Gesture Recognition Project

Few experiments were conducted with the parameters like batch size, number of frames, image size, number of convolution layers. The results of each experiment have been documented in the write-up. Each experiment is supported by an accuracy graph.

Experiment #	Model	Parameters	Accuracy
1	Conv3D	Batch Size = 10 Epochs = 20 Image size = 180 x 180 Image Sequence – Alternate frames – 15 frames	Validation Accuracy is 0.65. See Figure 1 Training Accuracy is 1.00. It is a clear case of overfitting
2	Conv3D	Batch Size = 10 Epochs = 20 Image size = 180 x 180 **Image Sequence – Every 5th image – 8 frames**	Validation Accuracy is 0.71. See Figure 2 Training Accuracy is 1.00. Better accuracy but still a case of overfitting
3	Conv3D	Batch Size = 10 Epochs = 20 **Image size = 100 x 100** Image Sequence – Every 5th image – 8 frames	Validation Accuracy is 0.87. See Figure 3 Training Accuracy is 0.9985. Accuracy has improved considerably. The higher image size was leading to overfitting.
4	Conv3D	**Batch Size = 32** Epochs = 20 Image size = 100 x 100 Image Sequence – Every 5th image – 8 frames	Validation Accuracy is 0.76. See Figure 4 Training Accuracy is 0.9940. Accuracy has dropped once again. Will reverse the batch size.
5 (Final Model)	Conv3D	**Batch Size = 10** Epochs = 20 Image size = 100 x 100 Image Sequence – Every 5th image – 8 frames **Added additional convolution layer**	Validation Accuracy is 0.88. See Figure 5 Training Accuracy is 0.9955. Accuracy has improved considerably. So far, the best case.
6	Conv3D + LSTM	**Batch Size = 10** Epochs = 20 Image size = 100 x 100 Image Sequence – Every 5th image – 8 frames **Added LSTM layer**	Validation Accuracy is 0.86. See Figure 6 Training Accuracy is 1.0. Accuracy is good but slightly less than Model 5.

