

# Model Training Report

## Configuration and Parameters:

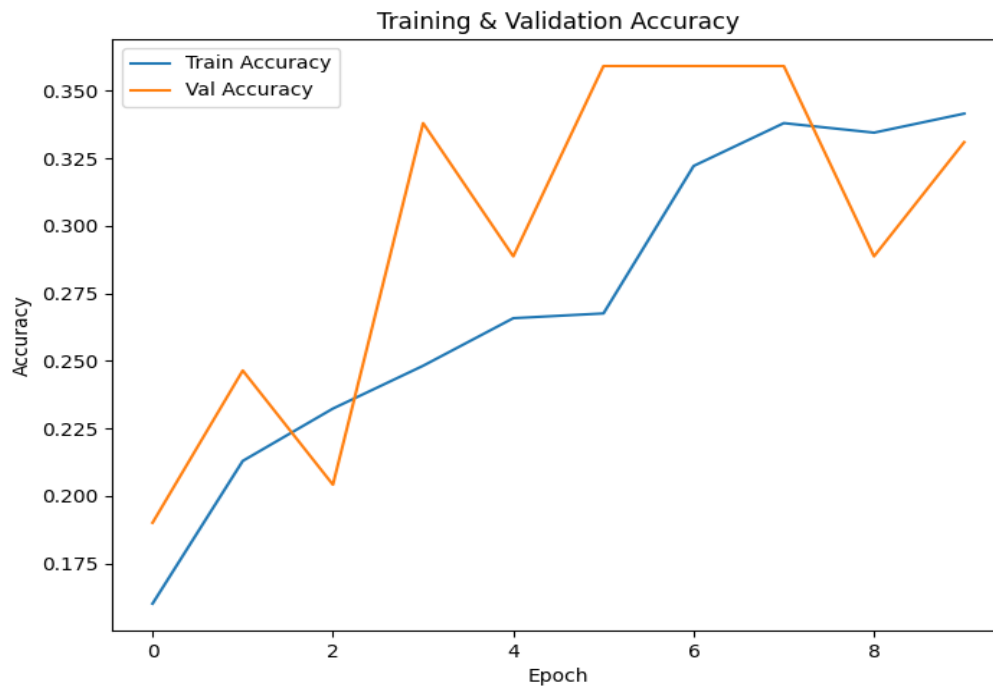
Image Size: (224, 224)  
Batch Size: 32  
Number of Classes: 8  
Epochs: 10  
Gaussian Noise STD: 0.03  
Salt-Pepper Noise Amount: 0.01  
Train Size: 568  
Validation Size: 142  
Test Size: 79

## Model Summary:

Model: "sequential_1"		
Layer (type)	Output Shape	Param #
conv2d (Conv2D)	(None, 222, 222, 32)	896
max_pooling2d (MaxPooling2D)	(None, 111, 111, 32)	0
conv2d_1 (Conv2D)	(None, 109, 109, 64)	18,496
max_pooling2d_1 (MaxPooling2D)	(None, 54, 54, 64)	0
conv2d_2 (Conv2D)	(None, 52, 52, 128)	73,856
max_pooling2d_2 (MaxPooling2D)	(None, 26, 26, 128)	0
flatten (Flatten)	(None, 86528)	0
dense (Dense)	(None, 128)	11,075,712
dropout (Dropout)	(None, 128)	0
dense_1 (Dense)	(None, 8)	1,032
Total params: 33,509,978 (127.83 MB)		
Trainable params: 11,169,992 (42.61 MB)		
Non-trainable params: 0 (0.00 B)		
Optimizer params: 22,339,986 (85.22 MB)		

**Test Accuracy:** 0.3165

## Training Accuracy over Epochs:



# Model Training Report

## Configuration and Parameters:

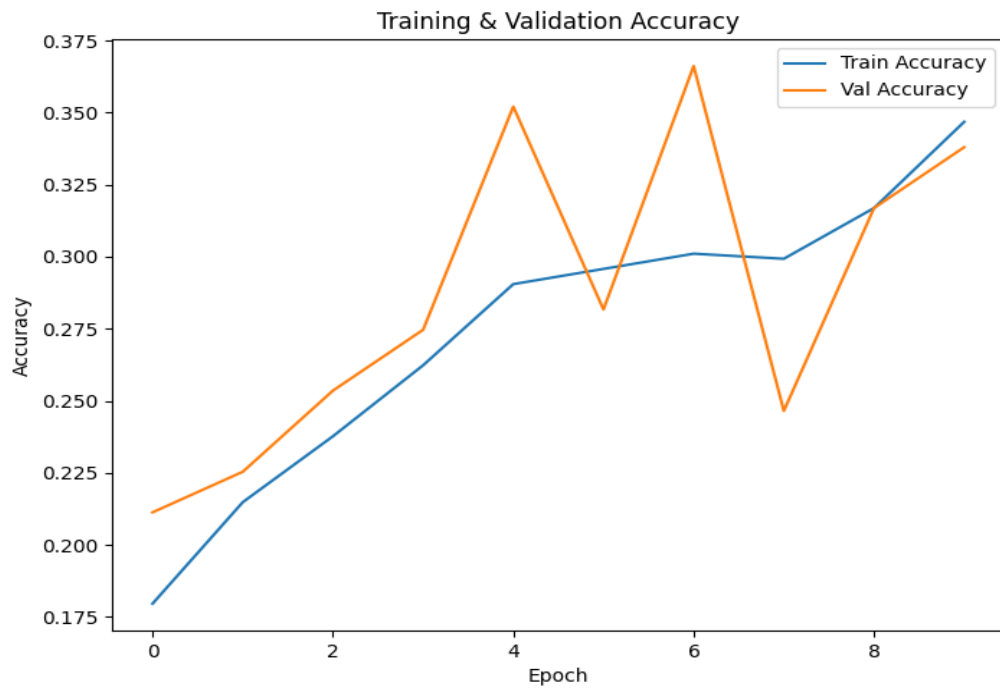
Image Size: (224, 224)  
Batch Size: 32  
Number of Classes: 8  
Epochs: 10  
Gaussian Noise STD: 0.03  
Salt-Pepper Noise Amount: 0.01  
Train Size: 568  
Validation Size: 142  
Test Size: 79

