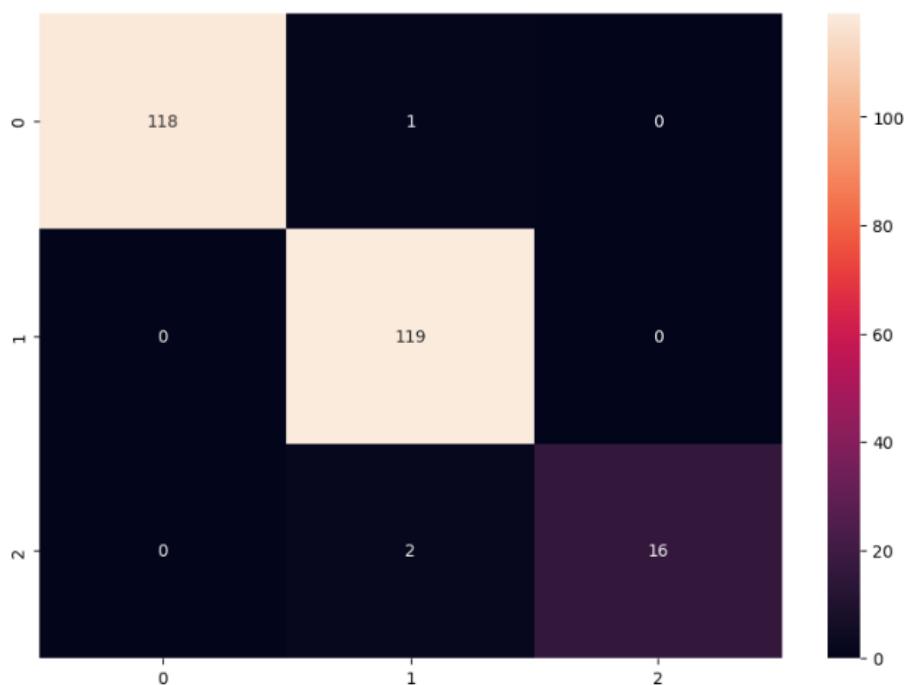


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	1.00	0.99	1.00	119
1	0.98	1.00	0.99	119
2	1.00	0.89	0.94	18
accuracy			0.99	256
macro avg	0.99	0.96	0.97	256
weighted avg	0.99	0.99	0.99	256



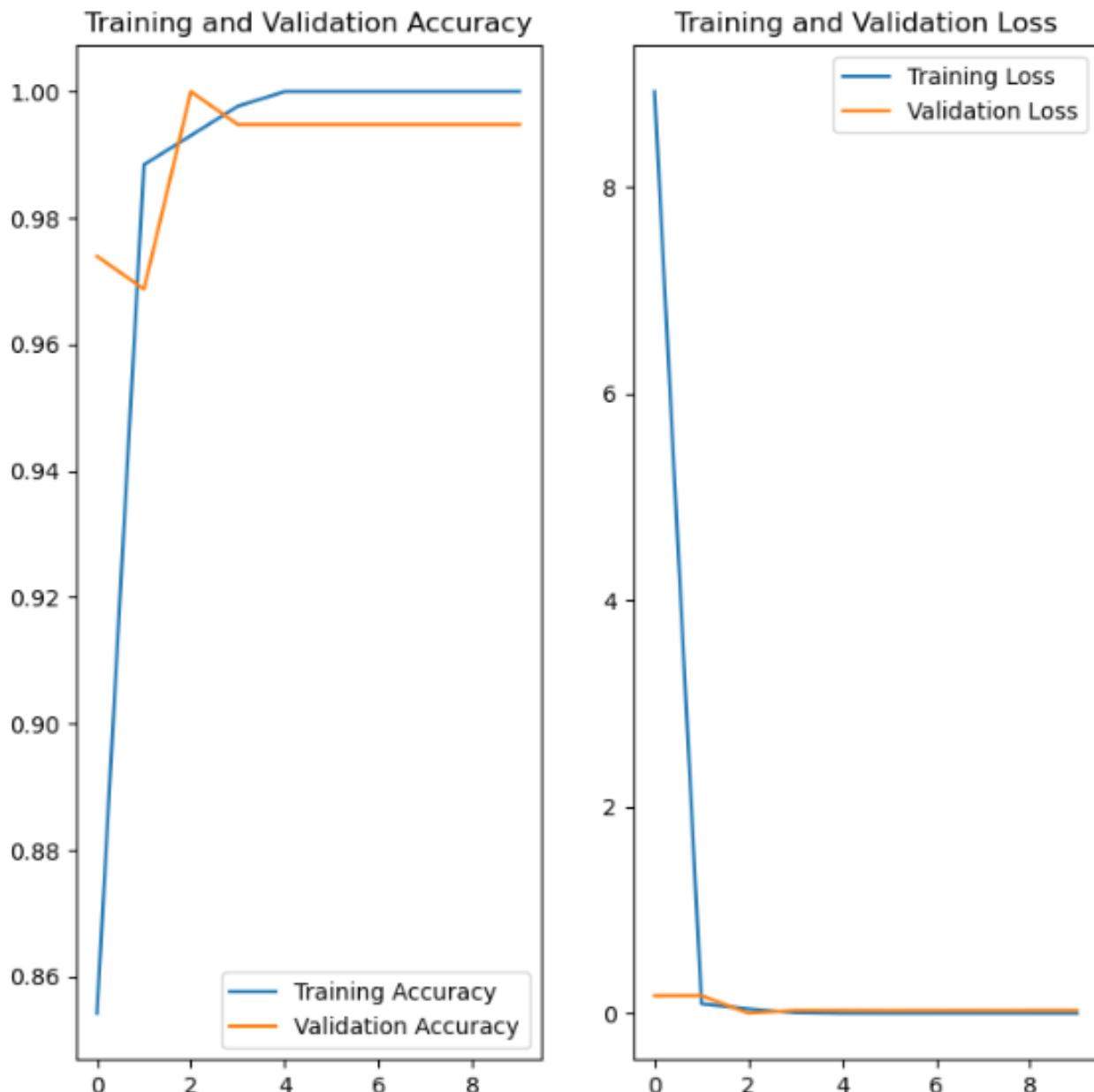
(e) 10

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=10
```

```
scores=model_from_vgg16.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 45s 5s/step - loss: 0.0866 - accuracy: 0.9961  
[0.0866105780005455, 0.99609375]
```

Average Time per Epoch: 298.10 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

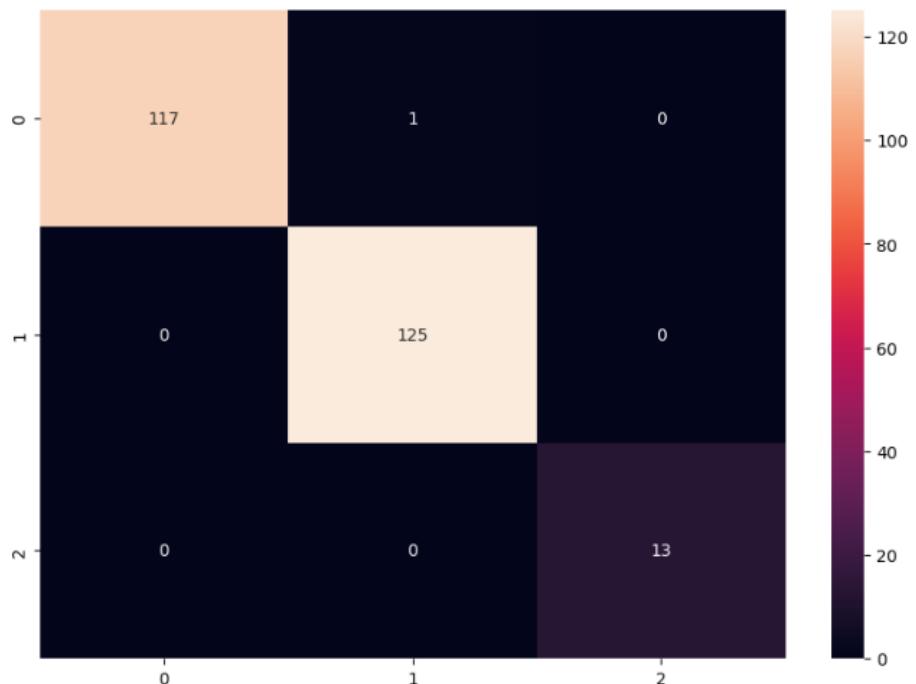


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	1.00	0.99	1.00	118
1	0.99	1.00	1.00	125
2	1.00	1.00	1.00	13
accuracy			1.00	256
macro avg	1.00	1.00	1.00	256
weighted avg	1.00	1.00	1.00	256



BATCH SIZE

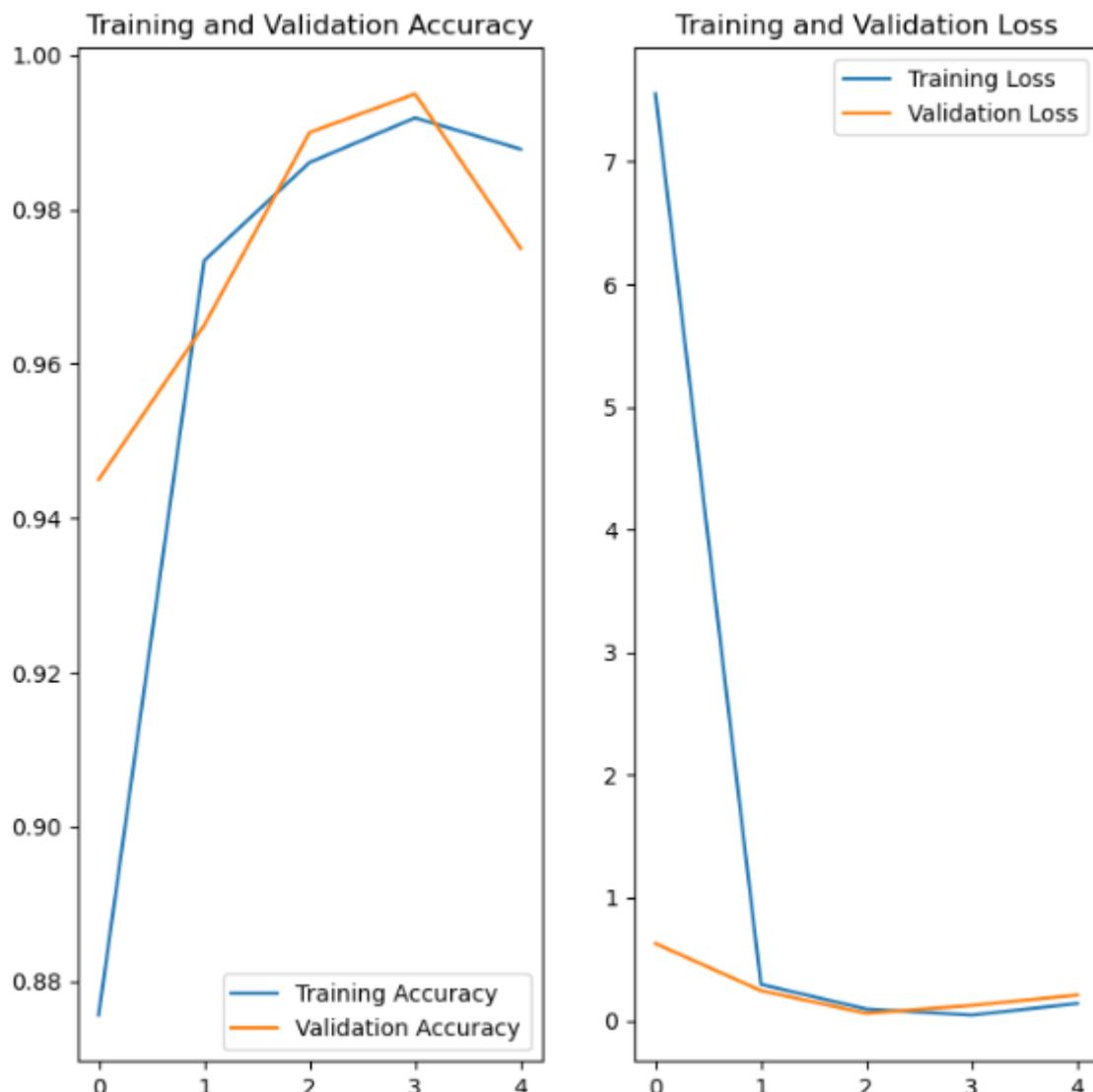
(a) 16

```
IMAGE_SIZE=224  
BATCH_SIZE=16  
CHANNELS=3  
EPOCHS=5
```

```
scores=model_from_vgg16.evaluate(test_ds)  
scores
```

```
14/14 [=====] - 36s 3s/step - loss: 0.2970 - accuracy: 0.9866  
[0.29698997735977173, 0.9866071343421936]
```

Average Time per Epoch: 297.00 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 99.93%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%

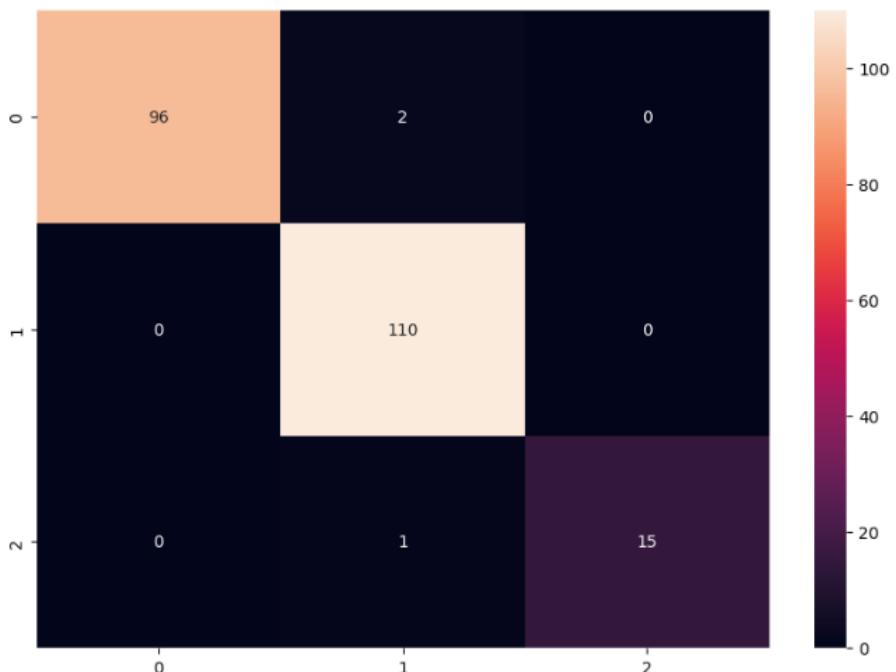


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	1.00	0.98	0.99	98
1	0.97	1.00	0.99	110
2	1.00	0.94	0.97	16
accuracy			0.99	224
macro avg	0.99	0.97	0.98	224
weighted avg	0.99	0.99	0.99	224



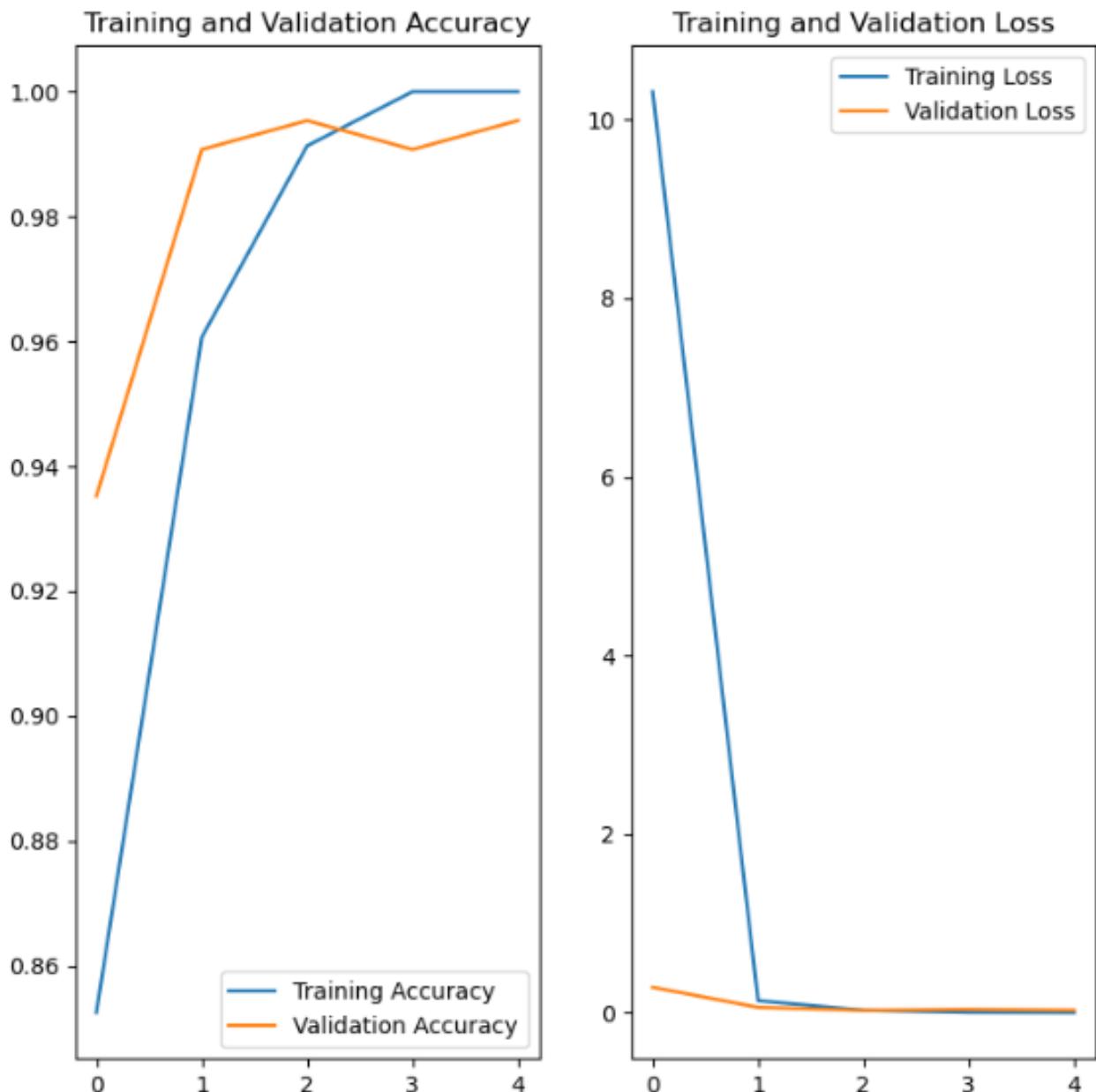
(b) 24

```
IMAGE_SIZE=224  
BATCH_SIZE=24  
CHANNELS=3  
EPOCHS=5
```

```
scores=model_from_vgg16.evaluate(test_ds)  
scores
```

```
9/9 [=====] - 36s 4s/step - loss: 0.0019 - accuracy: 1.0000  
[0.001880924915894866, 1.0]
```

Average Time per Epoch: 284.80 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.55%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

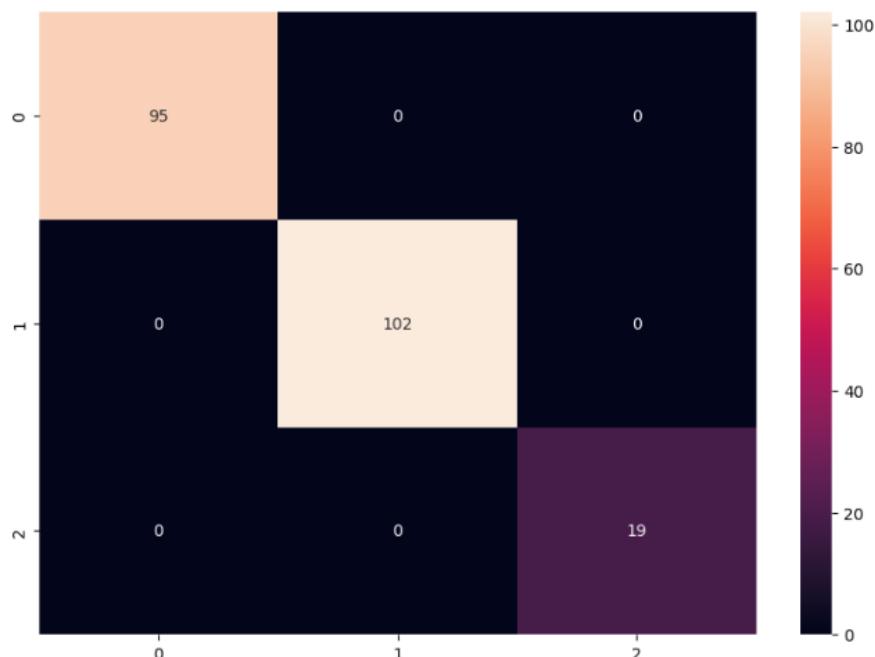


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	1.00	1.00	1.00	95
1	1.00	1.00	1.00	102
2	1.00	1.00	1.00	19
accuracy			1.00	216
macro avg	1.00	1.00	1.00	216
weighted avg	1.00	1.00	1.00	216



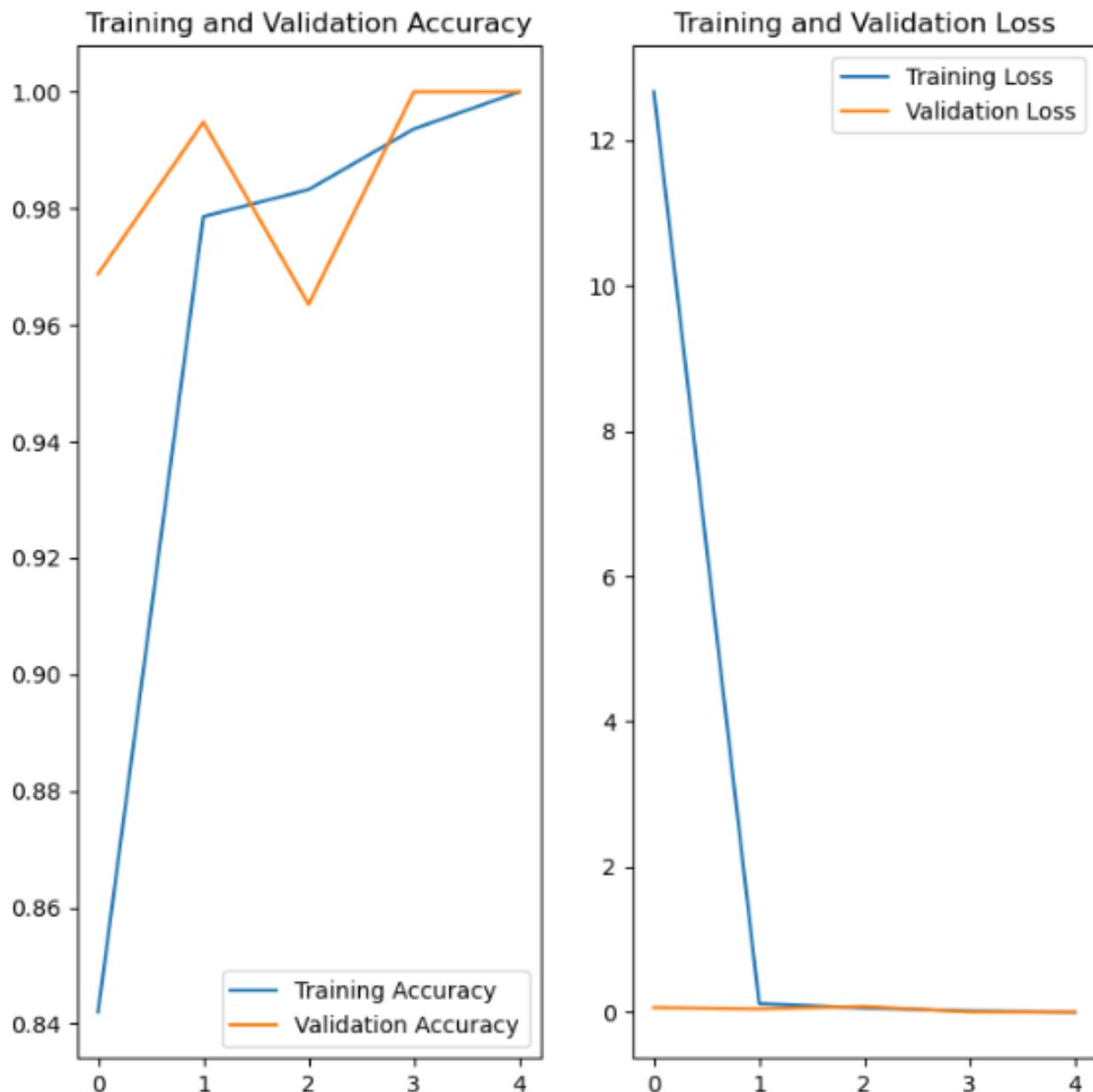
(c) 32

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=5
```

```
scores=model_from_vgg16.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 44s 6s/step - loss: 4.5239e-04 - accuracy: 1.0000  
[0.0004523913376033306, 1.0]
```

Average Time per Epoch: 286.40 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%

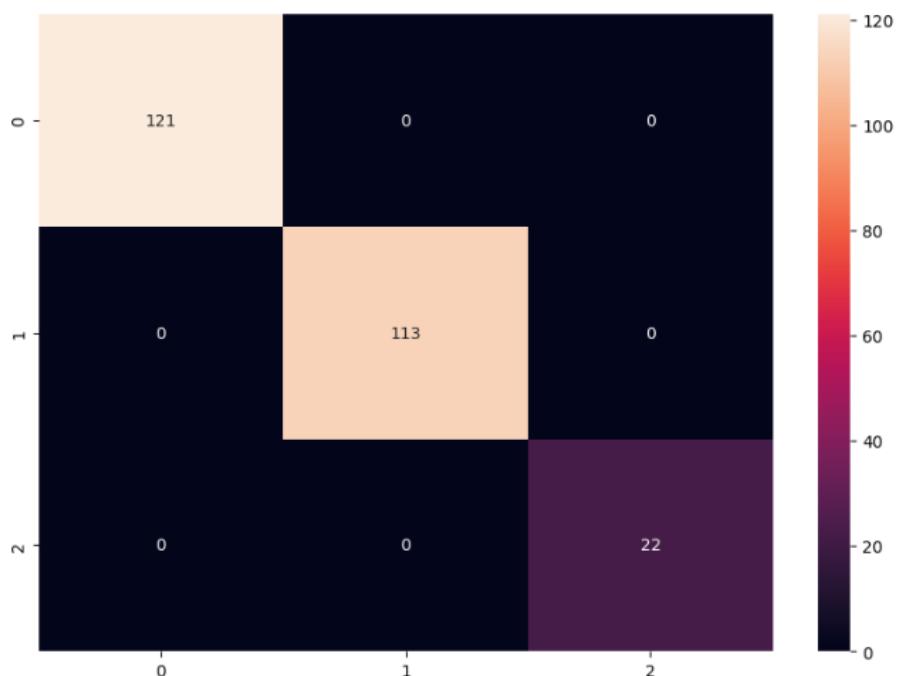


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	1.00	1.00	1.00	121
1	1.00	1.00	1.00	113
2	1.00	1.00	1.00	22
accuracy			1.00	256
macro avg	1.00	1.00	1.00	256
weighted avg	1.00	1.00	1.00	256



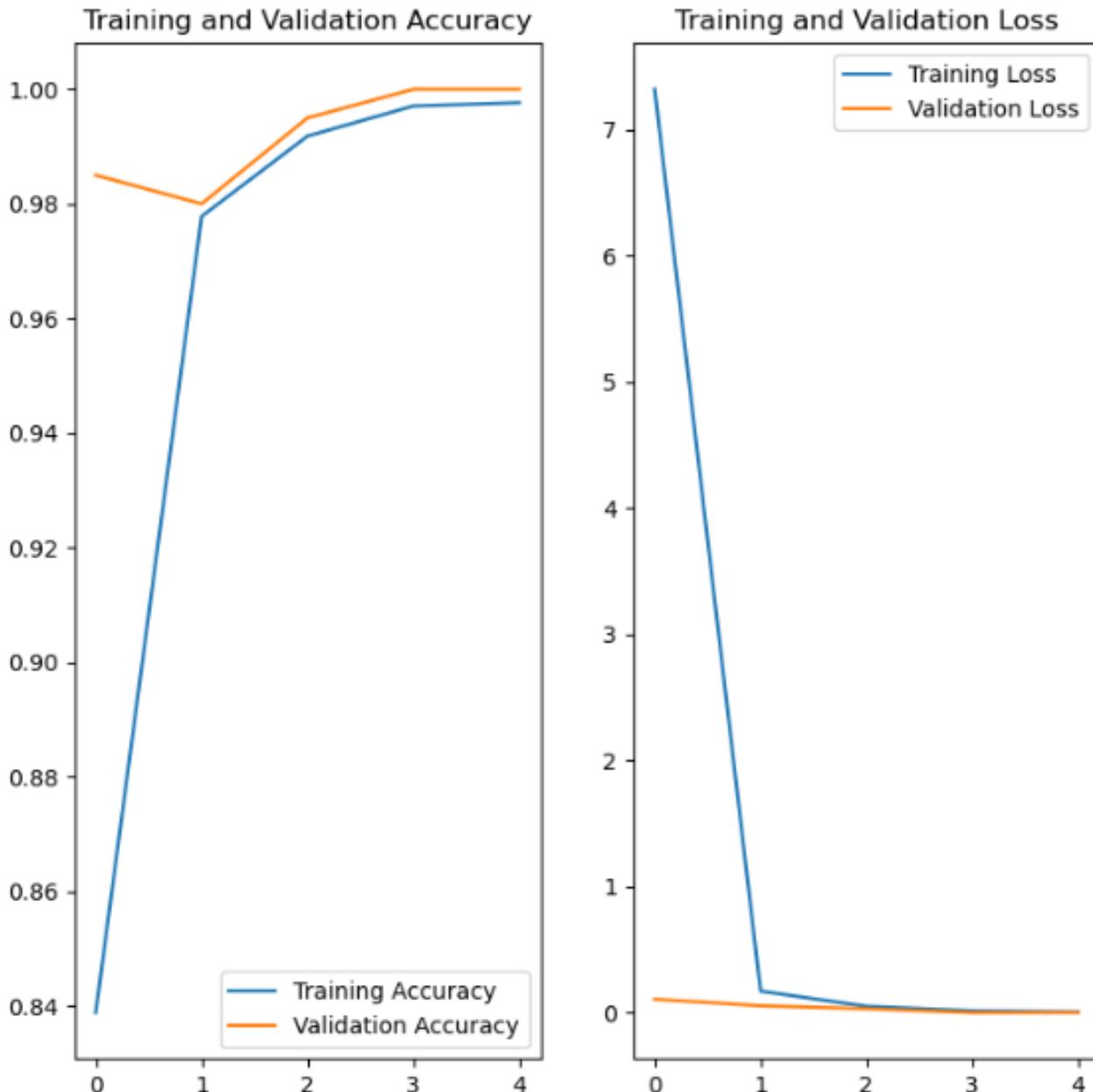
(d) 40

```
IMAGE_SIZE=224  
BATCH_SIZE=40  
CHANNELS=3  
EPOCHS=5
```

```
scores=model_from_vgg16.evaluate(test_ds)  
scores
```

```
6/6 [=====] - 43s 7s/step - loss: 0.0855 - accuracy: 0.9833  
[0.08551069349050522, 0.9833333492279053]
```

Average Time per Epoch: 283.00 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

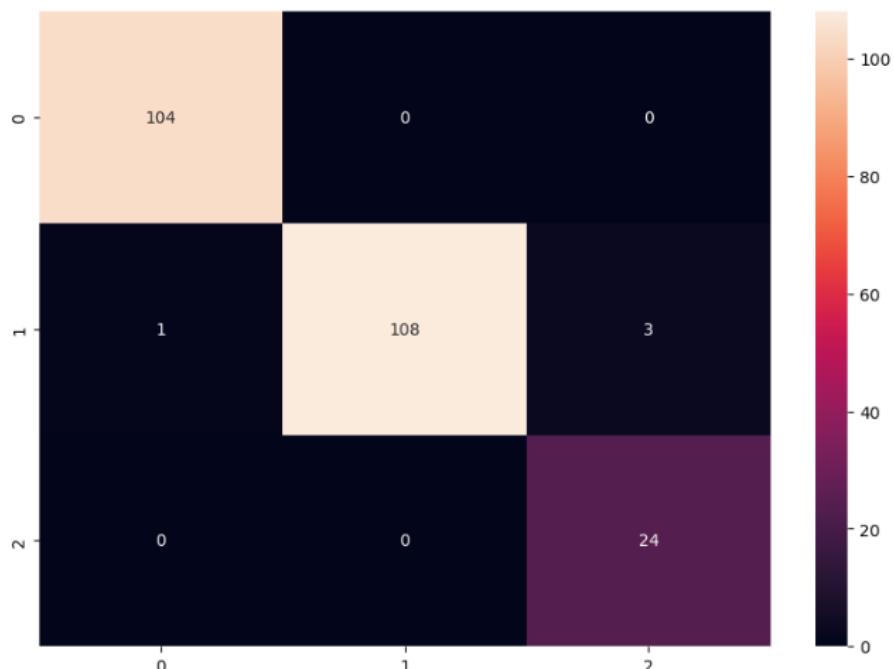


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	0.99	1.00	1.00	104
1	1.00	0.96	0.98	112
2	0.89	1.00	0.94	24
accuracy			0.98	240
macro avg	0.96	0.99	0.97	240
weighted avg	0.98	0.98	0.98	240



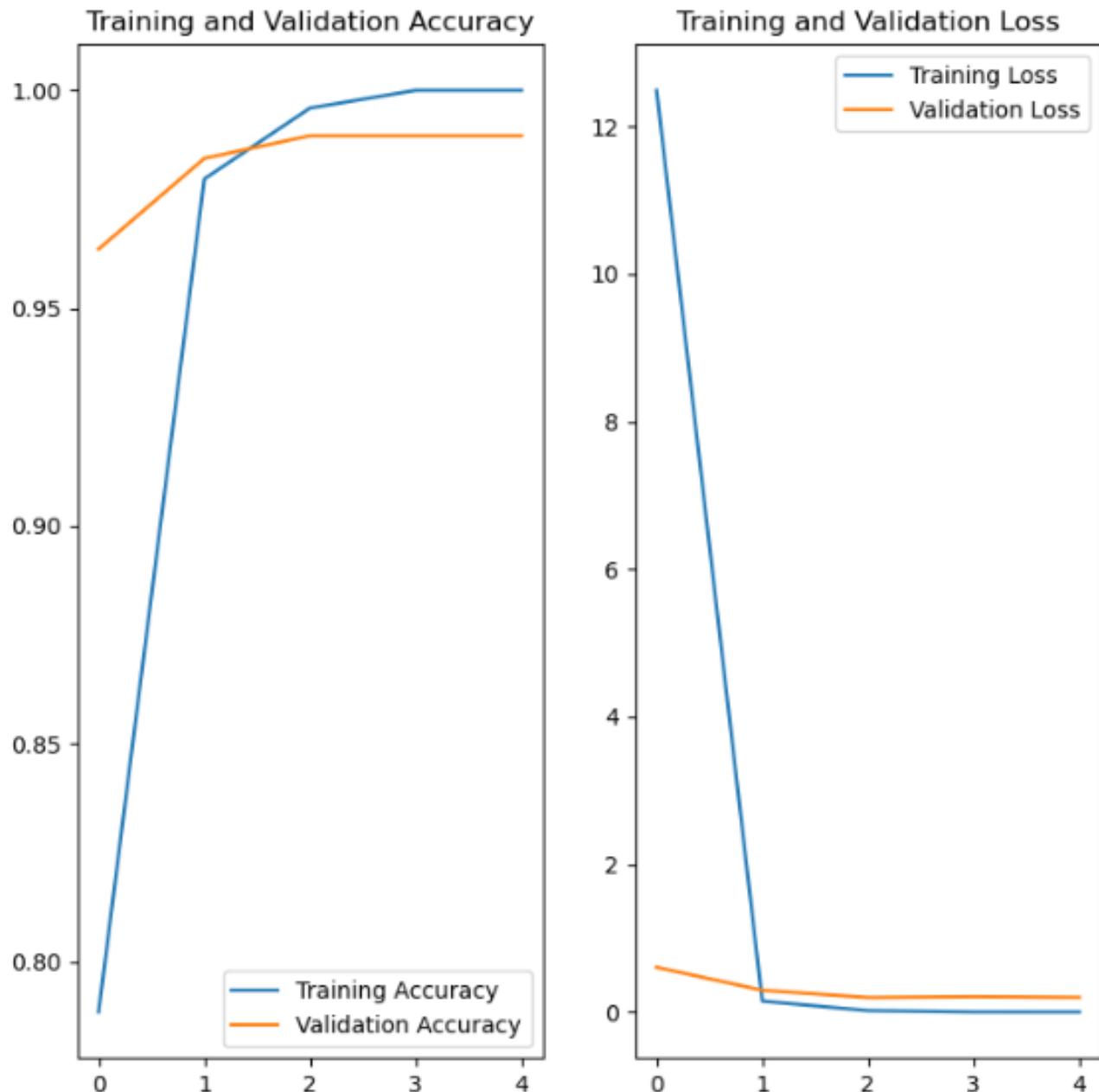
(e) 48

```
IMAGE_SIZE=224  
BATCH_SIZE=48  
CHANNELS=3  
EPOCHS=5
```

```
scores=model_from_vgg16.evaluate(test_ds)  
scores
```

```
5/5 [=====] - 44s 8s/step - loss: 0.0139 - accuracy: 0.9958  
[0.013858538120985031, 0.9958333373069763]
```

Average Time per Epoch: 279.80 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%

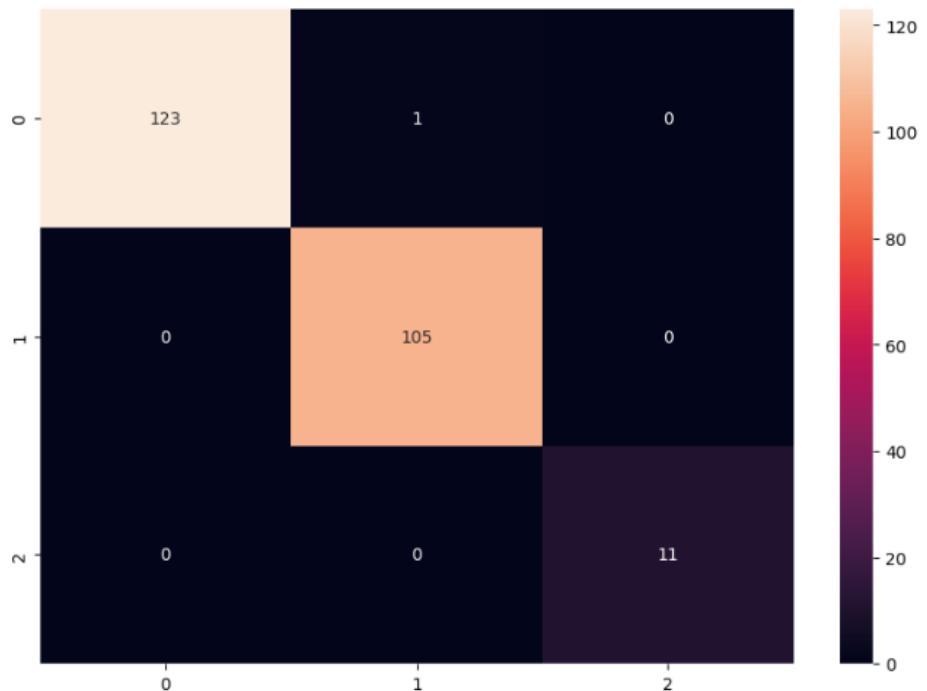


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	1.00	0.99	1.00	124
1	0.99	1.00	1.00	105
2	1.00	1.00	1.00	11
accuracy			1.00	240
macro avg	1.00	1.00	1.00	240
weighted avg	1.00	1.00	1.00	240



DATASET SPLIT RATIO

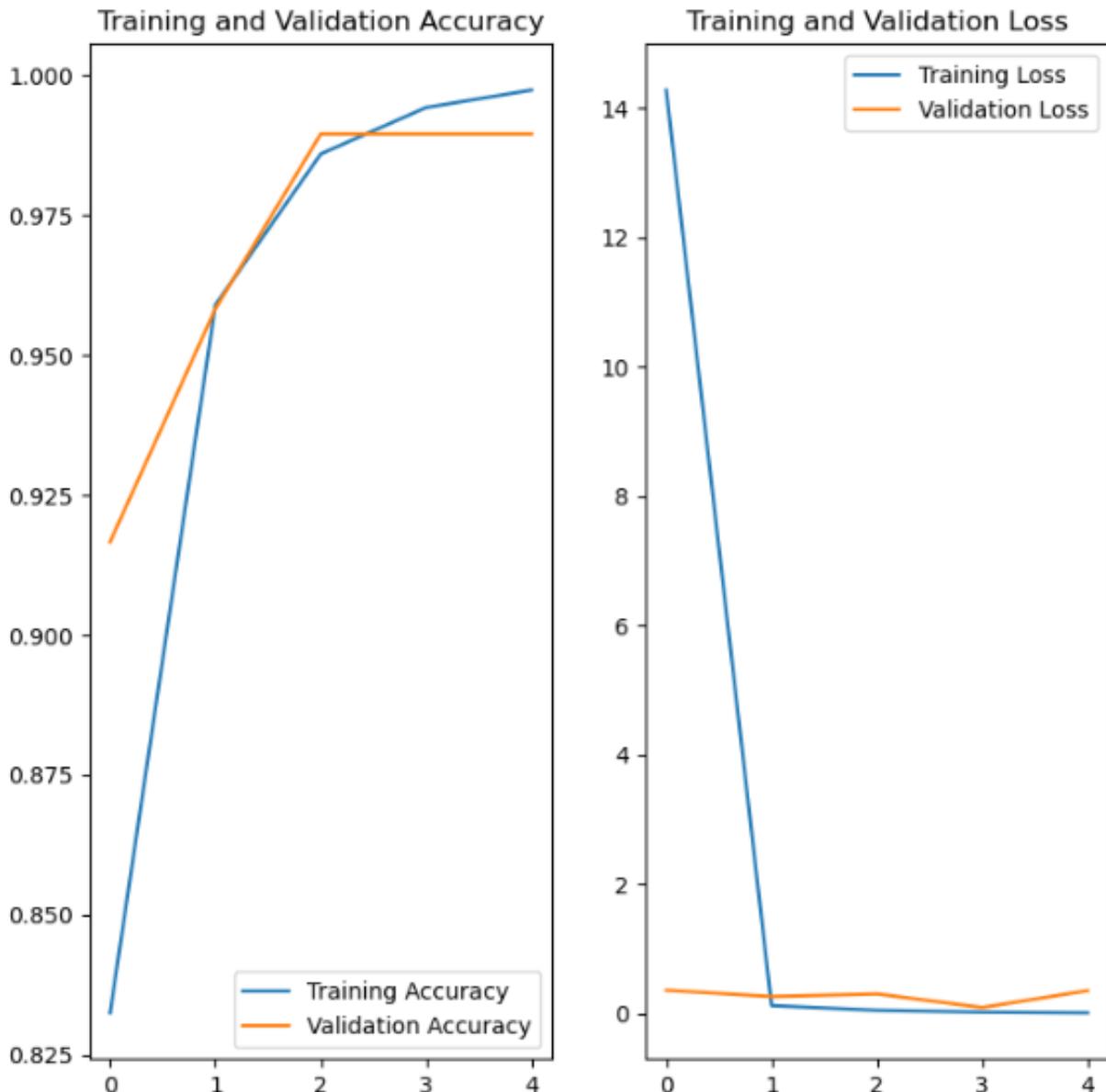
(a) 90:5:5

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=5
```

```
scores=model_from_vgg16.evaluate(test_ds)  
scores
```

```
4/4 [=====] - 25s 6s/step - loss: 0.0023 - accuracy: 1.0000  
[0.0022736680693924427, 1.0]
```

Average Time per Epoch: 302.20 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.99%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

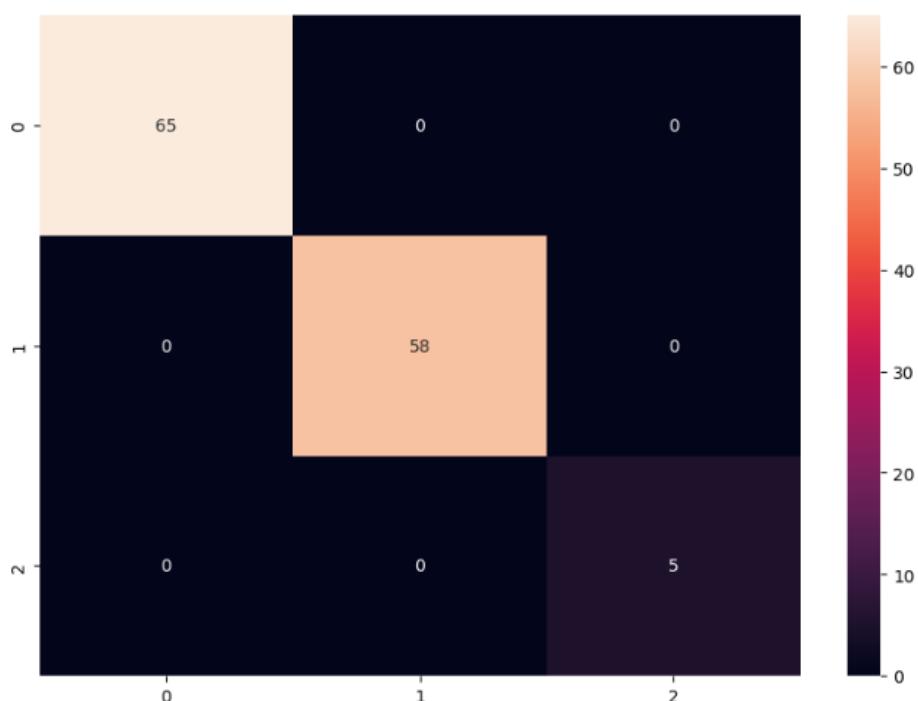


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	1.00	1.00	1.00	65
1	1.00	1.00	1.00	58
2	1.00	1.00	1.00	5
accuracy			1.00	128
macro avg	1.00	1.00	1.00	128
weighted avg	1.00	1.00	1.00	128



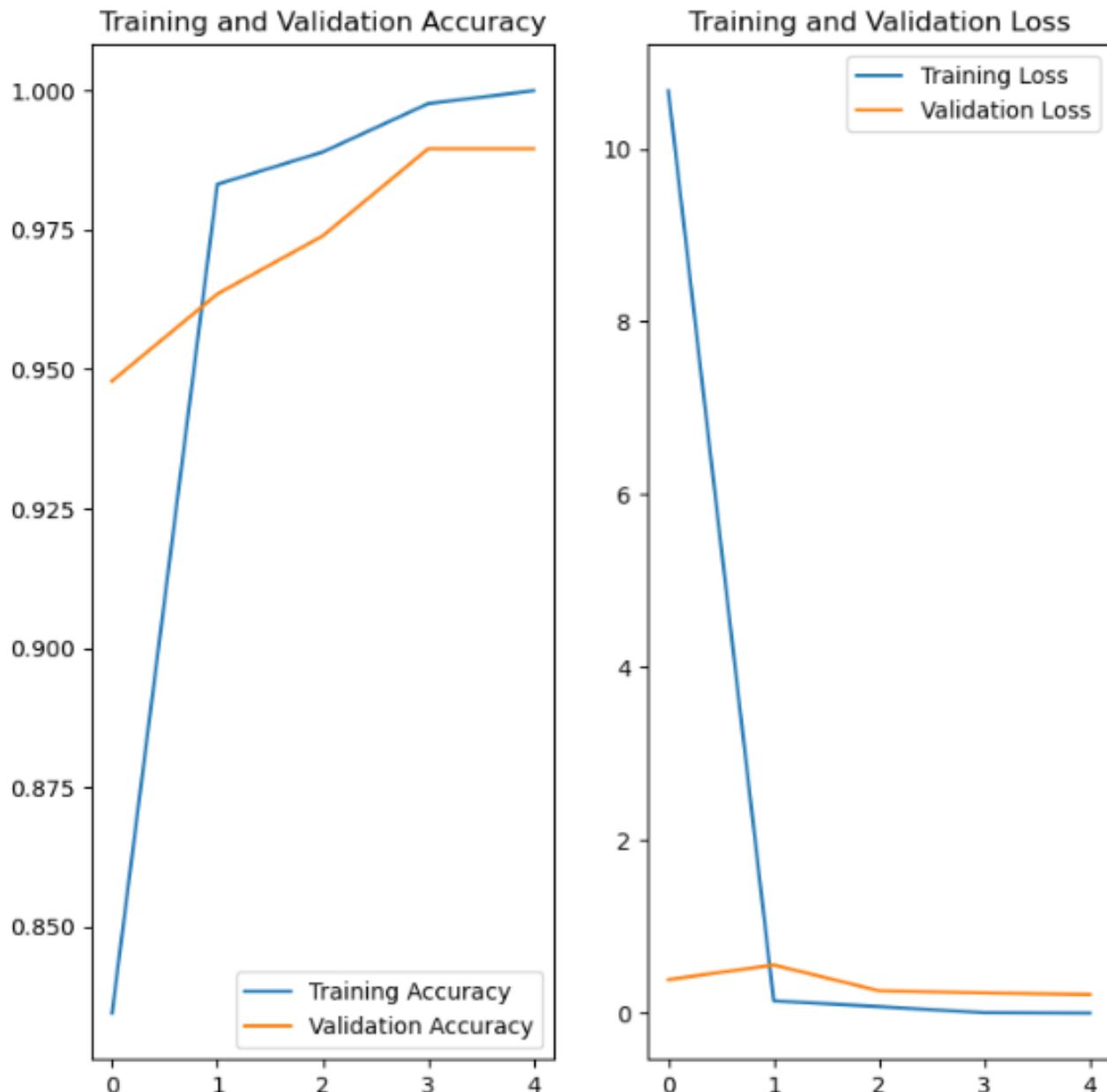
(b) 80:10:10

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=5
```

```
scores=model_from_vgg16.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 32s 4s/step - loss: 0.1033 - accuracy: 0.9961  
[0.10331163555383682, 0.99609375]
```