Figure 1

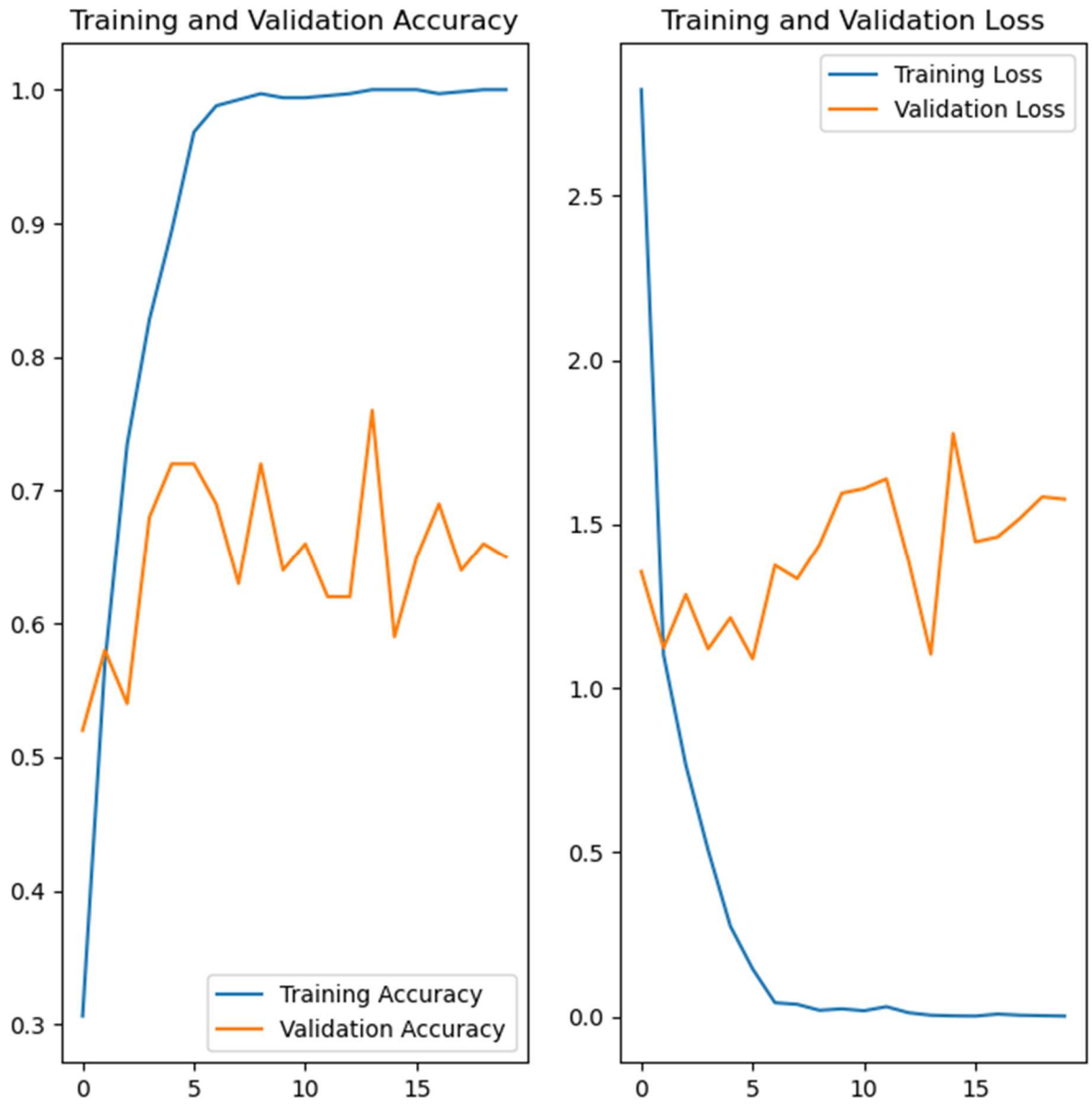

Training and Validation Accuracy
Training Accuracy
Validation Accuracy
Training and Validation Loss
Training Loss
Validation Loss