## Model Summary:

Model: "sequential_1"		
Layer (type)	Output Shape	Param #
conv2d (Conv2D)	(None, 222, 222, 32)	896
max_pooling2d (MaxPooling2D)	(None, 111, 111, 32)	0
conv2d_1 (Conv2D)	(None, 109, 109, 64)	18,496
max_pooling2d_1 (MaxPooling2D)	(None, 54, 54, 64)	0
conv2d_2 (Conv2D)	(None, 52, 52, 128)	73,856
max_pooling2d_2 (MaxPooling2D)	(None, 26, 26, 128)	0
flatten (Flatten)	(None, 86528)	0
dense (Dense)	(None, 128)	11,075,712
dropout (Dropout)	(None, 128)	0
dense_1 (Dense)	(None, 8)	1,032
Total params: 33,509,978 (127.83 MB)		
Trainable params: 11,169,992 (42.61 MB)		
Non-trainable params: 0 (0.00 B)		
Optimizer params: 22,339,986 (85.22 MB)		

**Test Accuracy: 0.2785**

## Training Accuracy over Epochs:



# Model Training Report

## Configuration and Parameters:

Image Size: (224, 224)  
Batch Size: 32  
Number of Classes: 8  
Epochs: 10  
Gaussian Noise STD: 0.03  
Salt-Pepper Noise Amount: 0.01  
Train Size: 568  
Validation Size: 142  
Test Size: 79  
Comments: Increased augmentation by adding random brightness

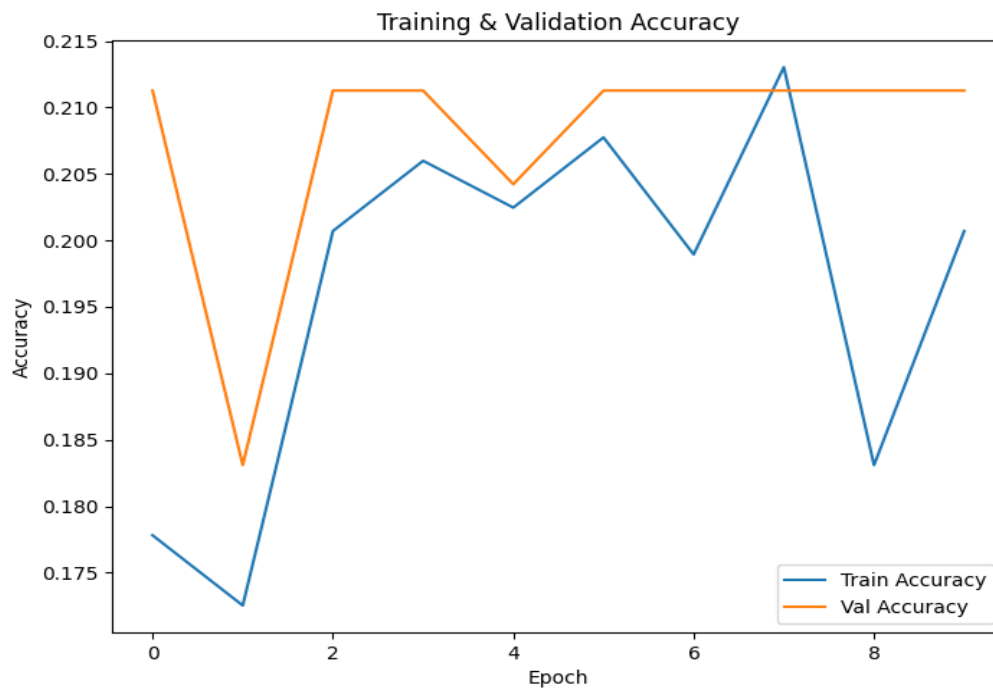
## Model Summary:

Model: "sequential_1"		
Layer (type)	Output Shape	Param #
conv2d (Conv2D)	(None, 222, 222, 32)	896
max_pooling2d (MaxPooling2D)	(None, 111, 111, 32)	0
conv2d_1 (Conv2D)	(None, 109, 109, 64)	18,496
max_pooling2d_1 (MaxPooling2D)	(None, 54, 54, 64)	0
conv2d_2 (Conv2D)	(None, 52, 52, 128)	73,856
max_pooling2d_2 (MaxPooling2D)	(None, 26, 26, 128)	0
flatten (Flatten)	(None, 86528)	0
dense (Dense)	(None, 128)	11,075,712
dropout (Dropout)	(None, 128)	0
dense_1 (Dense)	(None, 8)	1,032
Total params: 33,509,978 (127.83 MB)		
Trainable params: 11,169,992 (42.61 MB)		
Non-trainable params: 0 (0.00 B)		

Optimizer params: 22,339,986 (85.22 MB)

**Test Accuracy: 0.2152**

## Training Accuracy over Epochs:



# Model Training Report

## Configuration and Parameters:

**Image Size:** (224, 224)  
**Batch Size:** 32  
**Number of Classes:** 8  
**Class Weights:** {0: np.float64(1.3653846153846154), 1: np.float64(0.5867768595041323), 2: np.float64(1.3148148148148149), 3: np.float64(0.6454545454545455), 4: np.float64(1.1639344262295082), 5: np.float64(1.1451612903225807), 6: np.float64(1.3148148148148149), 7: np.float64(1.3148148148148149)}  
**Epochs:** 10  
**Gaussian Noise STD:** 0.03  
**Salt-Pepper Noise Amount:** 0.01  
**Train Size:** 568  
**Validation Size:** 142  
**Test Size:** 79  
**Comments:** Apply class weights for balancing

## Model Summary:

Model: "sequential_1"		
Layer (type)	Output Shape	Param #
conv2d (Conv2D)	(None, 222, 222, 32)	896
max_pooling2d (MaxPooling2D)	(None, 111, 111, 32)	0
conv2d_1 (Conv2D)	(None, 109, 109, 64)	18,496
max_pooling2d_1 (MaxPooling2D)	(None, 54, 54, 64)	0
conv2d_2 (Conv2D)	(None, 52, 52, 128)	73,856
max_pooling2d_2 (MaxPooling2D)	(None, 26, 26, 128)	0
flatten (Flatten)	(None, 86528)	0
dense (Dense)	(None, 128)	11,075,712
dropout (Dropout)	(None, 128)	0
dense_1 (Dense)	(None, 8)	1,032

**Test Accuracy:** 0.1013

The graph displays the training and validation accuracy over 9 epochs. The training accuracy (blue line) starts at approximately 0.151 at epoch 0, drops to 0.097 at epoch 1, peaks at 0.101 at epoch 2, drops to 0.081 at epoch 3, rises to 0.101 at epoch 5, drops to 0.085 at epoch 6, rises to 0.095 at epoch 7, drops to 0.090 at epoch 8, and ends at 0.088 at epoch 9. The validation accuracy (orange line) starts at approximately 0.134 at epoch 0, drops to 0.099 at epoch 1, rises to 0.106 at epoch 2, drops to 0.099 at epoch 3, rises to 0.113 at epoch 5, drops to 0.085 at epoch 7, and ends at 0.099 at epoch 9.

Epoch	Train Accuracy	Val Accuracy
0	0.151	0.134
1	0.097	0.099
2	0.101	0.106
3	0.081	0.099
4	0.094	0.106
5	0.101	0.113
6	0.085	0.100
7	0.095	0.085
8	0.090	0.085
9	0.088	0.099



# Model Training Report

## Configuration and Parameters:

**Image Size:** (224, 224)  
**Batch Size:** 32  
**Number of Classes:** 8  
**Class Weights:** {0: np.float64(1.3653846153846154), 1: np.float64(0.5867768595041323), 2: np.float64(1.3148148148148149), 3: np.float64(0.6454545454545455), 4: np.float64(1.1639344262295082), 5: np.float64(1.1451612903225807), 6: np.float64(1.3148148148148149), 7: np.float64(1.3148148148148149)}  
**Epochs:** 10  
**Gaussian Noise STD:** 0.03  
**Salt-Pepper Noise Amount:** 0.01  
**Train Size:** 568  
**Validation Size:** 142  
**Test Size:** 79  
**Comments:** Applied real random brightness augmentation