Average Time per Epoch: 288.00 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

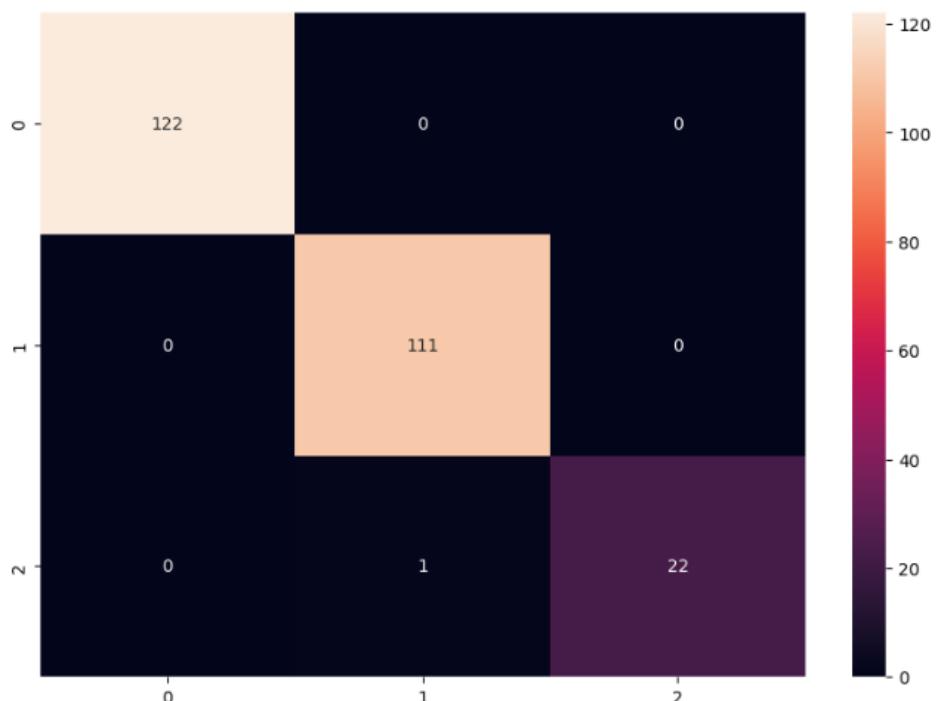


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	1.00	1.00	1.00	122
1	0.99	1.00	1.00	111
2	1.00	0.96	0.98	23
accuracy			1.00	256
macro avg	1.00	0.99	0.99	256
weighted avg	1.00	1.00	1.00	256



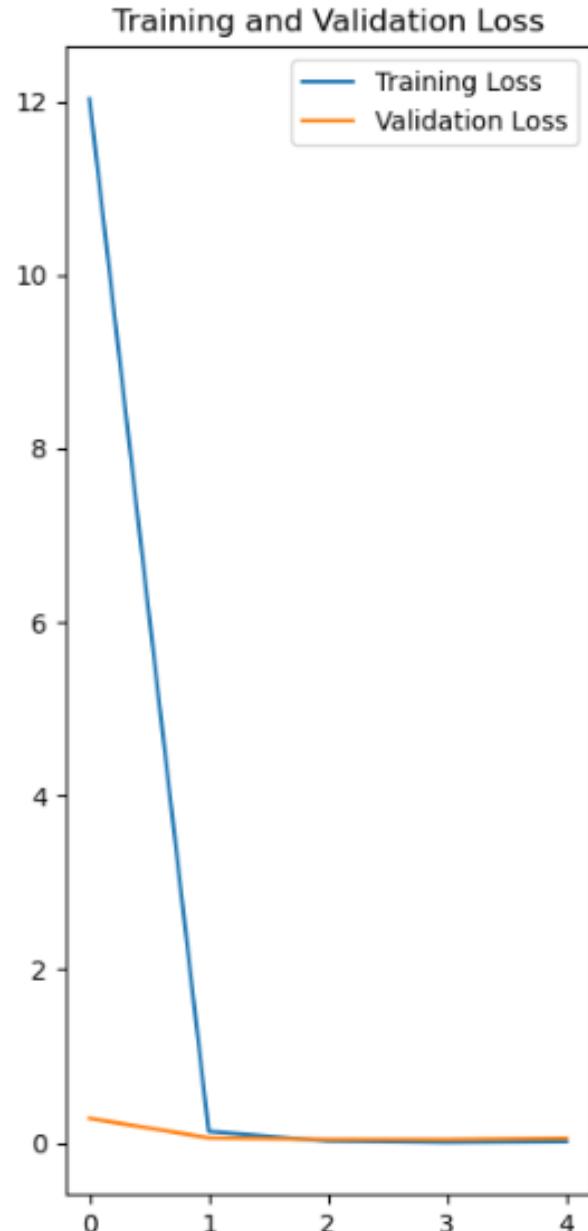
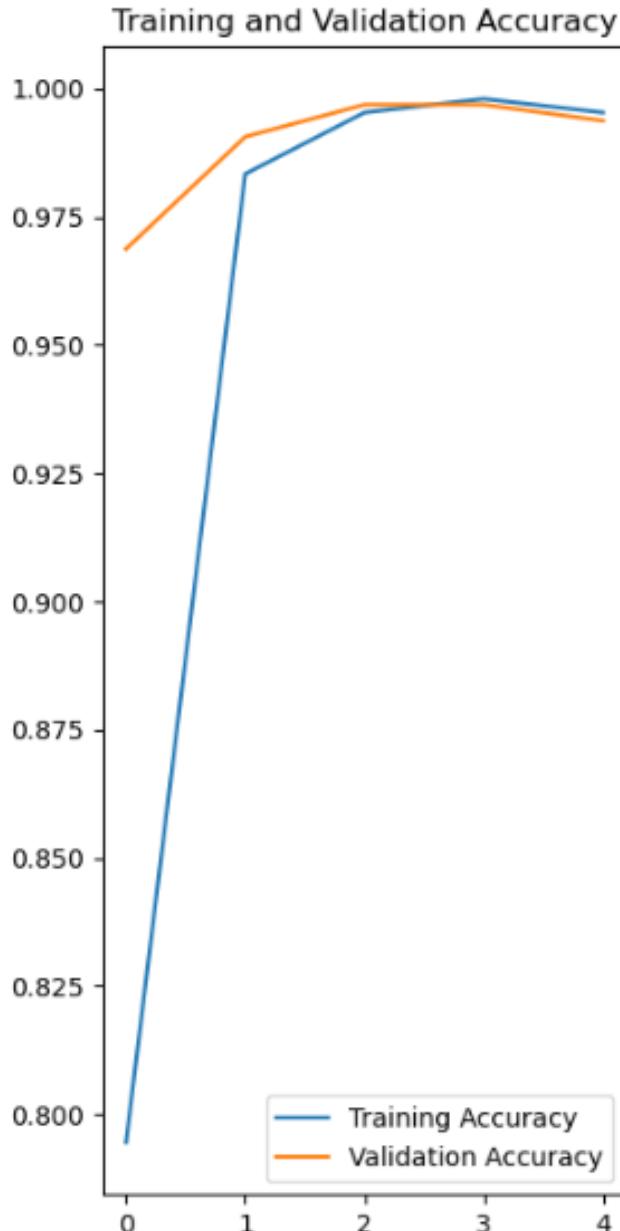
(c) 70:15:15

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=5
```

```
scores=model_from_vgg16.evaluate(test_ds)  
scores
```

```
11/11 [=====] - 51s 5s/step - loss: 0.0105 - accuracy: 0.9915  
[0.01053461804986, 0.9914772510528564]
```

Average Time per Epoch: 274.20 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

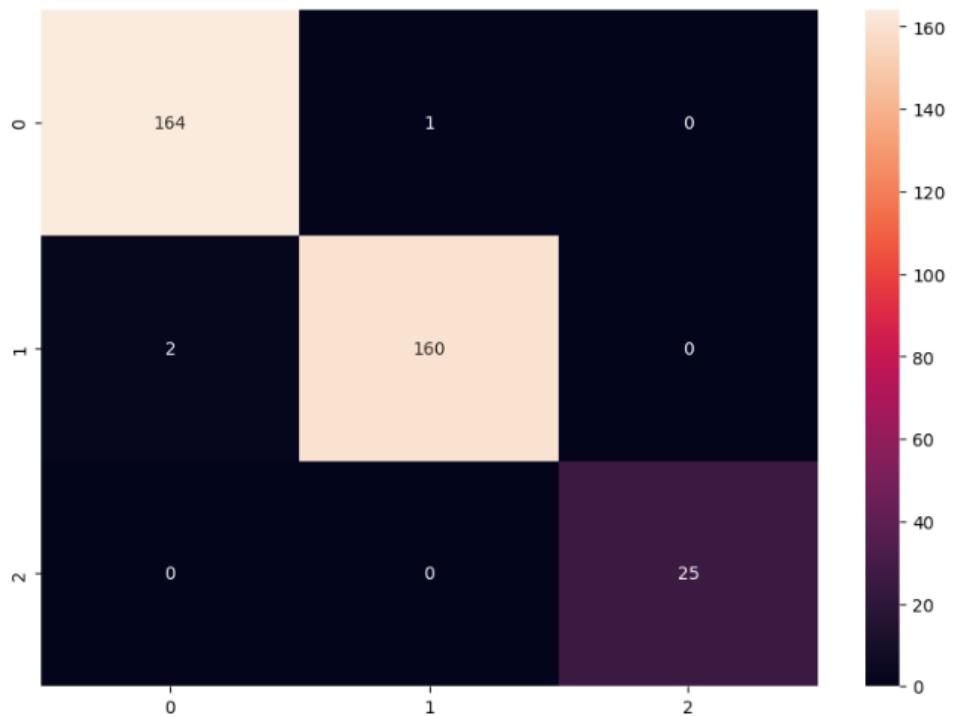


Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	0.99	0.99	0.99	165
1	0.99	0.99	0.99	162
2	1.00	1.00	1.00	25
accuracy			0.99	352
macro avg	0.99	0.99	0.99	352
weighted avg	0.99	0.99	0.99	352



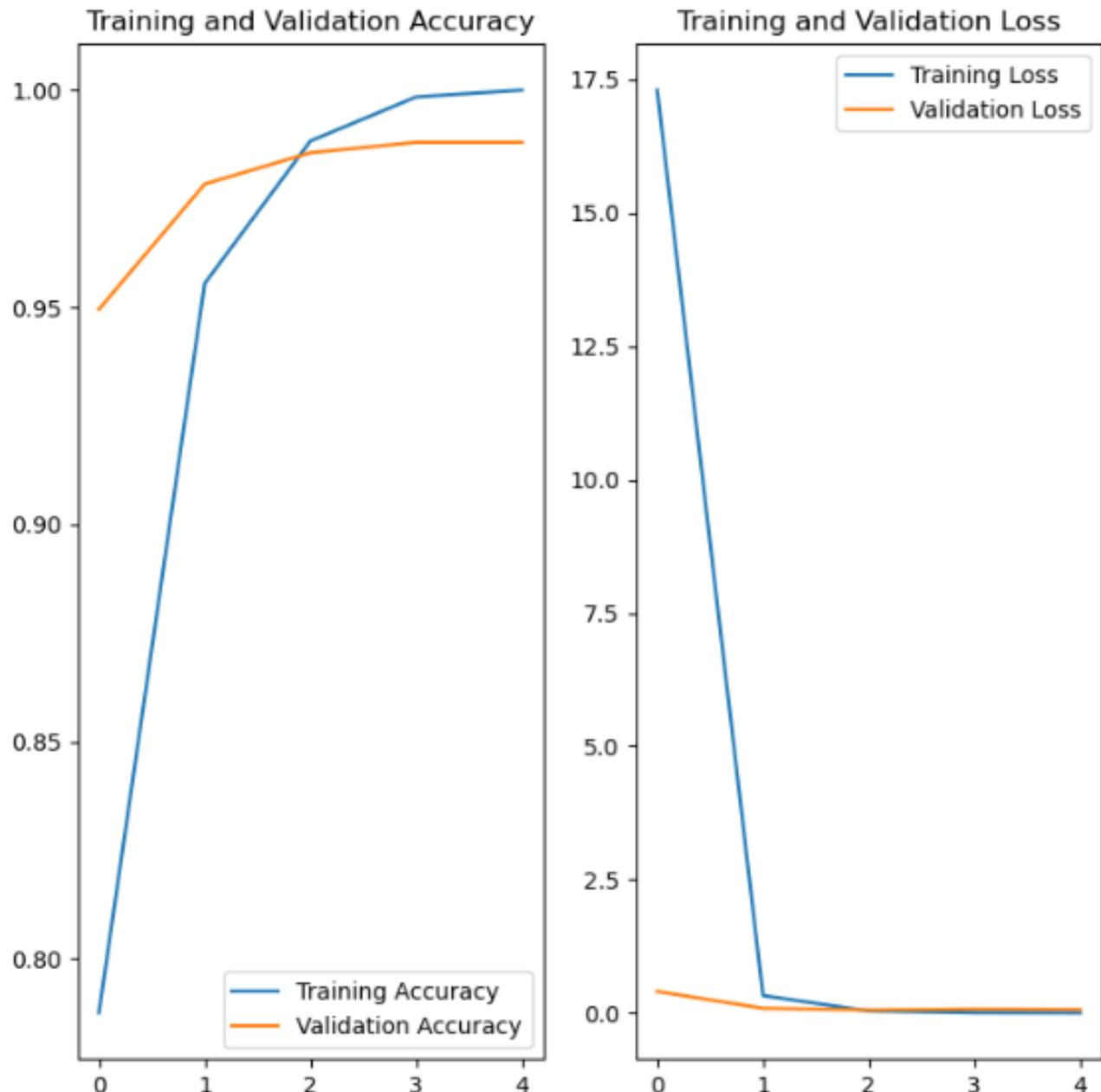
(d) 60:20:20

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=5
```

```
scores=model_from_vgg16.evaluate(test_ds)  
scores
```

```
15/15 [=====] - 61s 4s/step - loss: 0.0561 - accuracy: 0.9917  
[0.05608634650707245, 0.9916666746139526]
```

Average Time per Epoch: 312.40 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

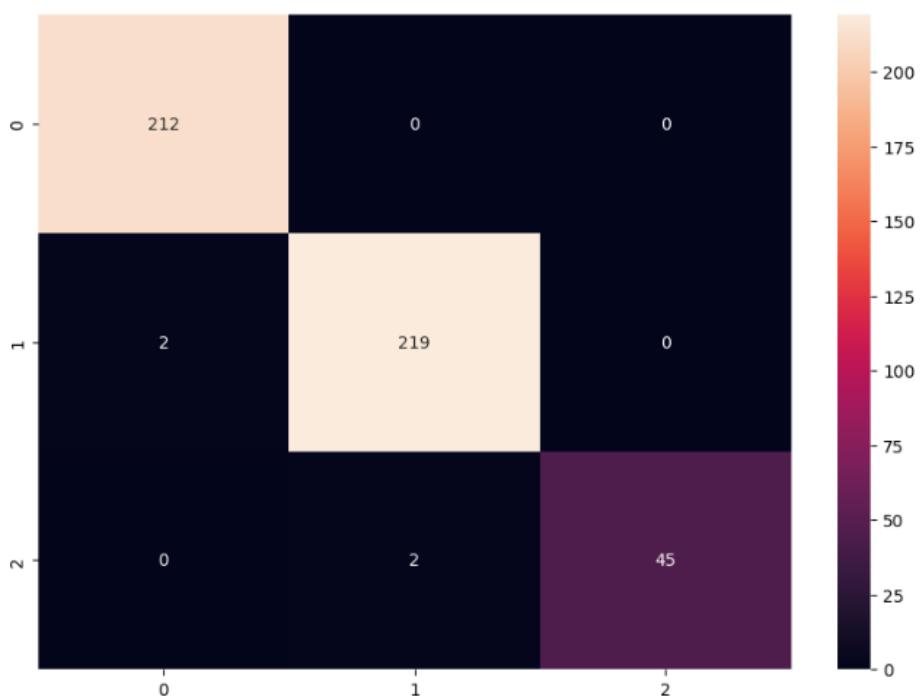


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	0.99	1.00	1.00	212
1	0.99	0.99	0.99	221
2	1.00	0.96	0.98	47
accuracy			0.99	480
macro avg	0.99	0.98	0.99	480
weighted avg	0.99	0.99	0.99	480



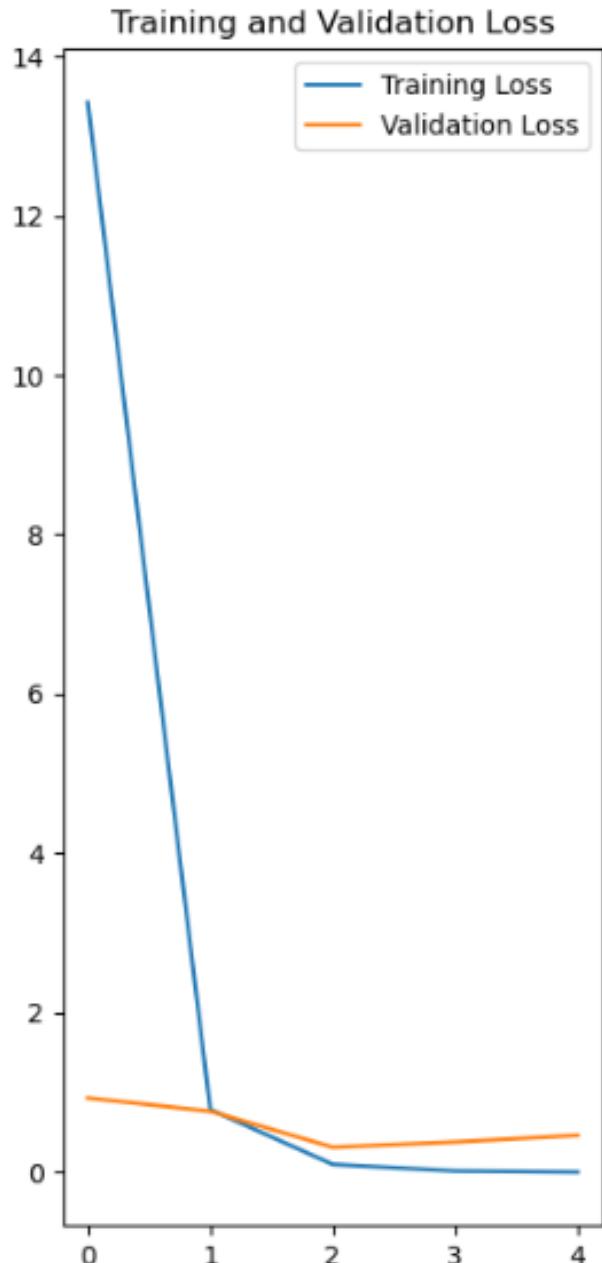
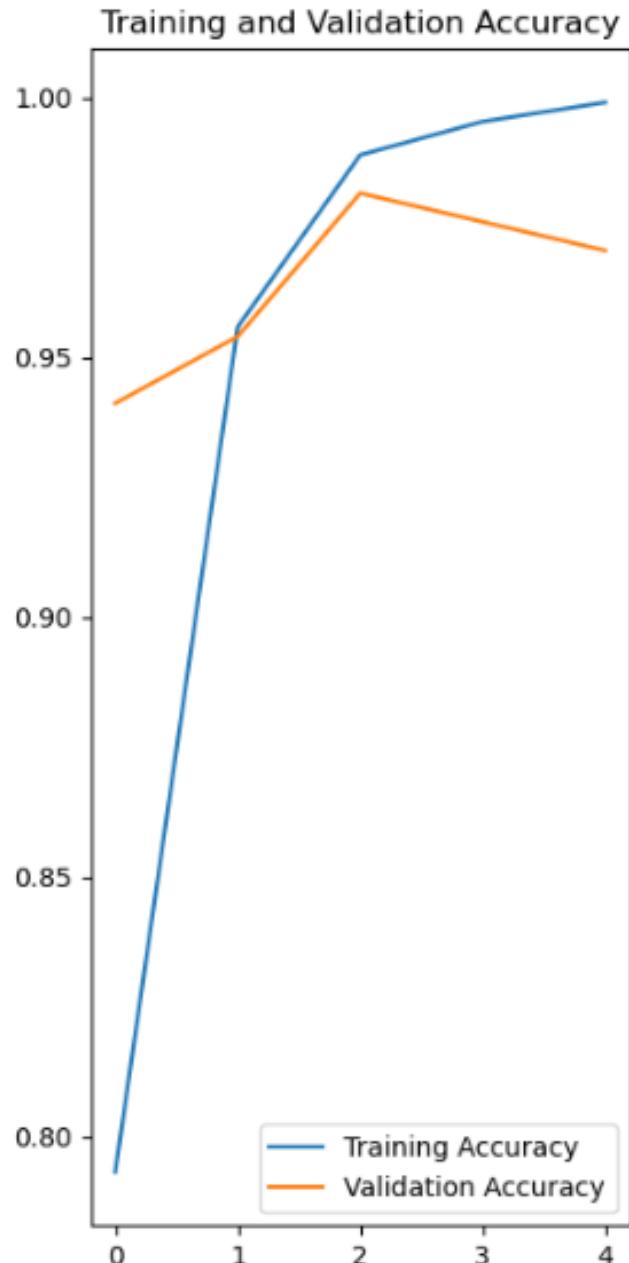
(e) 50:25:25

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=5
```

```
scores=model_from_vgg16.evaluate(test_ds)  
scores
```

```
17/17 [=====] - 73s 4s/step - loss: 0.2934 - accuracy: 0.9798  
[0.29338982701301575, 0.9797794222831726]
```

Average Time per Epoch: 239.40 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%

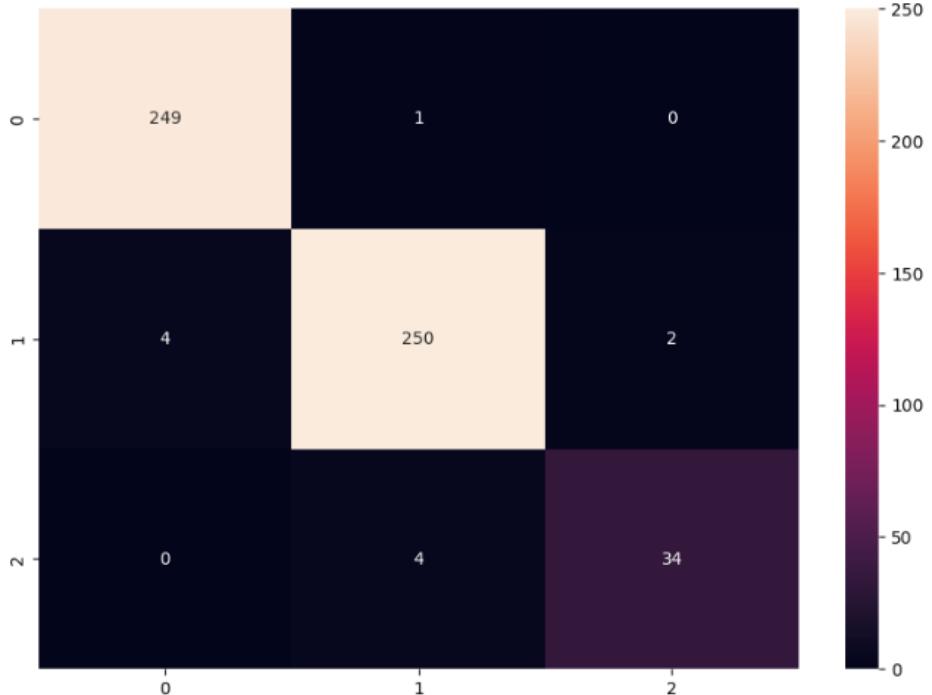


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	0.98	1.00	0.99	250
1	0.98	0.98	0.98	256
2	0.94	0.89	0.92	38
accuracy			0.98	544
macro avg	0.97	0.96	0.96	544
weighted avg	0.98	0.98	0.98	544



Model 4: VGG19

BASE MODEL

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=2
```

```
scores=model_from_vgg19.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 52s 7s/step - loss: 0.0926 - accuracy: 0.9922  
[0.09257867932319641, 0.9921875]
```

Average Time per Epoch: 319.50 s

```
history3.history['loss']
```

```
[6.831719398498535, 0.05310869589447975]
```

```
history3.history['accuracy']
```

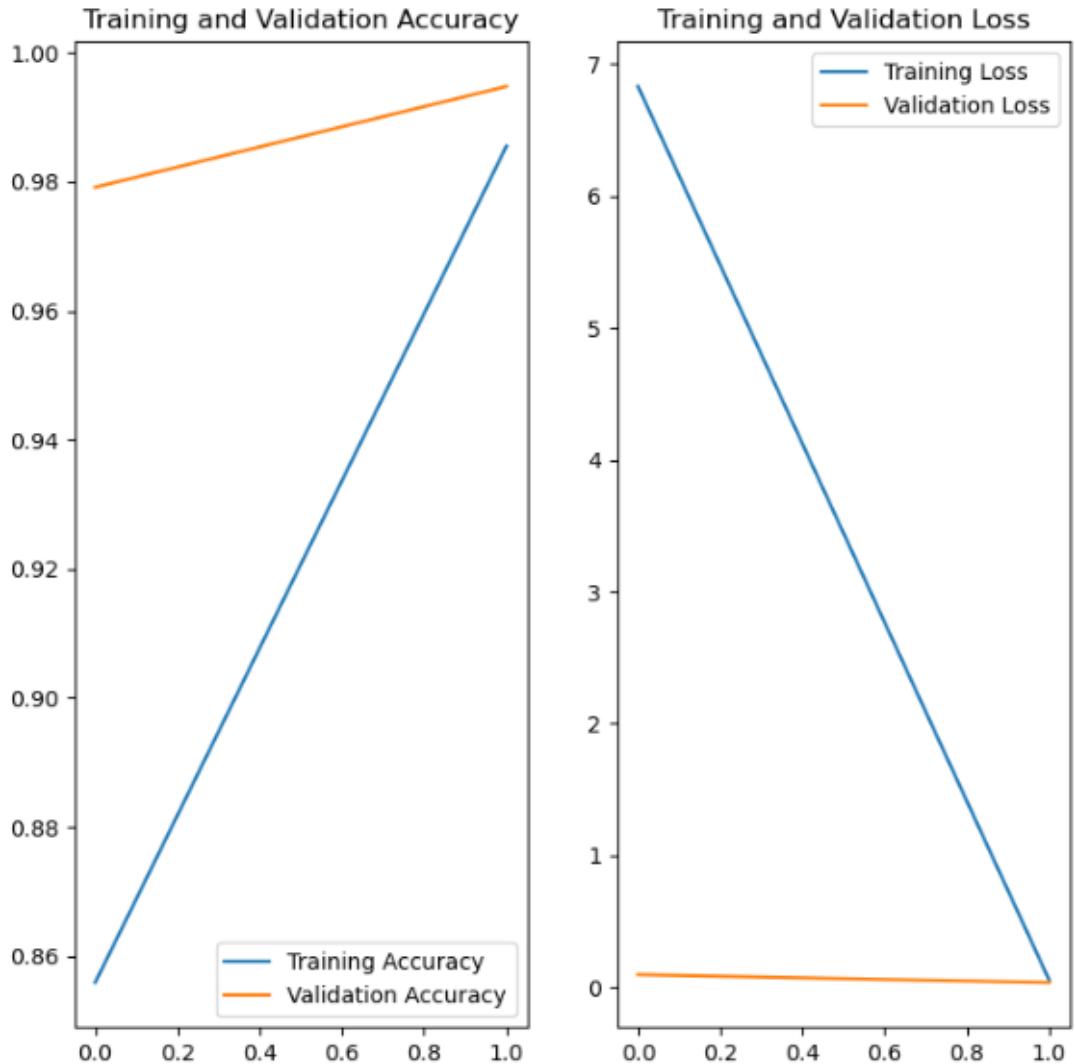
```
[0.8559027910232544, 0.9855324029922485]
```

```
history3.history['val_loss']
```

```
[0.09497755765914917, 0.034705355763435364]
```

```
history3.history['val_accuracy']
```

```
[0.9791666865348816, 0.9947916865348816]
```



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



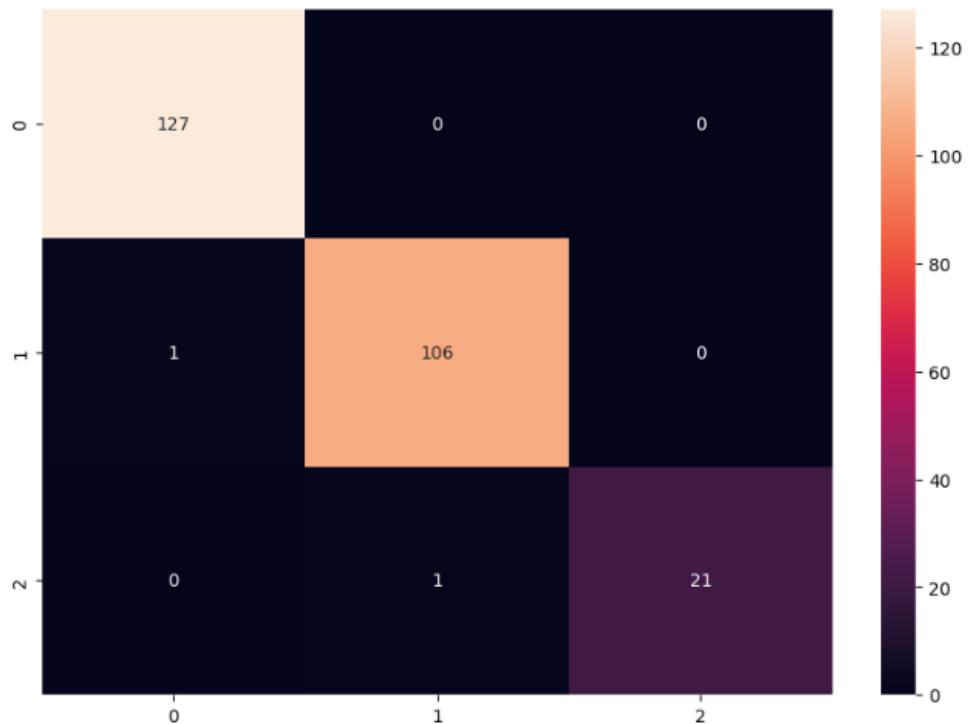
Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:				
	precision	recall	f1-score	support
0	0.99	1.00	1.00	127
1	0.99	0.99	0.99	107
2	1.00	0.95	0.98	22
accuracy			0.99	256
macro avg	0.99	0.98	0.99	256
weighted avg	0.99	0.99	0.99	256



NO. OF EPOCHS

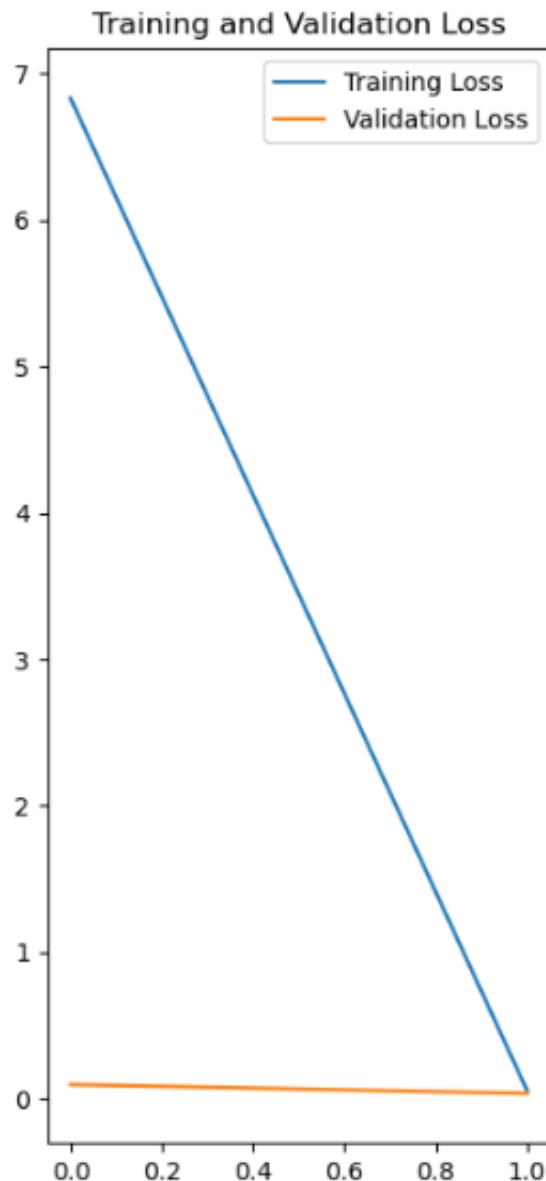
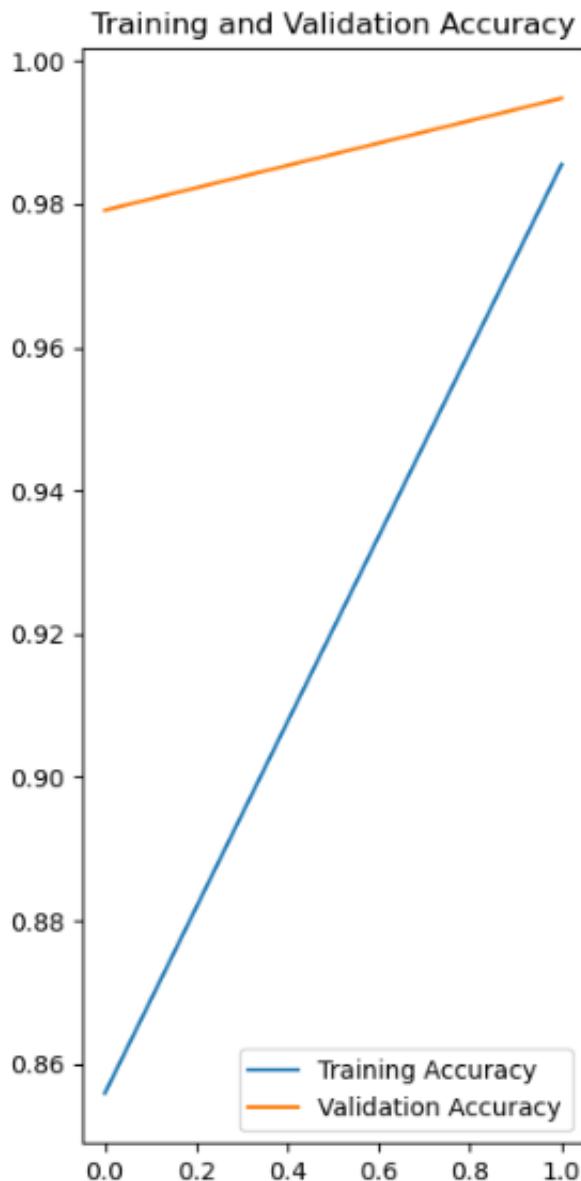
(a) 2

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=2
```

```
scores=model_from_vgg19.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 52s 7s/step - loss: 0.0926 - accuracy: 0.9922  
[0.09257867932319641, 0.9921875]
```

Average Time per Epoch: 319.50 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

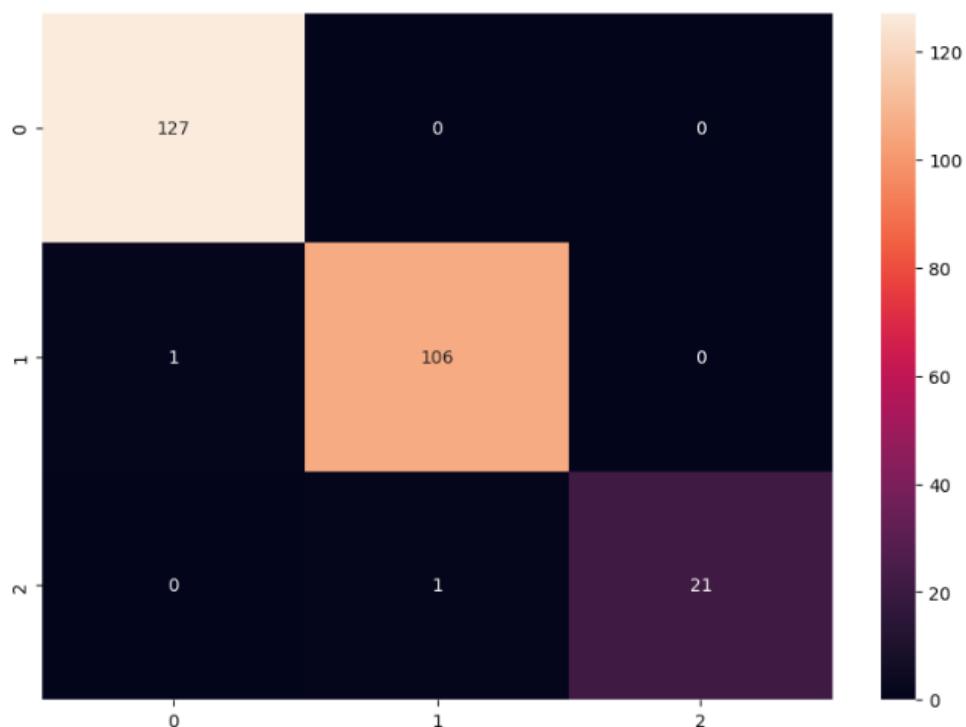


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	0.99	1.00	1.00	127
1	0.99	0.99	0.99	107
2	1.00	0.95	0.98	22
accuracy			0.99	256
macro avg	0.99	0.98	0.99	256
weighted avg	0.99	0.99	0.99	256



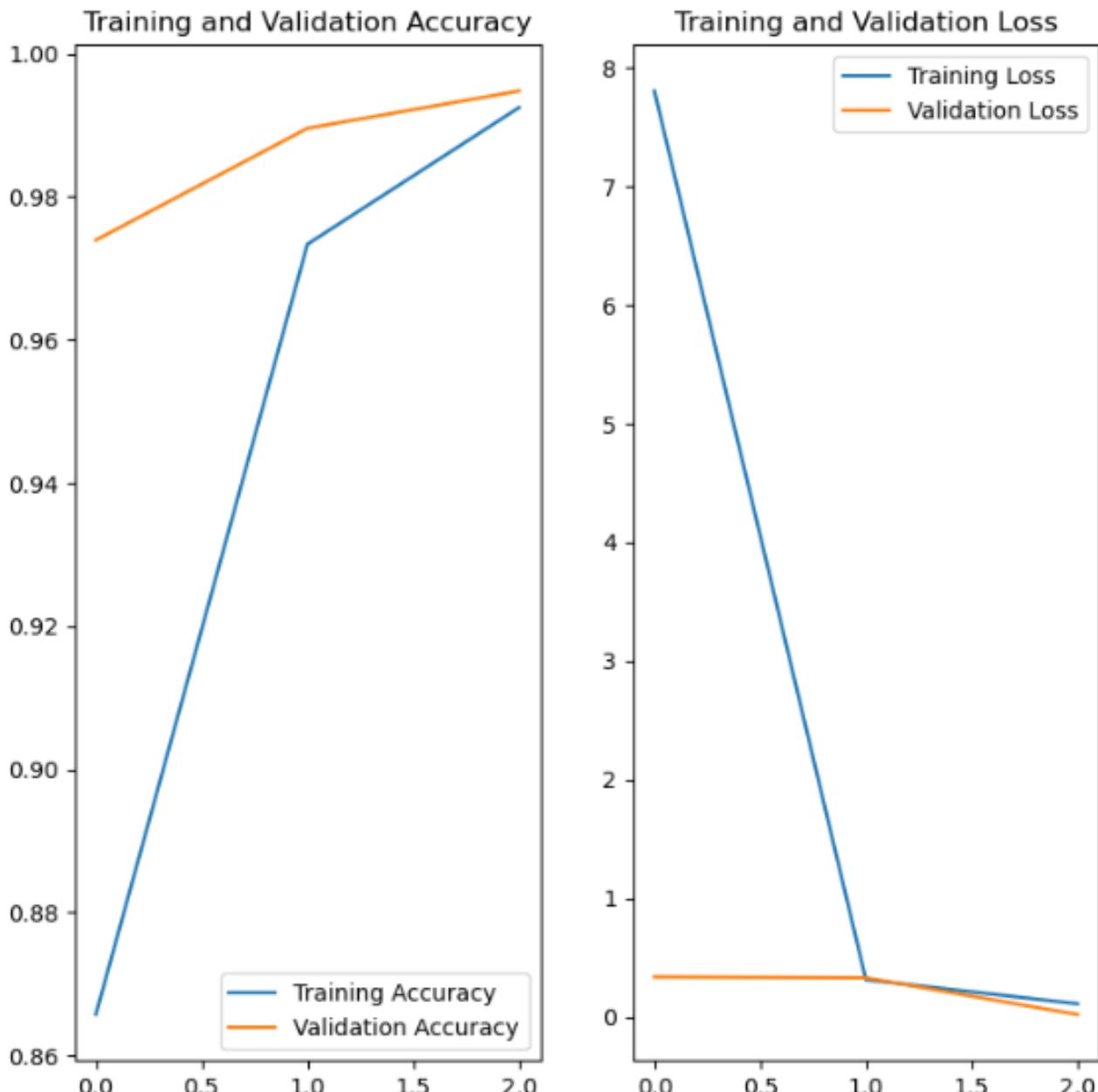
(b) 3

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=3
```

```
scores=model_from_vgg19.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 41s 5s/step - loss: 0.2140 - accuracy: 0.9648  
[0.21396367251873016, 0.96484375]
```

Average Time per Epoch: 383.33 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.98%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%

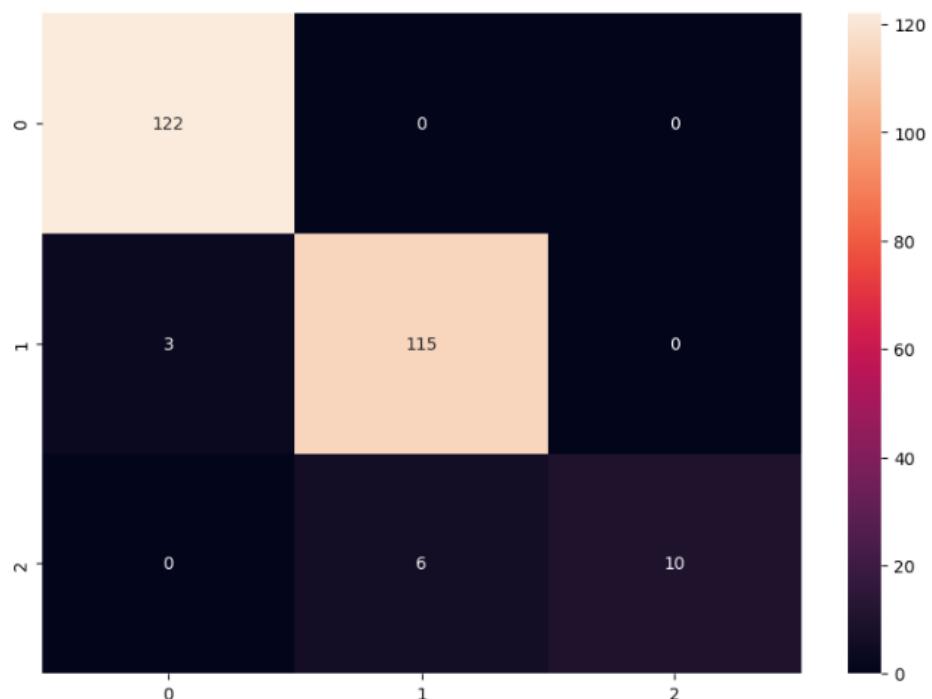


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	0.98	1.00	0.99	122
1	0.95	0.97	0.96	118
2	1.00	0.62	0.77	16
accuracy			0.96	256
macro avg	0.98	0.87	0.91	256
weighted avg	0.97	0.96	0.96	256