Figure 2

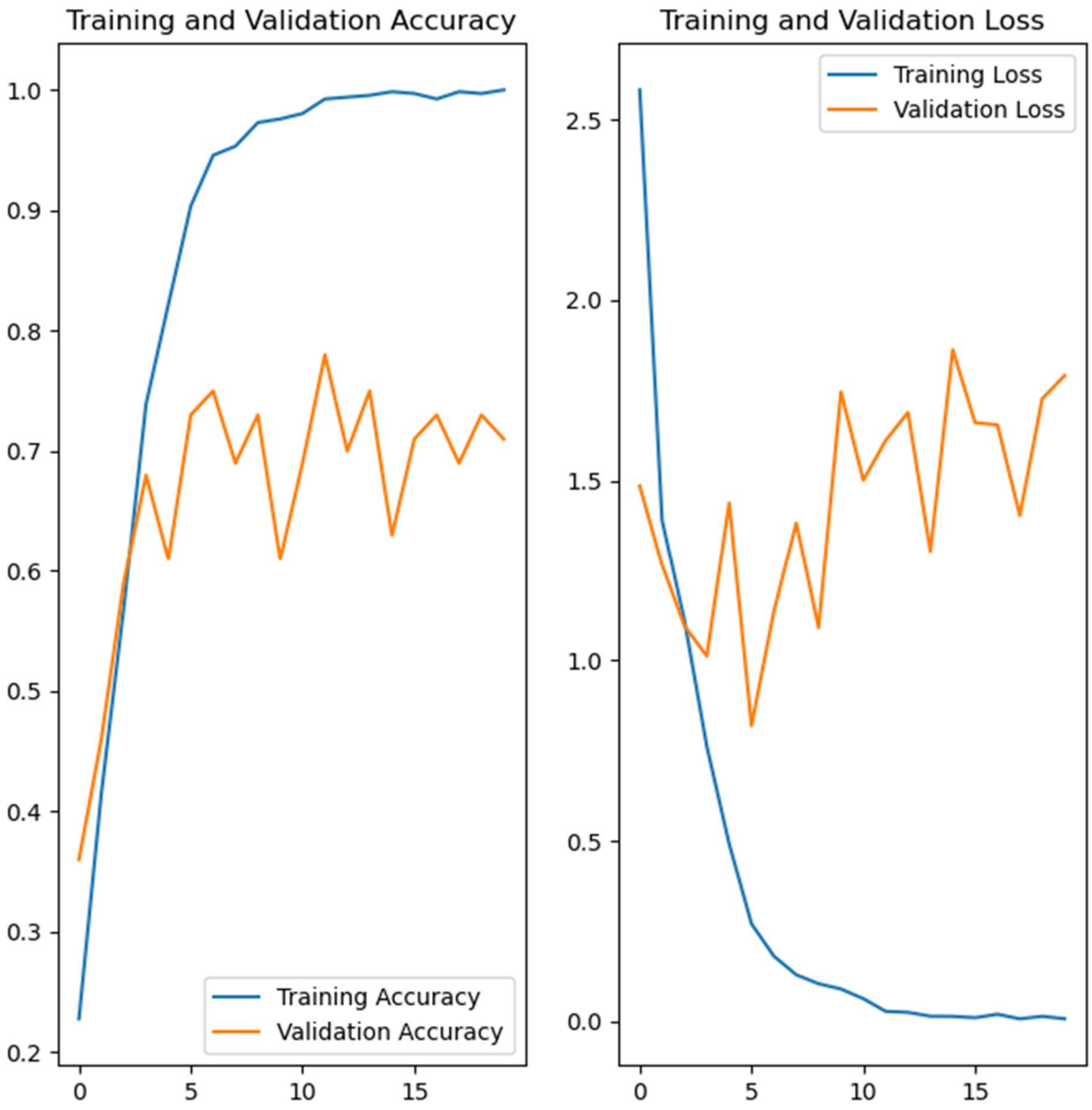

Training and Validation Accuracy
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
5
10
15
Training Accuracy
Validation Accuracy
Training and Validation Loss
2.5
2.0
1.5
1.0
0.5
0.0
0
5
10
15
Training Loss
Validation Loss