## Model Summary:

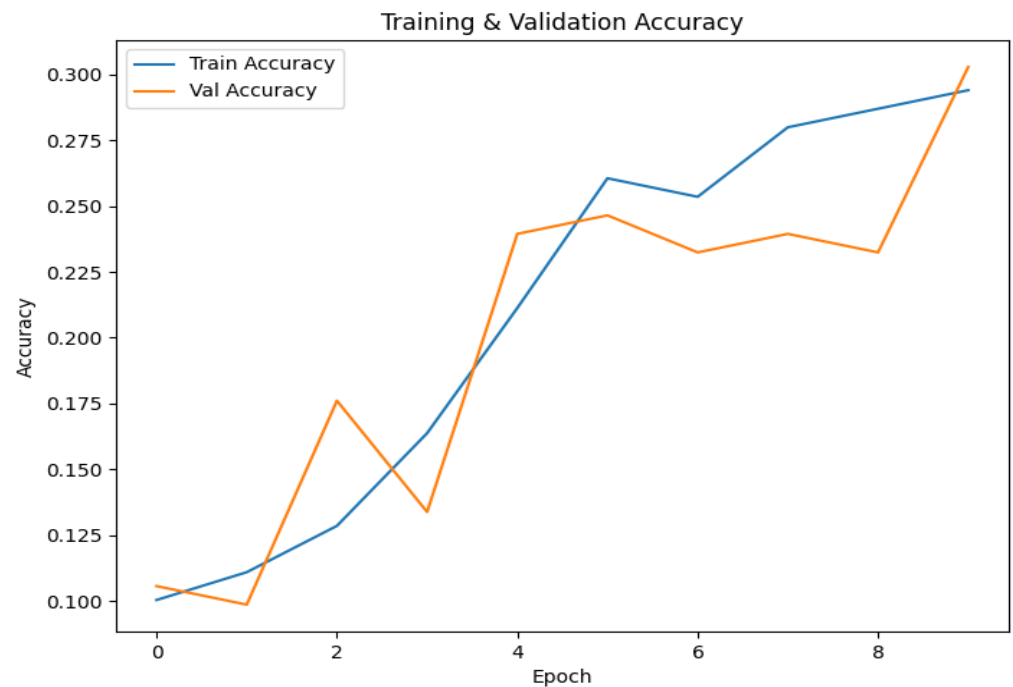
Model: "sequential_1"		
Layer (type)	Output Shape	Param #
conv2d (Conv2D)	(None, 222, 222, 32)	896
max_pooling2d (MaxPooling2D)	(None, 111, 111, 32)	0
conv2d_1 (Conv2D)	(None, 109, 109, 64)	18,496
max_pooling2d_1 (MaxPooling2D)	(None, 54, 54, 64)	0
conv2d_2 (Conv2D)	(None, 52, 52, 128)	73,856
max_pooling2d_2 (MaxPooling2D)	(None, 26, 26, 128)	0
flatten (Flatten)	(None, 86528)	0
dense (Dense)	(None, 128)	11,075,712
dropout (Dropout)	(None, 128)	0
dense_1 (Dense)	(None, 8)	1,032



Total params: 33,509,978 (127.83 MB)  
Trainable params: 11,169,992 (42.61 MB)  
Non-trainable params: 0 (0.00 B)  
Optimizer params: 22,339,986 (85.22 MB)

Test Accuracy: 0.3544

### Training Accuracy over Epochs:



# Model Training Report

## Configuration and Parameters:

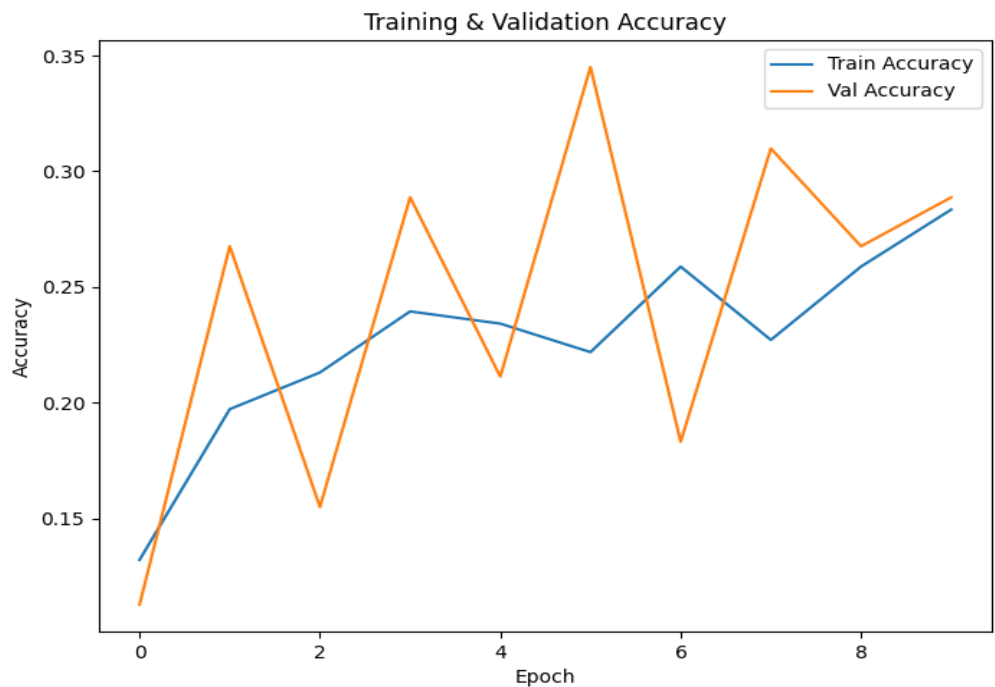
**Image Size:** (224, 224)  
**Batch Size:** 32  
**Number of Classes:** 8  
**Class Weights:** {0: np.float64(1.3653846153846154), 1: np.float64(0.5867768595041323), 2: np.float64(1.3148148148148149), 3: np.float64(0.6454545454545455), 4: np.float64(1.1639344262295082), 5: np.float64(1.1451612903225807), 6: np.float64(1.3148148148148149), 7: np.float64(1.3148148148148149)}  
**Epochs:** 10  
**Gaussian Noise STD:** 0.03  
**Salt-Pepper Noise Amount:** 0.01  
**Train Size:** 568  
**Validation Size:** 142  
**Test Size:** 79  
**Comments:** Applied real random translation augmentation