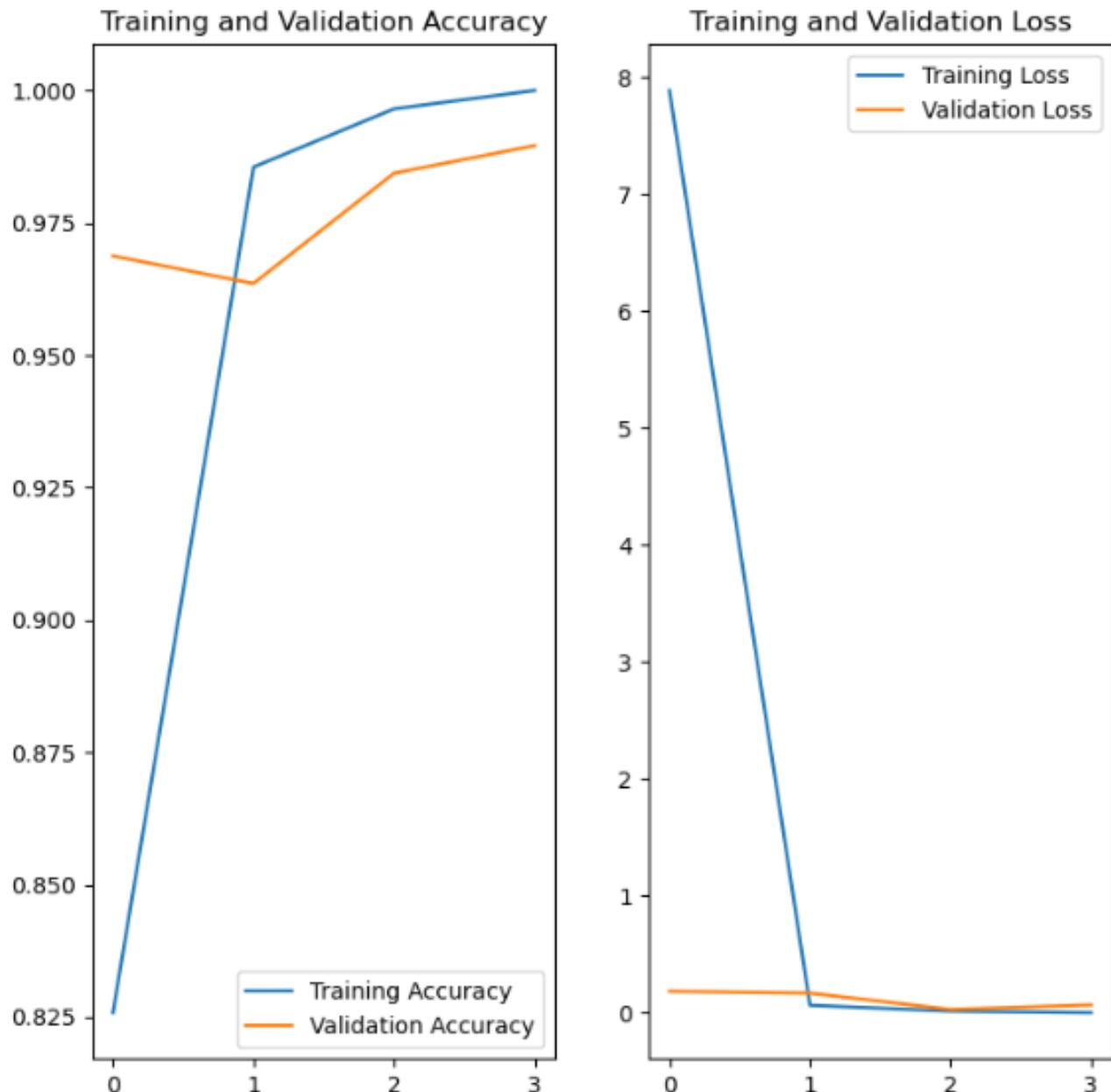
(c) 4

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=4
```

```
scores=model_from_vgg19.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 57s 7s/step - loss: 0.0279 - accuracy: 0.9922  
[0.027934890240430832, 0.9921875]
```

Average Time per Epoch: 349.00 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.88%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.99%

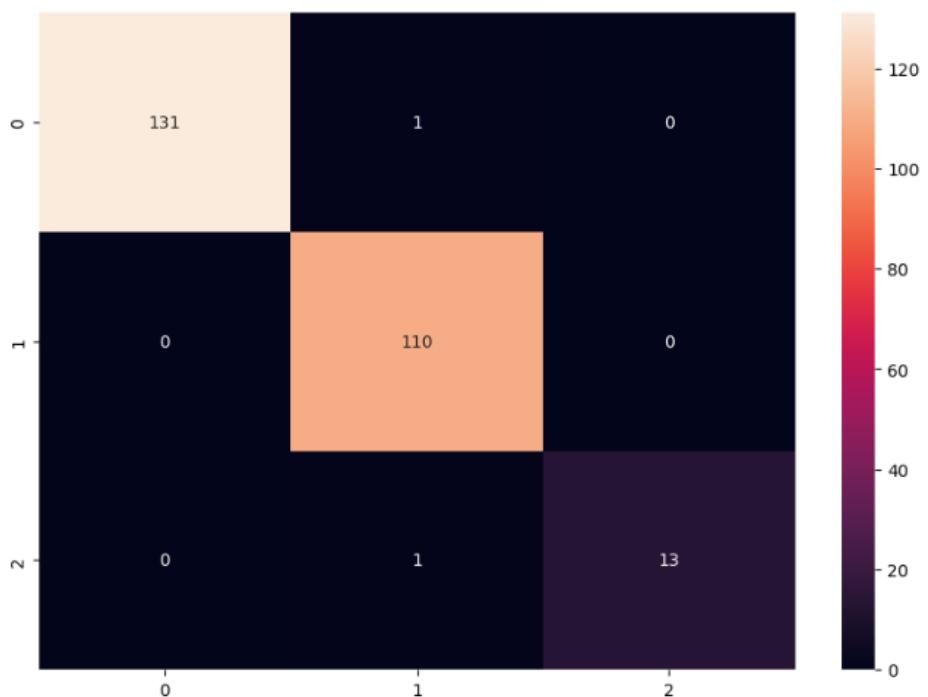


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.98%



Classification Report:

	precision	recall	f1-score	support
0	1.00	0.99	1.00	132
1	0.98	1.00	0.99	110
2	1.00	0.93	0.96	14
accuracy			0.99	256
macro avg	0.99	0.97	0.98	256
weighted avg	0.99	0.99	0.99	256



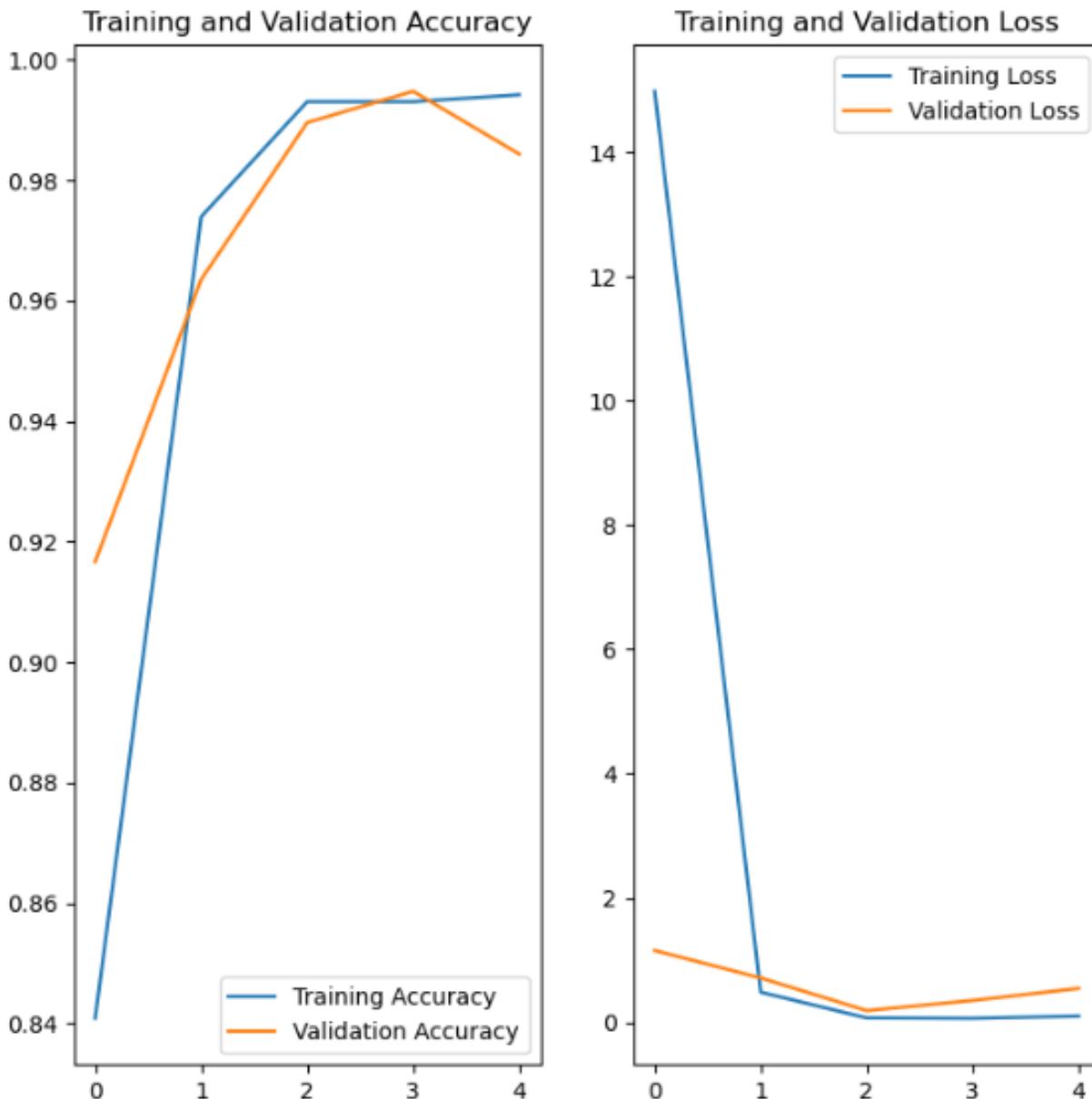
(d) 5

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=5
```

```
scores=model_from_vgg19.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 51s 7s/step - loss: 0.0221 - accuracy: 0.9922  
[0.022112229838967323, 0.9921875]
```

Average Time per Epoch: 350.80 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



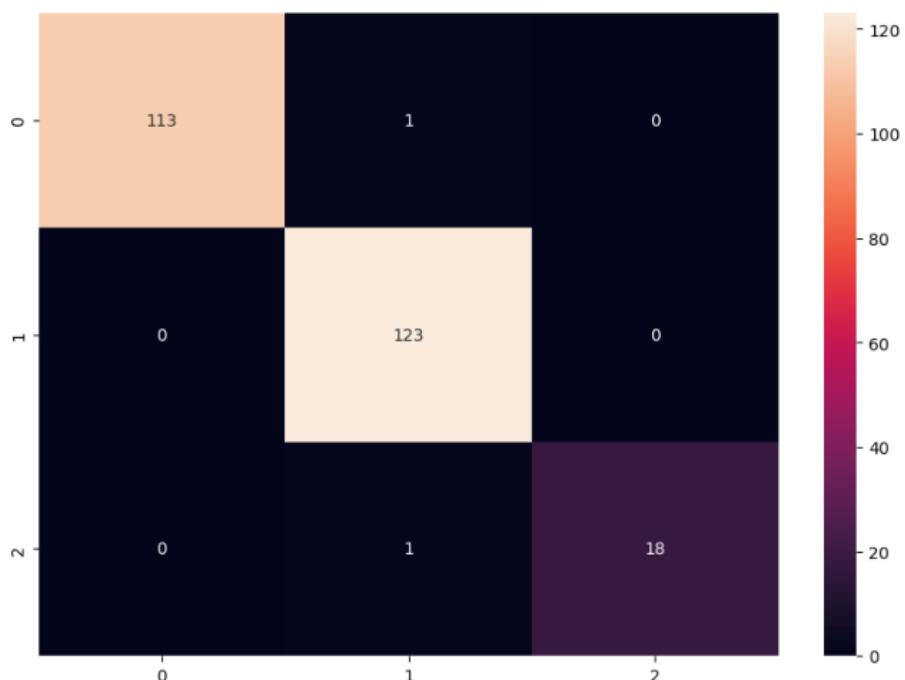
Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:					
	precision	recall	f1-score	support	
0	1.00	0.99	1.00	114	
1	0.98	1.00	0.99	123	
2	1.00	0.95	0.97	19	
accuracy			0.99	256	
macro avg	0.99	0.98	0.99	256	
weighted avg	0.99	0.99	0.99	256	



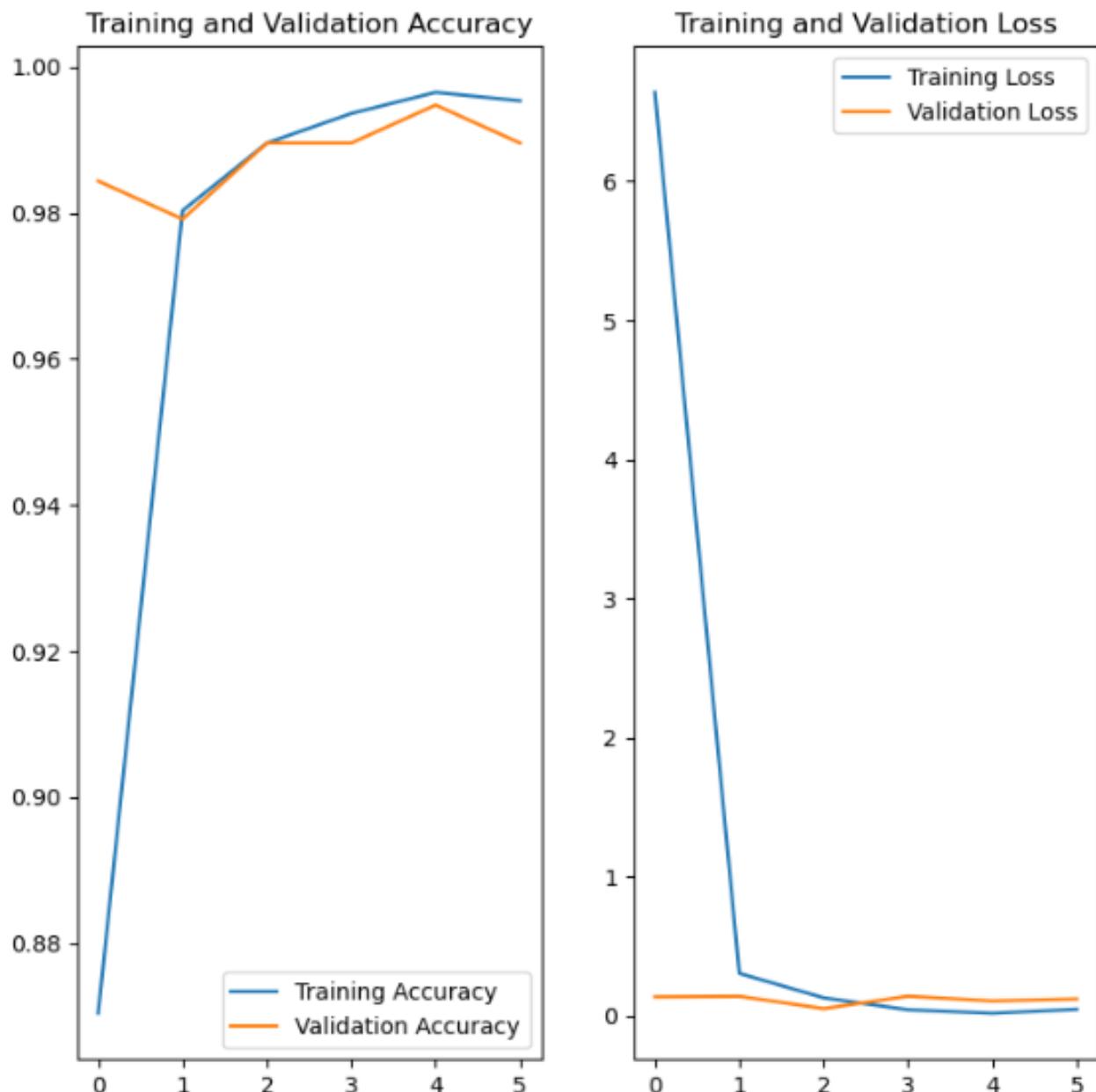
(e) 6

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=6
```

```
scores=model_from_vgg19.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 44s 6s/step - loss: 0.1341 - accuracy: 0.9922  
[0.13410162925720215, 0.9921875]
```

Average Time per Epoch: 350.50 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%

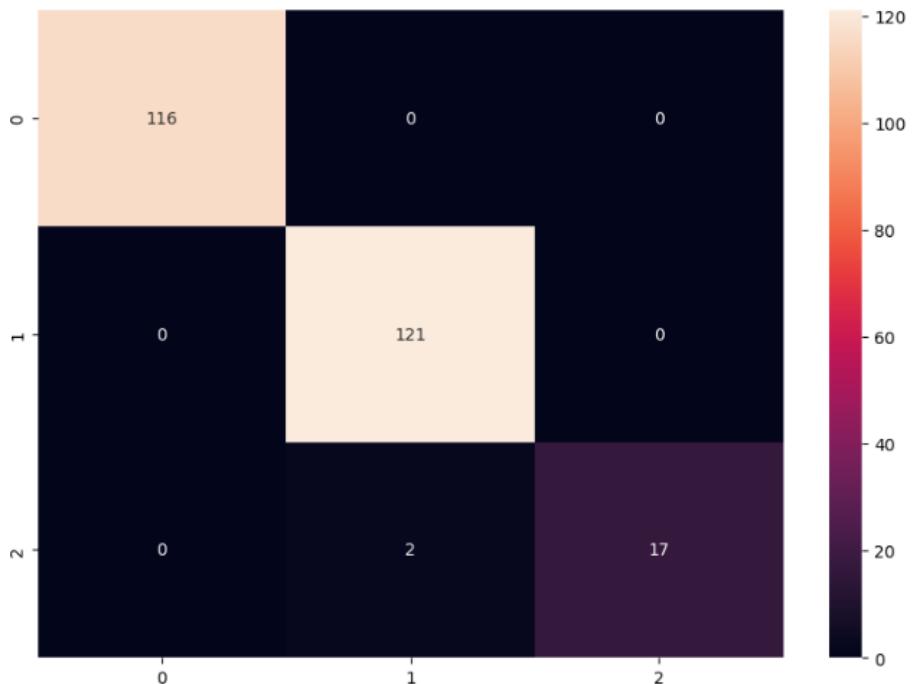


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	1.00	1.00	1.00	116
1	0.98	1.00	0.99	121
2	1.00	0.89	0.94	19
accuracy			0.99	256
macro avg	0.99	0.96	0.98	256
weighted avg	0.99	0.99	0.99	256



BATCH SIZE

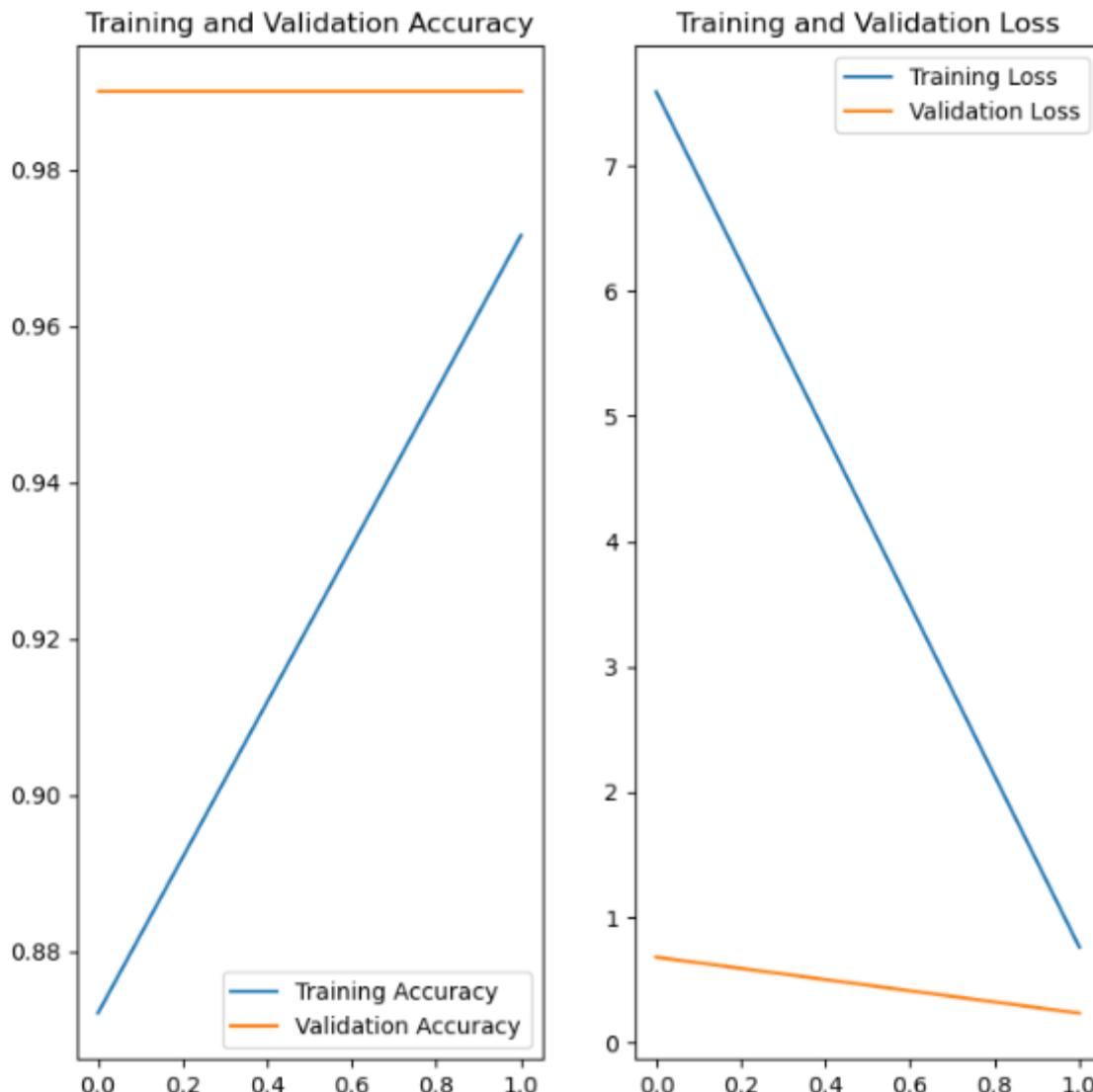
(a) 16

```
IMAGE_SIZE=224  
BATCH_SIZE=16  
CHANNELS=3  
EPOCHS=2
```

```
scores=model_from_vgg19.evaluate(test_ds)  
scores
```

```
14/14 [=====] - 35s 3s/step - loss: 0.1907 - accuracy: 0.9955  
[0.19072911143302917, 0.9955357313156128]
```

Average Time per Epoch: 317.50 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

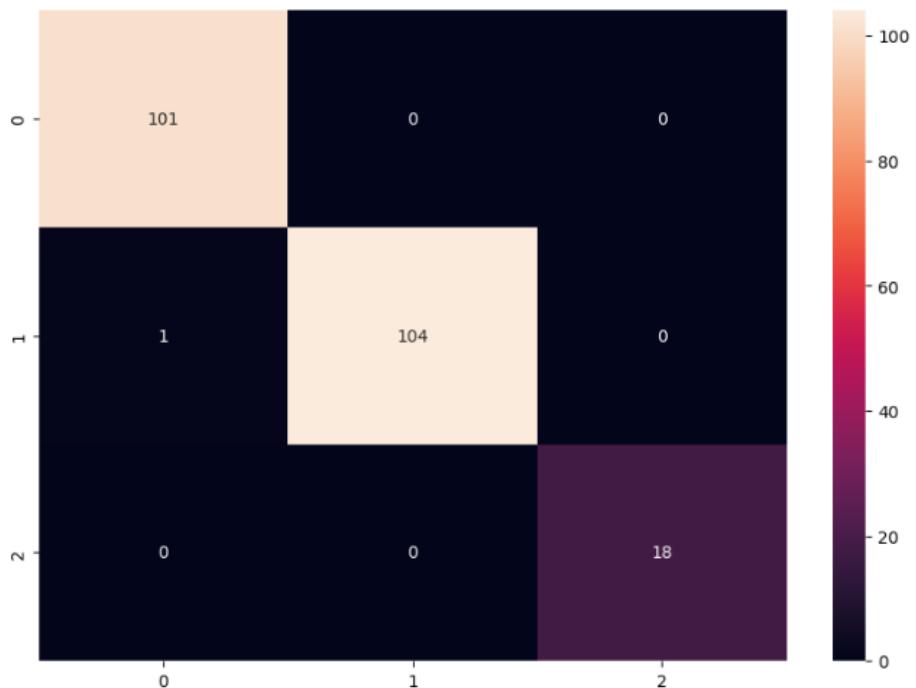


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	0.99	1.00	1.00	101
1	1.00	0.99	1.00	105
2	1.00	1.00	1.00	18
accuracy			1.00	224
macro avg	1.00	1.00	1.00	224
weighted avg	1.00	1.00	1.00	224



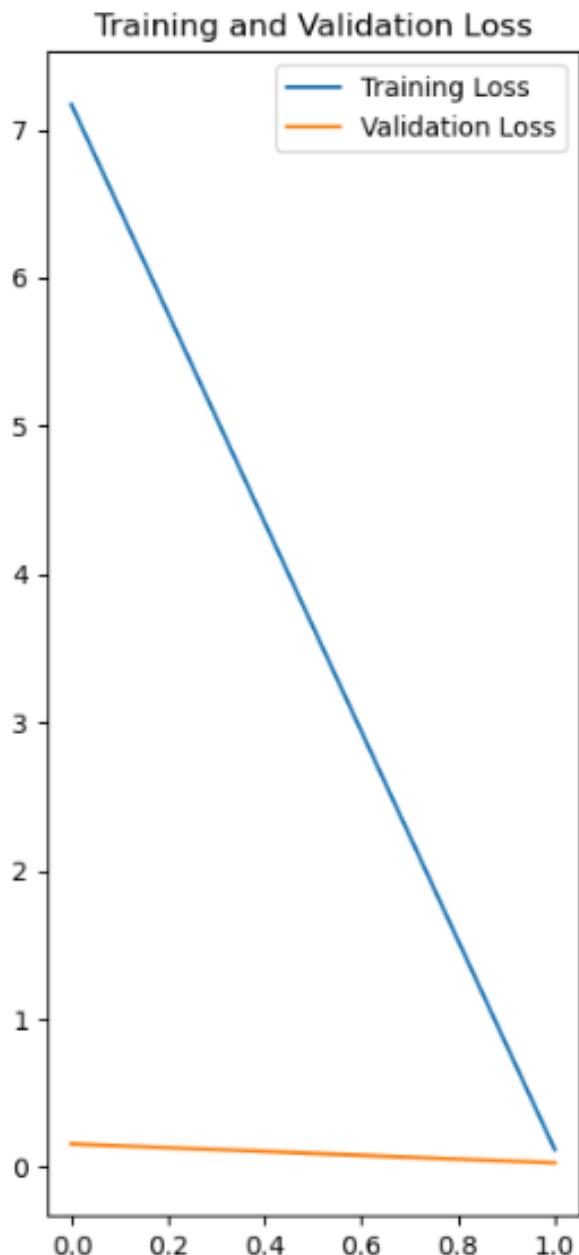
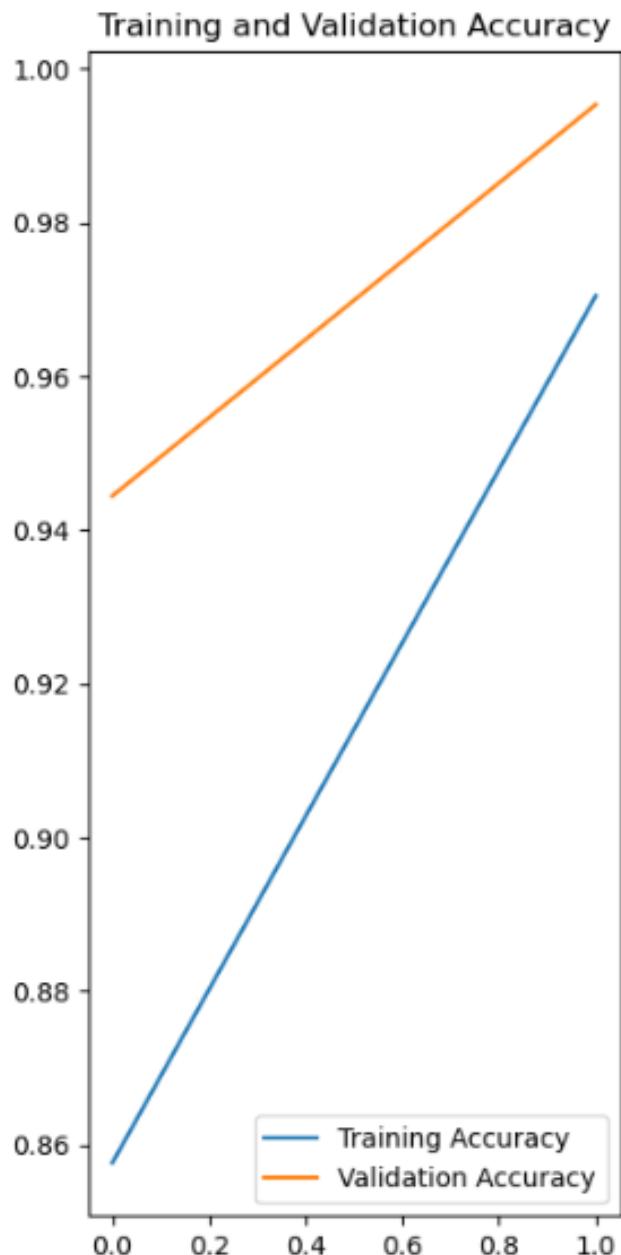
(b) 24

```
IMAGE_SIZE=224  
BATCH_SIZE=24  
CHANNELS=3  
EPOCHS=2
```

```
scores=model_from_vgg19.evaluate(test_ds)  
scores
```

```
9/9 [=====] - 29s 3s/step - loss: 0.0125 - accuracy: 0.9954  
[0.012510780245065689, 0.9953703880310059]
```

Average Time per Epoch: 349.50 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.8%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



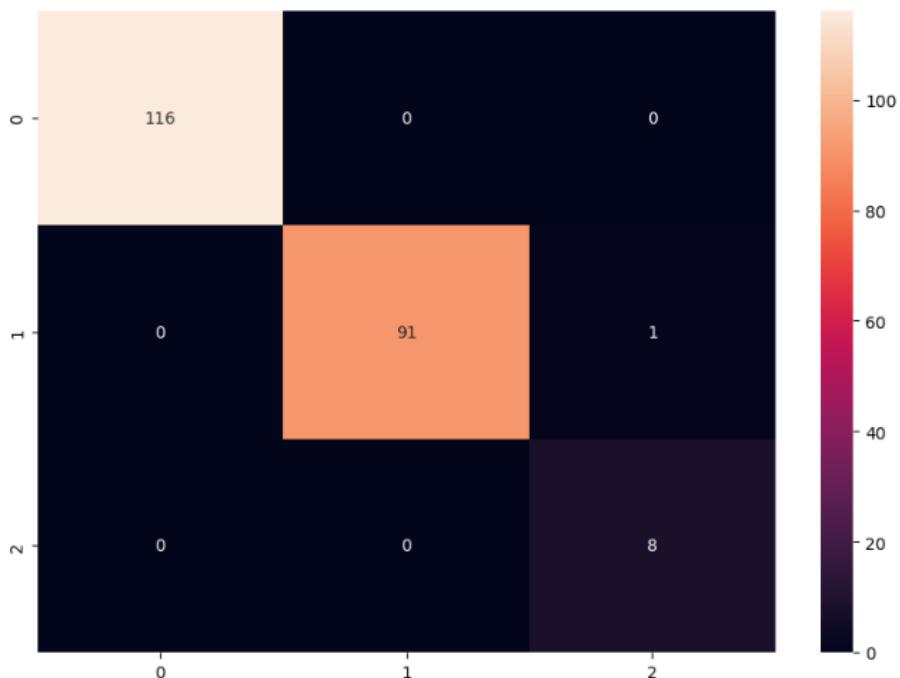
Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.92%



Classification Report:					
	precision	recall	f1-score	support	
0	1.00	1.00	1.00	116	
1	1.00	0.99	0.99	92	
2	0.89	1.00	0.94	8	
accuracy			1.00	216	
macro avg	0.96	1.00	0.98	216	
weighted avg	1.00	1.00	1.00	216	



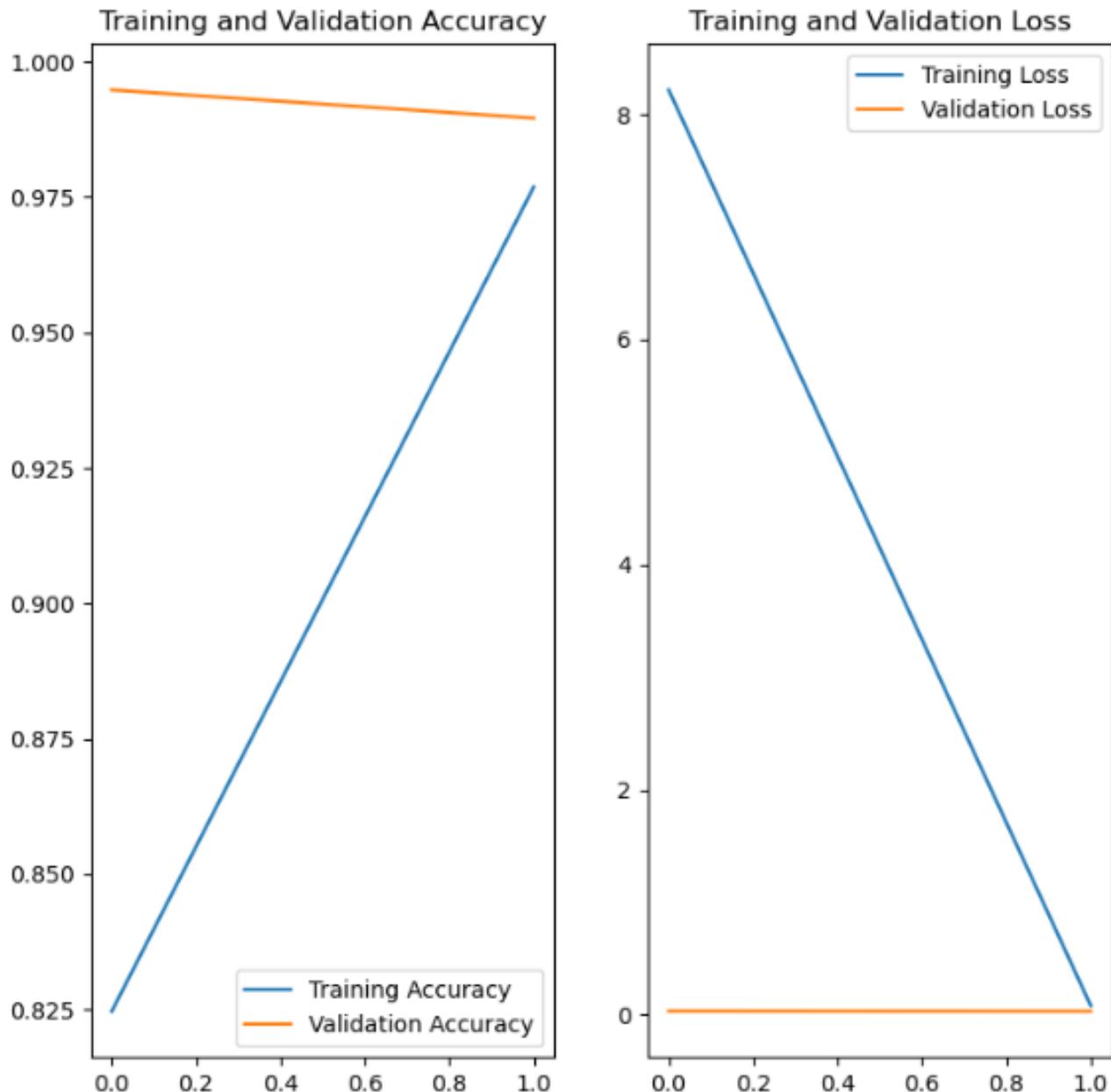
(c) 32

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=2
```

```
scores=model_from_vgg19.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 36s 5s/step - loss: 0.0148 - accuracy: 0.9961  
[0.014761524274945259, 0.99609375]
```

Average Time per Epoch: 318.50 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

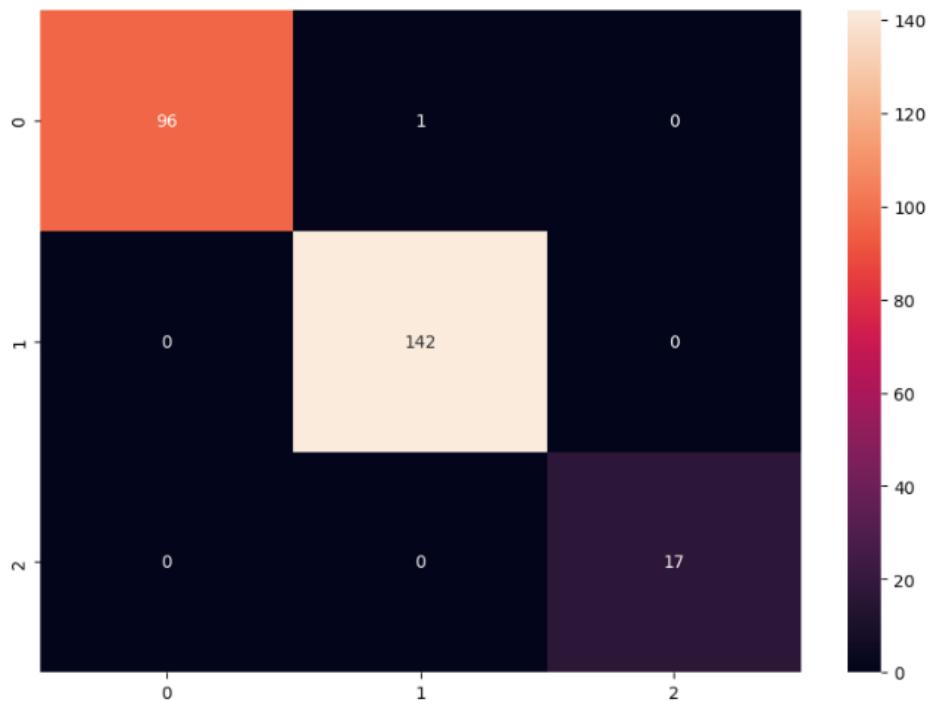


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	1.00	0.99	0.99	97
1	0.99	1.00	1.00	142
2	1.00	1.00	1.00	17
accuracy			1.00	256
macro avg	1.00	1.00	1.00	256
weighted avg	1.00	1.00	1.00	256



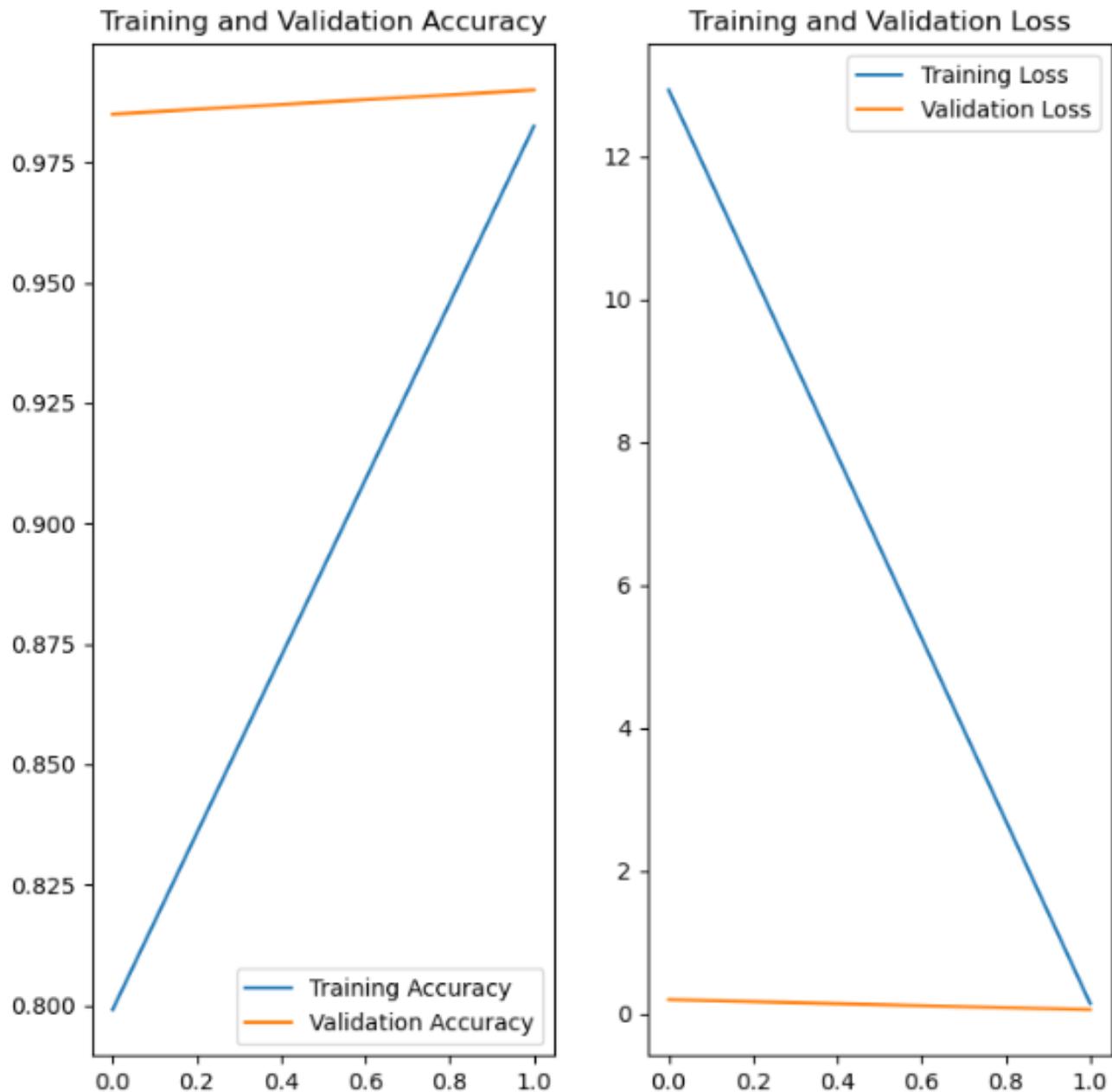
(d) 40

```
IMAGE_SIZE=224  
BATCH_SIZE=40  
CHANNELS=3  
EPOCHS=2
```

```
scores=model_from_vgg19.evaluate(test_ds)  
scores
```

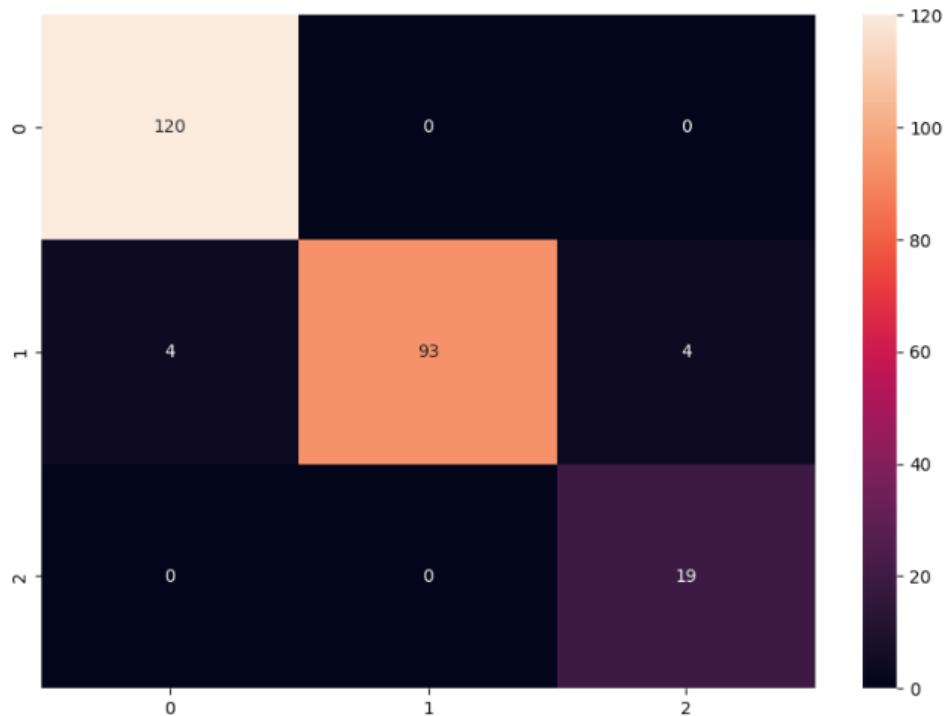
```
6/6 [=====] - 35s 6s/step - loss: 0.2710 - accuracy: 0.9667  
[0.27098581194877625, 0.9666666388511658]
```

Average Time per Epoch: 314.00 s





Classification Report:					
	precision	recall	f1-score	support	
0	0.97	1.00	0.98	120	
1	1.00	0.92	0.96	101	
2	0.83	1.00	0.90	19	
accuracy			0.97	240	
macro avg	0.93	0.97	0.95	240	
weighted avg	0.97	0.97	0.97	240	



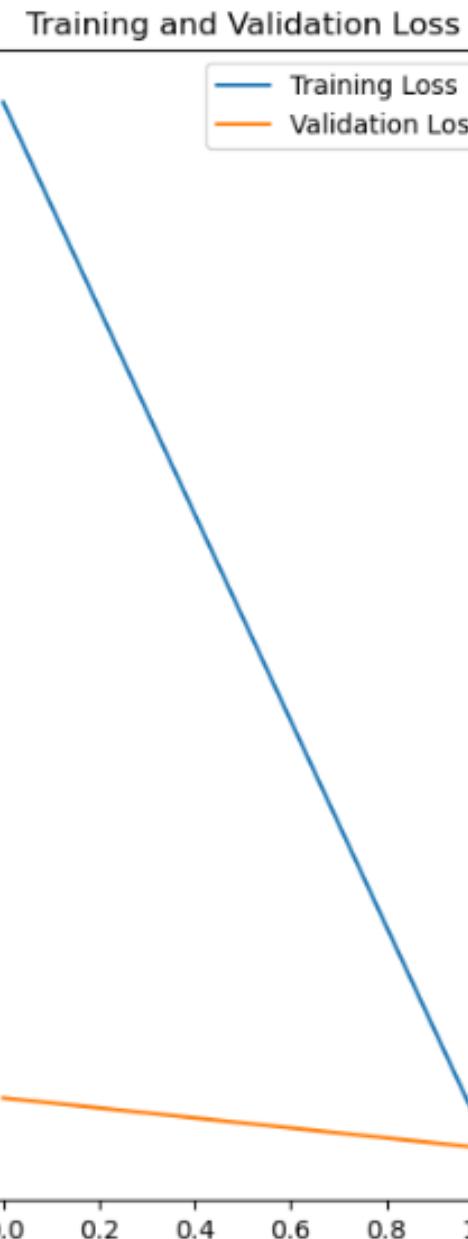
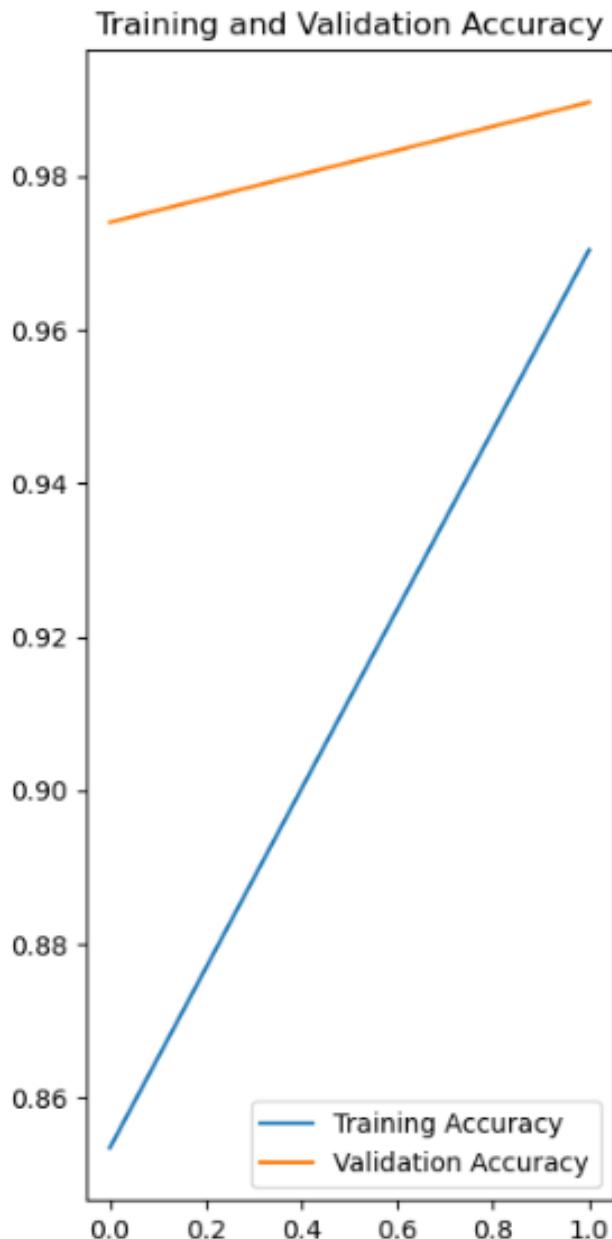
(e) 48

```
IMAGE_SIZE=224  
BATCH_SIZE=48  
CHANNELS=3  
EPOCHS=2
```

```
scores=model_from_vgg19.evaluate(test_ds)  
scores
```

```
5/5 [=====] - 33s 7s/step - loss: 3.1846e-04 - accuracy: 1.0000  
[0.0003184608358424157, 1.0]
```

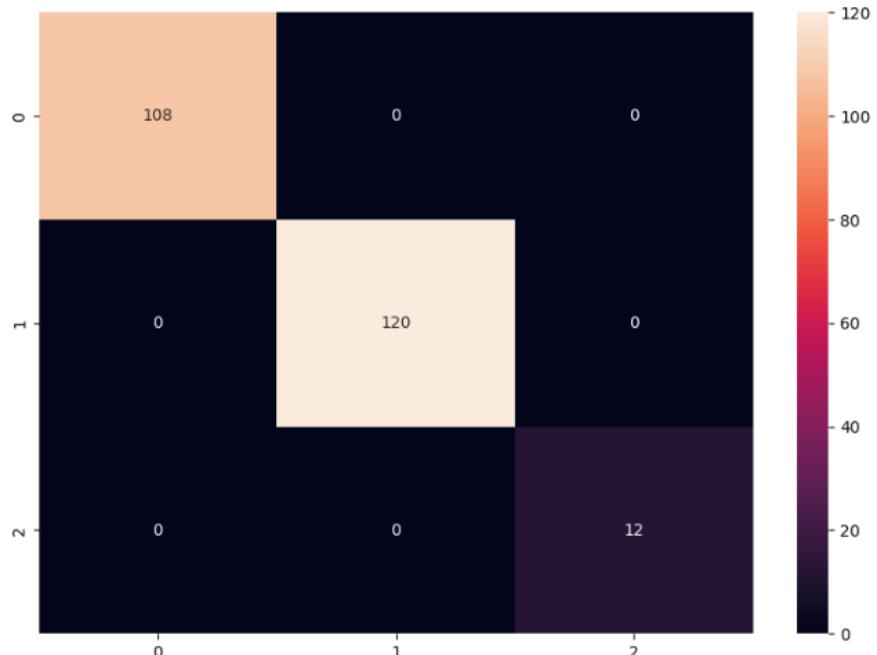
Average Time per Epoch: 315.50 s





Classification Report:

	precision	recall	f1-score	support
0	1.00	1.00	1.00	108
1	1.00	1.00	1.00	120
2	1.00	1.00	1.00	12
accuracy			1.00	240
macro avg	1.00	1.00	1.00	240
weighted avg	1.00	1.00	1.00	240