Figure 3

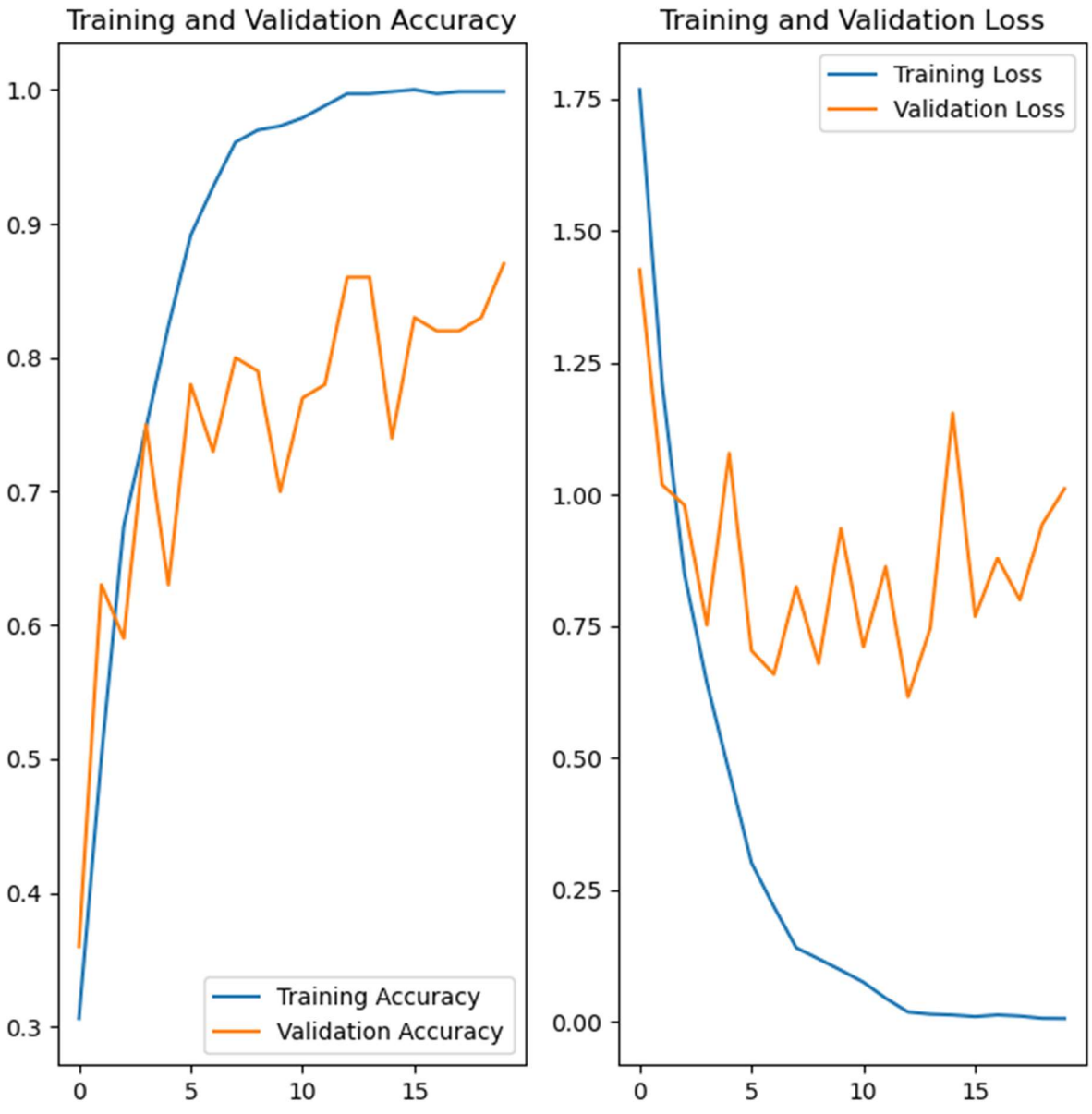

Training and Validation Accuracy
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0
5
10
15
Training Accuracy
Validation Accuracy
Training and Validation Loss
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
0
5
10
15
Training Loss
Validation Loss