## Model Summary:

Model: "sequential_1"		
Layer (type)	Output Shape	Param #
conv2d (Conv2D)	(None, 222, 222, 32)	896
max_pooling2d (MaxPooling2D)	(None, 111, 111, 32)	0
conv2d_1 (Conv2D)	(None, 109, 109, 64)	18,496
max_pooling2d_1 (MaxPooling2D)	(None, 54, 54, 64)	0
conv2d_2 (Conv2D)	(None, 52, 52, 128)	73,856
max_pooling2d_2 (MaxPooling2D)	(None, 26, 26, 128)	0
flatten (Flatten)	(None, 86528)	0
dense (Dense)	(None, 128)	11,075,712
dropout (Dropout)	(None, 128)	0
dense_1 (Dense)	(None, 8)	1,032

**Test Accuracy: 0.2532**

## Training Accuracy over Epochs:



# Model Training Report

## Configuration and Parameters:

**Image Size:** (224, 224)  
**Batch Size:** 32  
**Number of Classes:** 8  
**Class Weights:** {0: 1.365, 1: 0.587, 2: 1.315, 3: 0.645, 4: 1.164, 5: 1.145, 6: 1.315, 7: 1.315}  
**Epochs:** 10  
**Data Augmentation:** RandomFlip(horizontal), RandomRotation(0.1 radians), RandomZoom(0.1), RandomContrast(0.1), RandomBrightness(0.1)RandomTranslation(0.05, 0.05)  
**Gaussian Noise STD:** 0.03  
**Salt-Pepper Noise Amount:** 0.01  
**Train Size:** 568  
**Validation Size:** 142  
**Test Size:** 79  
**Comments:** Reduced random translation augmentation to 5%

## Model Summary:

Model: "sequential_1"		
Layer (type)	Output Shape	Param #
conv2d (Conv2D)	(None, 222, 222, 32)	896
max_pooling2d (MaxPooling2D)	(None, 111, 111, 32)	0
conv2d_1 (Conv2D)	(None, 109, 109, 64)	18,496
max_pooling2d_1 (MaxPooling2D)	(None, 54, 54, 64)	0
conv2d_2 (Conv2D)	(None, 52, 52, 128)	73,856
max_pooling2d_2 (MaxPooling2D)	(None, 26, 26, 128)	0
flatten (Flatten)	(None, 86528)	0
dense (Dense)	(None, 128)	11,075,712
dropout (Dropout)	(None, 128)	0
dense_1 (Dense)	(None, 8)	1,032

**Test Accuracy: 0.1519**

The graph displays the training and validation accuracy over 9 epochs. The training accuracy (blue line) starts at approximately 0.13, remains relatively stable until epoch 4, then increases to a peak of about 0.25 at epoch 7, before slightly declining to 0.24 at epoch 9. The validation accuracy (orange line) starts lower at approximately 0.08, shows significant fluctuations, peaking at about 0.30 at epoch 8, and ending at approximately 0.16 at epoch 9.

Epoch	Train Accuracy	Val Accuracy
0	0.13	0.08
1	0.13	0.105
2	0.14	0.225
3	0.125	0.155
4	0.155	0.17
5	0.155	0.115
6	0.225	0.22
7	0.25	0.135
8	0.235	0.30
9	0.24	0.16