DATASET SPLIT RATIO

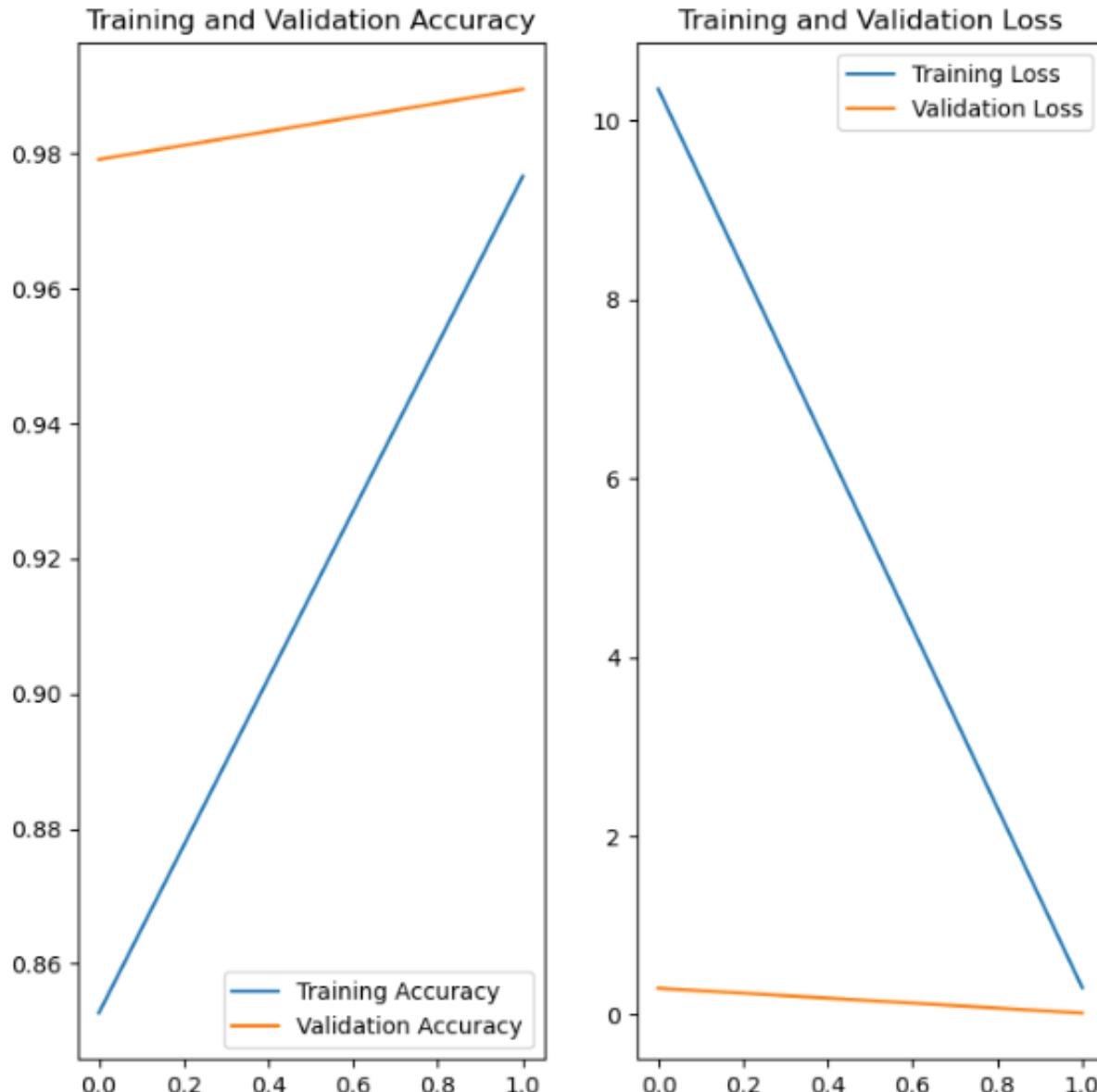
(a) 90:5:5

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=2
```

```
scores=model_from_vgg19.evaluate(test_ds)  
scores
```

```
4/4 [=====] - 15s 4s/step - loss: 0.1172 - accuracy: 0.9766  
[0.1171937808394432, 0.9765625]
```

Average Time per Epoch: 325.00 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

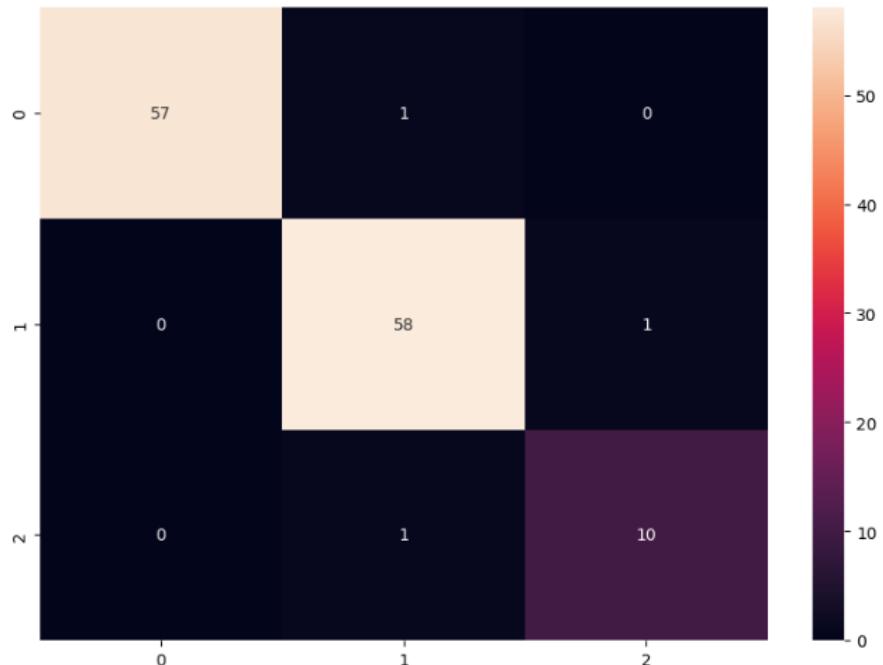


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	1.00	0.98	0.99	58
1	0.97	0.98	0.97	59
2	0.91	0.91	0.91	11
accuracy			0.98	128
macro avg	0.96	0.96	0.96	128
weighted avg	0.98	0.98	0.98	128



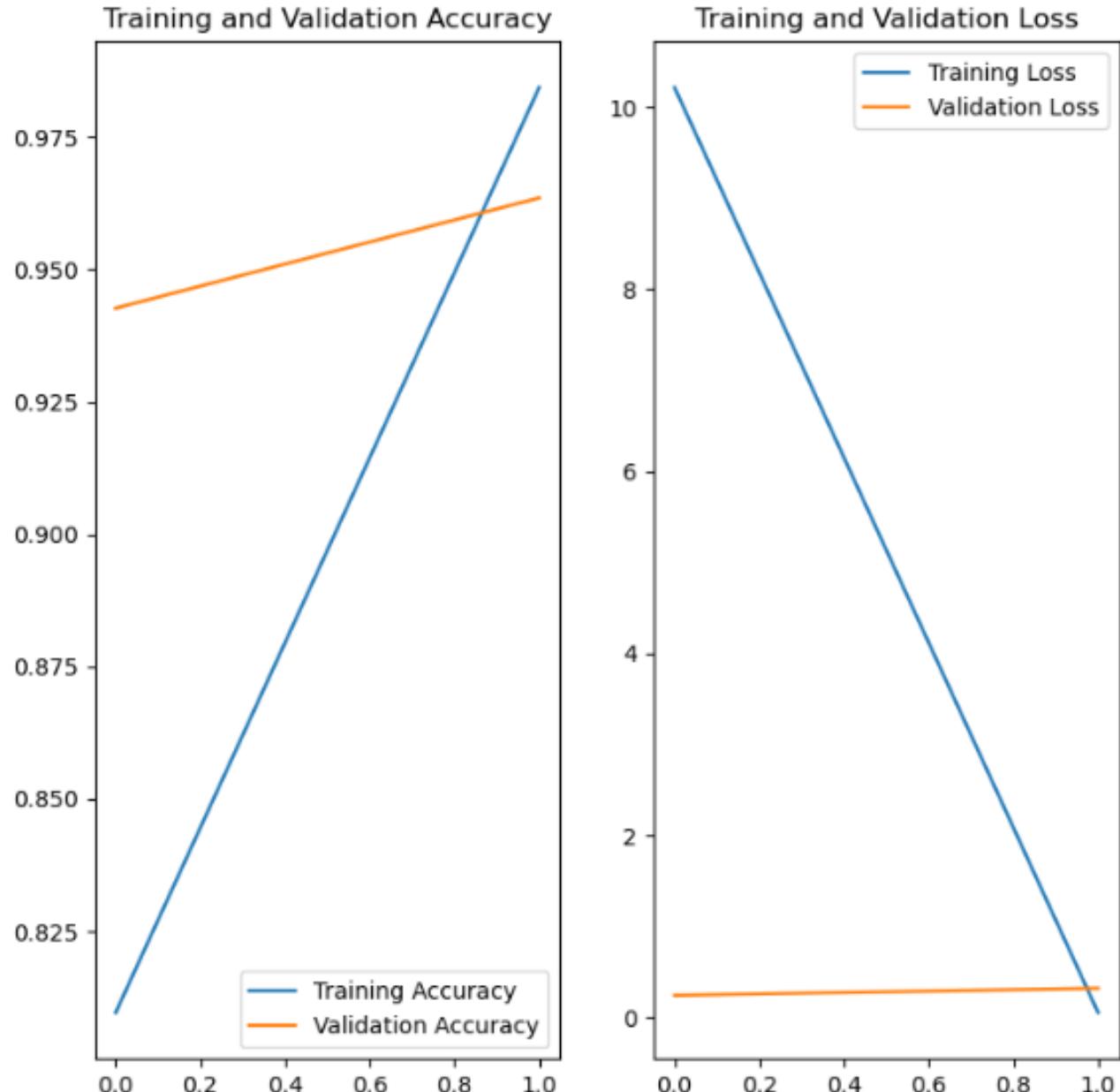
(b) 80:10:10

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=2
```

```
scores=model_from_vgg19.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 34s 4s/step - loss: 0.0187 - accuracy: 0.9961  
[0.018713239580392838, 0.99609375]
```

Average Time per Epoch: 319.50 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.93%

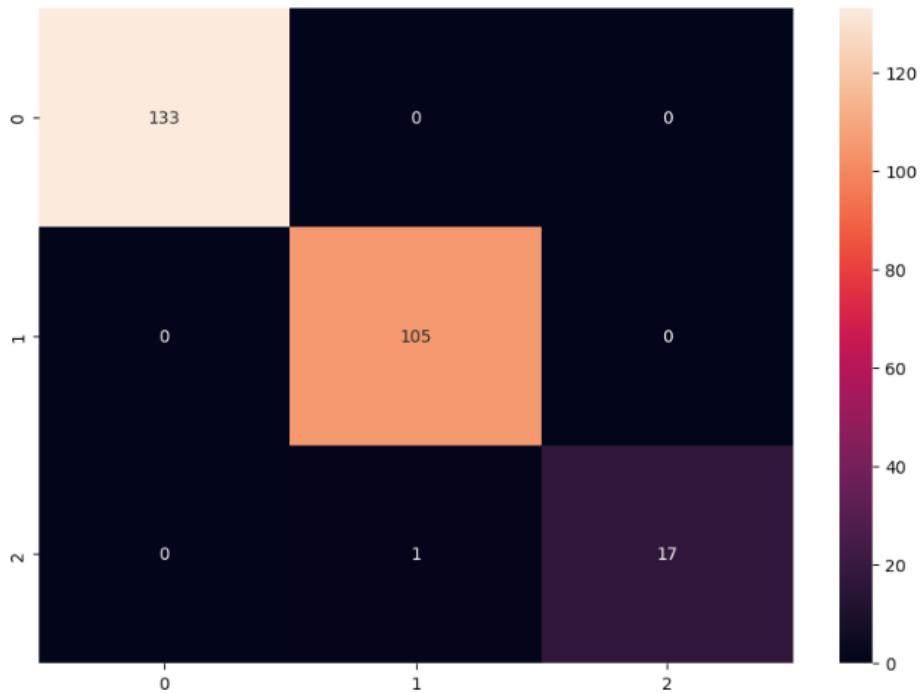


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	1.00	1.00	1.00	133
1	0.99	1.00	1.00	105
2	1.00	0.94	0.97	18
accuracy			1.00	256
macro avg	1.00	0.98	0.99	256
weighted avg	1.00	1.00	1.00	256



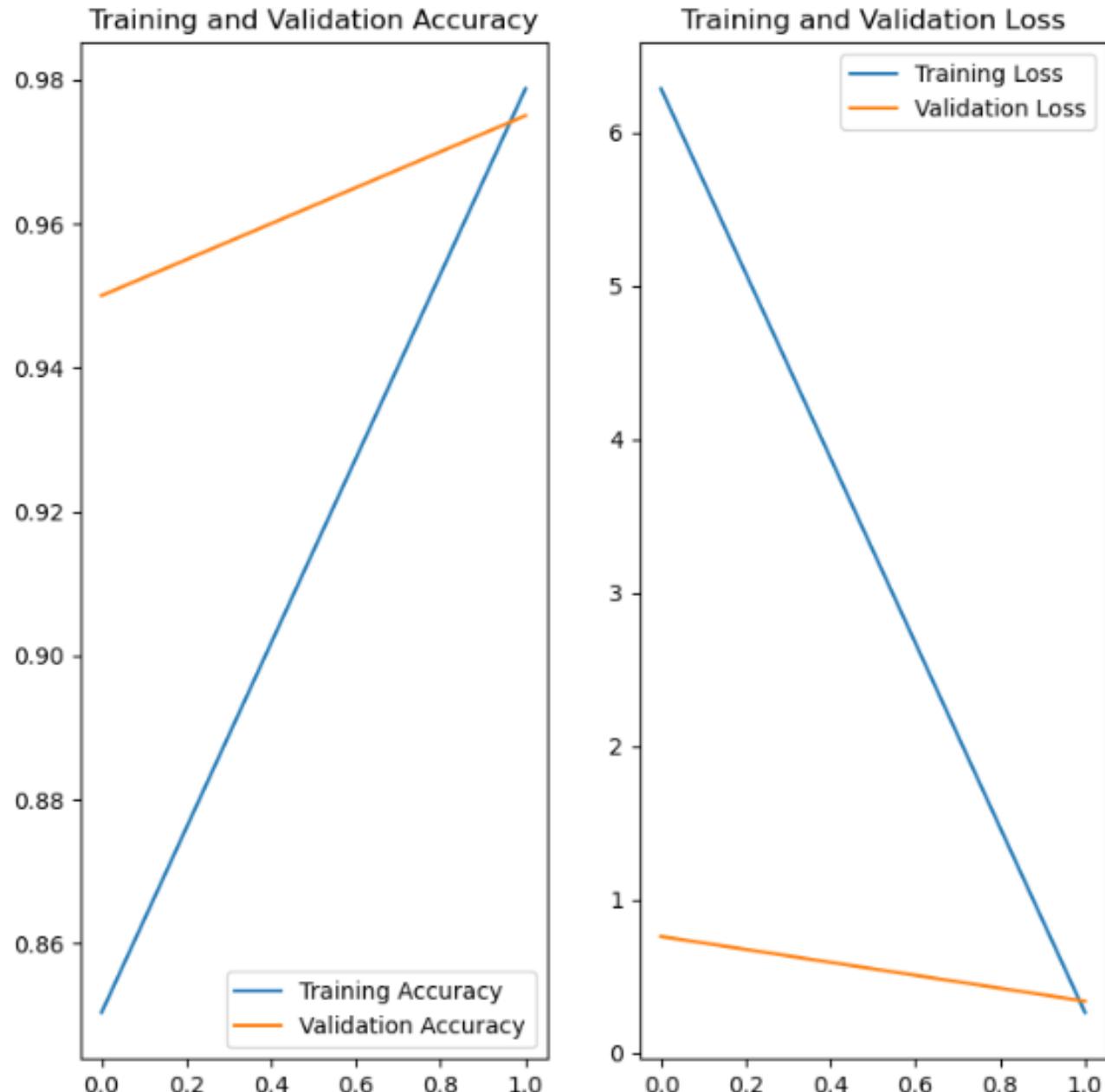
(c) 70:15:15

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=2
```

```
scores=model_from_vgg19.evaluate(test_ds)  
scores
```

```
11/11 [=====] - 57s 5s/step - loss: 0.2495 - accuracy: 0.9830  
[0.2495056539773941, 0.9829545617103577]
```

Average Time per Epoch: 301.00 s



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%

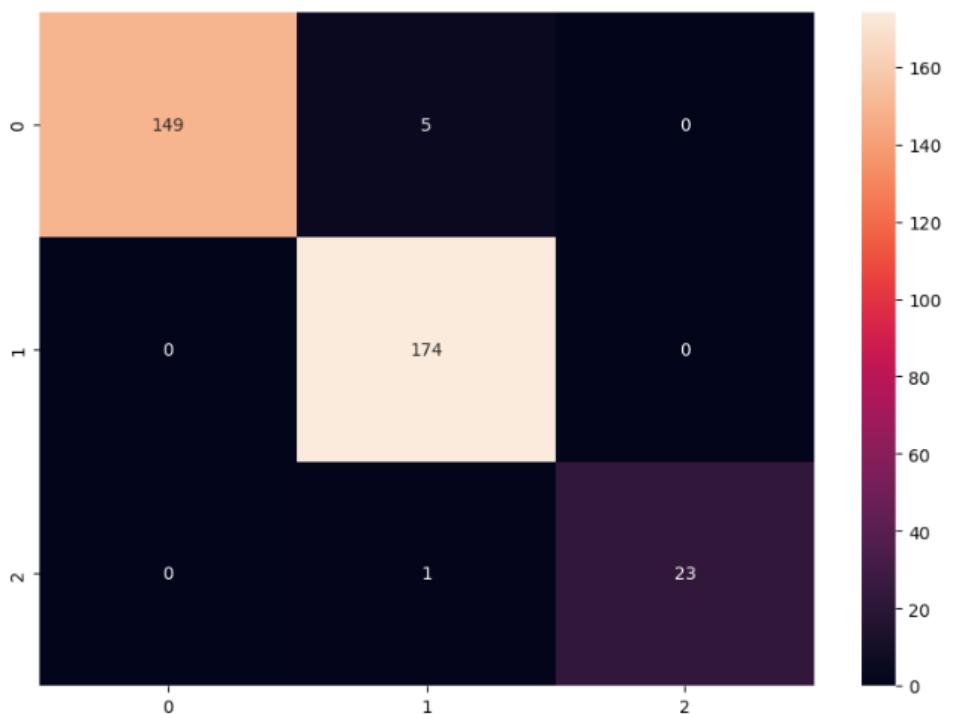


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	1.00	0.97	0.98	154
1	0.97	1.00	0.98	174
2	1.00	0.96	0.98	24
accuracy			0.98	352
macro avg	0.99	0.98	0.98	352
weighted avg	0.98	0.98	0.98	352



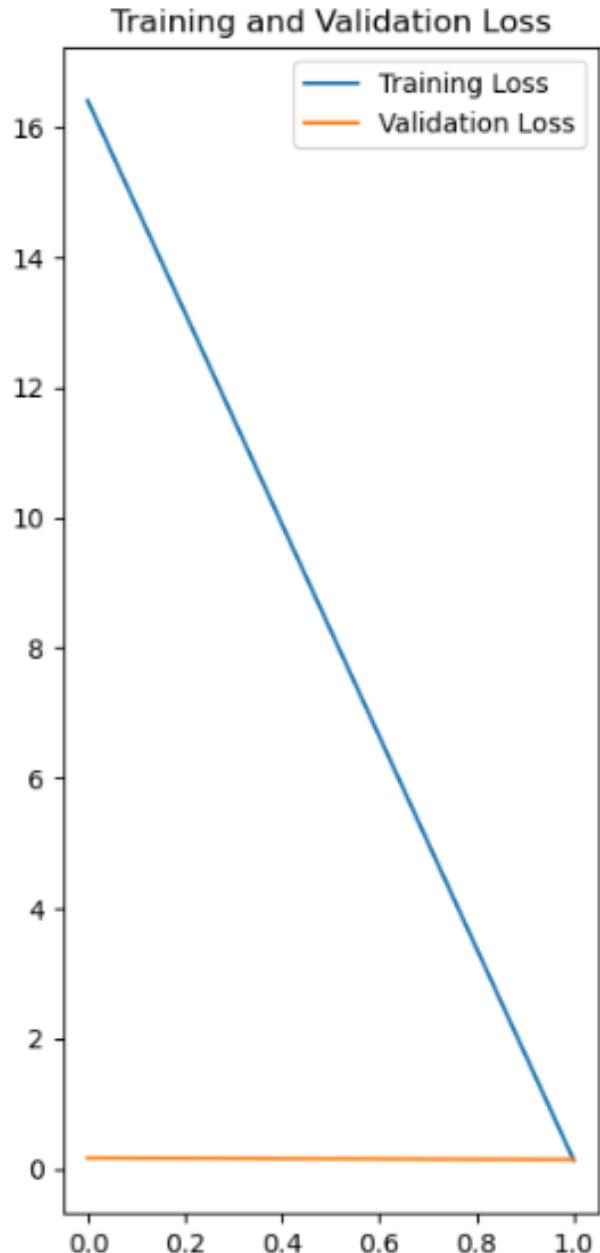
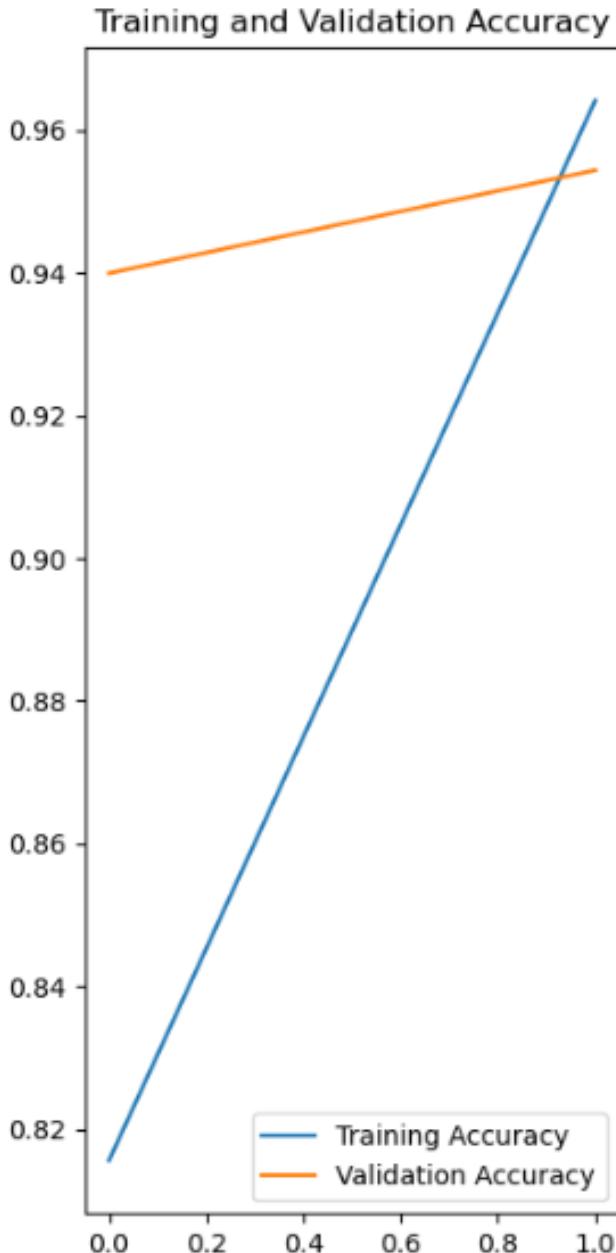
(d) 60:20:20

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=2
```

```
scores=model_from_vgg19.evaluate(test_ds)  
scores
```

```
15/15 [=====] - 60s 4s/step - loss: 0.1664 - accuracy: 0.9563  
[0.16639810800552368, 0.956250011920929]
```

Average Time per Epoch: 279.50 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.62%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.72%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

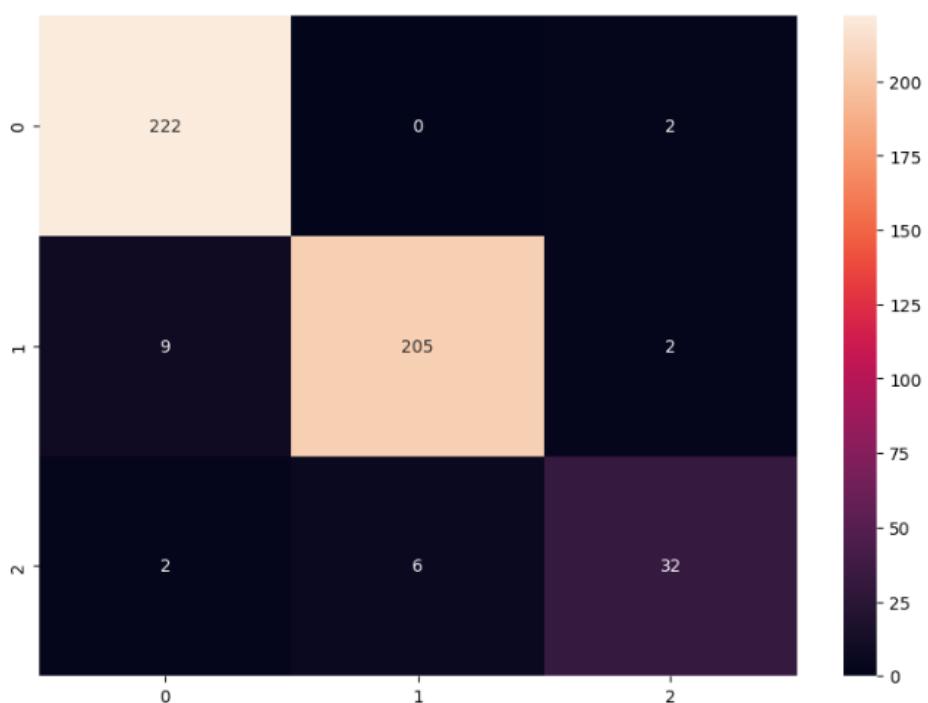


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.86%



Classification Report:

	precision	recall	f1-score	support
0	0.95	0.99	0.97	224
1	0.97	0.95	0.96	216
2	0.89	0.80	0.84	40
accuracy			0.96	480
macro avg	0.94	0.91	0.92	480
weighted avg	0.96	0.96	0.96	480



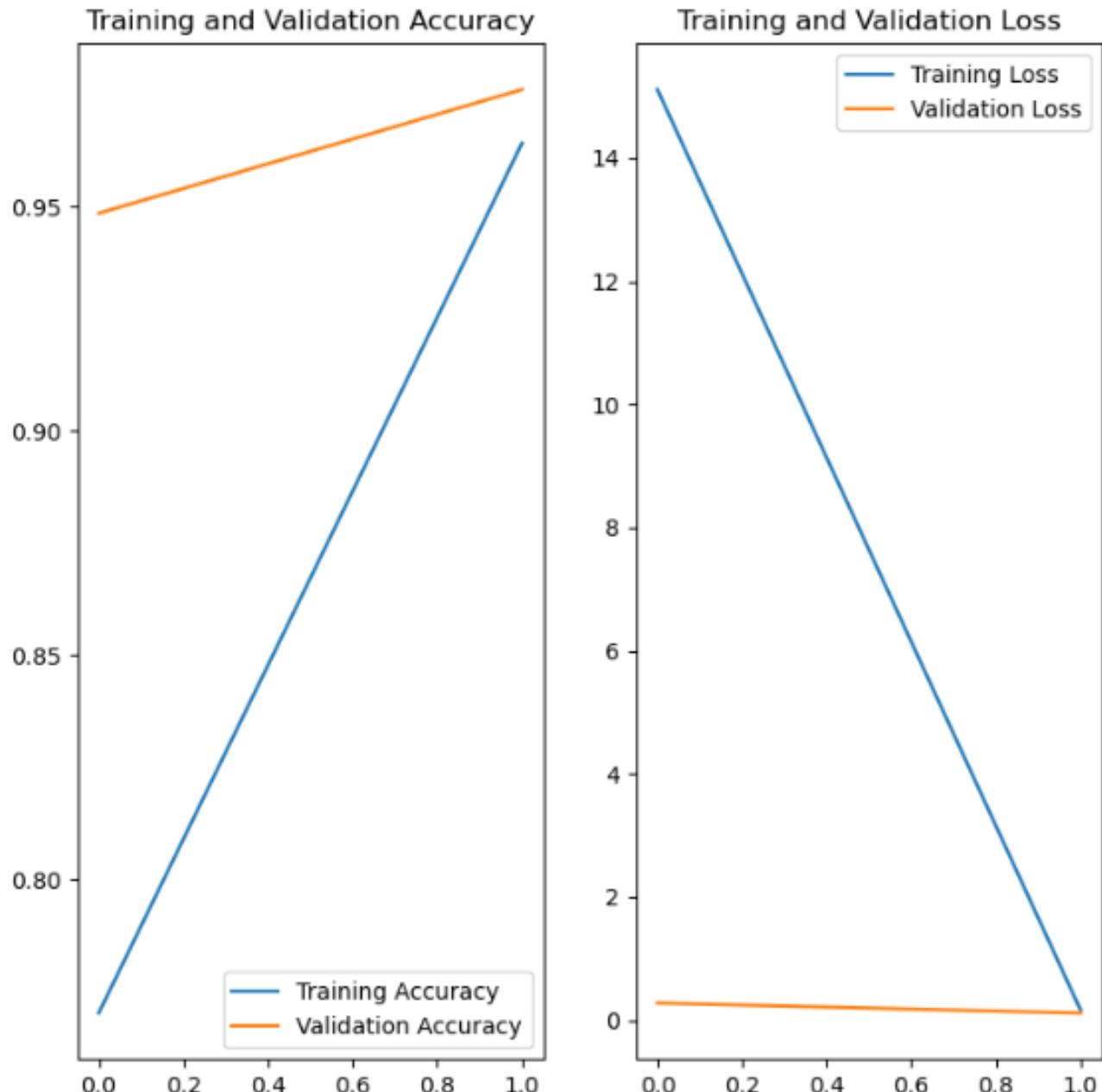
(e) 50:25:25

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=2
```

```
scores=model_from_vgg19.evaluate(test_ds)  
scores
```

```
17/17 [=====] - 93s 5s/step - loss: 0.1463 - accuracy: 0.9761  
[0.14634151756763458, 0.9761029481887817]
```

Average Time per Epoch: 267.00 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.97%



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

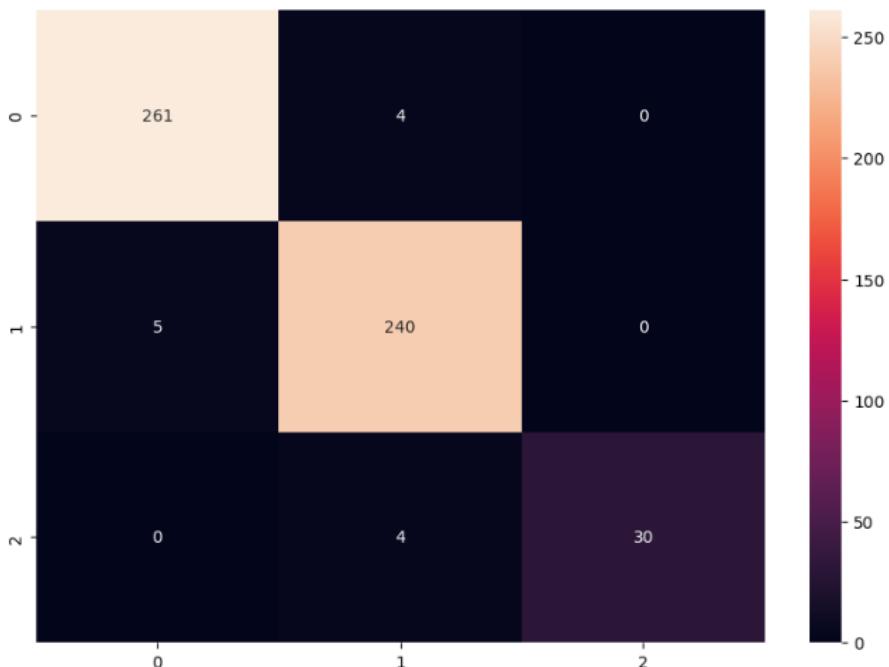


Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 95.75%



Classification Report:

	precision	recall	f1-score	support
0	0.98	0.98	0.98	265
1	0.97	0.98	0.97	245
2	1.00	0.88	0.94	34
accuracy			0.98	544
macro avg	0.98	0.95	0.96	544
weighted avg	0.98	0.98	0.98	544



Model 5: InceptionV3

BASE MODEL

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=15
```

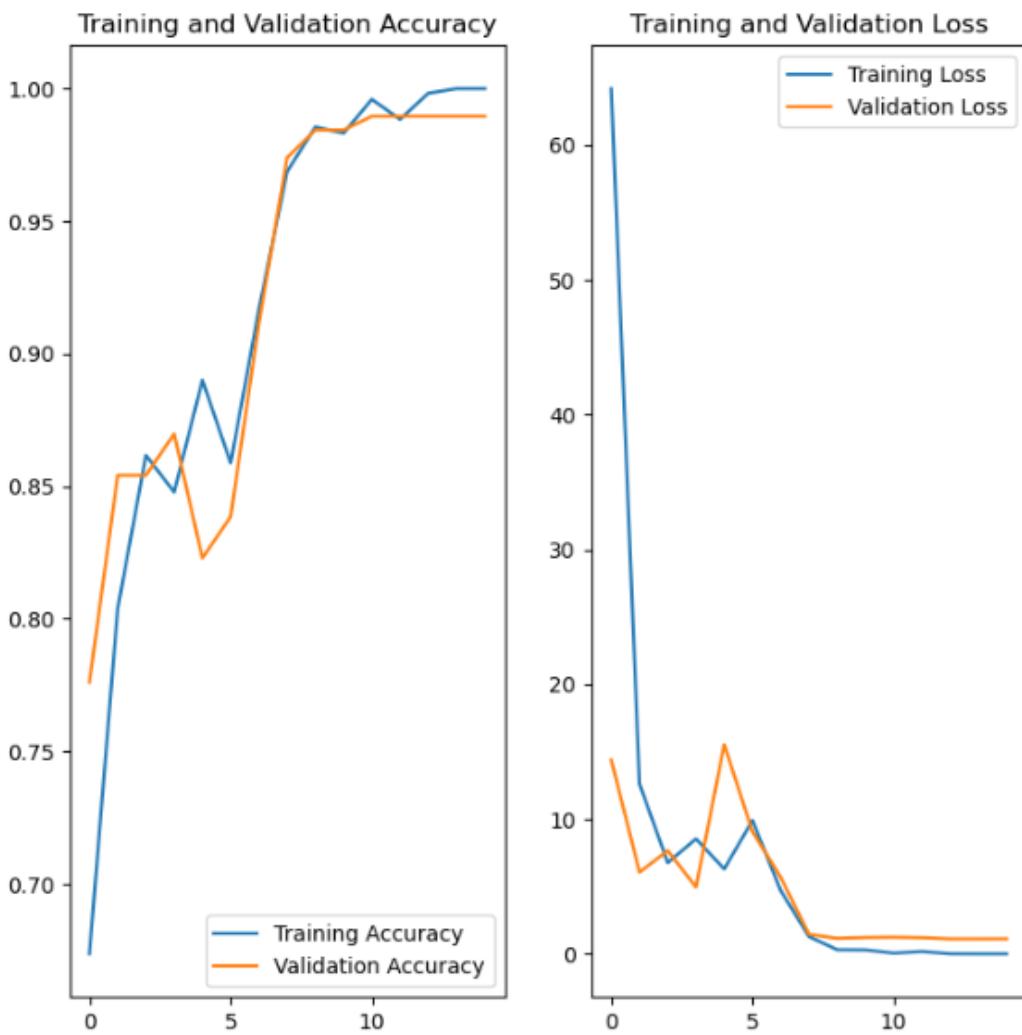
```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 10s 1s/step - loss: 1.5436 - accuracy: 0.9766  
[1.5435683727264404, 0.9765625]
```

Average Time per Epoch: 62.27 s

history4.history['loss']	history4.history['accuracy']
[64.17849731445312, 12.605438232421875, 6.76537561416626, 8.53201961517334, 6.298354625701904, 9.897819519042969, 4.693404674530029, 1.285945177078247, 0.3096759617328644, 0.2977701723575592, 0.05427165329456329, 0.17698051035404205, 0.006613903678953648, 3.465750705800019e-05, 2.1669588932127226e-06]	[0.6736111044883728, 0.8038194179534912, 0.8616898059844971, 0.8478009104728699, 0.8900462985038757, 0.8587962985038757, 0.9166666865348816, 0.96875, 0.9855324029922485, 0.9832175970077515, 0.9959490895271301, 0.9884259104728699, 0.9982638955116272, 1.0, 1.0]

history4.history['val_loss']	history4.history['val_accuracy']
[14.388167381286621, 6.060824871063232, 7.656291961669922, 4.951747417449951, 15.525978088378906, 9.068594932556152, 5.6797308921813965, 1.4527077674865723, 1.1510816812515259, 1.216181755065918, 1.2372618913650513, 1.2031797170639038, 1.1130115985870361, 1.114630103111267, 1.1165629625320435]	[0.7760416865348816, 0.8541666865348816, 0.8541666865348816, 0.8697916865348816, 0.8229166865348816, 0.8385416865348816, 0.9114583134651184, 0.9739583134651184, 0.984375, 0.984375, 0.9895833134651184, 0.9895833134651184, 0.9895833134651184, 0.9895833134651184, 0.9895833134651184]



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

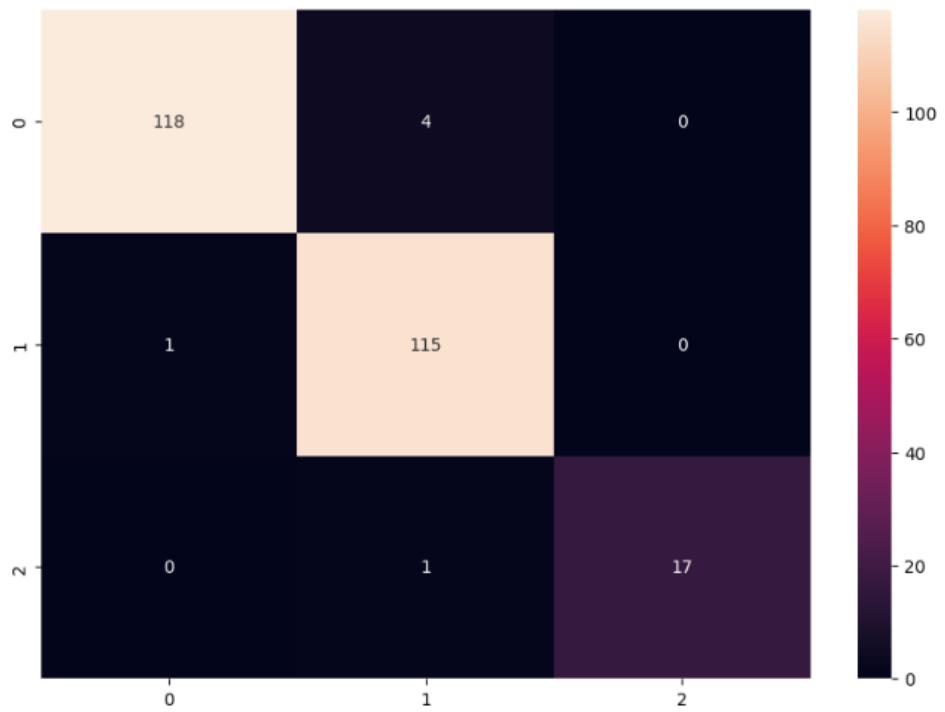
Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:				
	precision	recall	f1-score	support
0	0.99	0.97	0.98	122
1	0.96	0.99	0.97	116
2	1.00	0.94	0.97	18
accuracy			0.98	256
macro avg	0.98	0.97	0.98	256
weighted avg	0.98	0.98	0.98	256



NO. OF EPOCHS

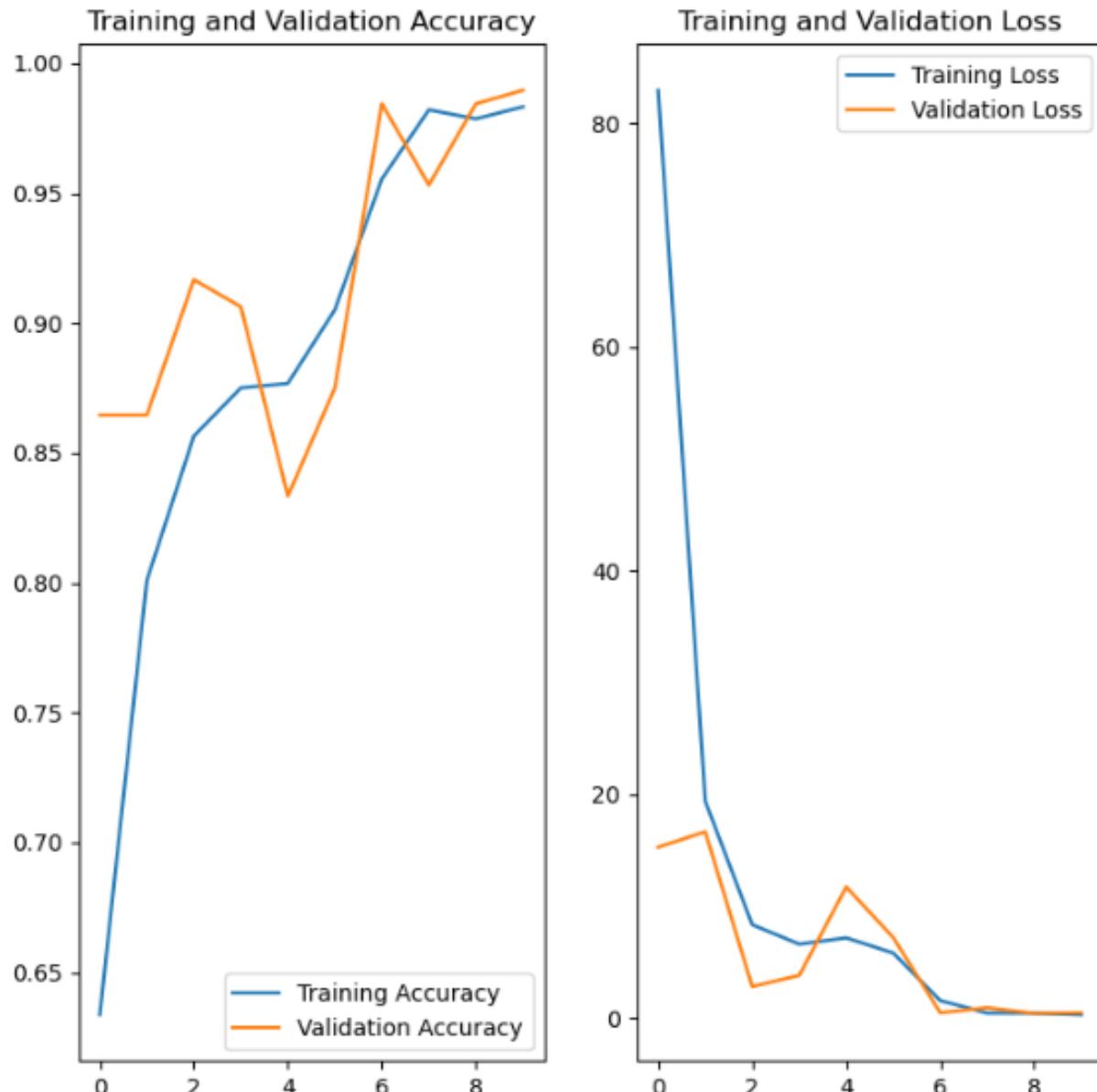
(a) 10

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=10
```

```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 10s 1s/step - loss: 1.0665 - accuracy: 0.9844  
[1.0664507150650024, 0.984375]
```

Average Time per Epoch: 60.90 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.96%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%

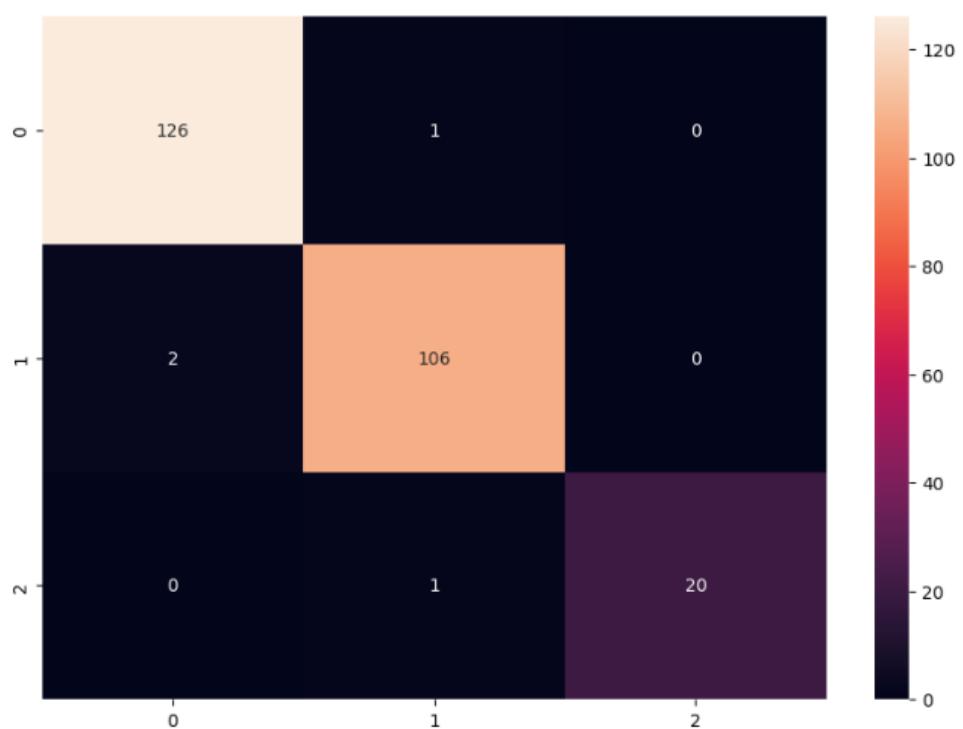


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	0.98	0.99	0.99	127
1	0.98	0.98	0.98	108
2	1.00	0.95	0.98	21
accuracy			0.98	256
macro avg	0.99	0.98	0.98	256
weighted avg	0.98	0.98	0.98	256



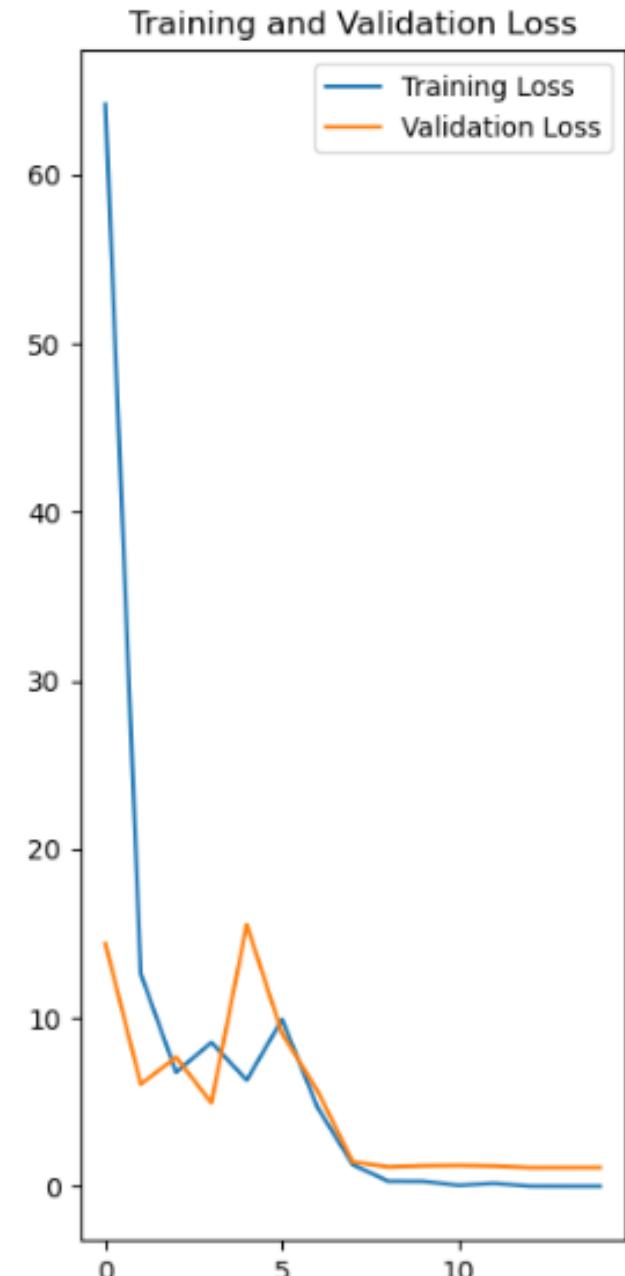
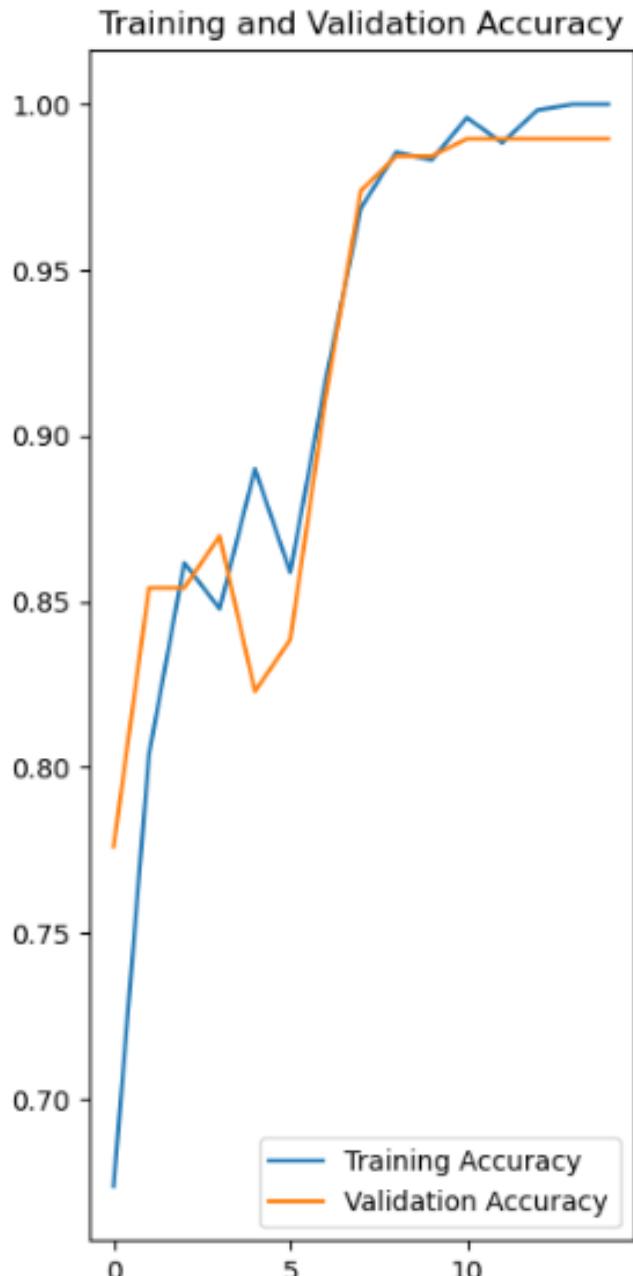
(b) 15

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=15
```

```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 10s 1s/step - loss: 1.5436 - accuracy: 0.9766  
[1.5435683727264404, 0.9765625]
```