Figure 4

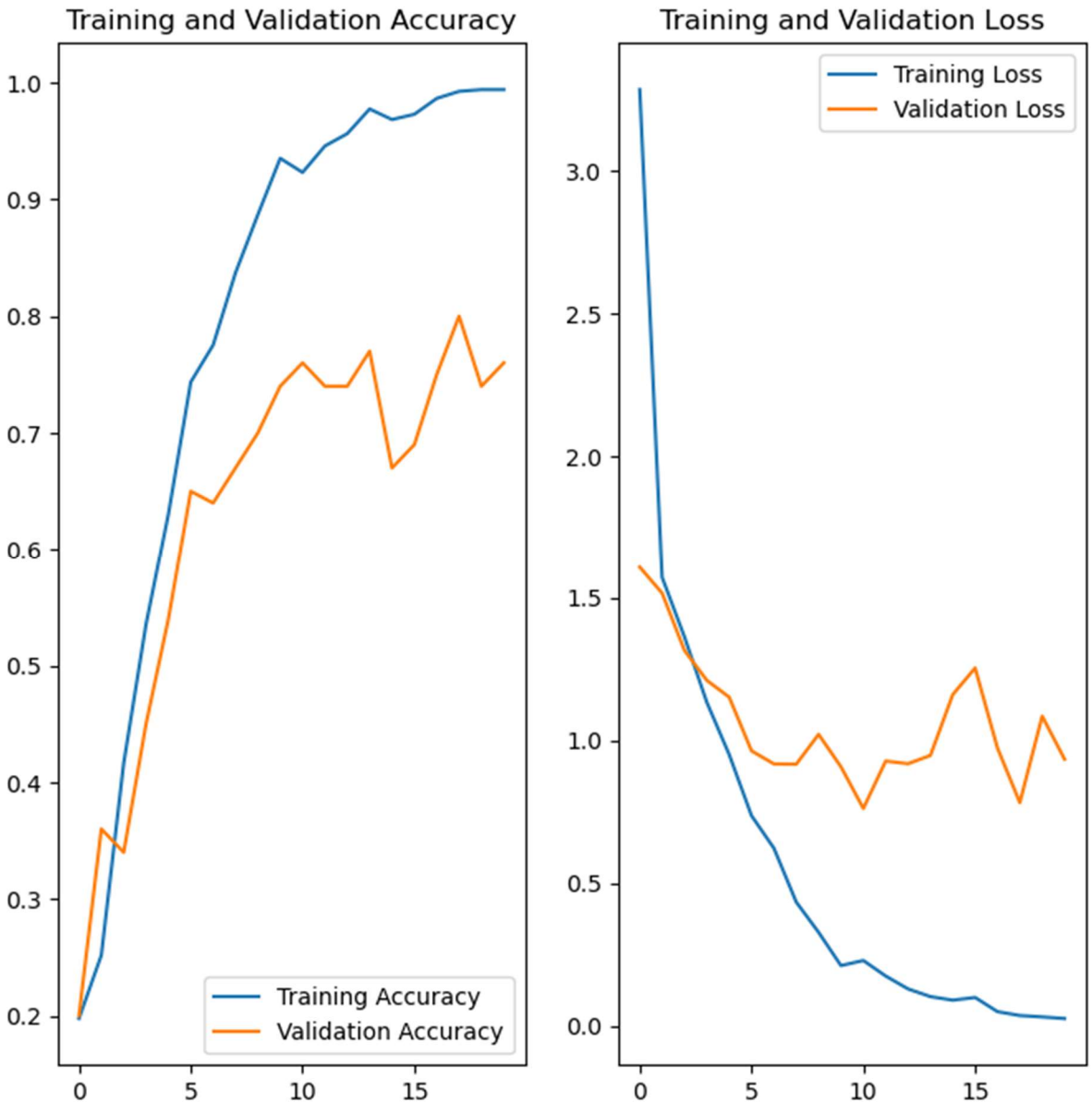

Training and Validation Accuracy
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
5
10
15
Training Accuracy
Validation Accuracy
Training and Validation Loss
Training Loss
Validation Loss
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
5
10
15