# Model Training Report

## Configuration and Parameters:

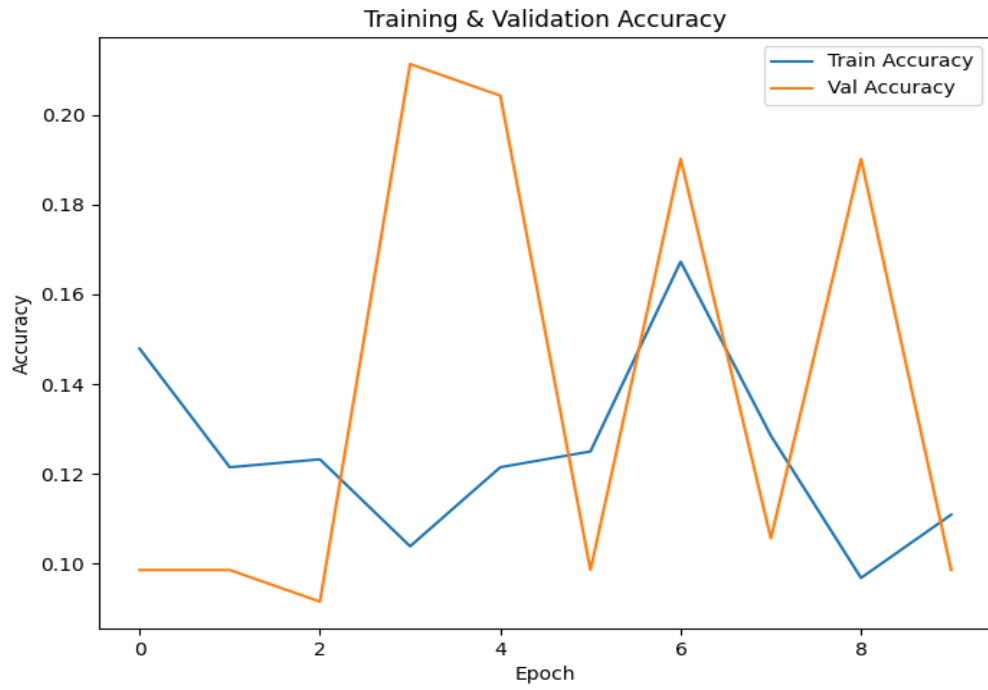
**Image Size:** (224, 224)  
**Batch Size:** 32  
**Number of Classes:** 8  
**Class Weights:** {0: 1.365, 1: 0.587, 2: 1.315, 3: 0.645, 4: 1.164, 5: 1.145, 6: 1.315, 7: 1.315}  
**Epochs:** 10  
**Data Augmentation:** RandomFlip(horizontal), RandomRotation(0.1 radians), RandomZoom(0.1), RandomContrast(0.1), RandomBrightness(0.1)RandomTranslation(0.05, 0.05)  
**Gaussian Noise STD:** 0.03  
**Salt-Pepper Noise Amount:** 0.01  
**Train Size:** 568  
**Validation Size:** 142  
**Test Size:** 79  
**Comments:** Implemented transfer learning with EfficientNetB0

## Model Summary:

Model: "sequential_1"		
Layer (type)	Output Shape	Param #
efficientnetb0 (Functional)	(None, 7, 7, 1280)	4,049,571
global_average_pooling2d (GlobalAveragePooling2D)	(None, 1280)	0
dropout (Dropout)	(None, 1280)	0
dense (Dense)	(None, 8)	10,248
Total params: 4,080,317 (15.57 MB)		
Trainable params: 10,248 (40.03 KB)		
Non-trainable params: 4,049,571 (15.45 MB)		
Optimizer params: 20,498 (80.07 KB)		

**Test Accuracy:** 0.1013

## Training Accuracy over Epochs:





# Model Training Report

## Configuration and Parameters:

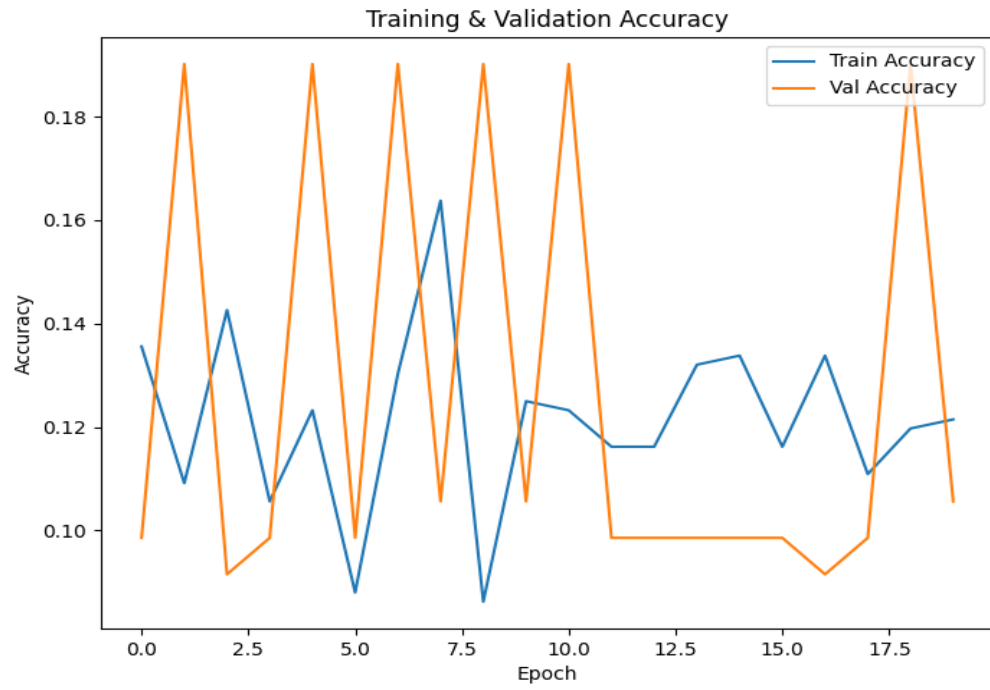
**Image Size:** (224, 224)  
**Batch Size:** 32  
**Number of Classes:** 8  
**Class Weights:** {0: 1.365, 1: 0.587, 2: 1.315, 3: 0.645, 4: 1.164, 5: 1.145, 6: 1.315, 7: 1.315}  
**Epochs:** 20  
**Data Augmentation:** RandomFlip(horizontal), RandomRotation(0.1 radians), RandomZoom(0.1), RandomContrast(0.1), RandomBrightness(0.1)RandomTranslation(0.05, 0.05)  
**Gaussian Noise STD:** 0.05  
**Salt-Pepper Noise Amount:** 0.02  
**Train Size:** 568  
**Validation Size:** 142  
**Test Size:** 79  
**Comments:** Using EfficientNetB0, increased to 20 epochs