Average Time per Epoch: 62.27 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

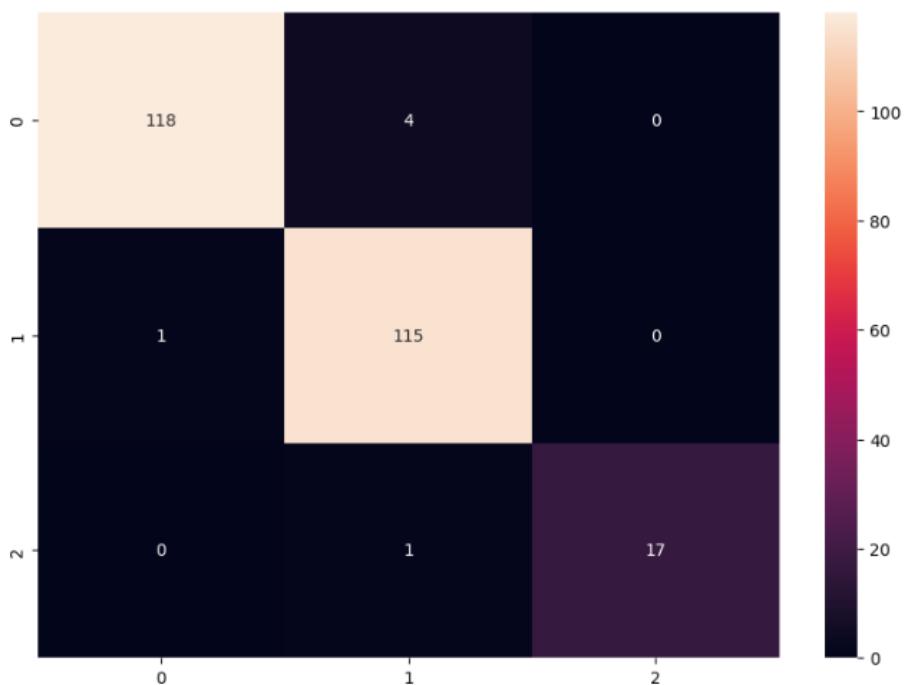


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	0.99	0.97	0.98	122
1	0.96	0.99	0.97	116
2	1.00	0.94	0.97	18
accuracy			0.98	256
macro avg	0.98	0.97	0.98	256
weighted avg	0.98	0.98	0.98	256



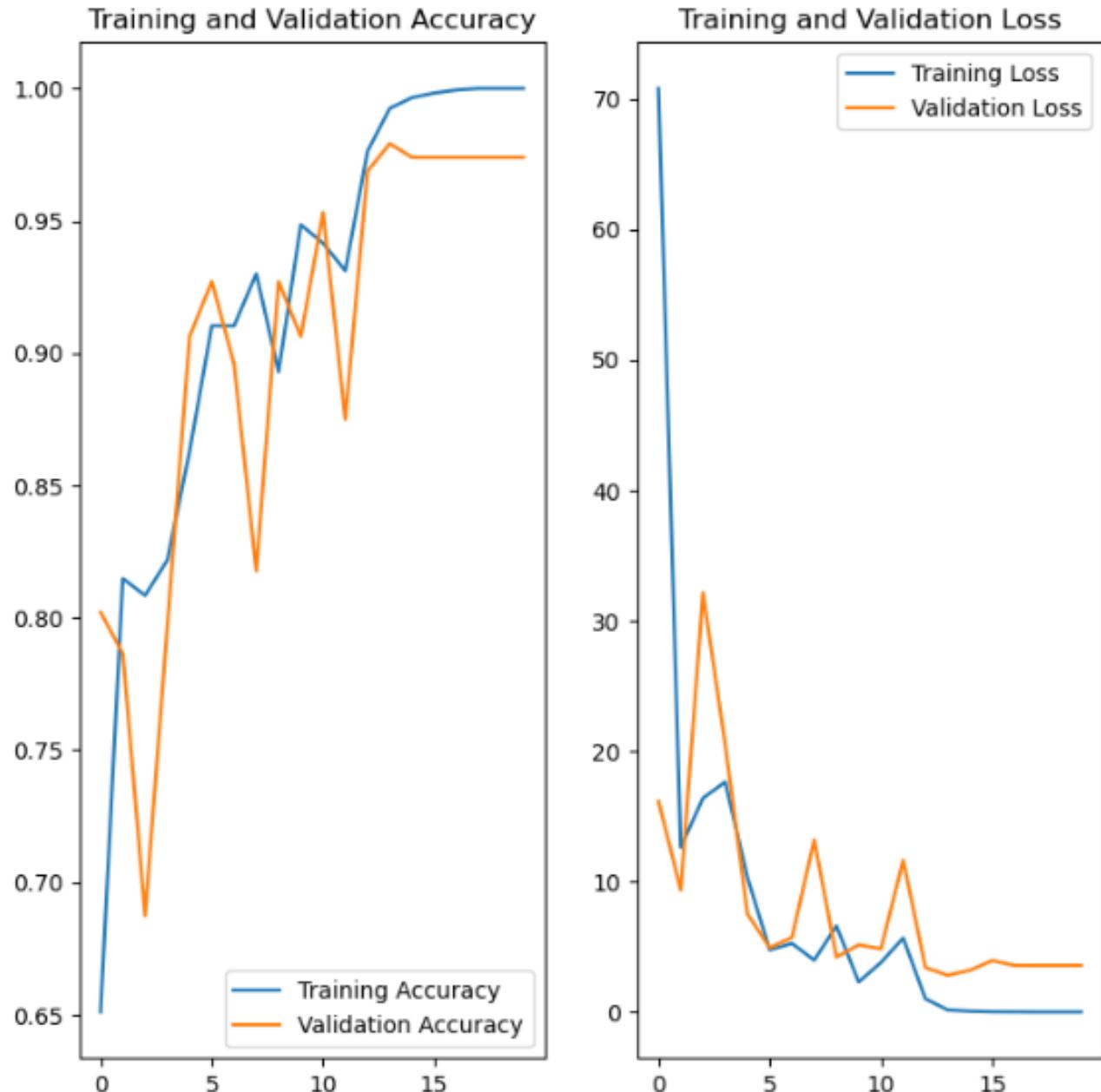
(c) 20

IMAGE_SIZE=224
BATCH_SIZE=32
CHANNELS=3
EPOCHS=20

```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 8s 715ms/step - loss: 1.6718 - accuracy: 0.9844  
[1.6718459129333496, 0.984375]
```

Average Time per Epoch: 61.50 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

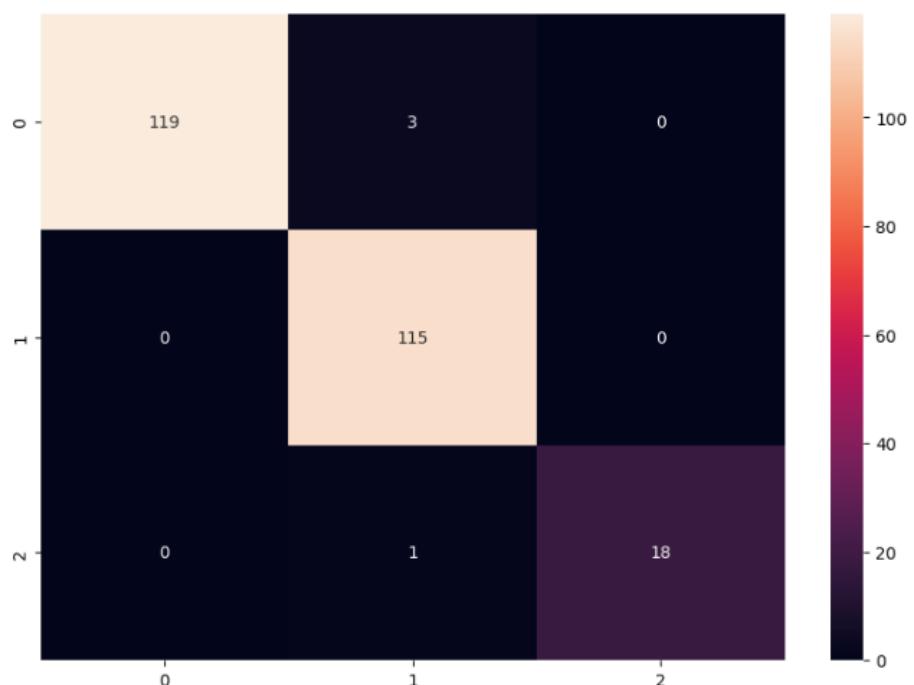


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	1.00	0.98	0.99	122
1	0.97	1.00	0.98	115
2	1.00	0.95	0.97	19
accuracy			0.98	256
macro avg	0.99	0.97	0.98	256
weighted avg	0.98	0.98	0.98	256



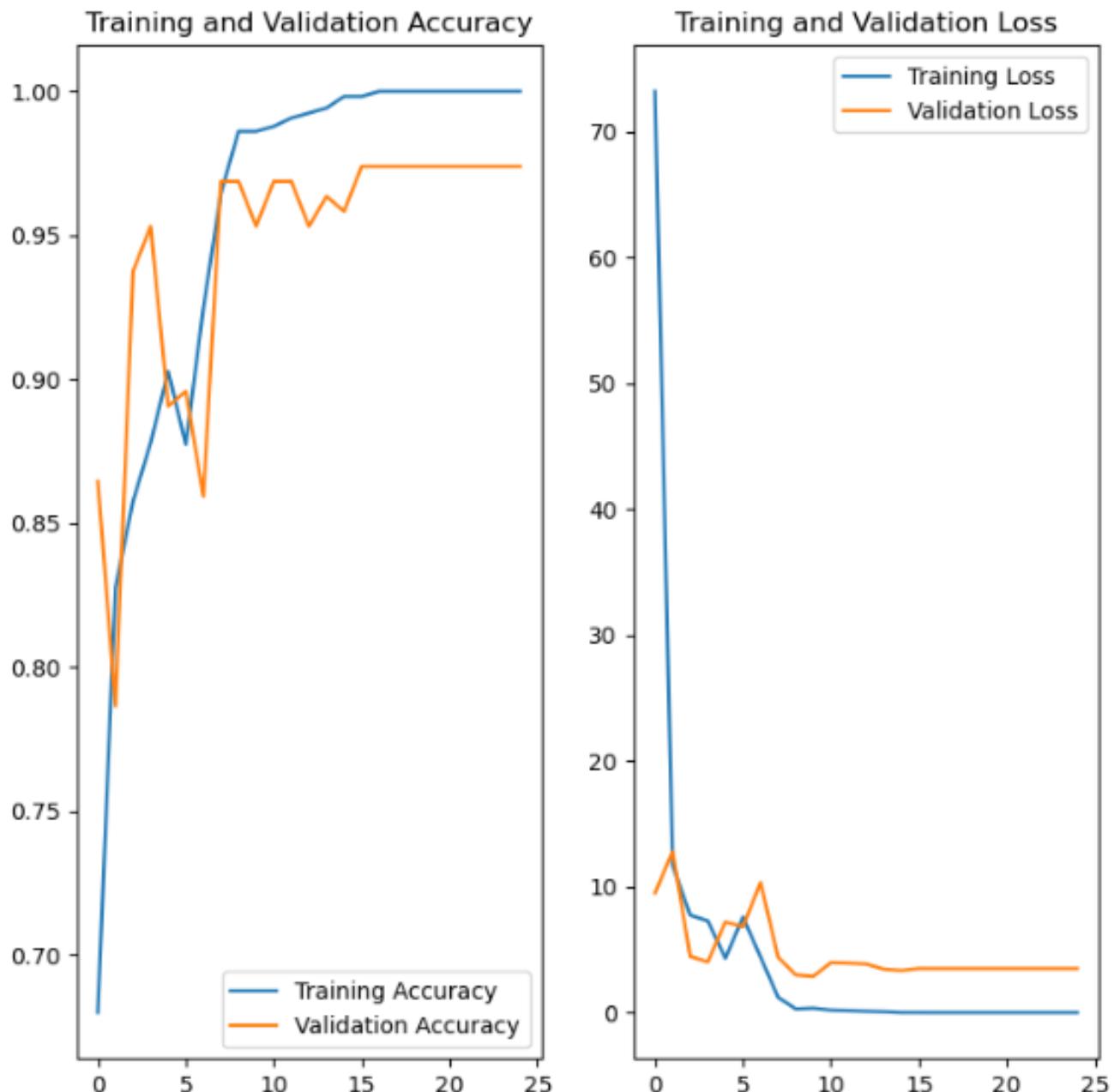
(d) 25

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=25
```

```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 9s 1s/step - loss: 2.7149 - accuracy: 0.9609  
[2.714888095855713, 0.9609375]
```

Average Time per Epoch: 62.60 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%

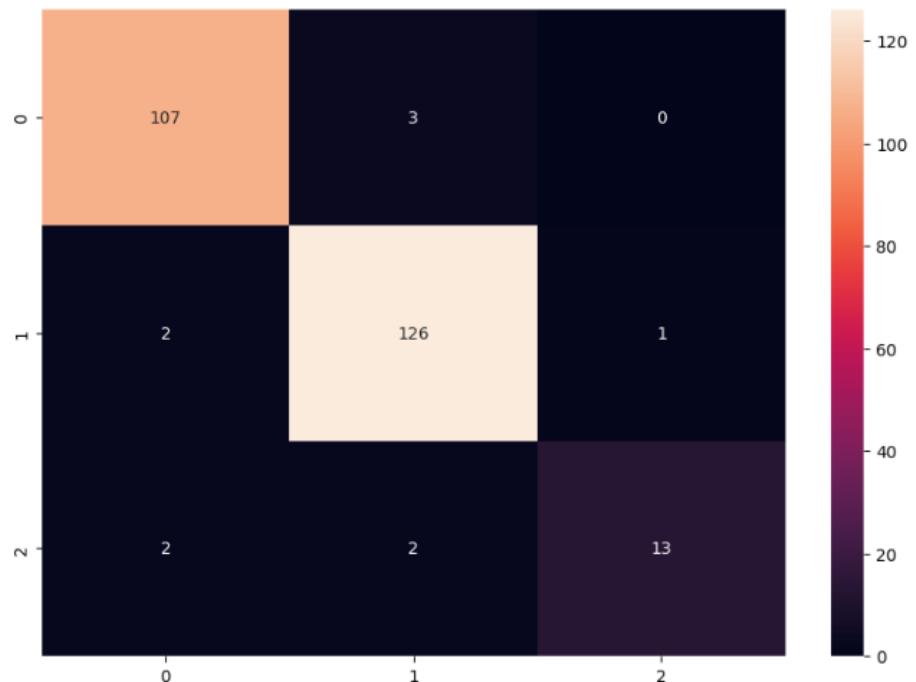


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	0.96	0.97	0.97	110
1	0.96	0.98	0.97	129
2	0.93	0.76	0.84	17
accuracy			0.96	256
macro avg	0.95	0.90	0.93	256
weighted avg	0.96	0.96	0.96	256



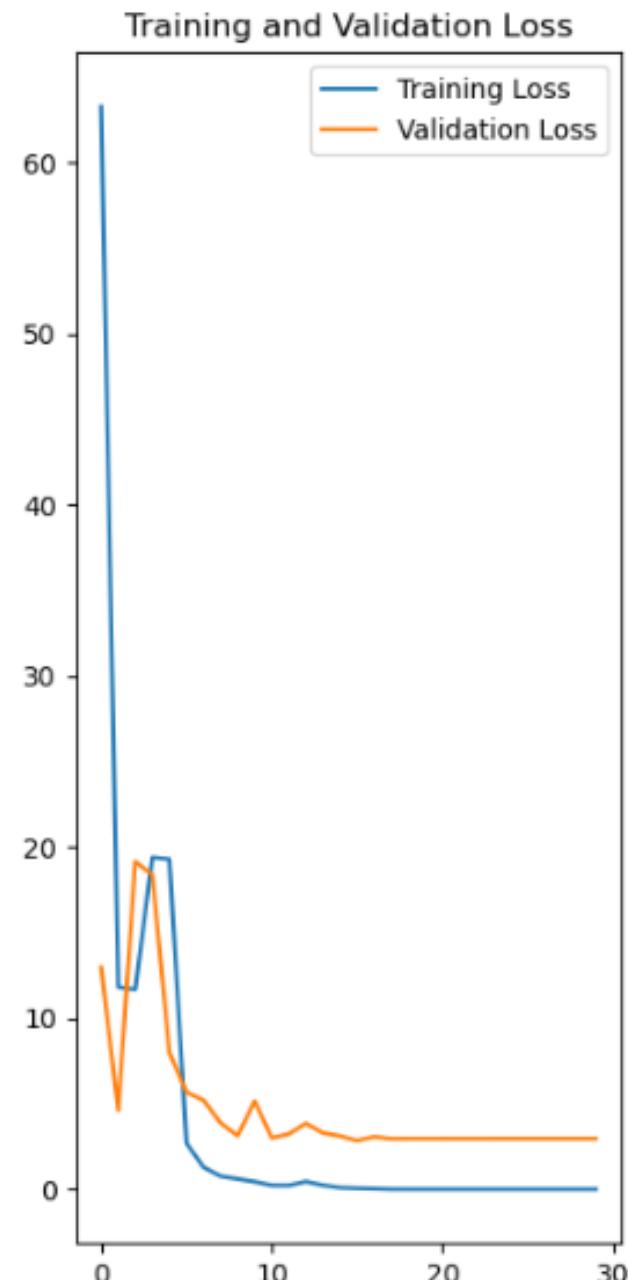
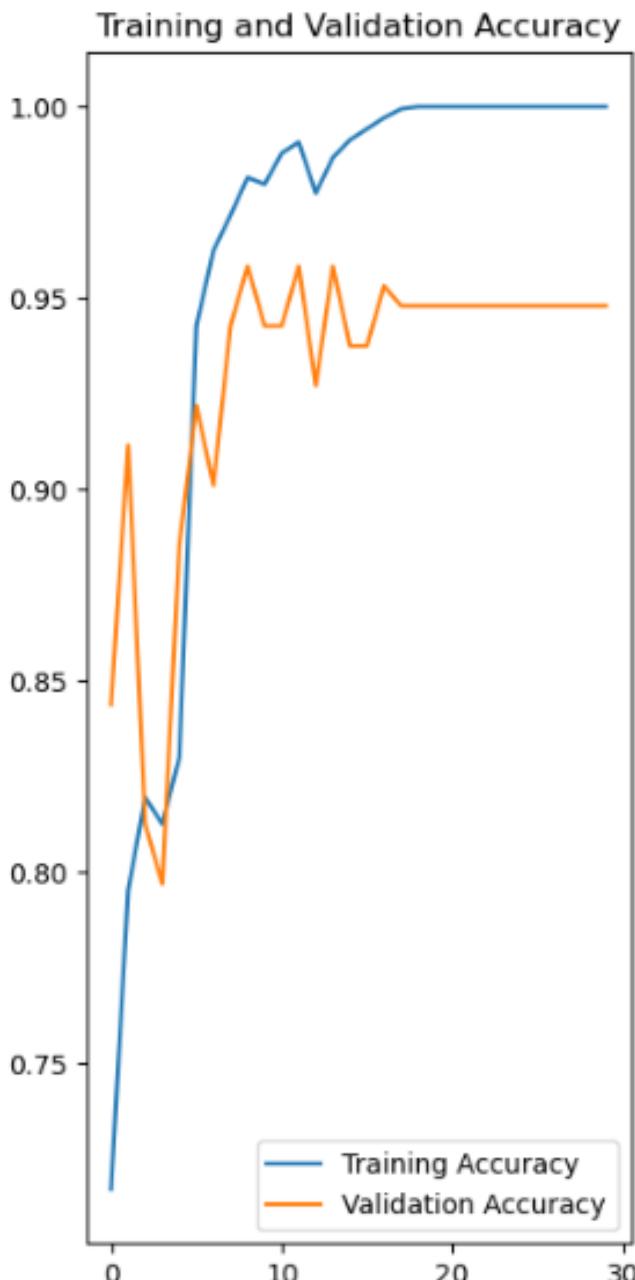
(e) 30

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=30
```

```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 7s 722ms/step - loss: 0.8142 - accuracy: 0.9844  
[0.8141929507255554, 0.984375]
```

Average Time per Epoch: 62.63 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%

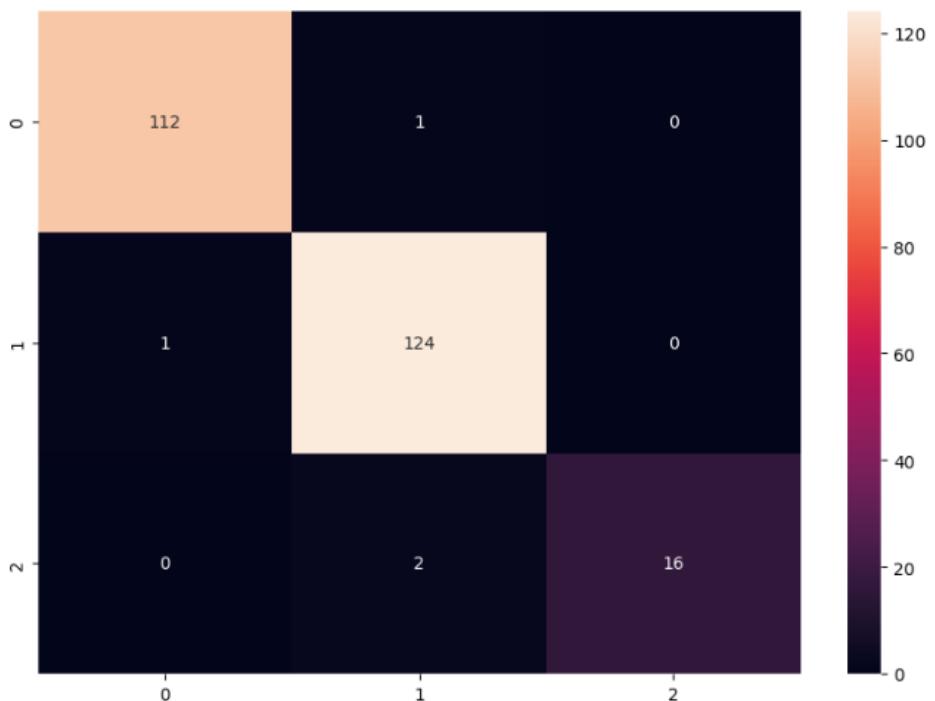


Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	0.99	0.99	0.99	113
1	0.98	0.99	0.98	125
2	1.00	0.89	0.94	18
accuracy			0.98	256
macro avg	0.99	0.96	0.97	256
weighted avg	0.98	0.98	0.98	256



BATCH SIZE

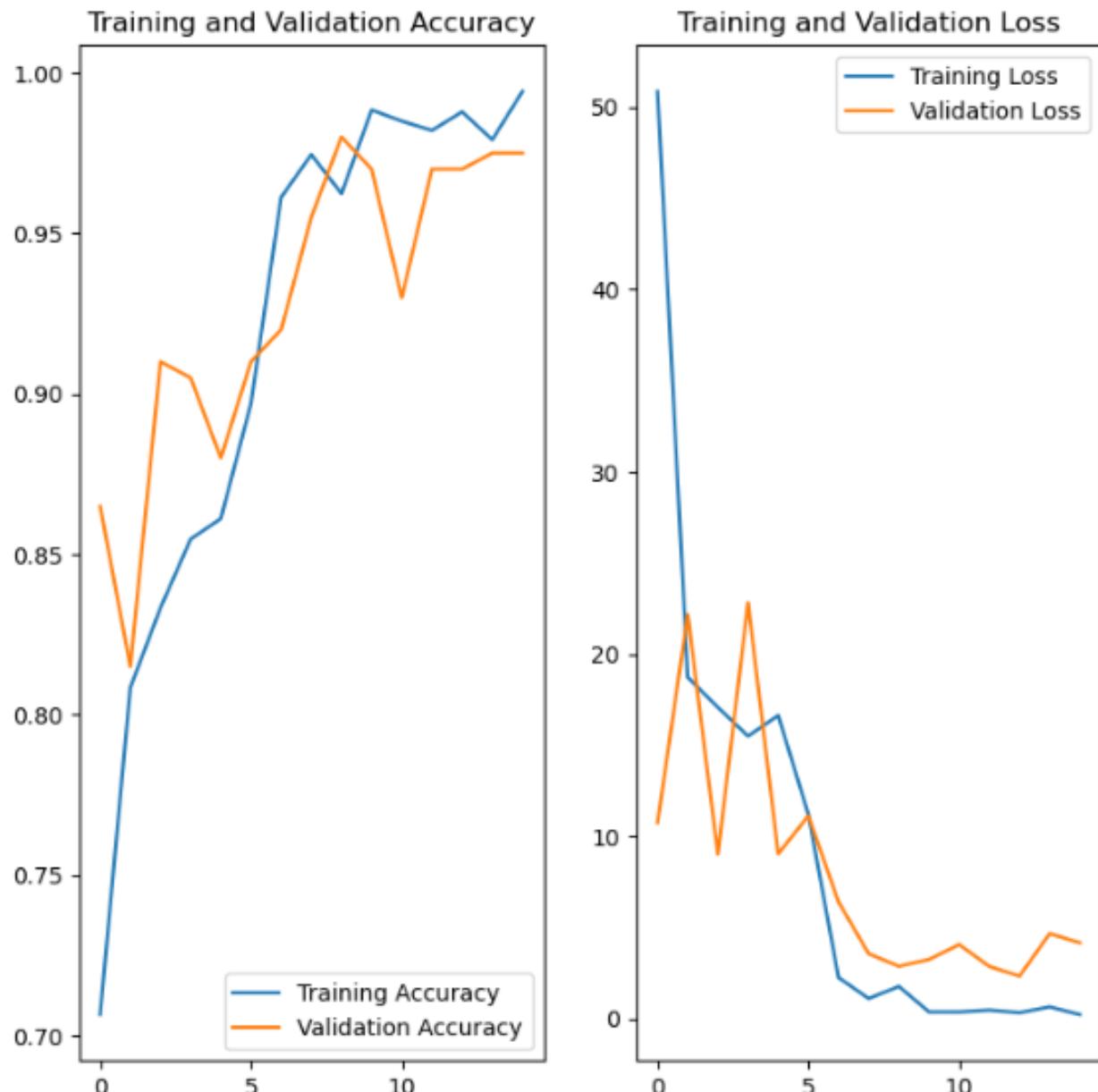
(a) 16

```
IMAGE_SIZE=224  
BATCH_SIZE=16  
CHANNELS=3  
EPOCHS=15
```

```
scores=model.evaluate(test_ds)  
scores
```

```
14/14 [=====] - 7s 458ms/step - loss: 3.9575 - accuracy: 0.9866  
[3.9575021266937256, 0.9866071343421936]
```

Average Time per Epoch: 66.93 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

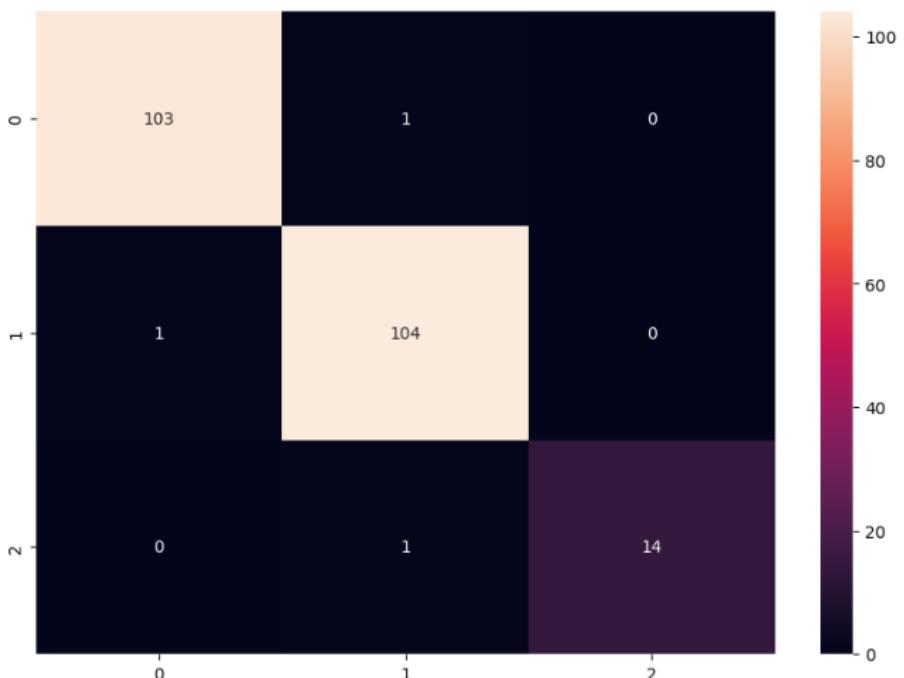


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	0.99	0.99	0.99	104
1	0.98	0.99	0.99	105
2	1.00	0.93	0.97	15
accuracy			0.99	224
macro avg	0.99	0.97	0.98	224
weighted avg	0.99	0.99	0.99	224



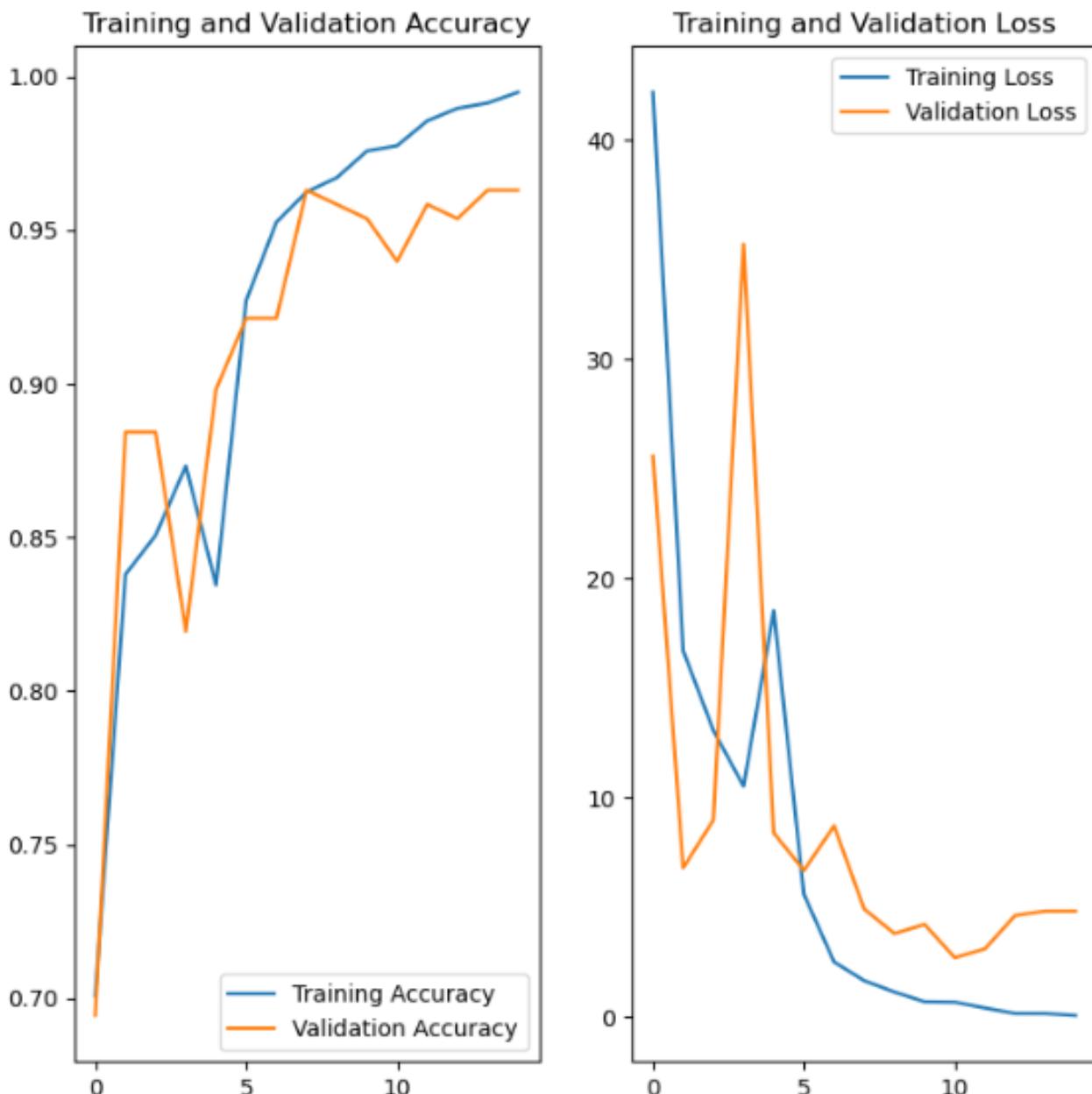
(b) 24

```
IMAGE_SIZE=224  
BATCH_SIZE=24  
CHANNELS=3  
EPOCHS=15
```

```
scores=model.evaluate(test_ds)  
scores
```

```
9/9 [=====] - 6s 572ms/step - loss: 2.6249 - accuracy: 0.9722  
[2.624911069869995, 0.9722222089767456]
```

Average Time per Epoch: 63.40 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%

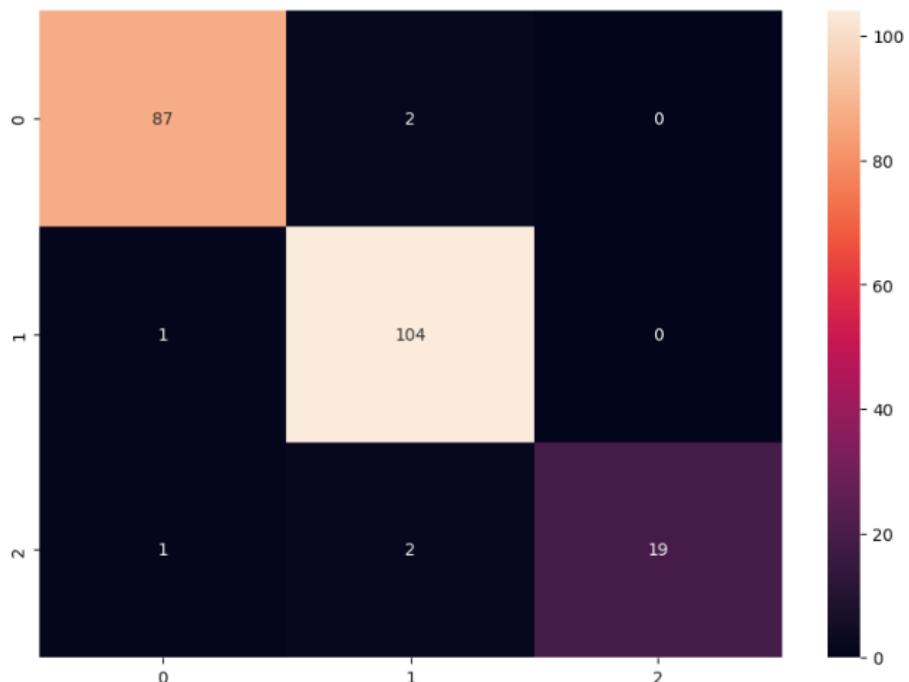


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	0.98	0.98	0.98	89
1	0.96	0.99	0.98	105
2	1.00	0.86	0.93	22
accuracy			0.97	216
macro avg	0.98	0.94	0.96	216
weighted avg	0.97	0.97	0.97	216



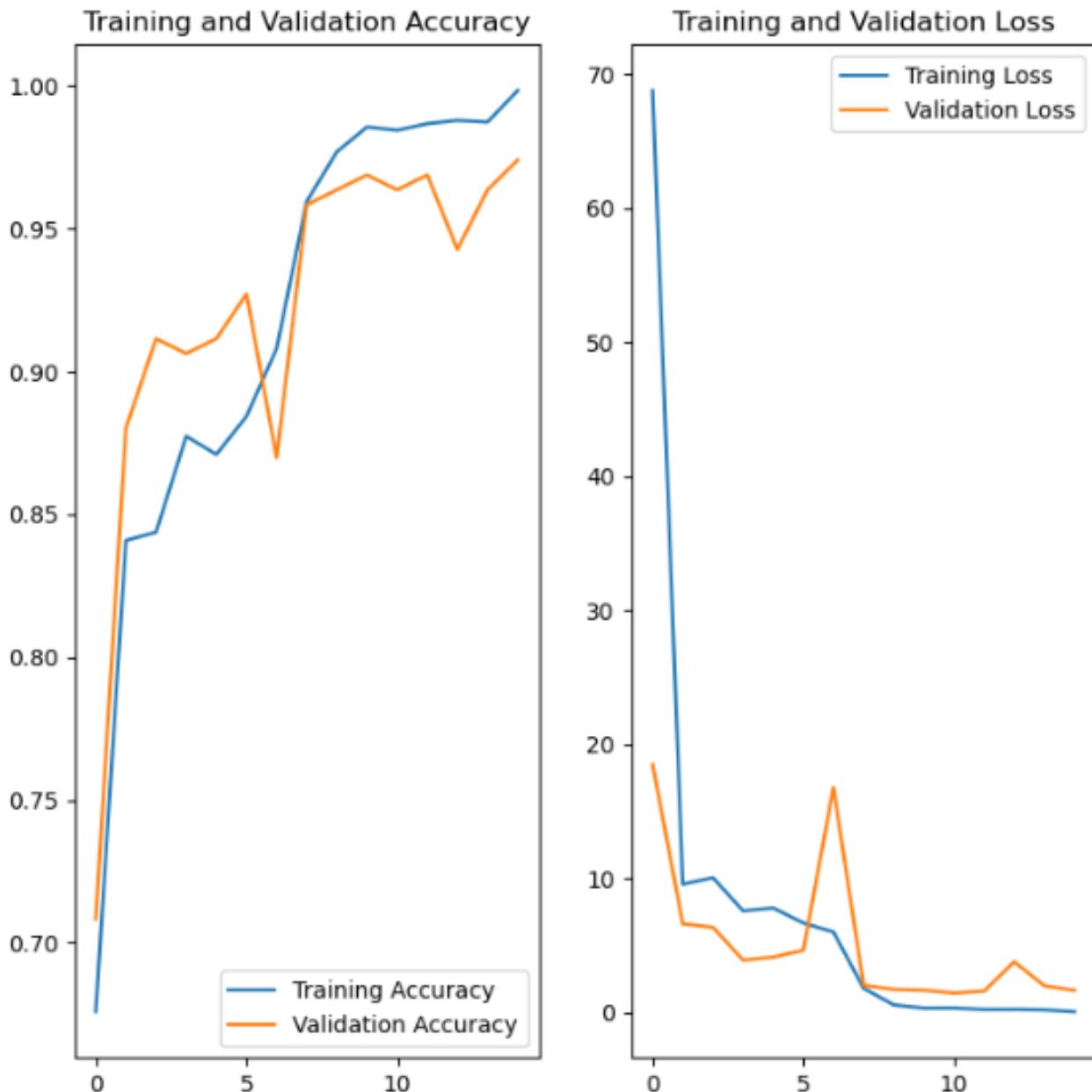
(c) 32

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=15
```

```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 8s 943ms/step - loss: 1.7377 - accuracy: 0.9844  
[1.7376668453216553, 0.984375]
```

Average Time per Epoch: 62.20 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

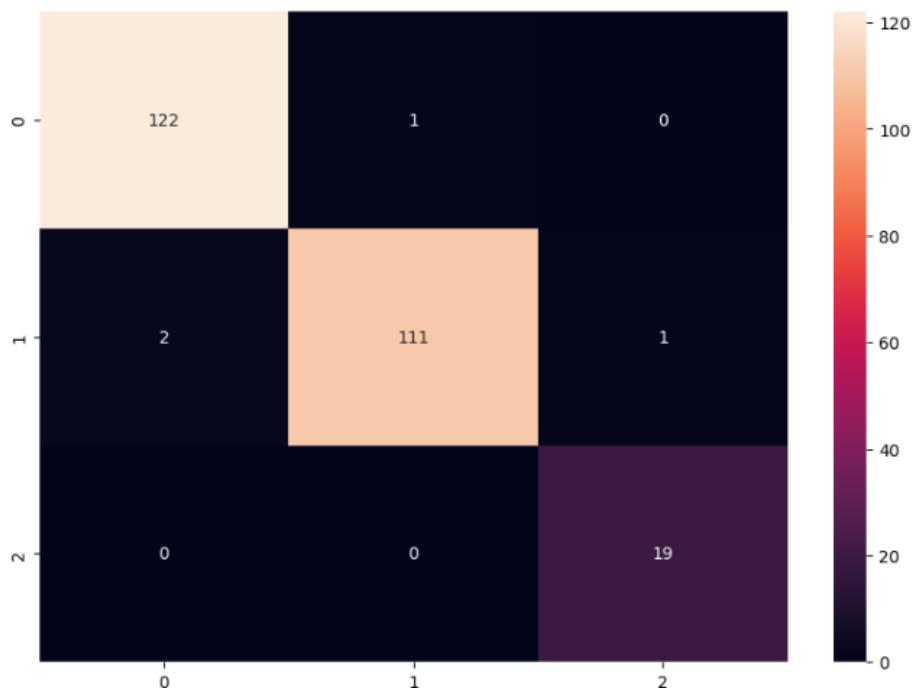


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	0.98	0.99	0.99	123
1	0.99	0.97	0.98	114
2	0.95	1.00	0.97	19
accuracy			0.98	256
macro avg	0.97	0.99	0.98	256
weighted avg	0.98	0.98	0.98	256



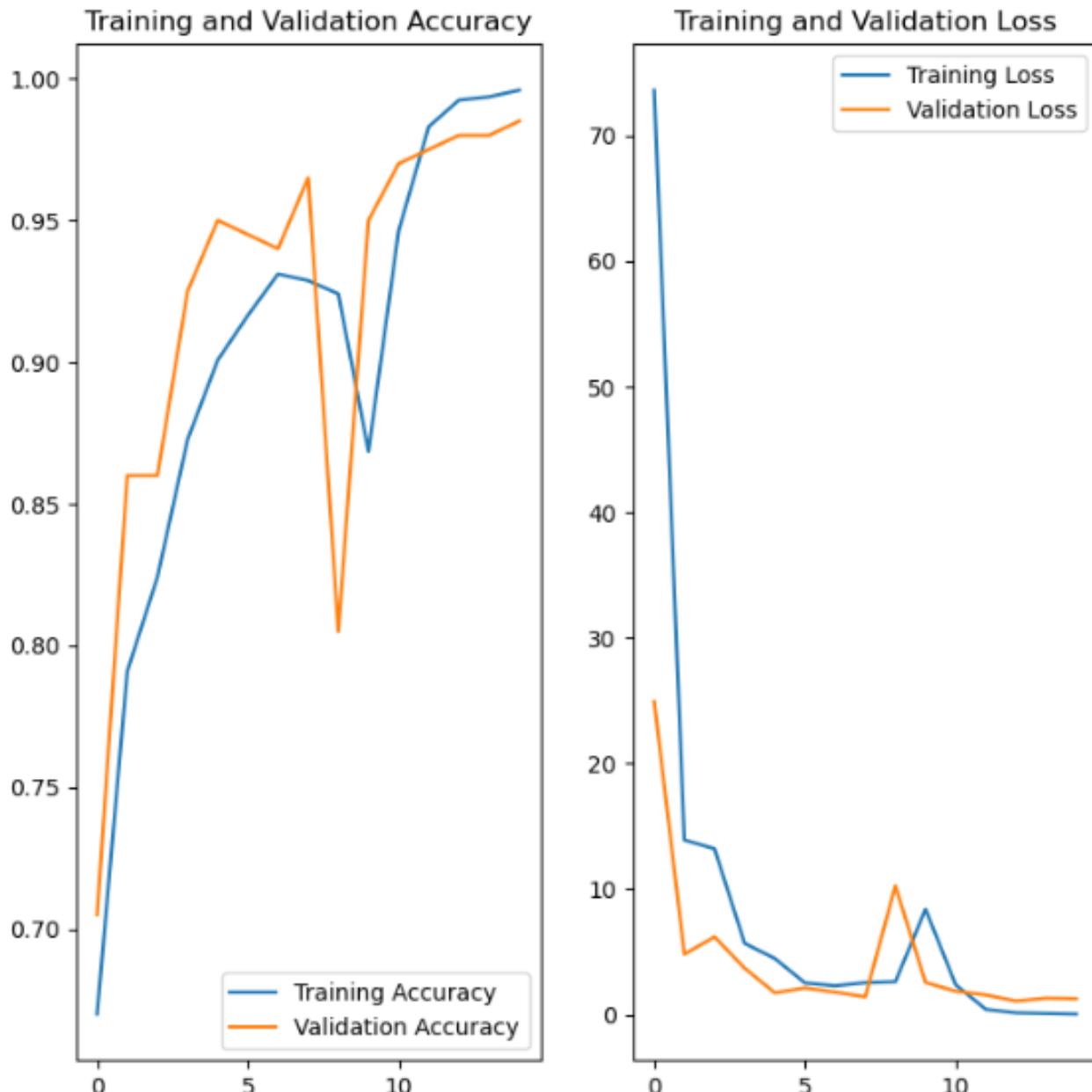
(d) 40