Figure 5

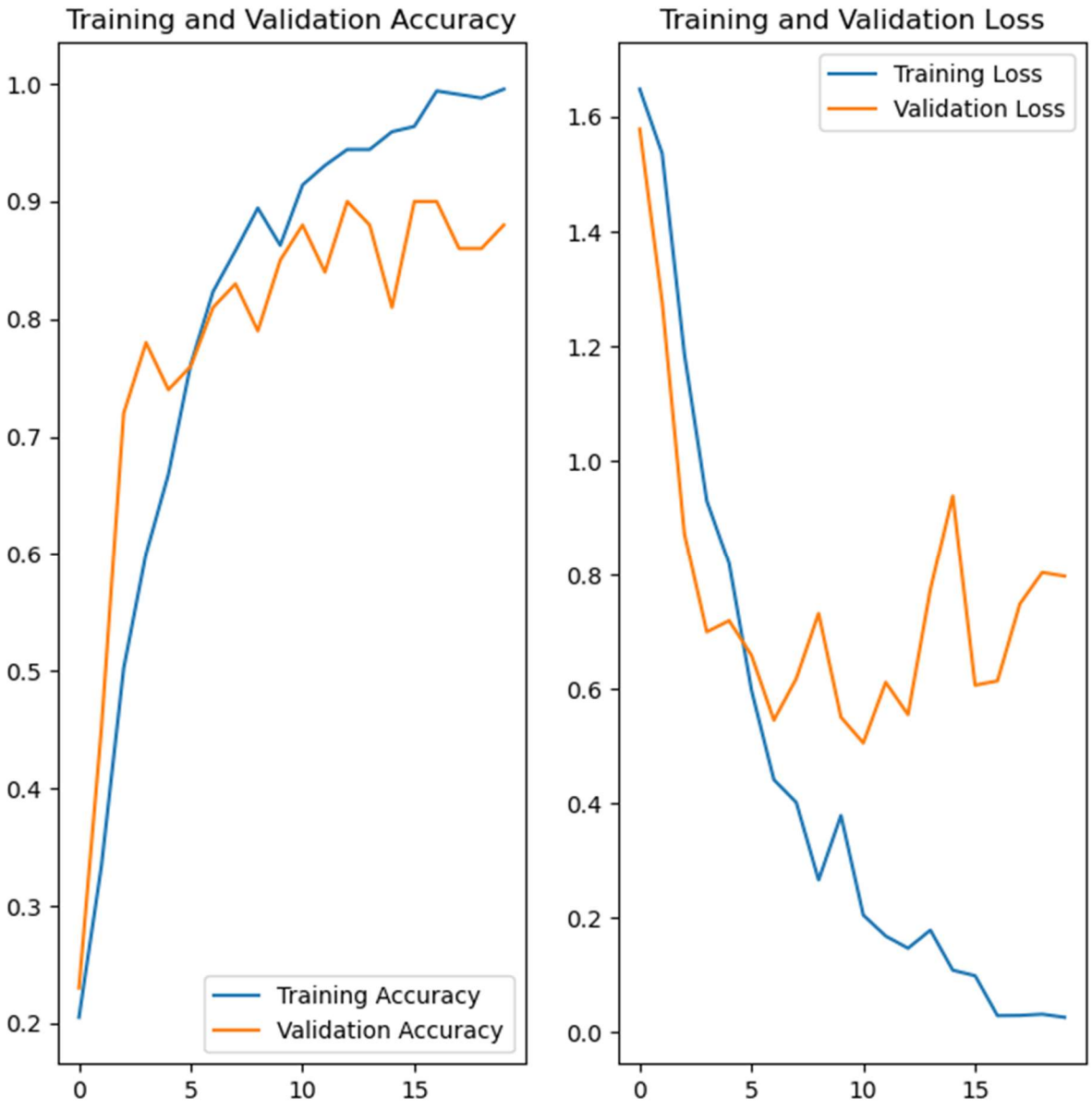
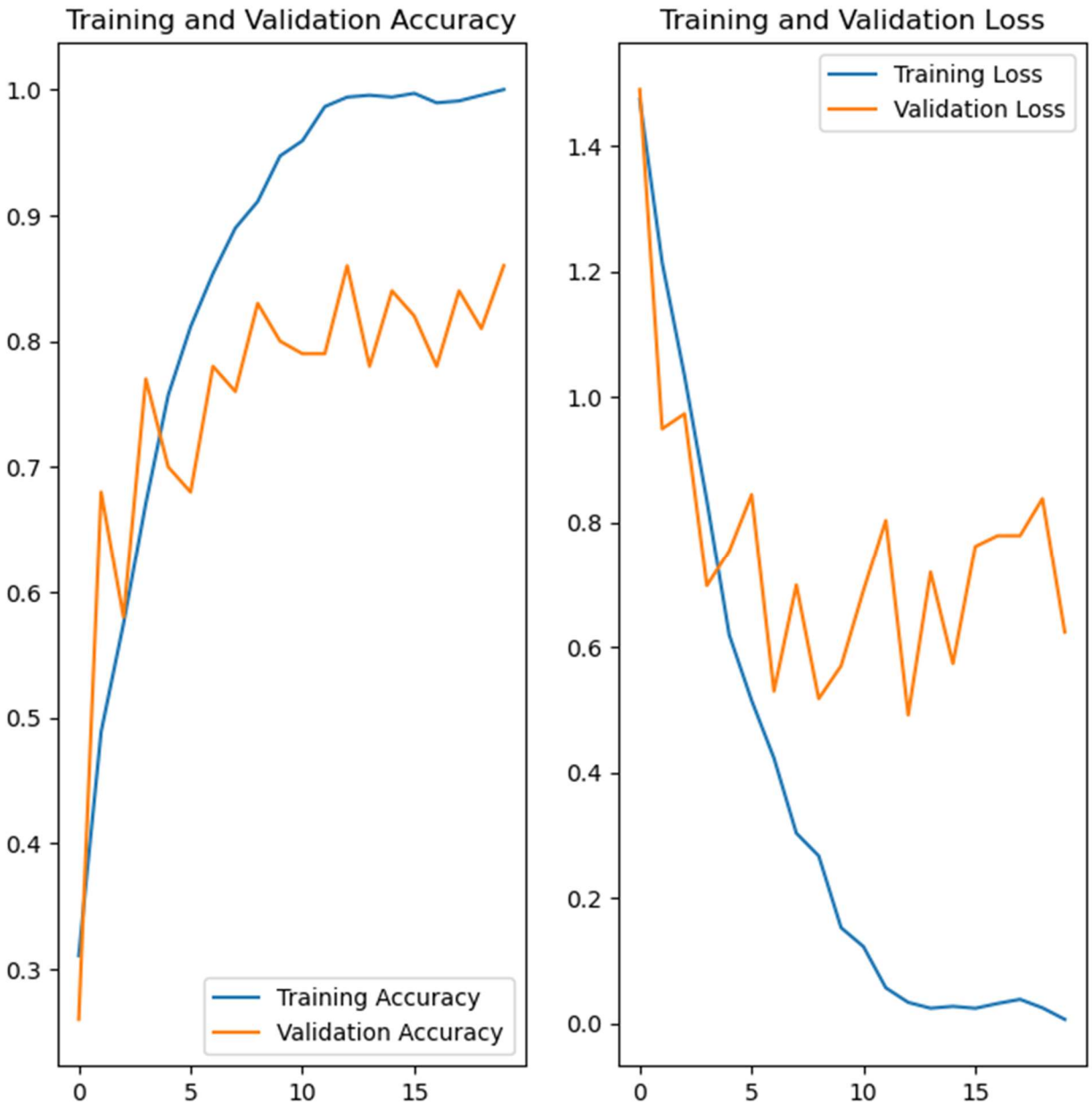

Training and Validation Accuracy
Training Accuracy
Validation Accuracy
Training and Validation Loss
Training Loss
Validation Loss

Figure 6


Training and Validation Accuracy
Training Accuracy
Validation Accuracy
Training and Validation Loss
Training Loss
Validation Loss