## Model Summary:

Model: "sequential_1"		
Layer (type)	Output Shape	Param #
efficientnetb0 (Functional)	(None, 7, 7, 1280)	4,049,571
global_average_pooling2d (GlobalAveragePooling2D)	(None, 1280)	0
dropout (Dropout)	(None, 1280)	0
dense (Dense)	(None, 8)	10,248
Total params: 4,080,317 (15.57 MB)		
Trainable params: 10,248 (40.03 KB)		
Non-trainable params: 4,049,571 (15.45 MB)		
Optimizer params: 20,498 (80.07 KB)		

**Test Accuracy:** 0.1139

## Training Accuracy over Epochs:



# Model Training Report

## Configuration and Parameters:

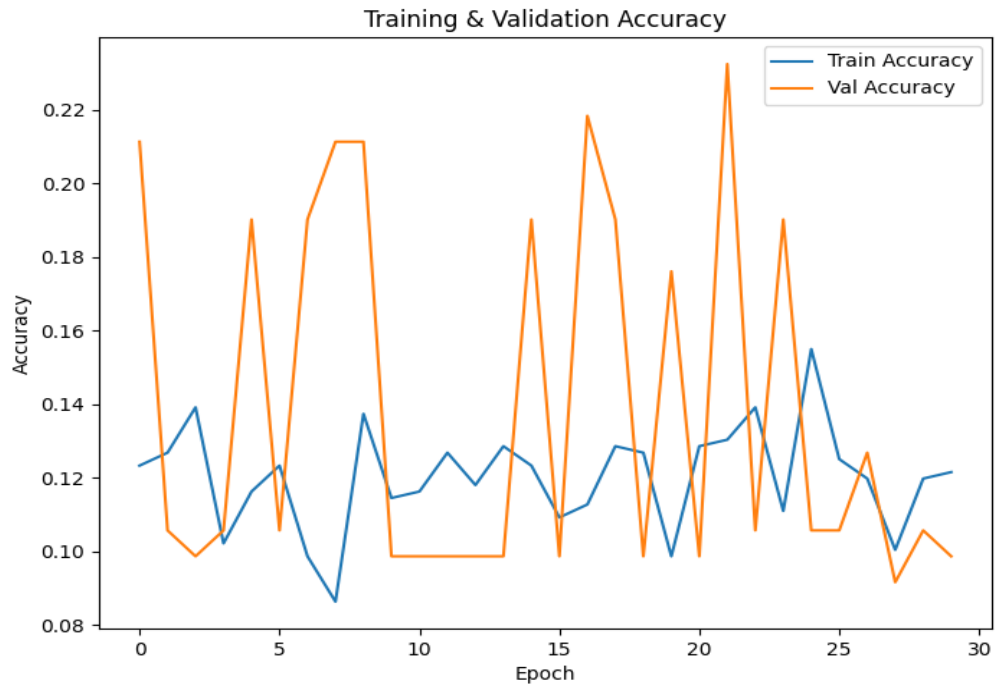
**Image Size:** (224, 224)  
**Batch Size:** 32  
**Number of Classes:** 8  
**Class Weights:** {0: 1.365, 1: 0.587, 2: 1.315, 3: 0.645, 4: 1.164, 5: 1.145, 6: 1.315, 7: 1.315}  
**Epochs:** 30  
**Data Augmentation:** RandomFlip(horizontal), RandomRotation(0.1 radians), RandomZoom(0.1), RandomContrast(0.1), RandomBrightness(0.1)RandomTranslation(0.05, 0.05)  
**Gaussian Noise STD:** 0.05  
**Salt-Pepper Noise Amount:** 0.02  
**Train Size:** 568  
**Validation Size:** 142  
**Test Size:** 79  
**Comments:** Using EfficientNetB0, increased to 30 epochs

## Model Summary:

Model: "sequential_1"		
Layer (type)	Output Shape	Param #
efficientnetb0 (Functional)	(None, 7, 7, 1280)	4,049,571
global_average_pooling2d (GlobalAveragePooling2D)	(None, 1280)	0
dropout (Dropout)	(None, 1280)	0
dense (Dense)	(None, 8)	10,248
Total params: 4,080,317 (15.57 MB)		
Trainable params: 10,248 (40.03 KB)		
Non-trainable params: 4,049,571 (15.45 MB)		
Optimizer params: 20,498 (80.07 KB)		