```
IMAGE_SIZE=224  
BATCH_SIZE=40  
CHANNELS=3  
EPOCHS=15
```

```
scores=model.evaluate(test_ds)  
scores
```

```
6/6 [=====] - 6s 894ms/step - loss: 2.3743 - accuracy: 0.9833  
[2.37428617477417, 0.9833333492279053]
```

Average Time per Epoch: 60.93 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%

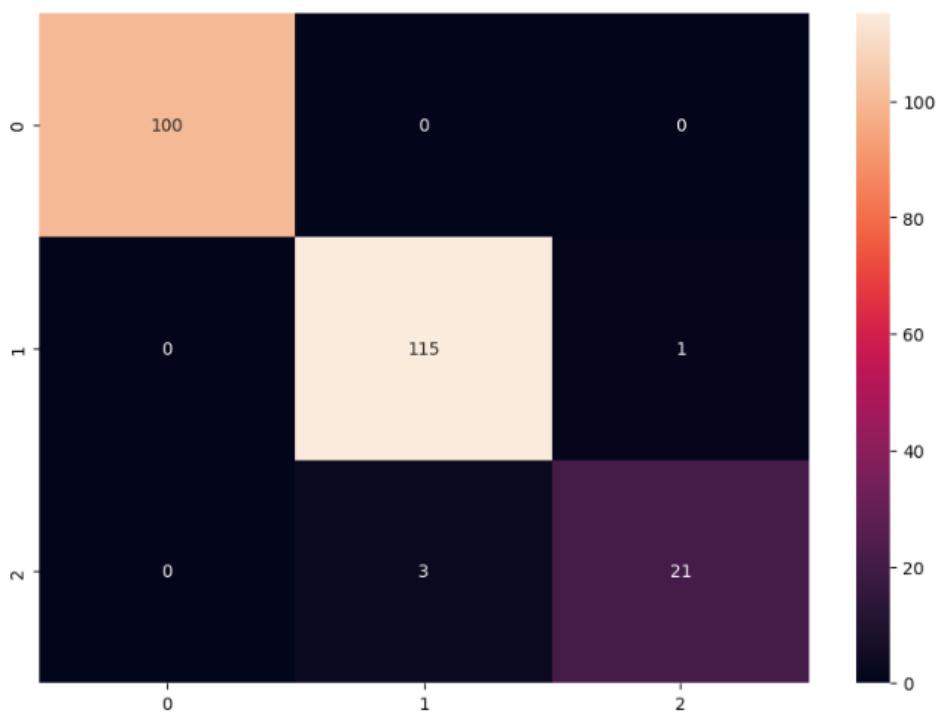


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	1.00	1.00	1.00	100
1	0.97	0.99	0.98	116
2	0.95	0.88	0.91	24
accuracy			0.98	240
macro avg	0.98	0.96	0.97	240
weighted avg	0.98	0.98	0.98	240



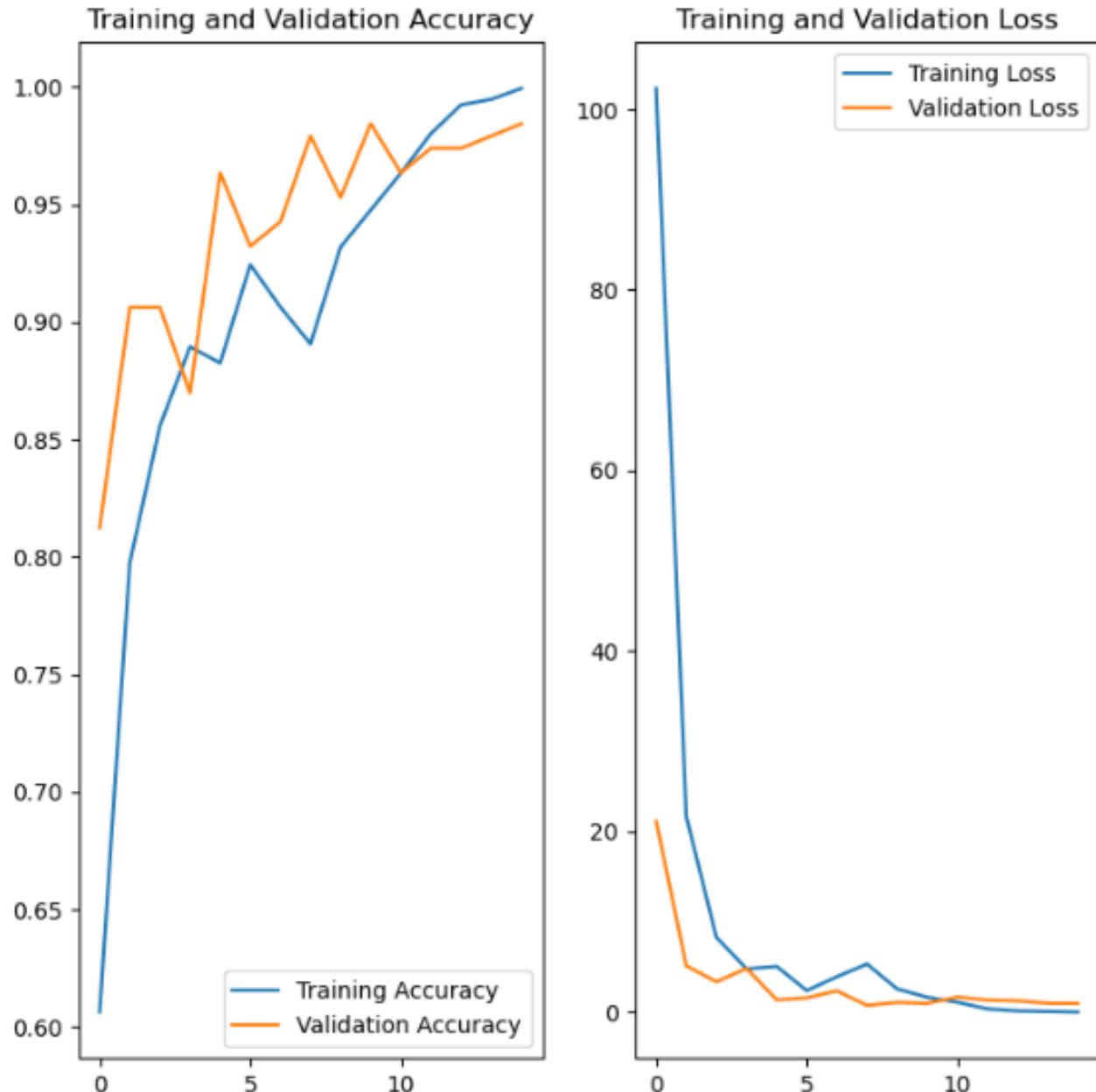
(e) 48

```
IMAGE_SIZE=224  
BATCH_SIZE=48  
CHANNELS=3  
EPOCHS=15
```

```
scores=model.evaluate(test_ds)  
scores
```

```
5/5 [=====] - 6s 1s/step - loss: 1.7254 - accuracy: 0.9708  
[1.7253830432891846, 0.9708333611488342]
```

Average Time per Epoch: 59.20 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_healthy,
Predicted: Potato_Late_blight,
Confidence: 100.0%

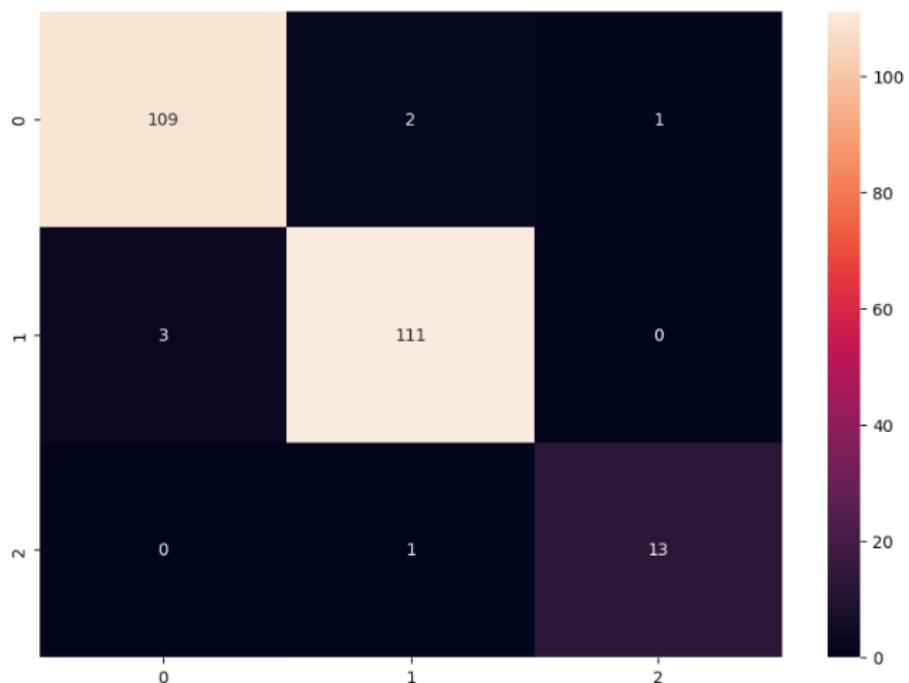


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	0.97	0.97	0.97	112
1	0.97	0.97	0.97	114
2	0.93	0.93	0.93	14
accuracy			0.97	240
macro avg	0.96	0.96	0.96	240
weighted avg	0.97	0.97	0.97	240



DATASET SPLIT RATIO

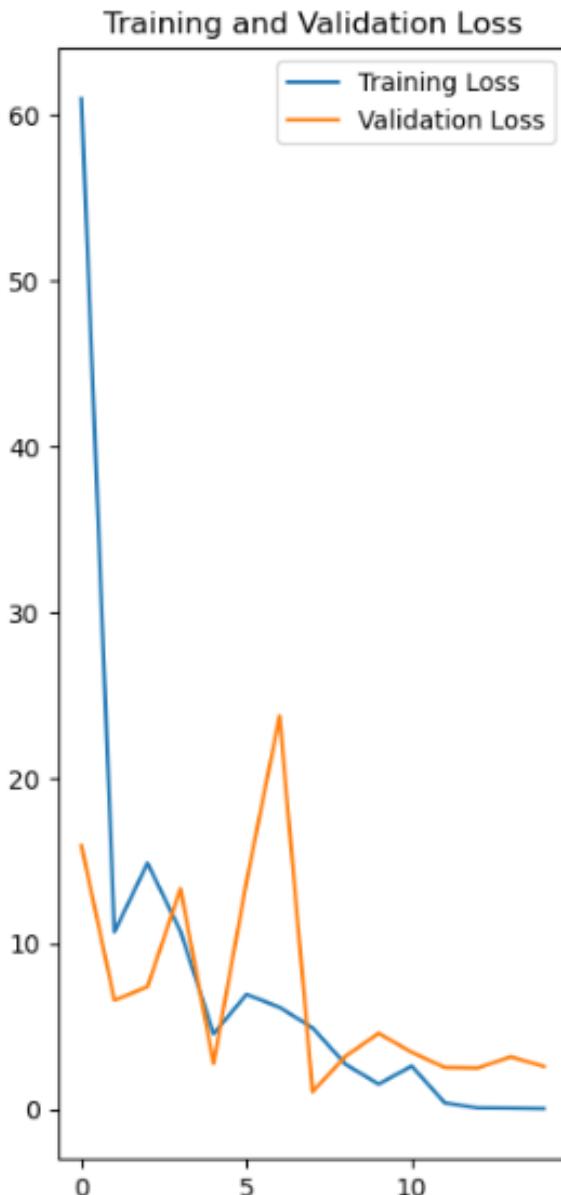
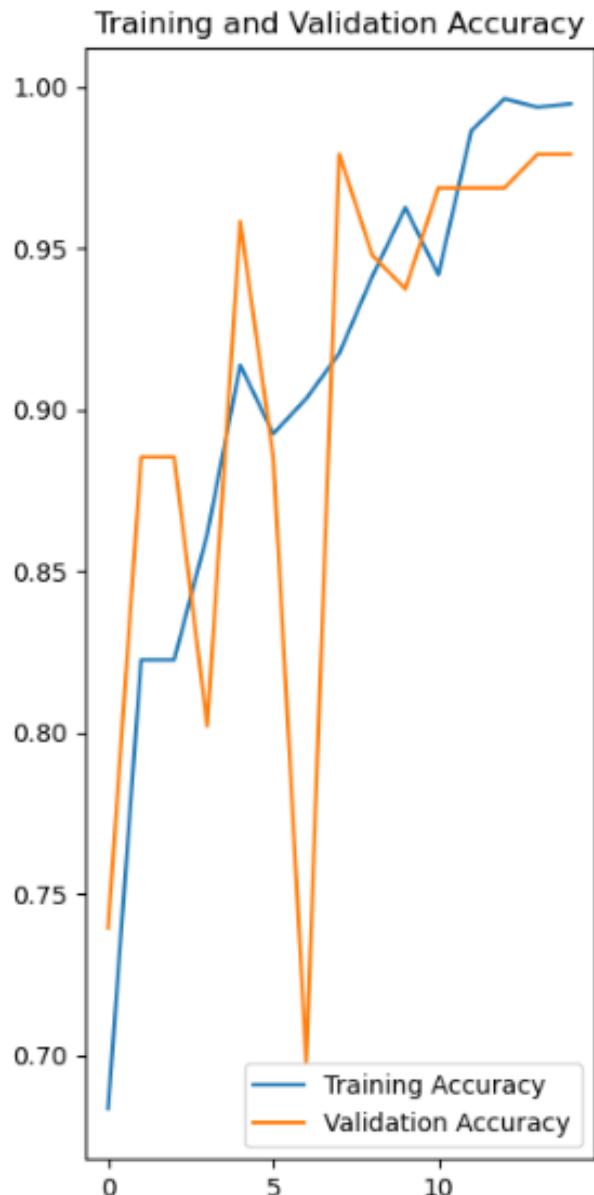
(a) 90:5:5

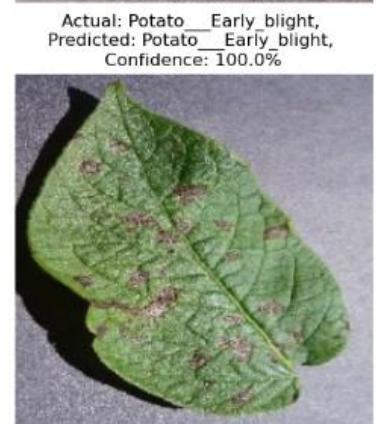
```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=15
```

```
scores=model.evaluate(test_ds)  
scores
```

```
4/4 [=====] - 4s 724ms/step - loss: 0.0000e+00 - accuracy: 1.0000  
[0.0, 1.0]
```

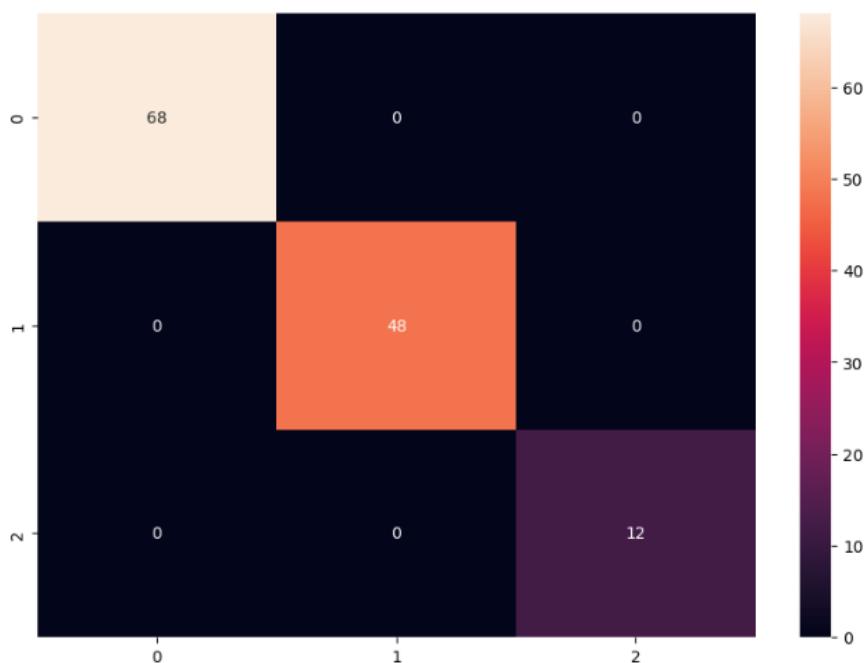
Average Time per Epoch: 66.20 s





Classification Report:

	precision	recall	f1-score	support
0	1.00	1.00	1.00	68
1	1.00	1.00	1.00	48
2	1.00	1.00	1.00	12
accuracy			1.00	128
macro avg	1.00	1.00	1.00	128
weighted avg	1.00	1.00	1.00	128



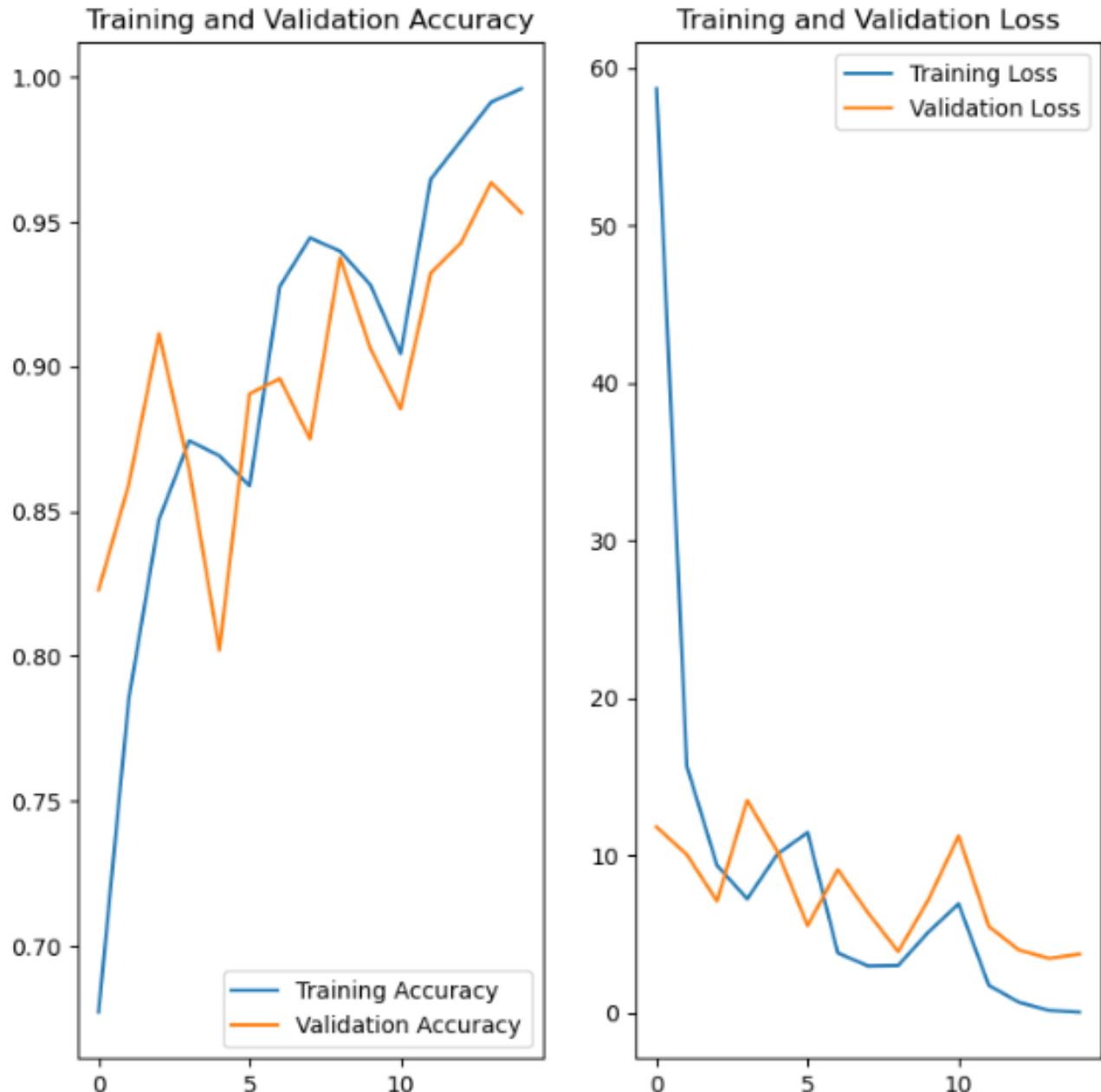
(b) 80:10:10

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=15
```

```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 7s 712ms/step - loss: 2.9319 - accuracy: 0.9648  
[2.9319112300872803, 0.96484375]
```

Average Time per Epoch: 63.20 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%

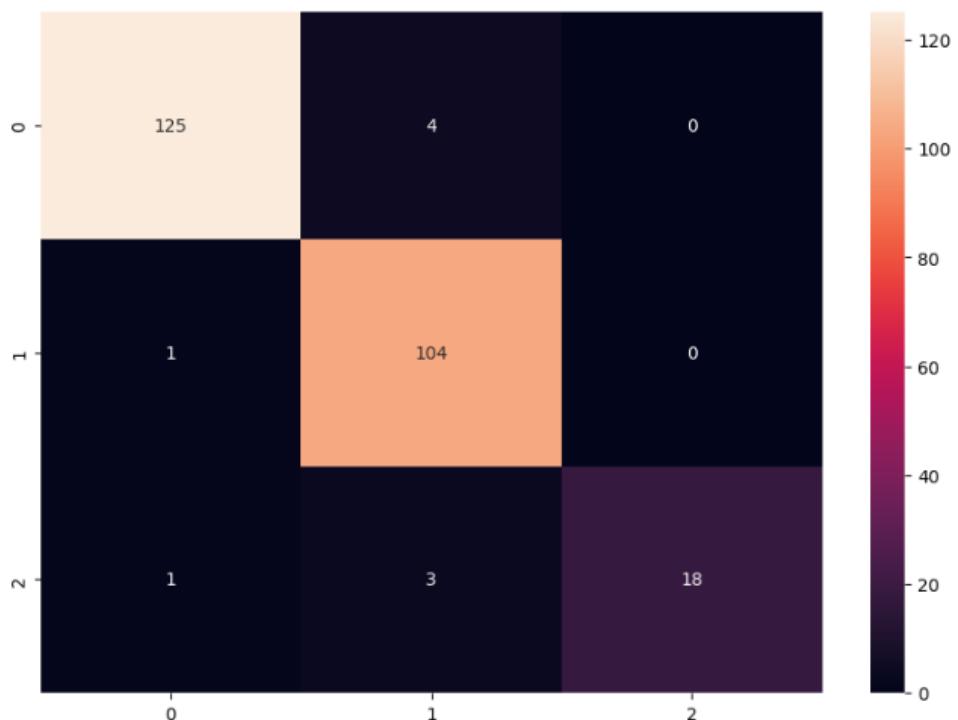


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	0.98	0.97	0.98	129
1	0.94	0.99	0.96	105
2	1.00	0.82	0.90	22
accuracy			0.96	256
macro avg	0.97	0.93	0.95	256
weighted avg	0.97	0.96	0.96	256



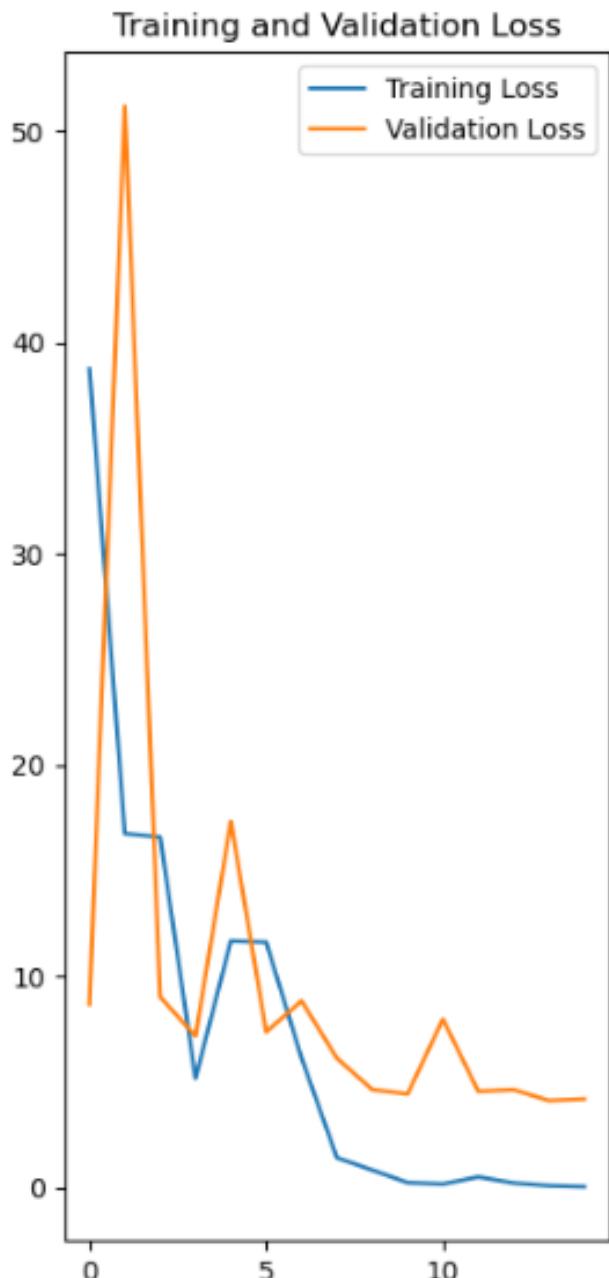
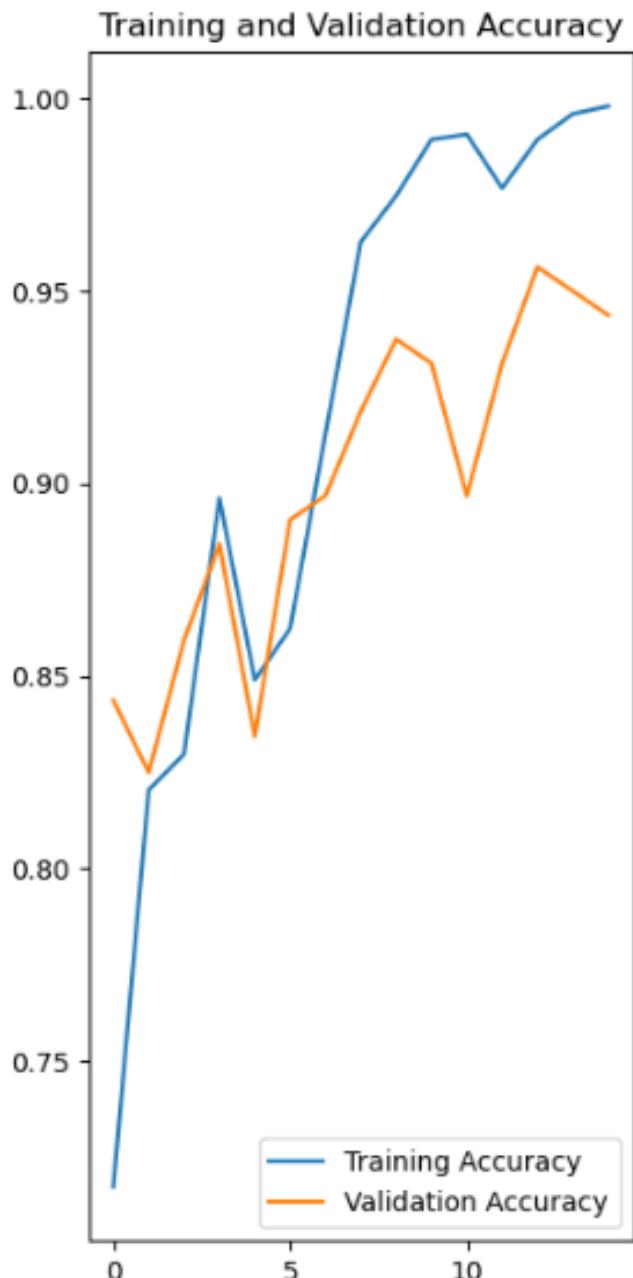
(c) 70:15:15

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=15
```

```
scores=model.evaluate(test_ds)  
scores
```

```
11/11 [=====] - 9s 727ms/step - loss: 2.4984 - accuracy: 0.9545  
[2.4983696937561035, 0.9545454382896423]
```

Average Time per Epoch: 60.20 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

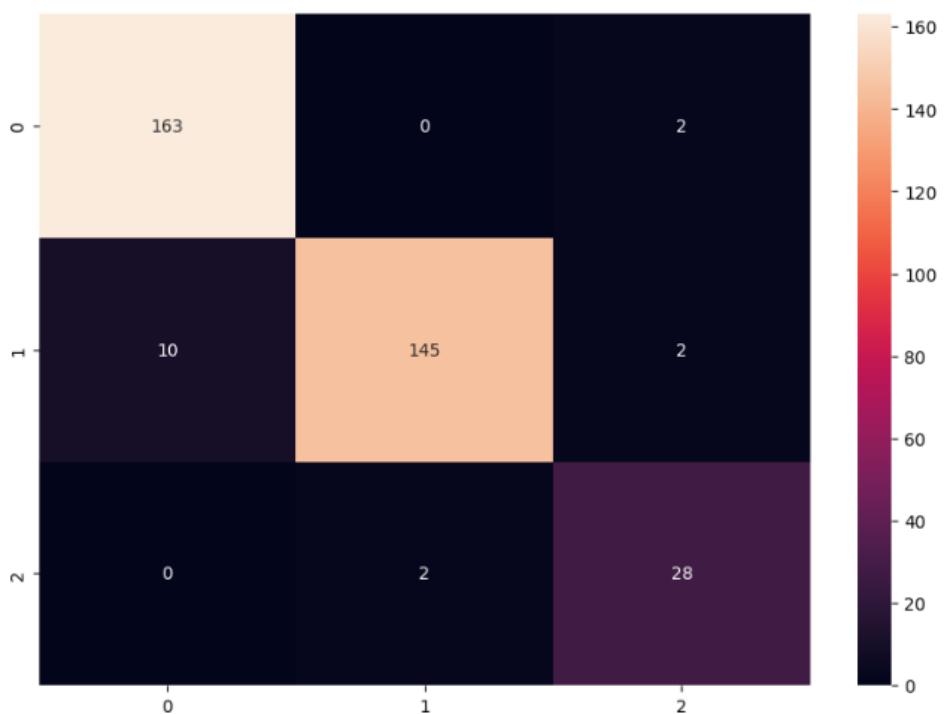


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	0.94	0.99	0.96	165
1	0.99	0.92	0.95	157
2	0.88	0.93	0.90	30
accuracy			0.95	352
macro avg	0.93	0.95	0.94	352
weighted avg	0.96	0.95	0.95	352



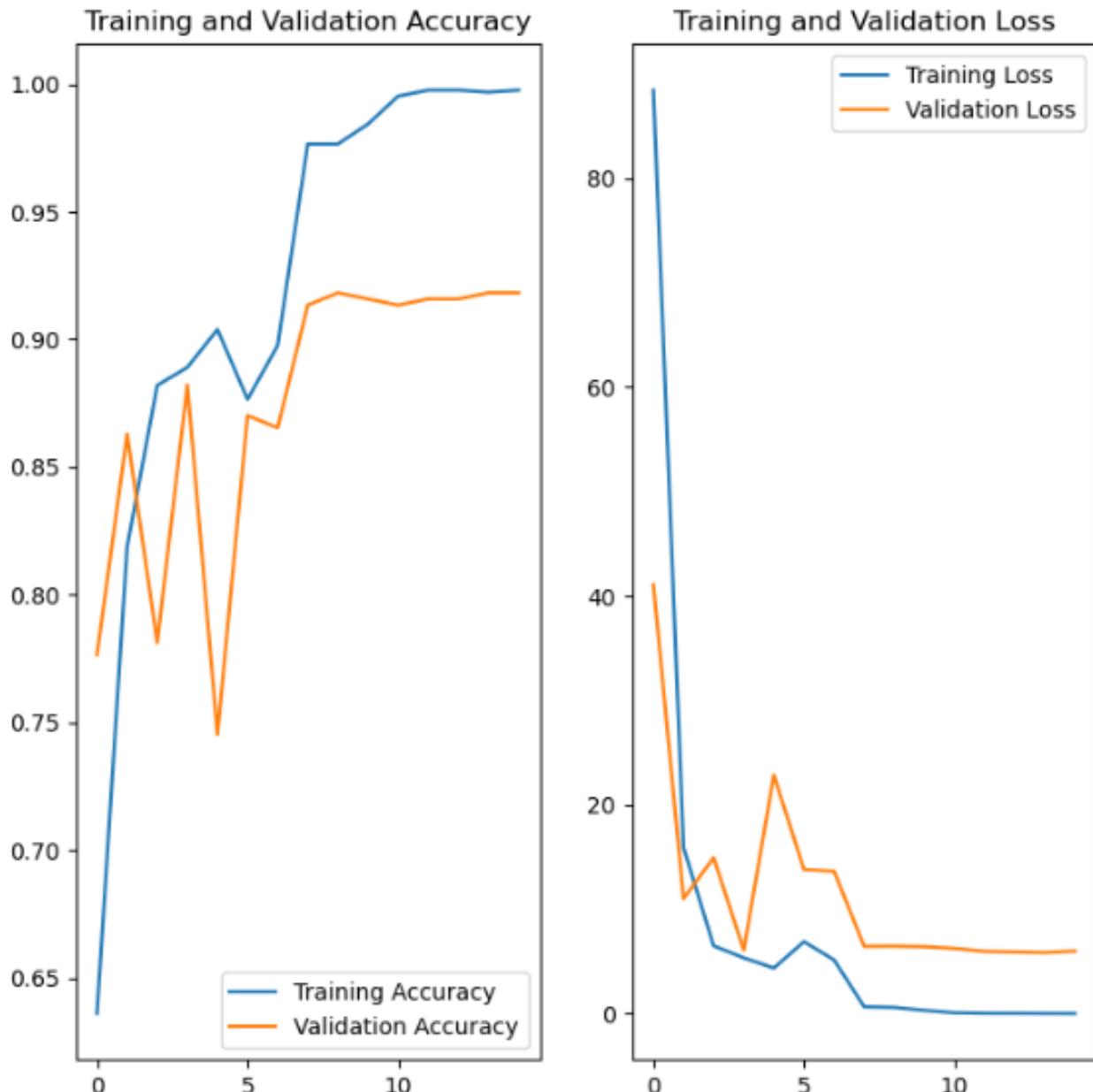
(d) 60:20:20

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=15
```

```
scores=model.evaluate(test_ds)  
scores
```

```
15/15 [=====] - 17s 1s/step - loss: 4.0944 - accuracy: 0.9396  
[4.094435214996338, 0.9395833611488342]
```

Average Time per Epoch: 56.33 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 100.0%

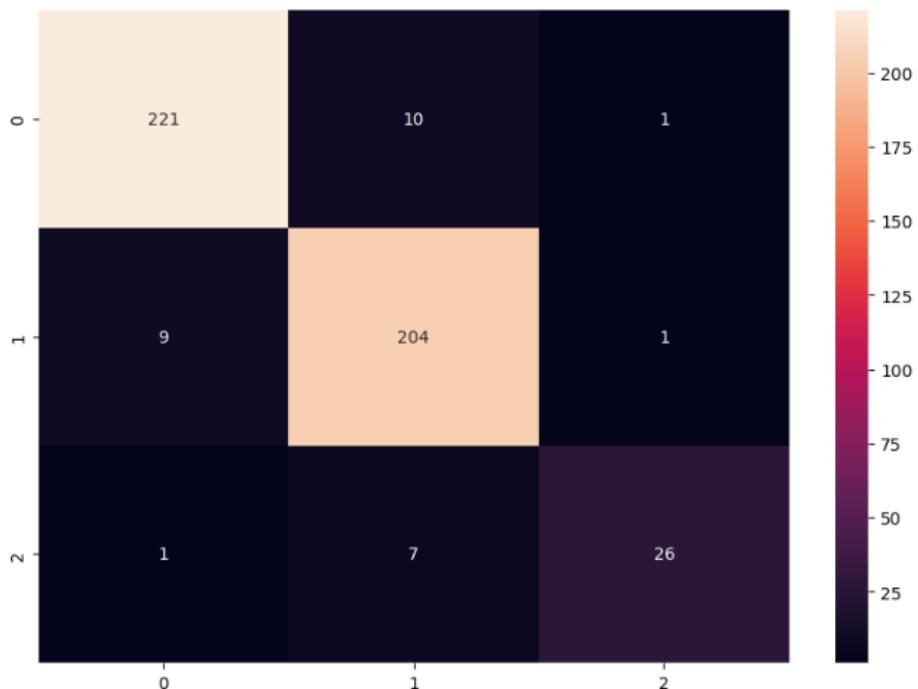


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	0.96	0.95	0.95	232
1	0.92	0.95	0.94	214
2	0.93	0.76	0.84	34
accuracy			0.94	480
macro avg	0.94	0.89	0.91	480
weighted avg	0.94	0.94	0.94	480



(e) 50:25:25

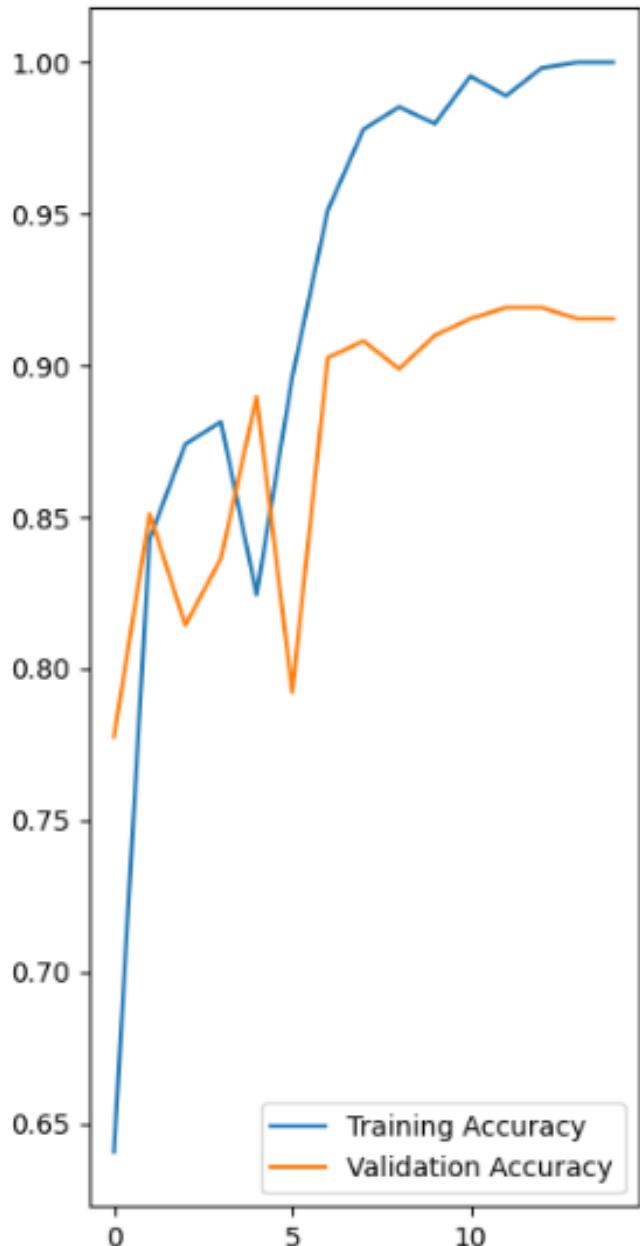
```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=15
```

```
scores=model.evaluate(test_ds)  
scores
```

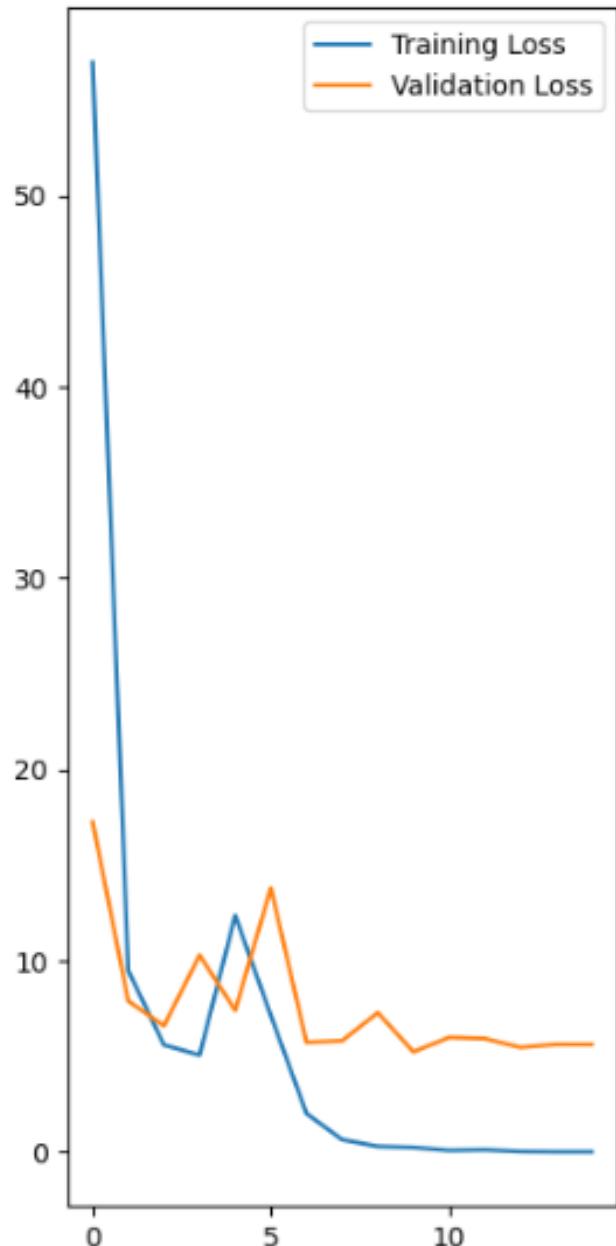
```
17/17 [=====] - 18s 1s/step - loss: 5.7160 - accuracy: 0.9173  
[5.715967655181885, 0.9172794222831726]
```

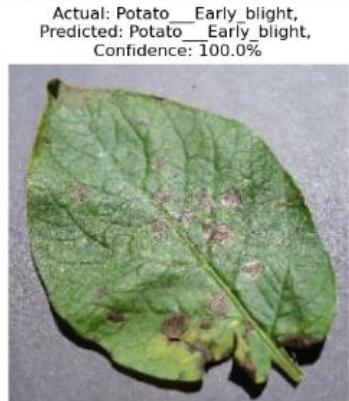
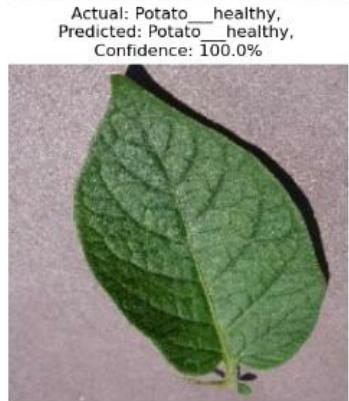
Average Time per Epoch: 56.00 s

Training and Validation Accuracy

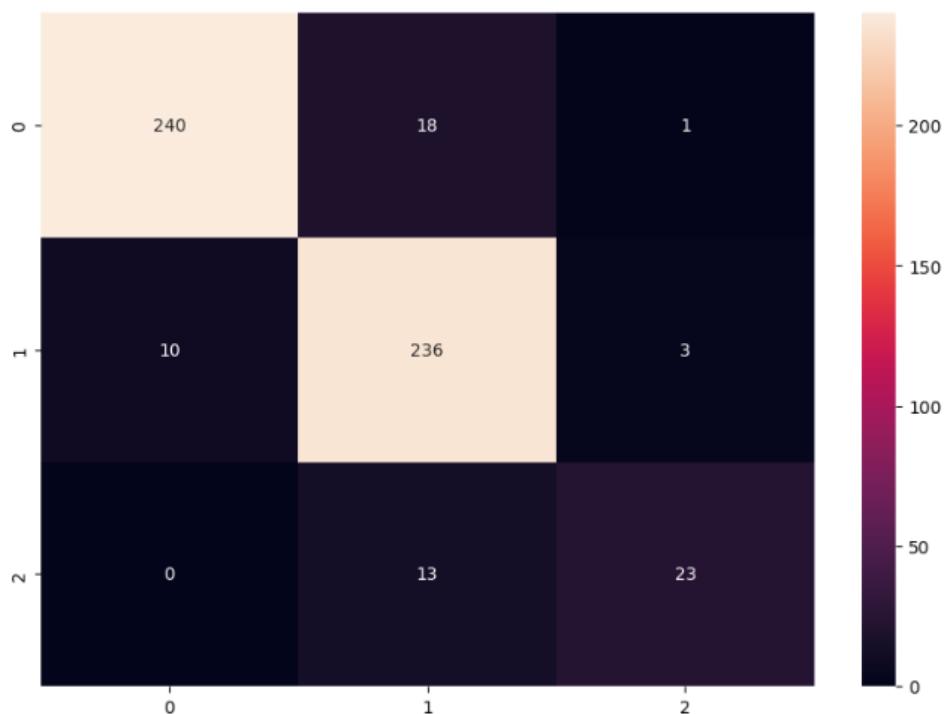


Training and Validation Loss





Classification Report:					
	precision	recall	f1-score	support	
0	0.96	0.93	0.94	259	
1	0.88	0.95	0.91	249	
2	0.85	0.64	0.73	36	
accuracy			0.92	544	
macro avg	0.90	0.84	0.86	544	
weighted avg	0.92	0.92	0.92	544	



Model 6: AlexNet

BASE MODEL

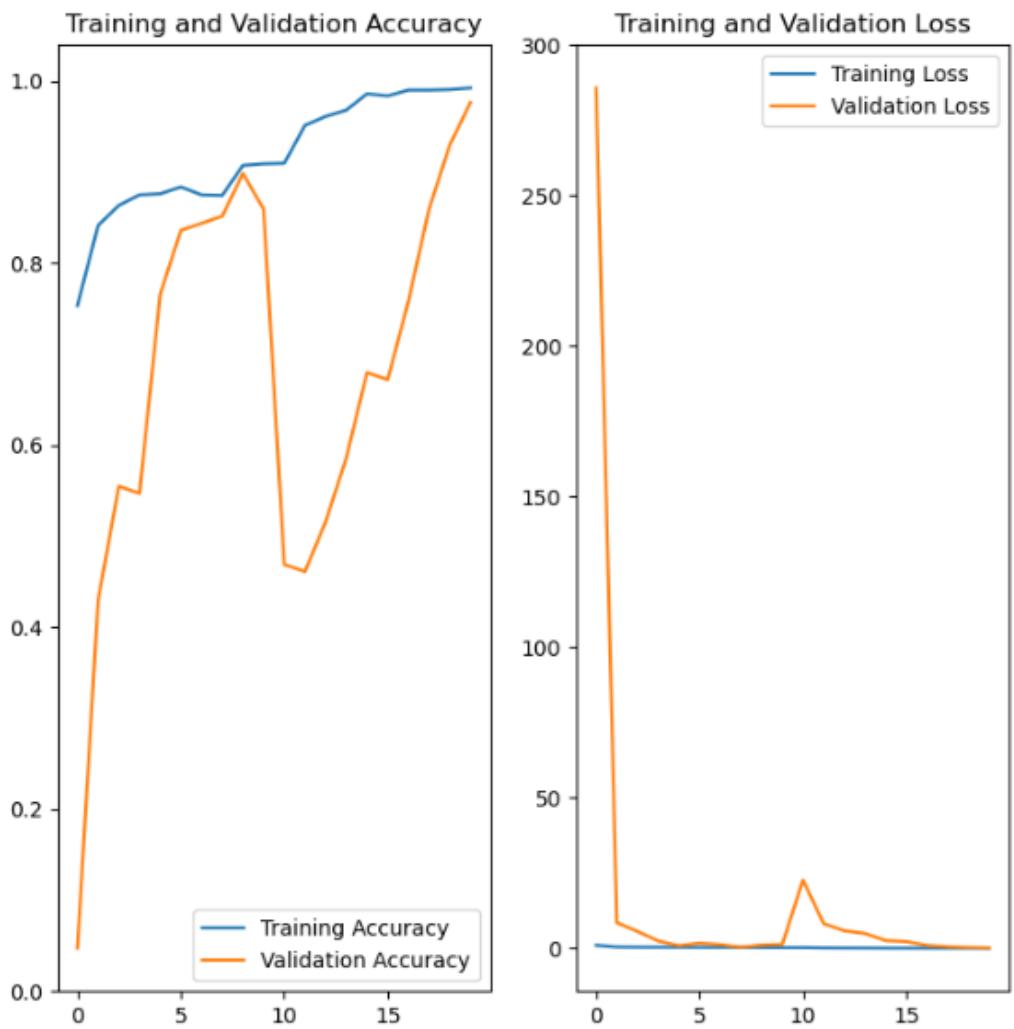
```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=20
```

```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 3s 211ms/step - loss: 0.2237 - accuracy: 0.9336  
[0.22369447350502014, 0.93359375]
```

Average Time per Epoch: 77.15 s

history.history['loss']	history.history['accuracy']	history.history['val_loss']	history.history['val_accuracy']
[1.0101335048675537, 0.4379669725894928, 0.3811780512332916, 0.36988022923469543, 0.34935376048088074, 0.32854163646698, 0.31981244683265686, 0.3197394907474518, 0.2501841187477112, 0.23148584365844727, 0.22849668562412262, 0.1269838660955429, 0.10005785524845123, 0.08520568907260895, 0.05184122920036316, 0.04414619505405426, 0.03557242453098297, 0.03338746726512909, 0.032362911850214005, 0.03099539317190647]	[0.7534722089767456, 0.8414351940155029, 0.8634259104728699, 0.875, 0.8761574029922485, 0.8836805820465088, 0.875, 0.8744212985038757, 0.9074074029922485, 0.9091435074806213, 0.9097222089767456, 0.9513888955116272, 0.9612268805503845, 0.9681712985038757, 0.986111044883728, 0.9837962985038757, 0.9901620149612427, 0.9901620149612427, 0.9907407164573669, 0.9924768805503845]	[285.7661437988281, 8.53463077545166, 5.6049957275390625, 2.452716588973999, 0.8860680468929871, 1.7423776388168335, 1.2294353246688843, 0.3326916992664337, 1.1014388799667358, 1.3298659324645996, 22.662792205810547, 8.2031831741333, 5.83718204498291, 4.933835983276367, 2.590003490447998, 2.231729507446289, 0.9850068688392639, 0.5132396817207336, 0.2744956612586975, 0.1249208003282547]	[0.046875, 0.4296875, 0.5546875, 0.546875, 0.765625, 0.8359375, 0.84375, 0.8515625, 0.8984375, 0.859375, 0.46875, 0.4609375, 0.515625, 0.5859375, 0.6796875, 0.671875, 0.7578125, 0.859375, 0.9296875, 0.9765625]



Actual: Potato__healthy,
Predicted: Potato__healthy,
Confidence: 68.54%



Actual: Potato__Late_blight,
Predicted: Potato__Late_blight,
Confidence: 99.99%



Actual: Potato__Late_blight,
Predicted: Potato__Late_blight,
Confidence: 99.92%



Actual: Potato__Late_blight,
Predicted: Potato__Late_blight,
Confidence: 99.83%



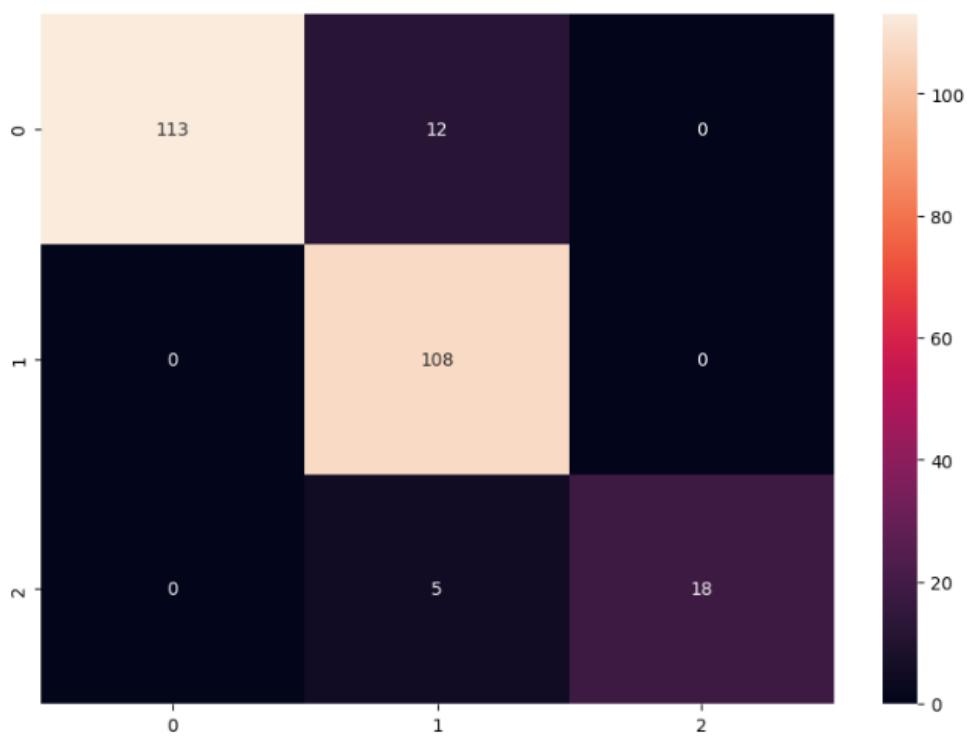
Actual: Potato__Early_blight,
Predicted: Potato__Late_blight,
Confidence: 79.05%



Actual: Potato__healthy,
Predicted: Potato__healthy,
Confidence: 84.86%



Classification Report:					
	precision	recall	f1-score	support	
0	1.00	0.90	0.95	125	
1	0.86	1.00	0.93	108	
2	1.00	0.78	0.88	23	
accuracy			0.93	256	
macro avg	0.95	0.90	0.92	256	
weighted avg	0.94	0.93	0.93	256	



NO. OF EPOCHS

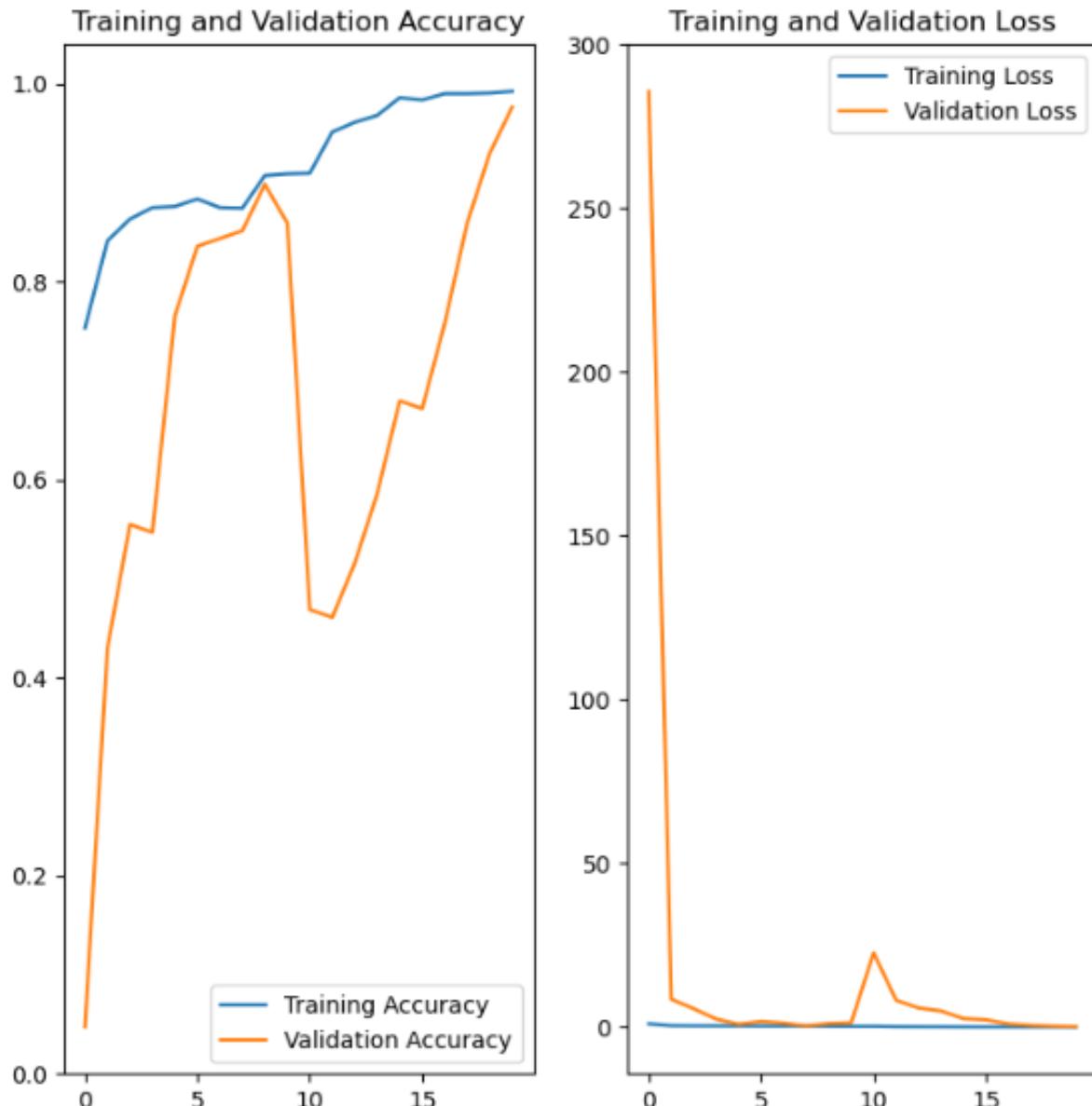
(a) 20

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=20
```

```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 3s 211ms/step - loss: 0.2237 - accuracy: 0.9336  
[0.22369447350502014, 0.93359375]
```

Average Time per Epoch: 77.15 s



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 68.54%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.92%



Actual: Potato_Early_blight,
Predicted: Potato_Late_blight,
Confidence: 79.05%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.99%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.83%

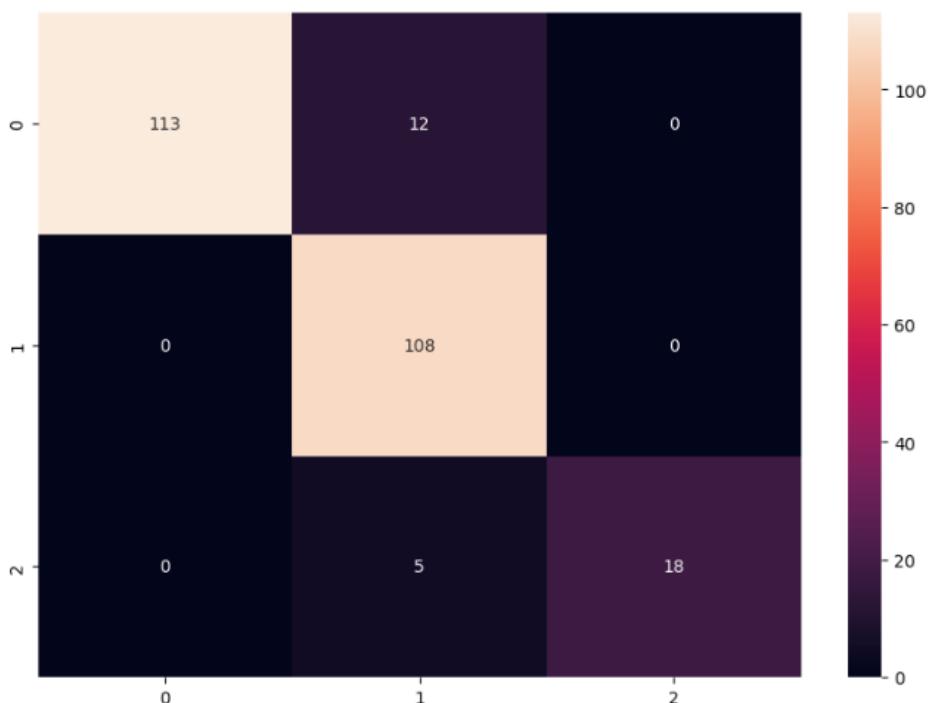


Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 84.86%



Classification Report:

	precision	recall	f1-score	support
0	1.00	0.90	0.95	125
1	0.86	1.00	0.93	108
2	1.00	0.78	0.88	23
accuracy			0.93	256
macro avg	0.95	0.90	0.92	256
weighted avg	0.94	0.93	0.93	256



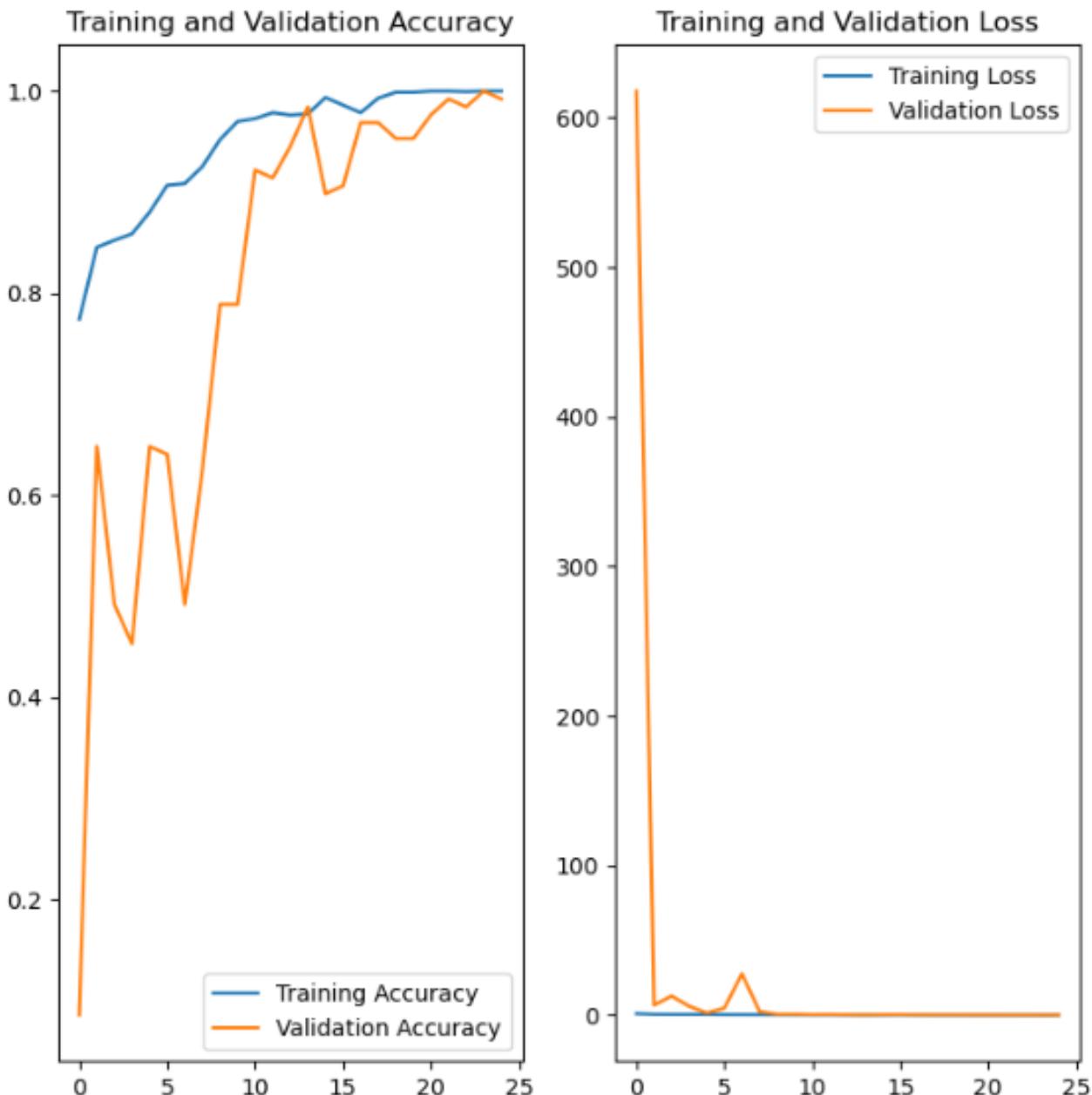
(b) 25

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=25
```

```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 4s 204ms/step - loss: 0.0367 - accuracy: 0.9922  
[0.03668561577796936, 0.9921875]
```

Average Time per Epoch: 80.80 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.68%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 97.28%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

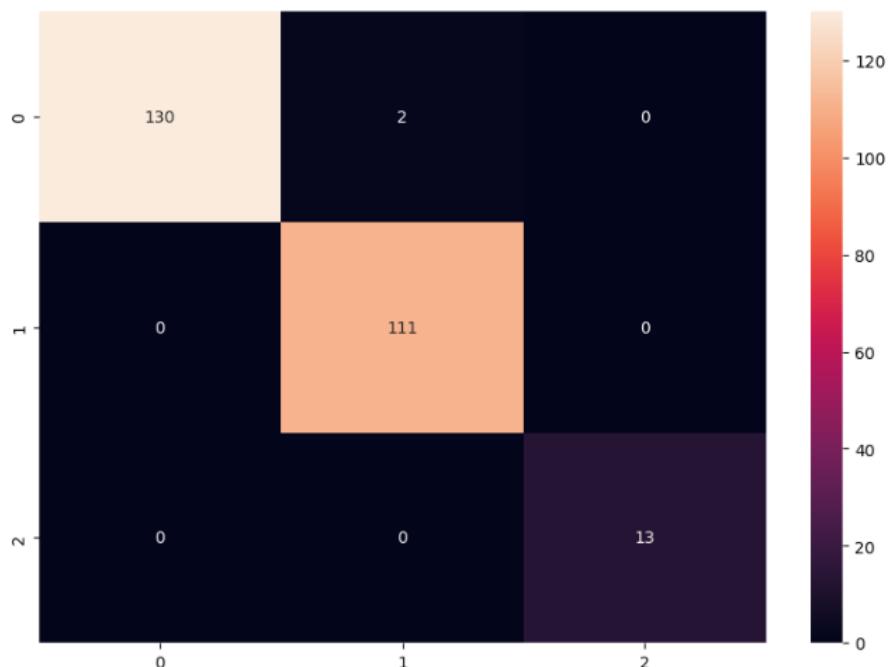


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.9%



Classification Report:

	precision	recall	f1-score	support
0	1.00	0.98	0.99	132
1	0.98	1.00	0.99	111
2	1.00	1.00	1.00	13
accuracy			0.99	256
macro avg	0.99	0.99	0.99	256
weighted avg	0.99	0.99	0.99	256



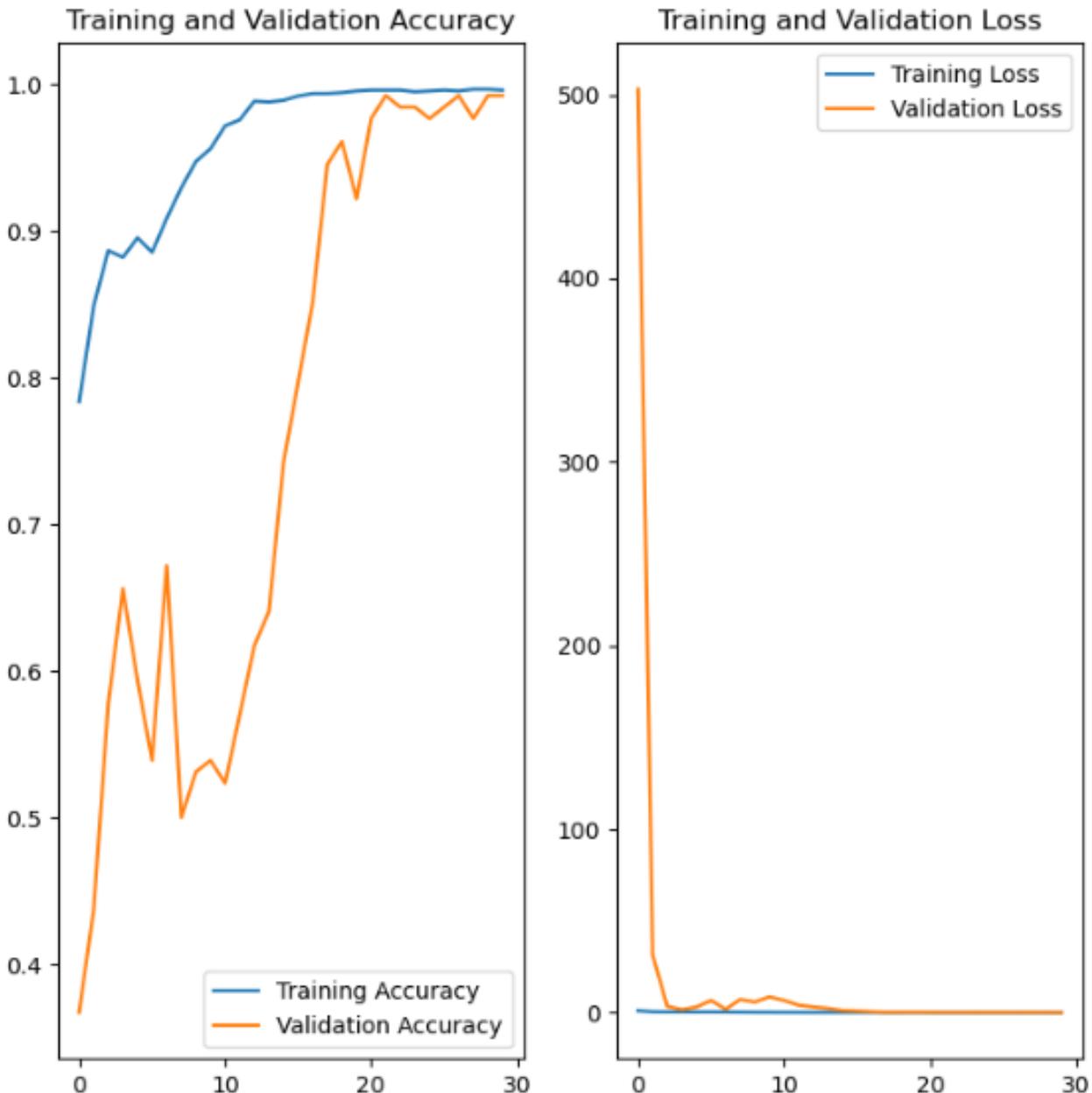
(c) 30

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=30
```

```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 3s 223ms/step - loss: 0.0306 - accuracy: 0.9844  
[0.030618205666542053, 0.984375]
```

Average Time per Epoch: 75.67 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.99%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.96%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 98.59%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.47%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.95%

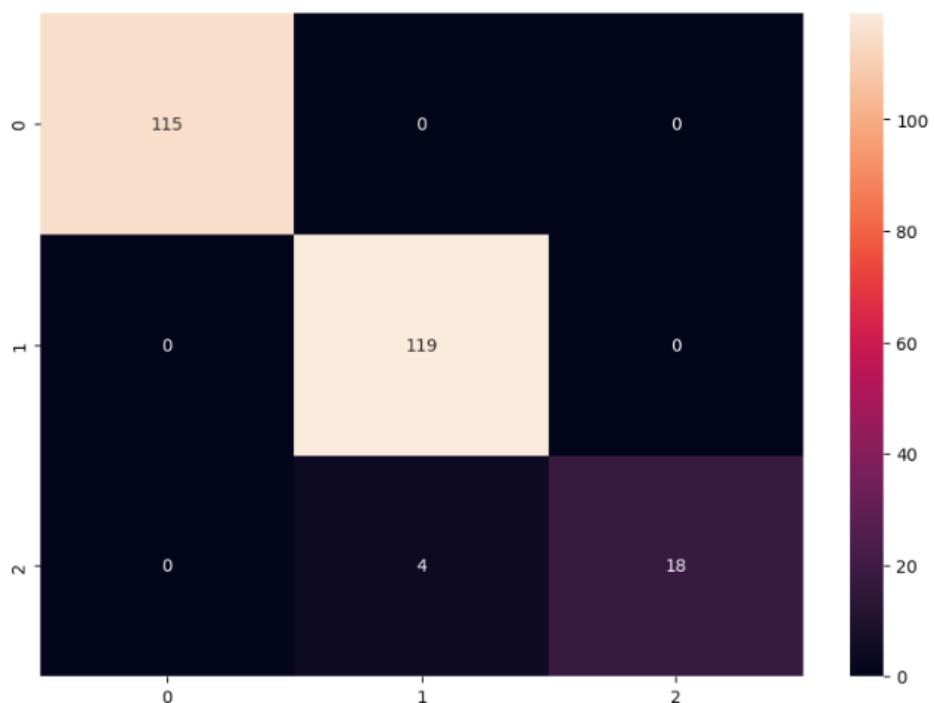


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.94%



Classification Report:

	precision	recall	f1-score	support
0	1.00	1.00	1.00	115
1	0.97	1.00	0.98	119
2	1.00	0.82	0.90	22
accuracy			0.98	256
macro avg	0.99	0.94	0.96	256
weighted avg	0.98	0.98	0.98	256



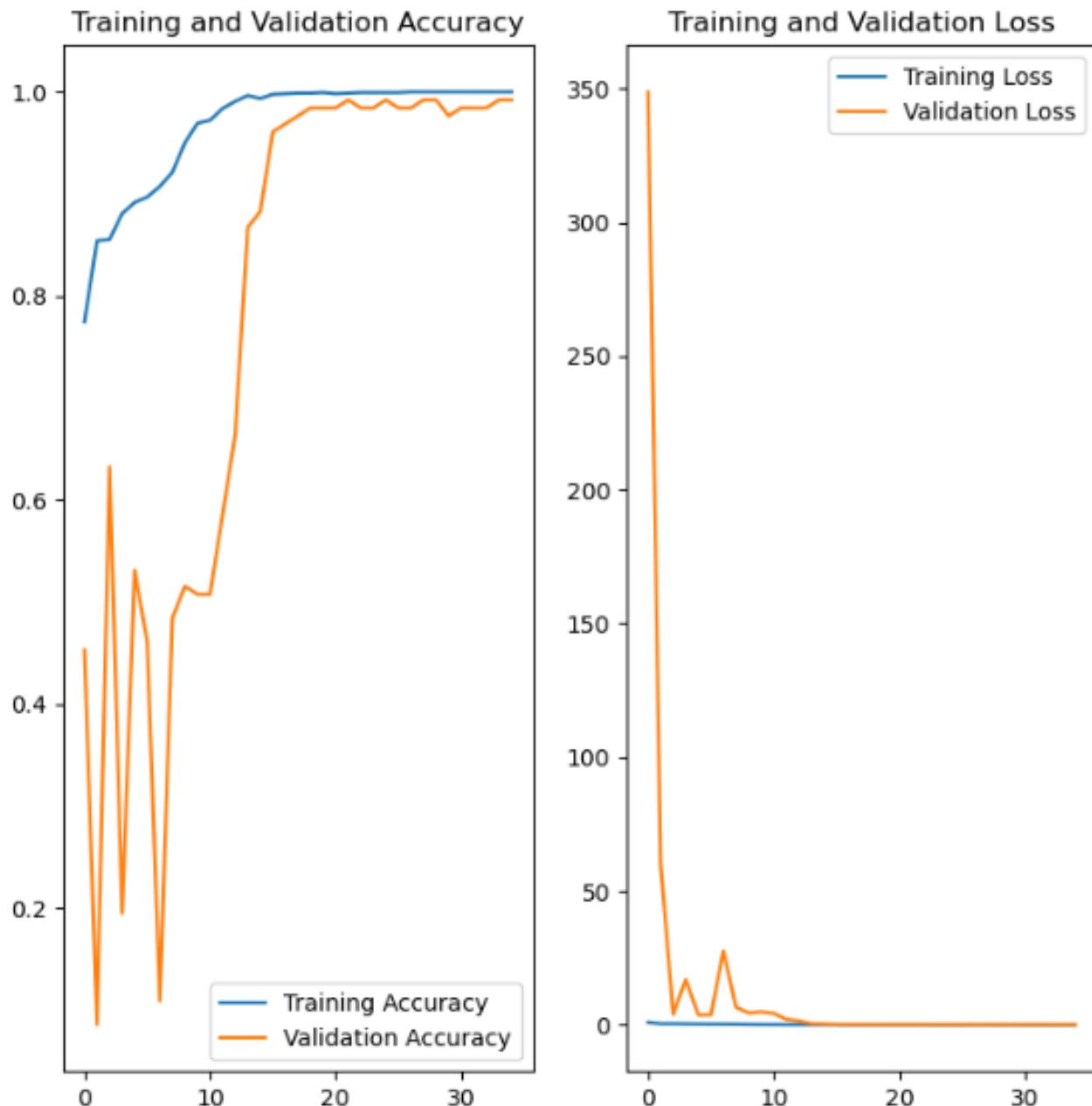
(d) 35

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=35
```

```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 3s 220ms/step - loss: 0.0167 - accuracy: 0.9961  
[0.016650211066007614, 0.99609375]
```

Average Time per Epoch: 77.14 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.9%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.97%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.96%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%

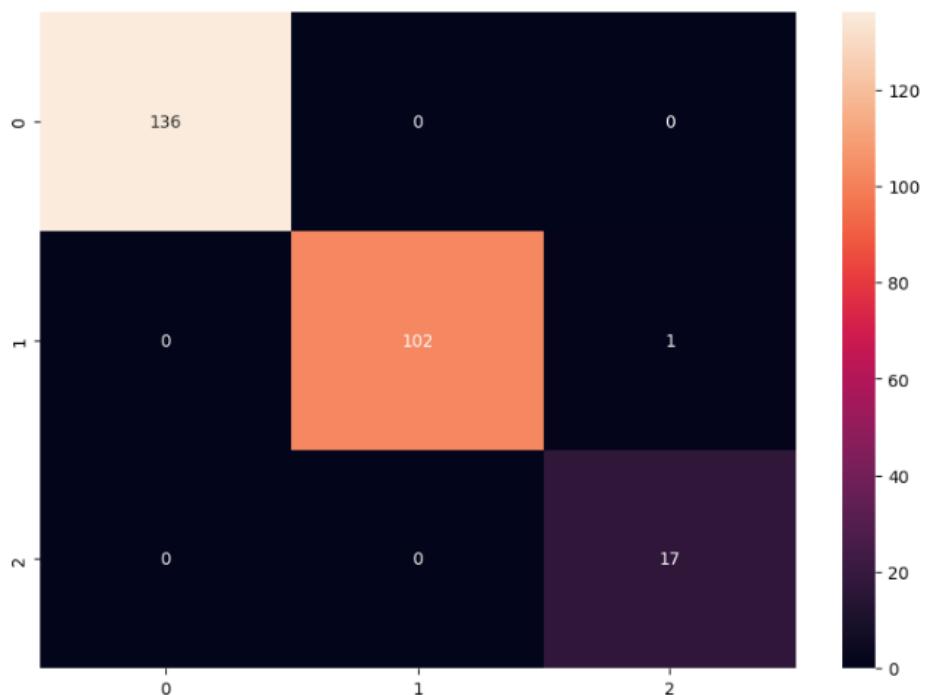


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	1.00	1.00	1.00	136
1	1.00	0.99	1.00	103
2	0.94	1.00	0.97	17
accuracy			1.00	256
macro avg	0.98	1.00	0.99	256
weighted avg	1.00	1.00	1.00	256



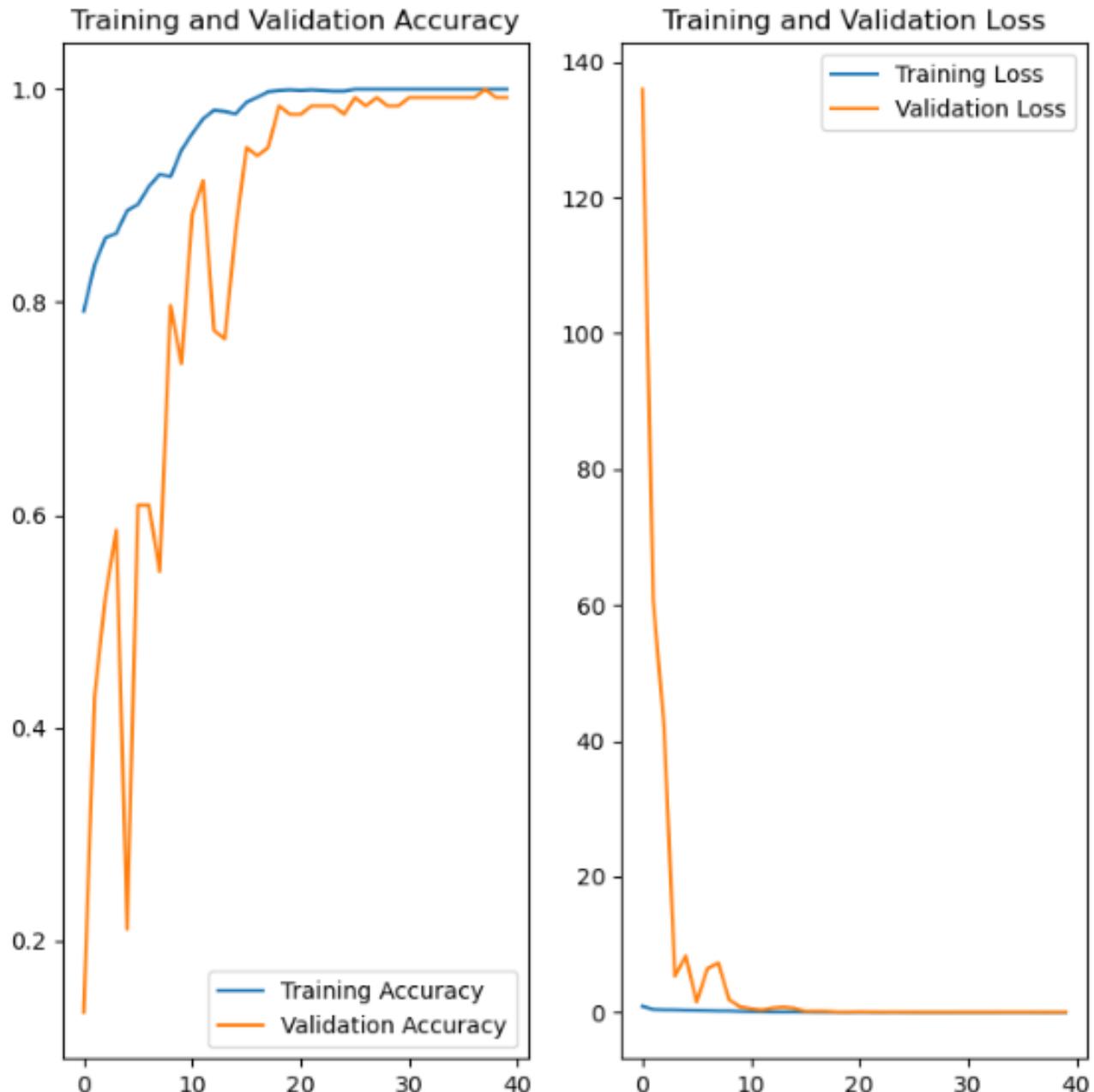
(e) 40

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=40
```

```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 3s 229ms/step - loss: 0.0812 - accuracy: 0.9883  
[0.08123921602964401, 0.98828125]
```

Average Time per Epoch: 75.70 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.99%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.95%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%

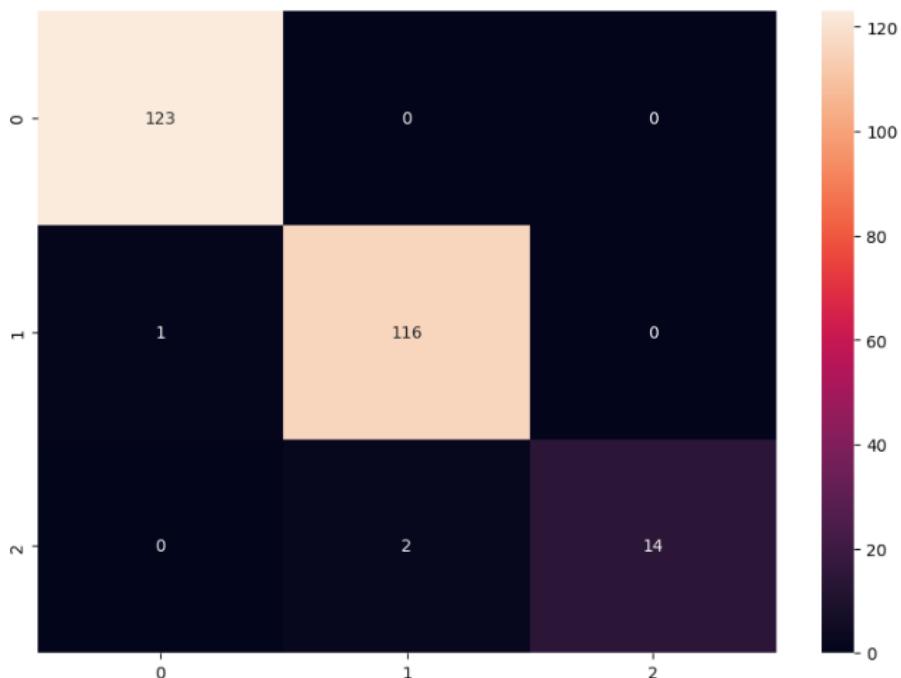


Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	0.99	1.00	1.00	123
1	0.98	0.99	0.99	117
2	1.00	0.88	0.93	16
accuracy			0.99	256
macro avg	0.99	0.96	0.97	256
weighted avg	0.99	0.99	0.99	256



BATCH SIZE

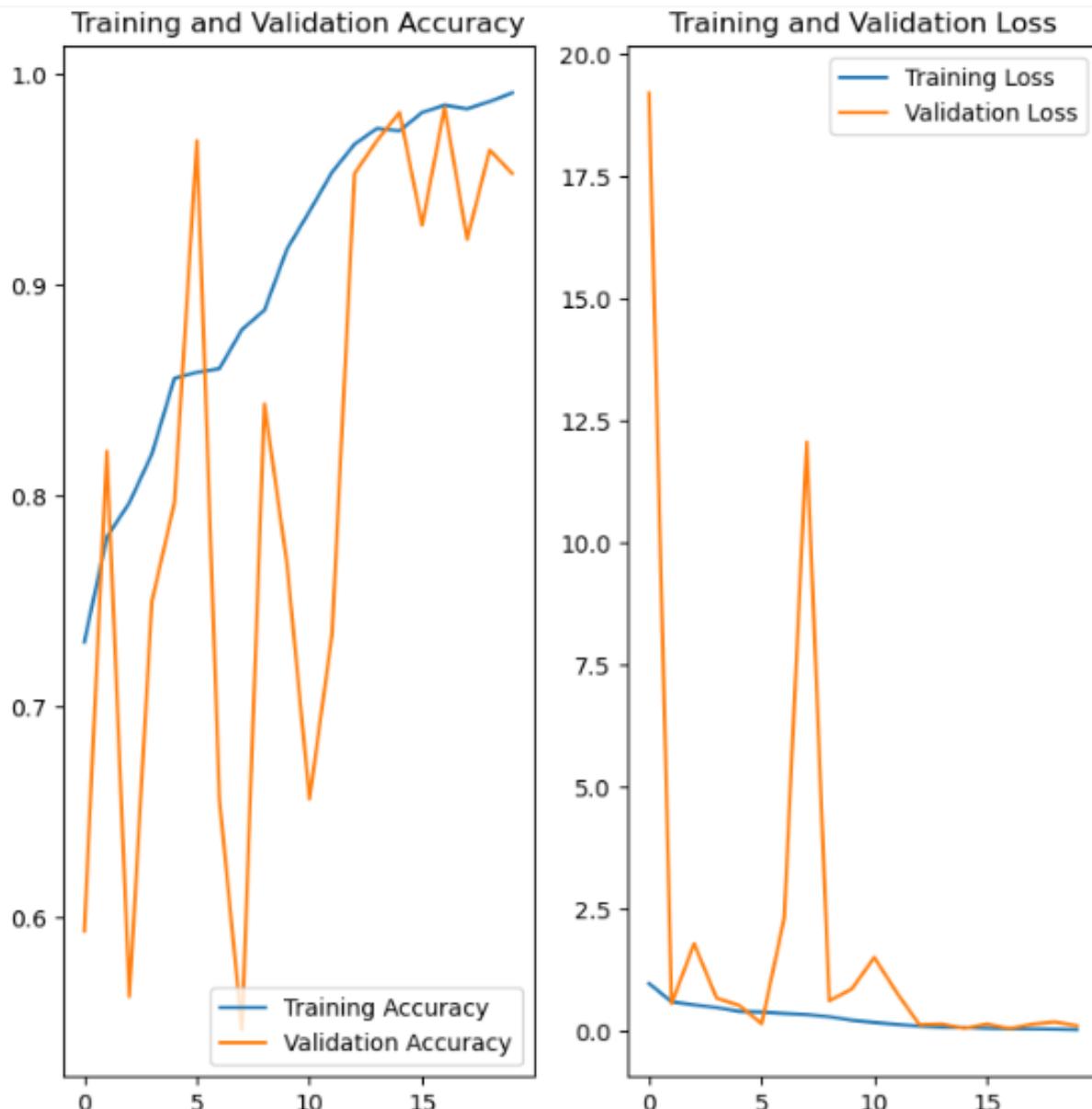
(a) 16

```
IMAGE_SIZE=224  
BATCH_SIZE=16  
CHANNELS=3  
EPOCHS=20
```

```
scores=model.evaluate(test_ds)  
scores
```

```
14/14 [=====] - 3s 157ms/step - loss: 0.0982 - accuracy: 0.9688  
[0.09822215884923935, 0.96875]
```

Average Time per Epoch: 86.40 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.68%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 98.07%



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 99.99%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 97.48%

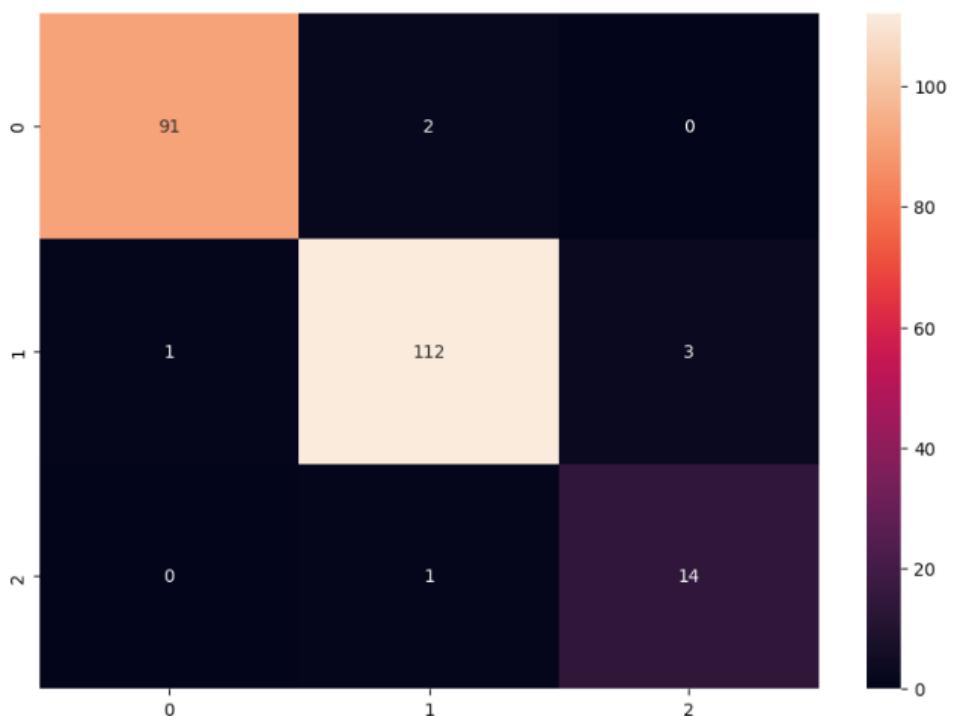


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.97%



Classification Report:

	precision	recall	f1-score	support
0	0.99	0.98	0.98	93
1	0.97	0.97	0.97	116
2	0.82	0.93	0.87	15
accuracy			0.97	224
macro avg	0.93	0.96	0.94	224
weighted avg	0.97	0.97	0.97	224



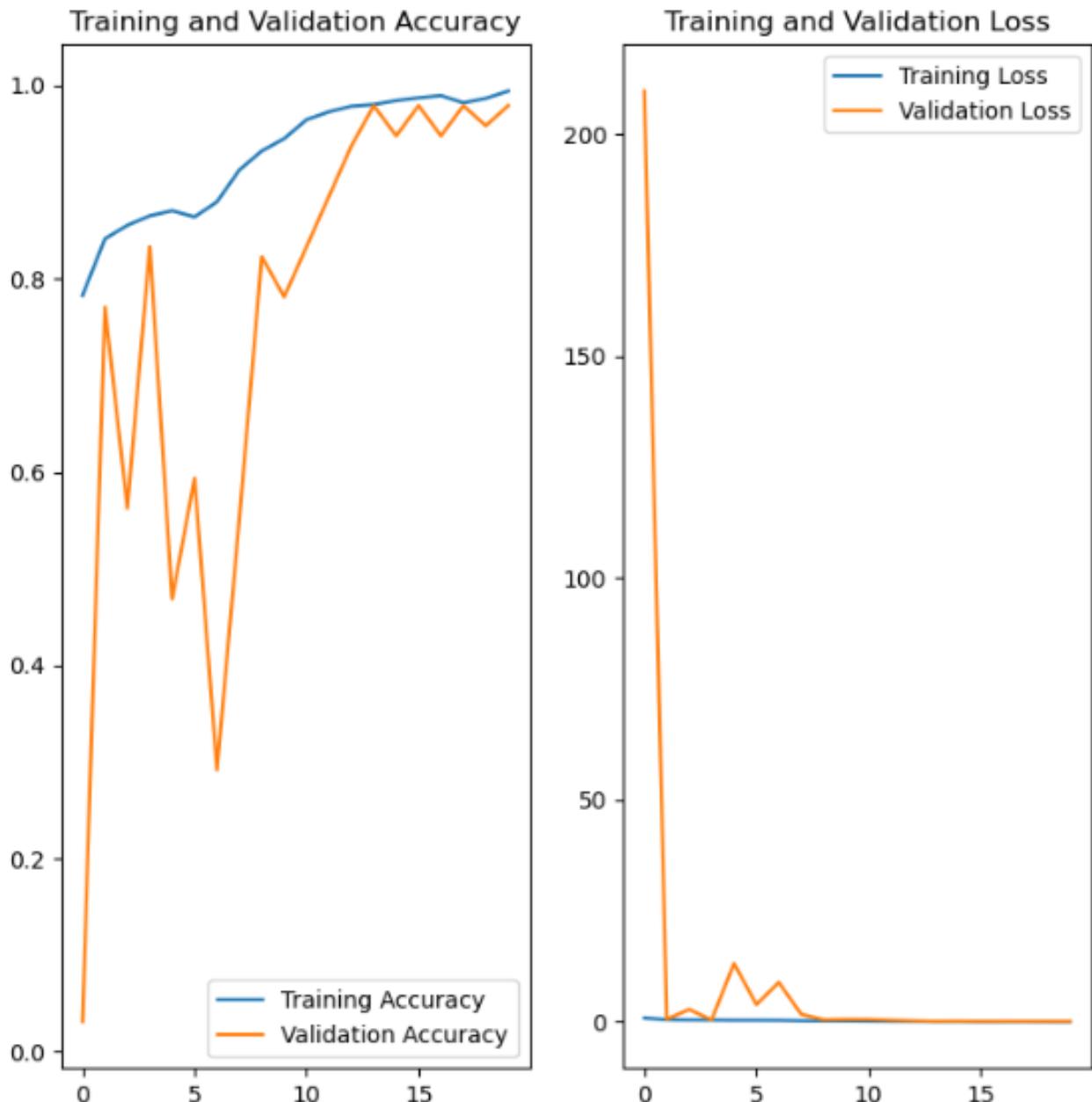
(b) 24

```
IMAGE_SIZE=224  
BATCH_SIZE=24  
CHANNELS=3  
EPOCHS=20
```

```
scores=model.evaluate(test_ds)  
scores
```

```
9/9 [=====] - 2s 163ms/step - loss: 0.1140 - accuracy: 0.9537  
[0.11400359869003296, 0.9537037014961243]
```

Average Time per Epoch: 79.05 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 93.8%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 97.94%



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 100.0%



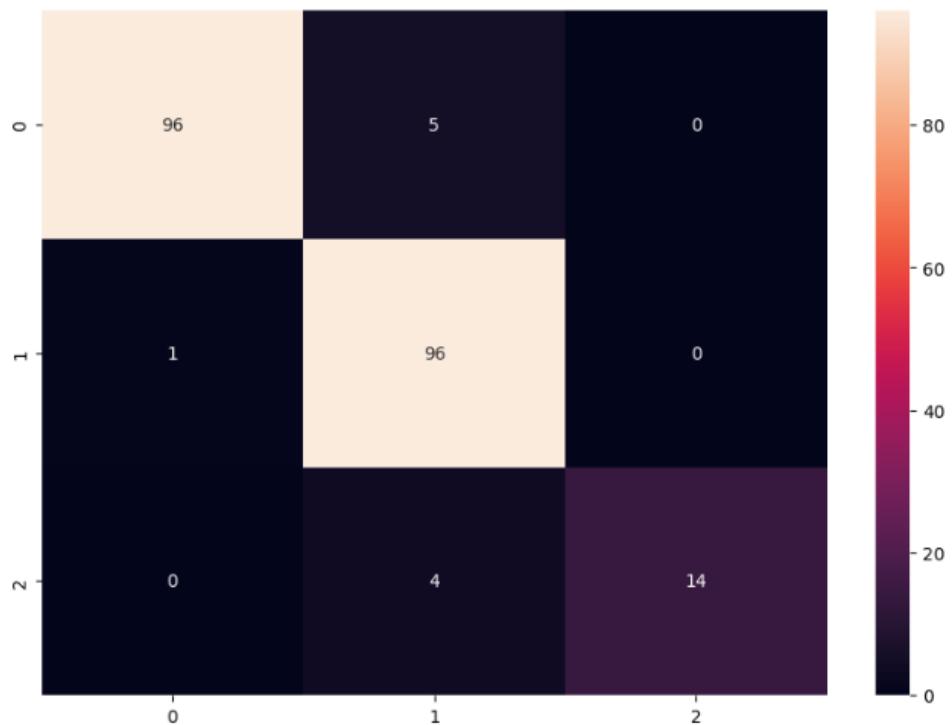
Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 62.76%



Actual: Potato_Early_blight,
Predicted: Potato_Late_blight,
Confidence: 76.86%



Classification Report:					
	precision	recall	f1-score	support	
0	0.99	0.95	0.97	101	
1	0.91	0.99	0.95	97	
2	1.00	0.78	0.88	18	
accuracy			0.95	216	
macro avg	0.97	0.91	0.93	216	
weighted avg	0.96	0.95	0.95	216	



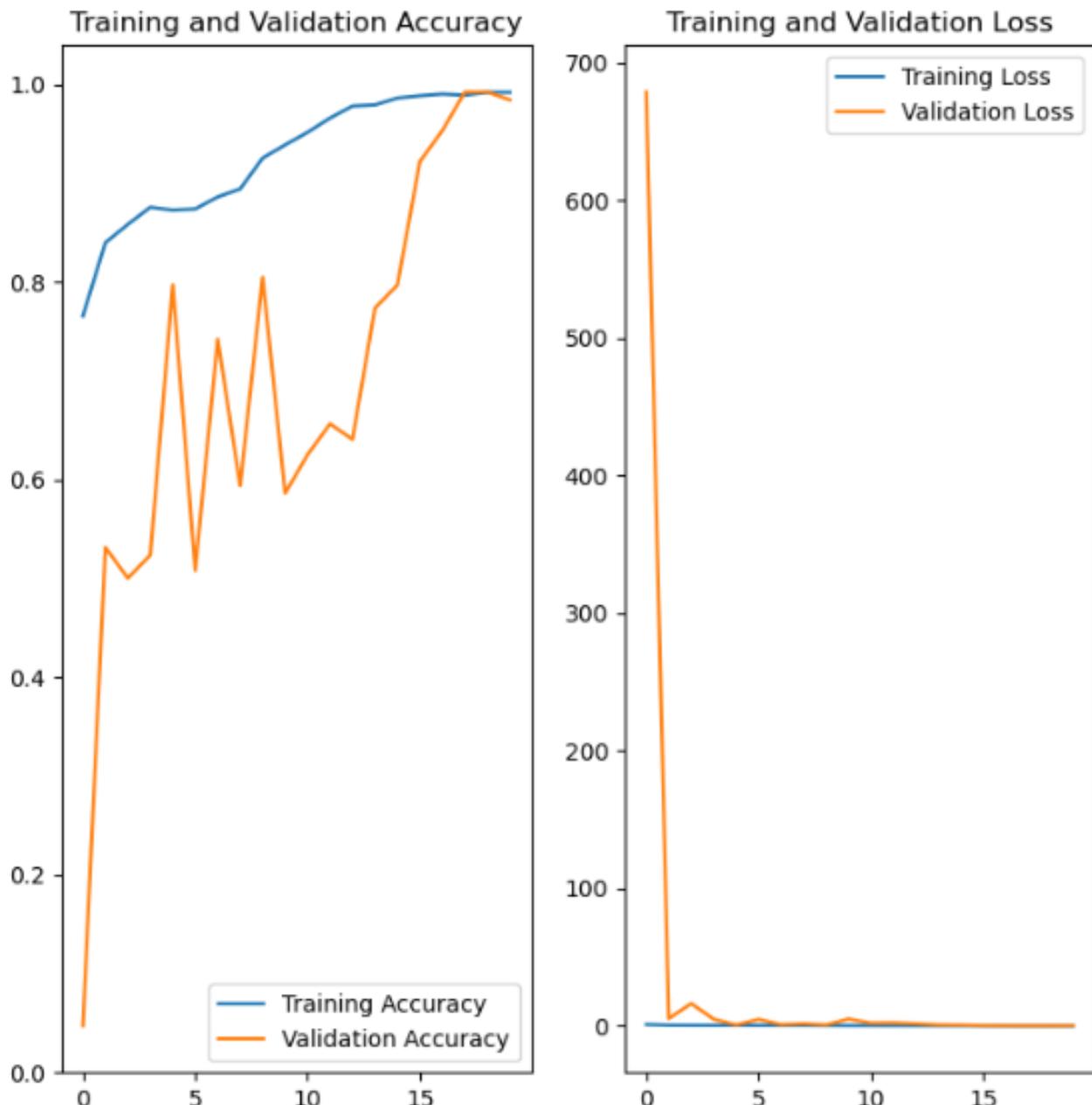
(c) 32

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=20
```

```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 4s 309ms/step - loss: 0.1099 - accuracy: 0.9531  
[0.1099371463060379, 0.953125]
```

Average Time per Epoch: 73.20 s



Actual: Potato_Early_blight,
Predicted: Potato_Late_blight,
Confidence: 95.68%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 98.61%



Actual: Potato_healthy,
Predicted: Potato_healthy,
Confidence: 99.96%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.94%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.96%

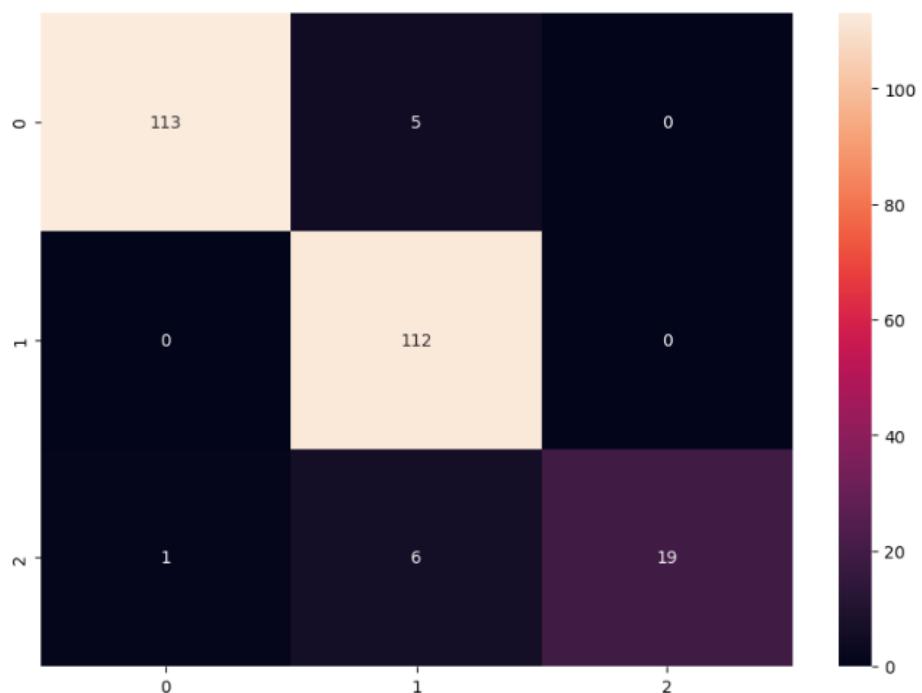


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.99%



Classification Report:

	precision	recall	f1-score	support
0	0.99	0.96	0.97	118
1	0.91	1.00	0.95	112
2	1.00	0.73	0.84	26
accuracy			0.95	256
macro avg	0.97	0.90	0.92	256
weighted avg	0.96	0.95	0.95	256



(d) 40

```
IMAGE_SIZE=224  
BATCH_SIZE=40  
CHANNELS=3  
EPOCHS=20
```

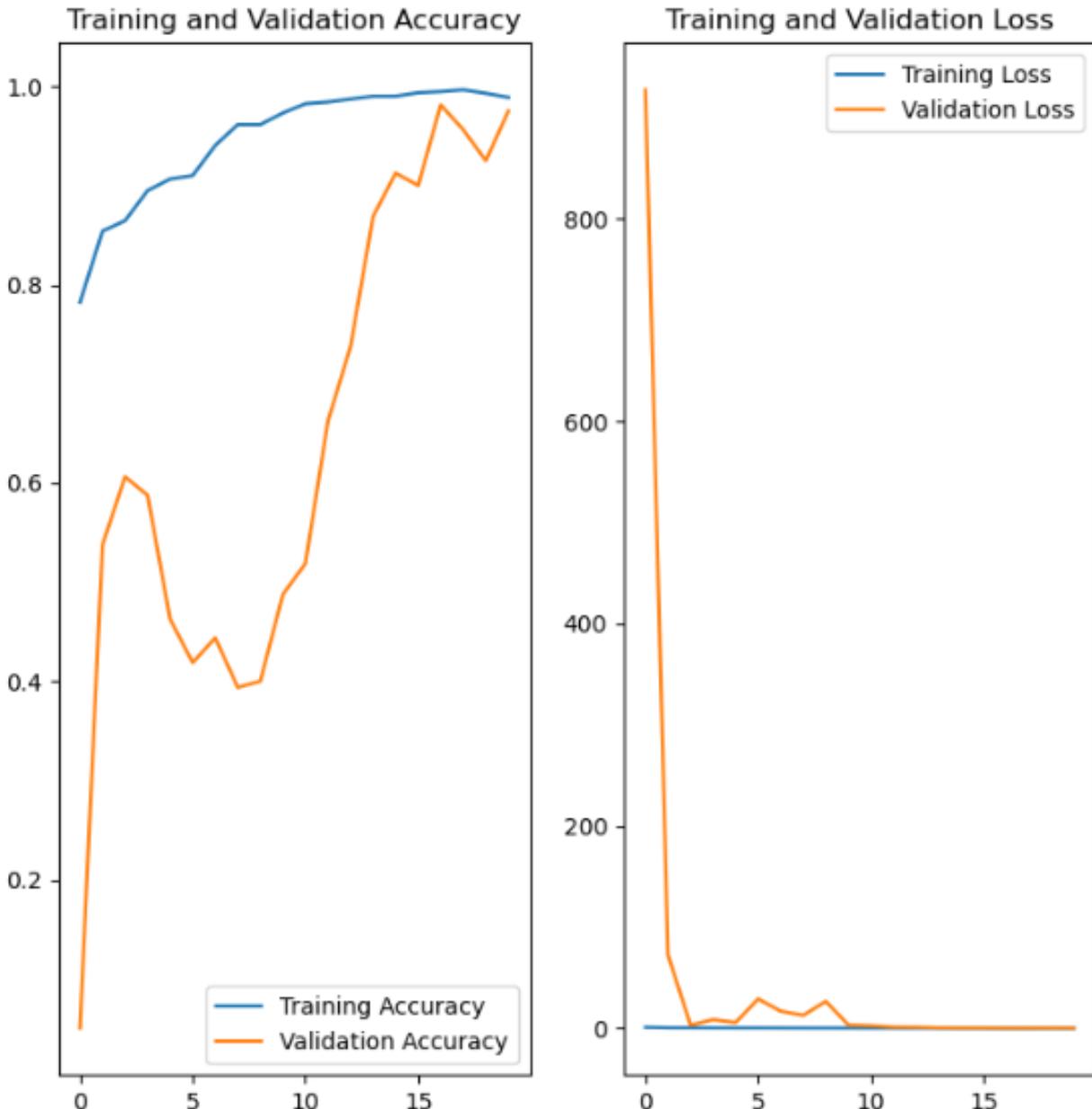
```
scores=model.evaluate(test_ds)
```

```
scores
```

```
6/6 [=====] - 2s 265ms/step - loss: 0.0625 - accuracy: 0.9708
```

```
[0.06250323355197906, 0.9708333611488342]
```

Average Time per Epoch: 69.85 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 93.77%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 78.31%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 94.37%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.05%

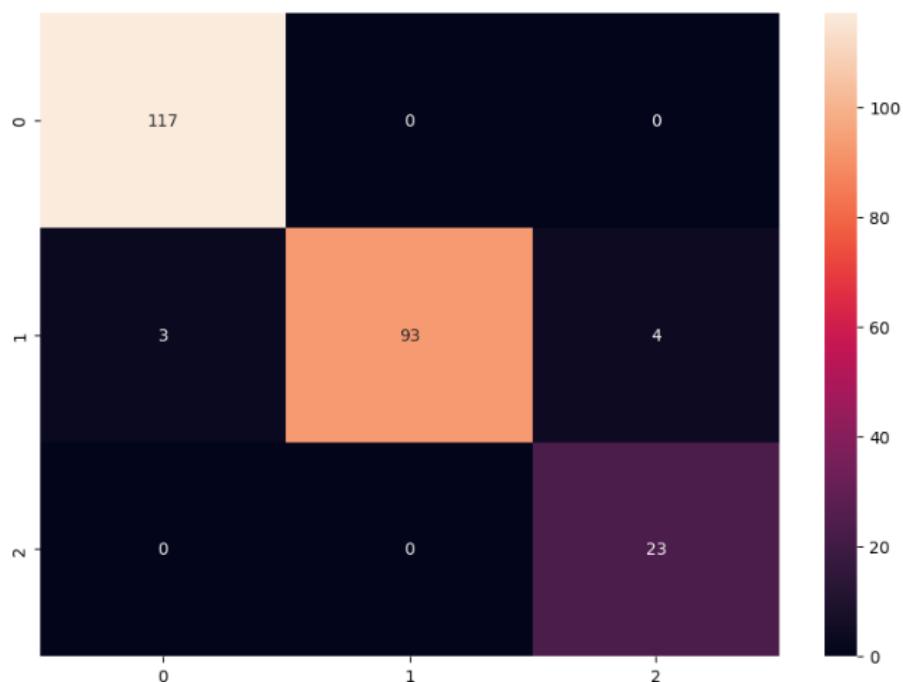


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 93.82%



Classification Report:

	precision	recall	f1-score	support
0	0.97	1.00	0.99	117
1	1.00	0.93	0.96	100
2	0.85	1.00	0.92	23
accuracy			0.97	240
macro avg	0.94	0.98	0.96	240
weighted avg	0.97	0.97	0.97	240



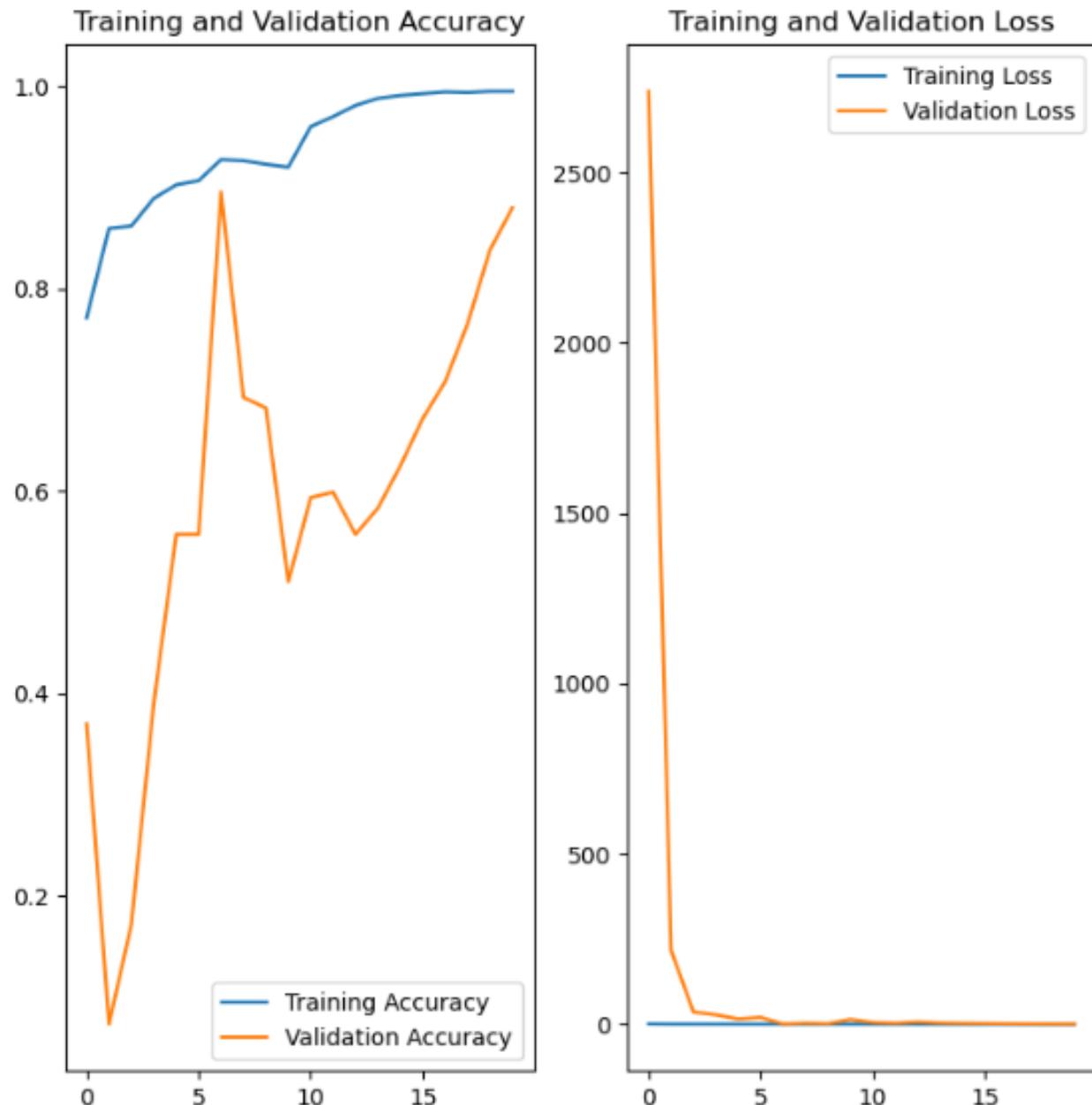
(e) 48

```
IMAGE_SIZE=224  
BATCH_SIZE=48  
CHANNELS=3  
EPOCHS=20
```

```
scores=model.evaluate(test_ds)  
scores
```

```
5/5 [=====] - 3s 327ms/step - loss: 0.4727 - accuracy: 0.8417  
[0.47274115681648254, 0.8416666388511658]
```

Average Time per Epoch: 69.55 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.96%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 97.24%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.23%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 95.24%

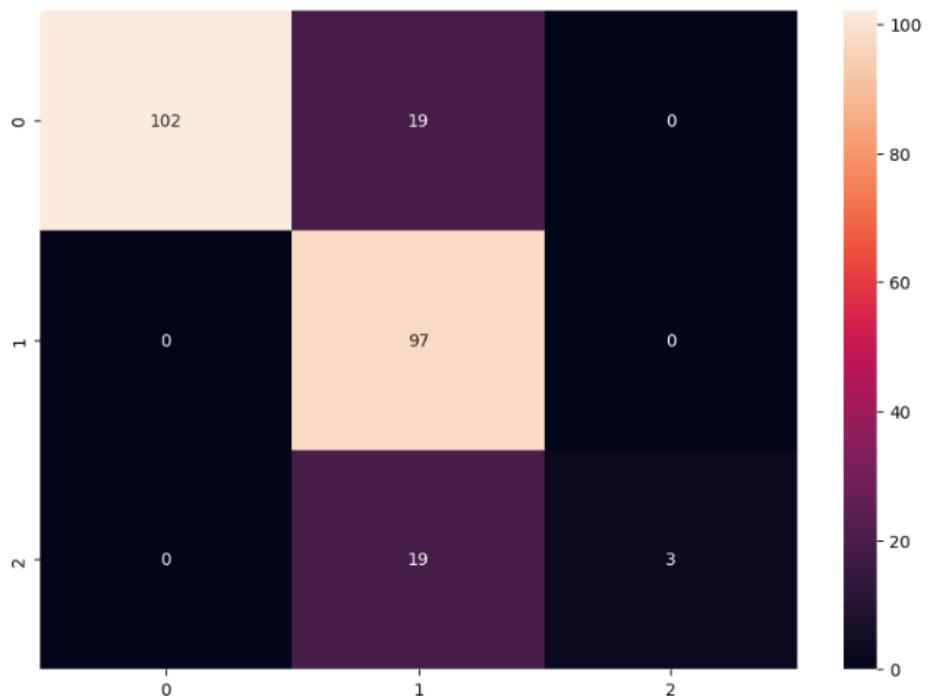


Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.99%



Classification Report:

	precision	recall	f1-score	support
0	1.00	0.84	0.91	121
1	0.72	1.00	0.84	97
2	1.00	0.14	0.24	22
accuracy			0.84	240
macro avg	0.91	0.66	0.66	240
weighted avg	0.89	0.84	0.82	240



DATASET SPLIT RATIO

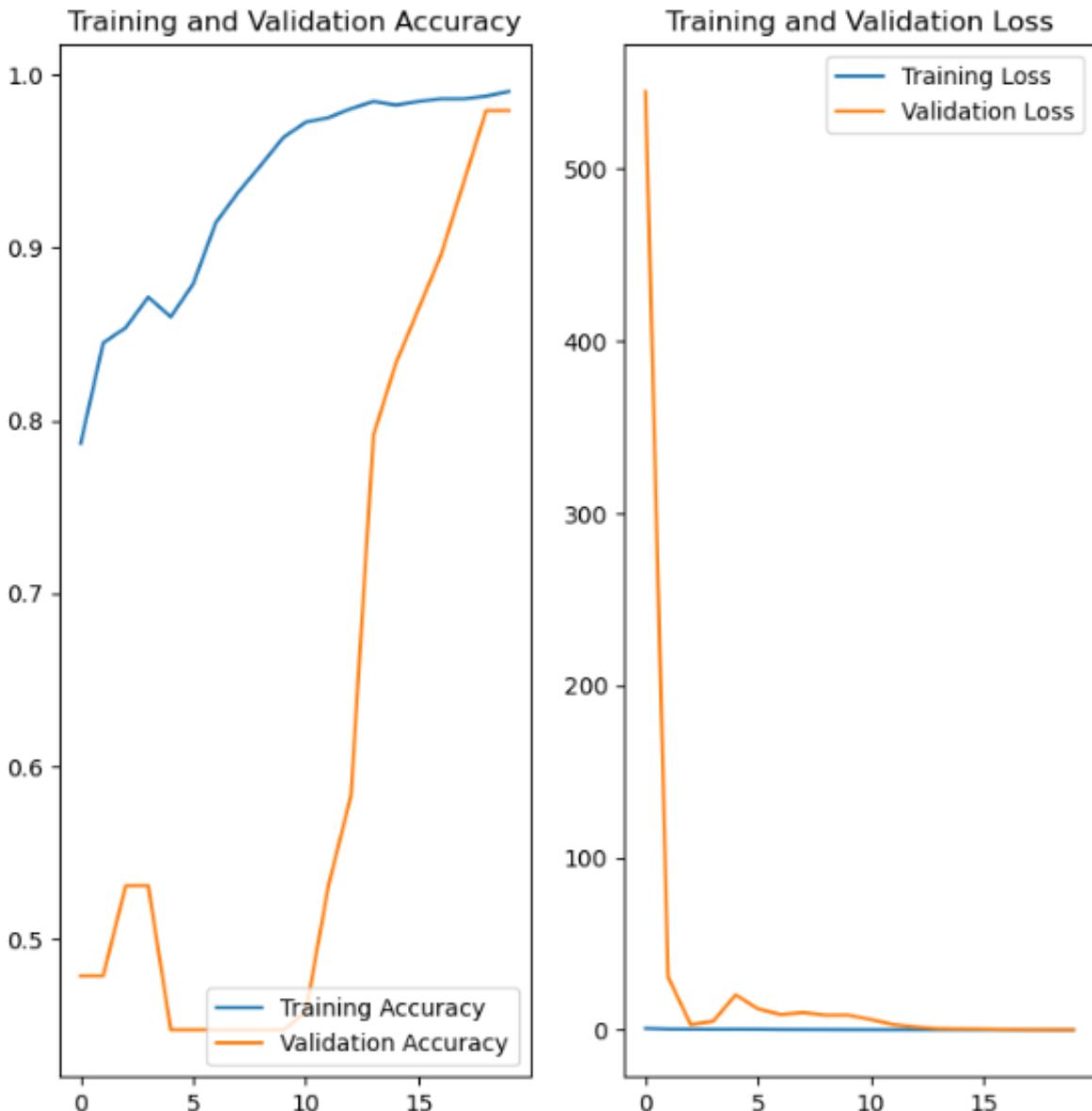
(a) 90:5:5

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=20
```

```
scores=model.evaluate(test_ds)  
scores
```

```
4/4 [=====] - 3s 194ms/step - loss: 0.0459 - accuracy: 0.9844  
[0.045899175107479095, 0.984375]
```

Average Time per Epoch: 81.80 s



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.92%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.56%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.96%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.95%

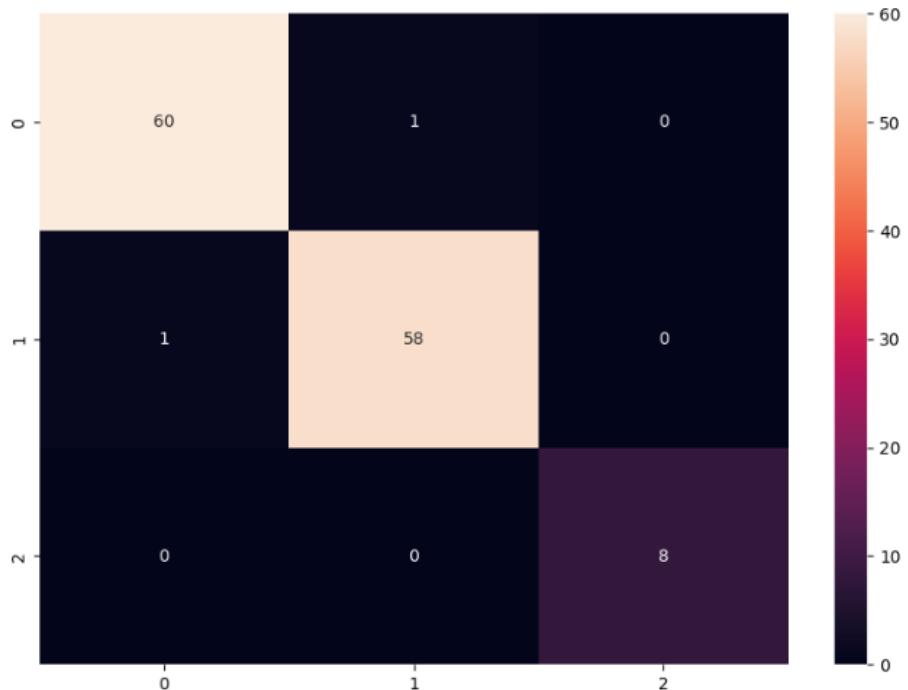


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.94%



Classification Report:

	precision	recall	f1-score	support
0	0.98	0.98	0.98	61
1	0.98	0.98	0.98	59
2	1.00	1.00	1.00	8
accuracy			0.98	128
macro avg	0.99	0.99	0.99	128
weighted avg	0.98	0.98	0.98	128



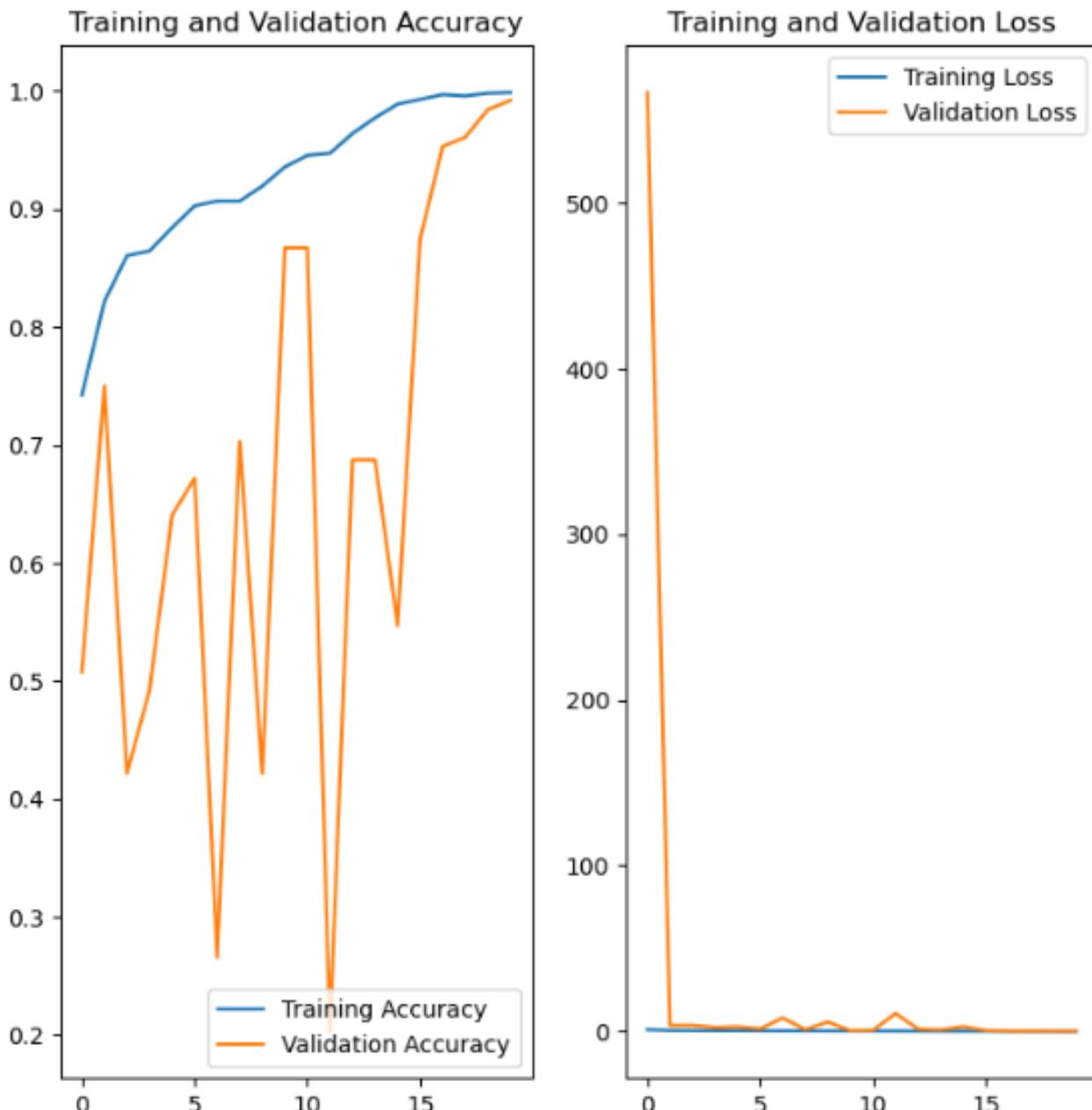
(b) 80:10:10

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=20
```

```
scores=model.evaluate(test_ds)  
scores
```

```
8/8 [=====] - 3s 299ms/step - loss: 0.0335 - accuracy: 0.9844  
[0.03347471356391907, 0.984375]
```

Average Time per Epoch: 72.75 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.33%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.99%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.66%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.68%

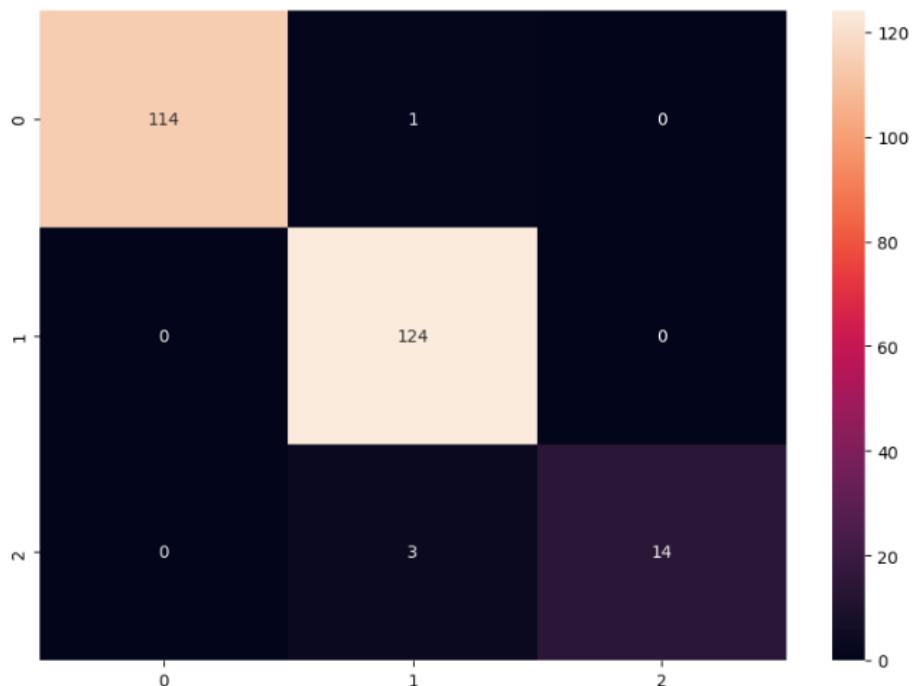


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.99%



Classification Report:

	precision	recall	f1-score	support
0	1.00	0.99	1.00	115
1	0.97	1.00	0.98	124
2	1.00	0.82	0.90	17
accuracy			0.98	256
macro avg	0.99	0.94	0.96	256
weighted avg	0.98	0.98	0.98	256



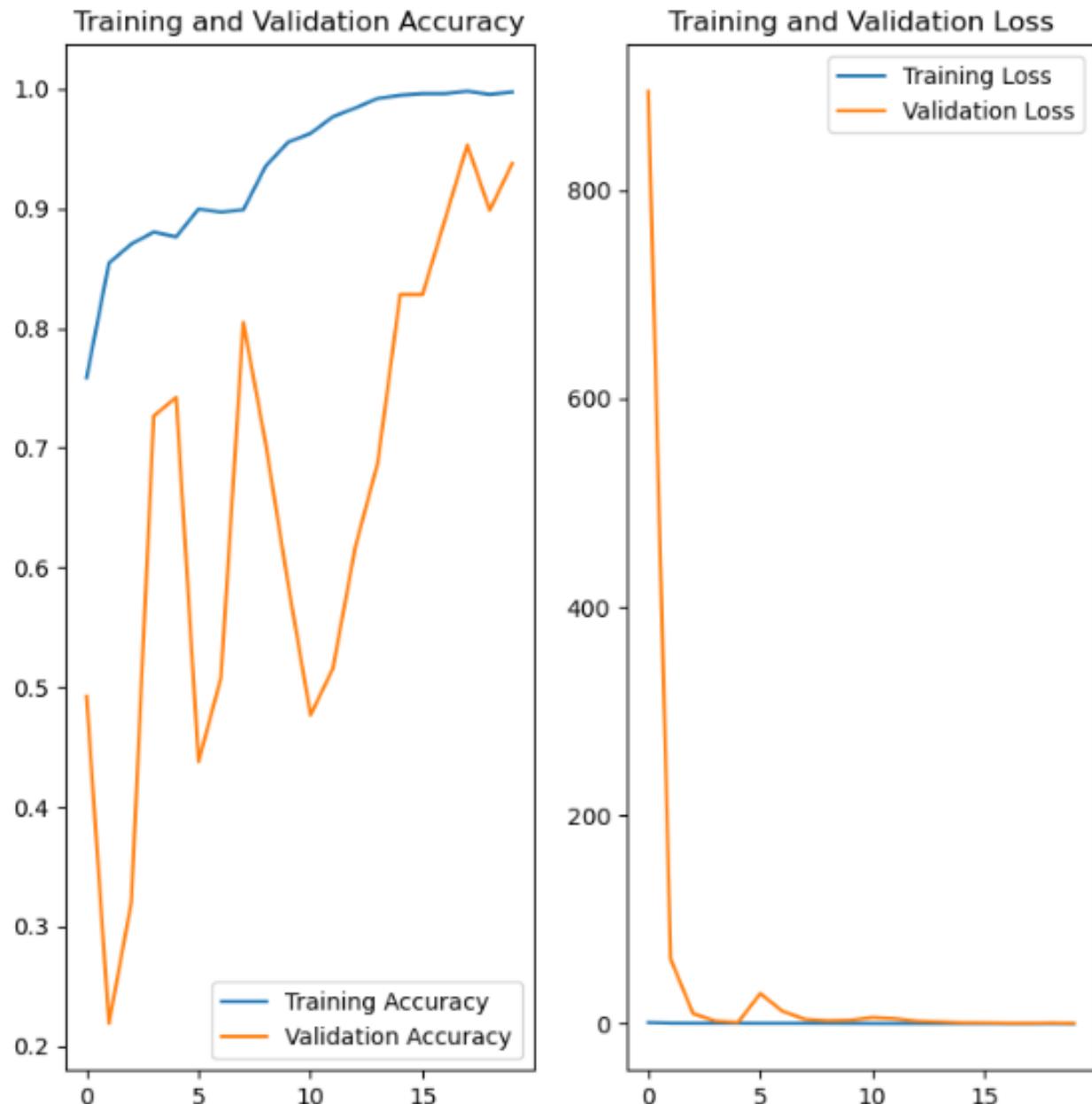
(c) 70:15:15

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=20
```

```
scores=model.evaluate(test_ds)  
scores
```

```
11/11 [=====] - 3s 193ms/step - loss: 0.2205 - accuracy: 0.9318  
[0.22049814462661743, 0.9318181872367859]
```

Average Time per Epoch: 64.30 s



Actual: Potato_Early_blight,
Predicted: Potato_Late_blight,
Confidence: 54.35%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.98%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.96%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.99%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

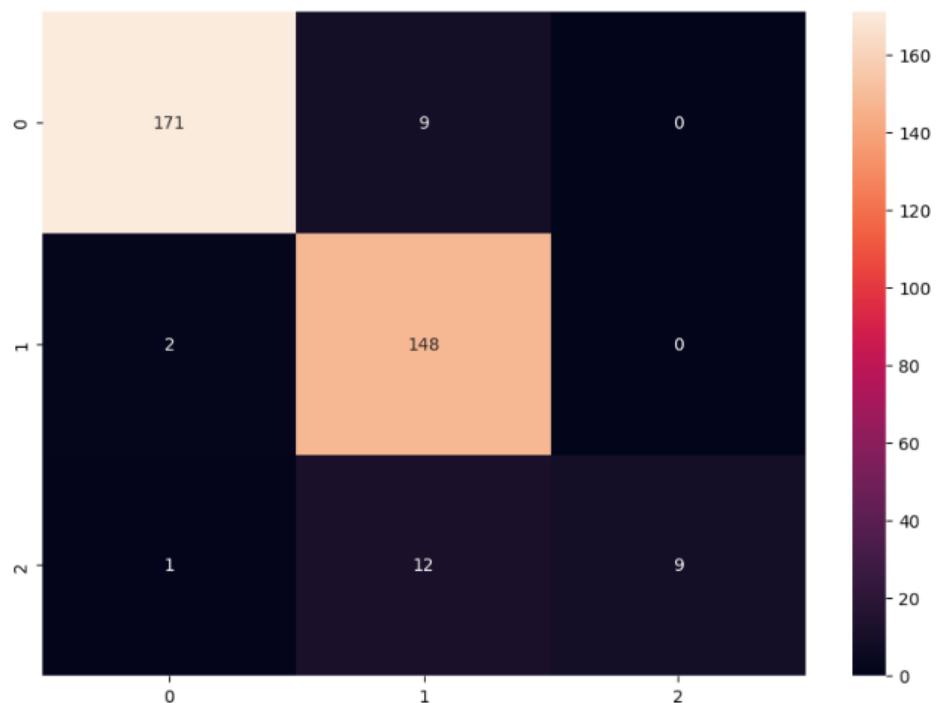


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.99%



Classification Report:

	precision	recall	f1-score	support
0	0.98	0.95	0.97	180
1	0.88	0.99	0.93	150
2	1.00	0.41	0.58	22
accuracy			0.93	352
macro avg	0.95	0.78	0.82	352
weighted avg	0.94	0.93	0.93	352



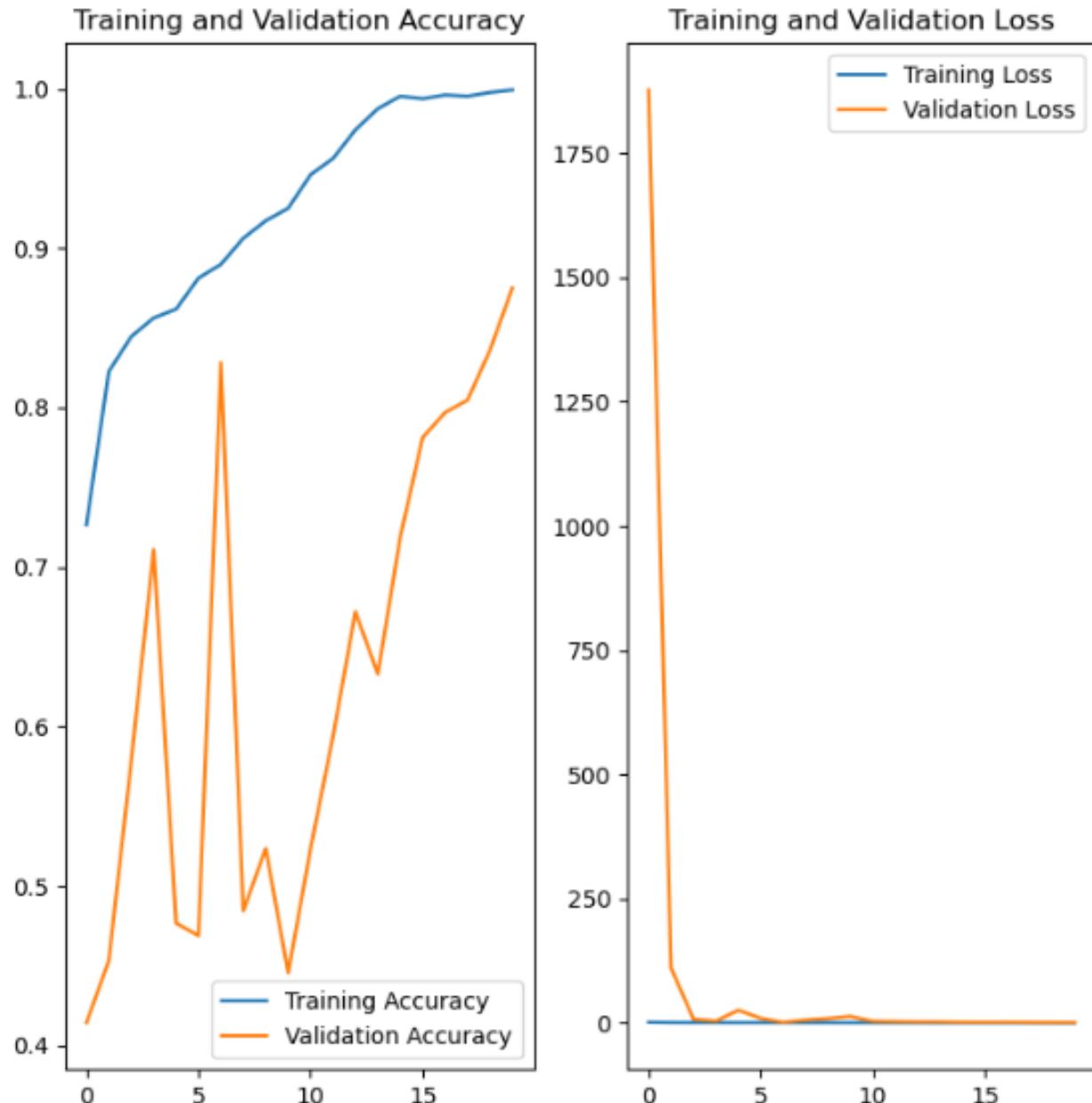
(d) 60:20:20

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=20
```

```
scores=model.evaluate(test_ds)  
scores
```

```
15/15 [=====] - 4s 196ms/step - loss: 0.3435 - accuracy: 0.9021  
[0.34348973631858826, 0.9020833373069763]
```

Average Time per Epoch: 56.70 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.99%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.85%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 53.79%



Actual: Potato_Early_blight,
Predicted: Potato_Late_blight,
Confidence: 72.91%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%

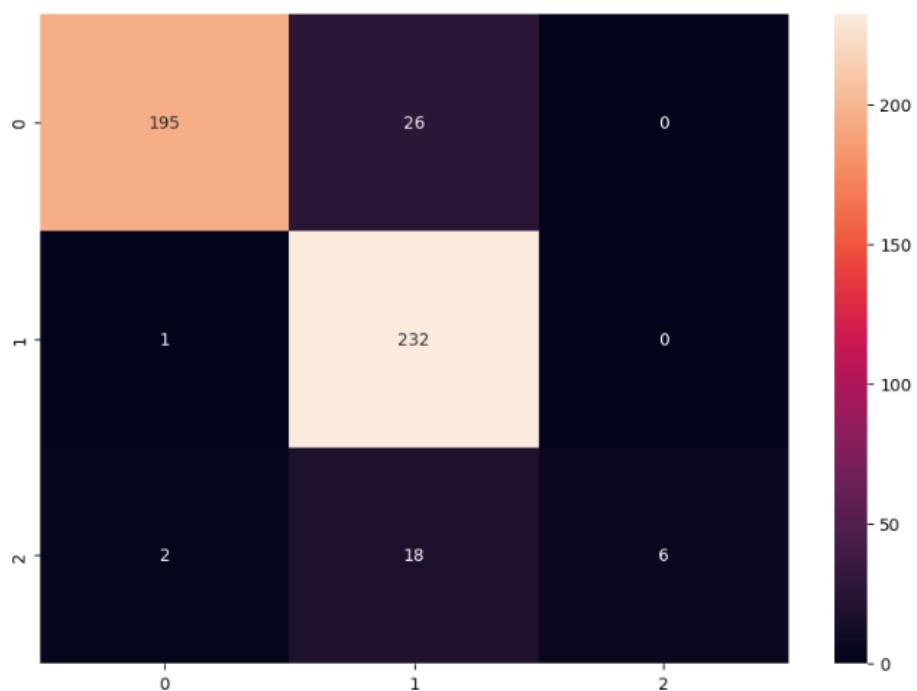


Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 99.13%



Classification Report:

	precision	recall	f1-score	support
0	0.98	0.88	0.93	221
1	0.84	1.00	0.91	233
2	1.00	0.23	0.38	26
accuracy			0.90	480
macro avg	0.94	0.70	0.74	480
weighted avg	0.92	0.90	0.89	480



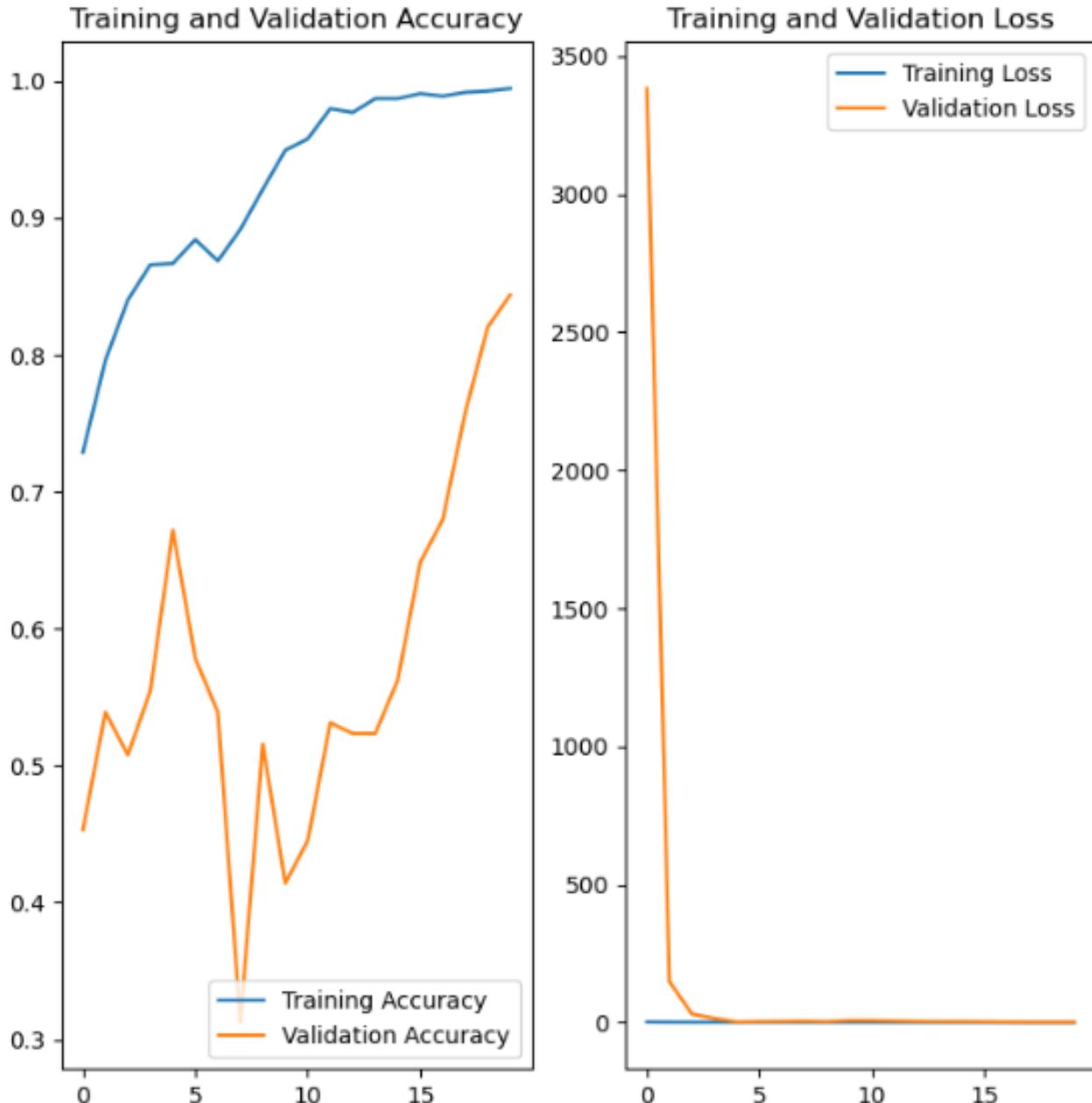
(e) 50:25:25

```
IMAGE_SIZE=224  
BATCH_SIZE=32  
CHANNELS=3  
EPOCHS=20
```

```
scores=model.evaluate(test_ds)  
scores
```

```
17/17 [=====] - 5s 248ms/step - loss: 0.4169 - accuracy: 0.8585  
[0.41691067814826965, 0.8584558963775635]
```

Average Time per Epoch: 47.15 s



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 100.0%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.81%



Actual: Potato_Late_blight,
Predicted: Potato_Late_blight,
Confidence: 99.94%



Actual: Potato_Early_blight,
Predicted: Potato_Late_blight,
Confidence: 98.74%



Actual: Potato_Early_blight,
Predicted: Potato_Early_blight,
Confidence: 100.0%



Classification Report:

	precision	recall	f1-score	support
0	0.99	0.74	0.85	253
1	0.77	1.00	0.87	255
2	1.00	0.75	0.86	36
accuracy			0.86	544
macro avg	0.92	0.83	0.86	544
weighted avg	0.89	0.86	0.86	544