**Test Accuracy:** 0.0886

## Training Accuracy over Epochs:



# Model Training Report

## Configuration and Parameters:

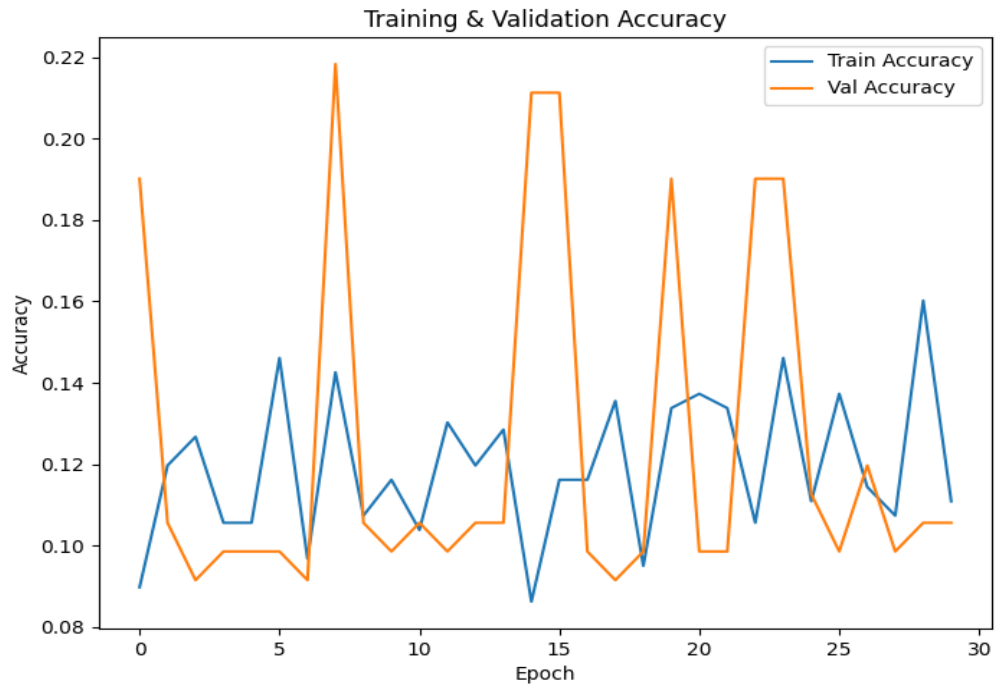
**Image Size:** (224, 224)  
**Batch Size:** 32  
**Number of Classes:** 8  
**Class Weights:** {0: 1.365, 1: 0.587, 2: 1.315, 3: 0.645, 4: 1.164, 5: 1.145, 6: 1.315, 7: 1.315}  
**Epochs:** 30  
**Data Augmentation:** RandomFlip(horizontal), RandomRotation(0.1 radians), RandomZoom(0.1), RandomContrast(0.1), RandomBrightness(0.1)RandomTranslation(0.01, 0.01)  
**Gaussian Noise STD:** 0.02  
**Salt-Pepper Noise Amount:** 0.02  
**Train Size:** 568  
**Validation Size:** 142  
**Test Size:** 79  
**Comments:** Using EfficientNetB0, increased to 30 epochs, reduced gaussian

## Model Summary:

Model: "sequential_1"		
Layer (type)	Output Shape	Param #
efficientnetb0 (Functional)	(None, 7, 7, 1280)	4,049,571
global_average_pooling2d (GlobalAveragePooling2D)	(None, 1280)	0
dropout (Dropout)	(None, 1280)	0
dense (Dense)	(None, 8)	10,248
Total params: 4,080,317 (15.57 MB)		
Trainable params: 10,248 (40.03 KB)		
Non-trainable params: 4,049,571 (15.45 MB)		
Optimizer params: 20,498 (80.07 KB)		

**Test Accuracy:** 0.0759

## Training Accuracy over Epochs:



# Model Training Report

## Configuration and Parameters:

**Image Size:** (224, 224)  
**Batch Size:** 32  
**Number of Classes:** 8  
**Class Weights:** {0: 1.365, 1: 0.587, 2: 1.315, 3: 0.645, 4: 1.164, 5: 1.145, 6: 1.315, 7: 1.315}  
**Base Epochs:** 10  
**Epochs:** 30  
**Data Augmentation:** RandomFlip(horizontal), RandomRotation(0.1 radians), RandomZoom(0.1), RandomContrast(0.1), RandomBrightness(0.1)  
**Gaussian Noise STD:** 0.05  
**Salt-Pepper Noise Amount:** 0.02  
**Train Size:** 568  
**Validation Size:** 142  
**Test Size:** 79  
**Comments:** Using EfficientNetB0, train deeper layers

## Model Summary:

Model: "sequential_1"		
Layer (type)	Output Shape	Param #
efficientnetb0 (Functional)	(None, 7, 7, 1280)	4,049,571
global_average_pooling2d (GlobalAveragePooling2D)	(None, 1280)	0
dropout (Dropout)	(None, 1280)	0
dense (Dense)	(None, 8)	10,248
Total params: 12,095,413 (46.14 MB)		
Trainable params: 4,017,796 (15.33 MB)		
Non-trainable params: 42,023 (164.16 KB)		
Optimizer params: 8,035,594 (30.65 MB)		

**Test Accuracy:** 0.1266

## Training Accuracy over Epochs:





# Model Training Report

## Configuration and Parameters:

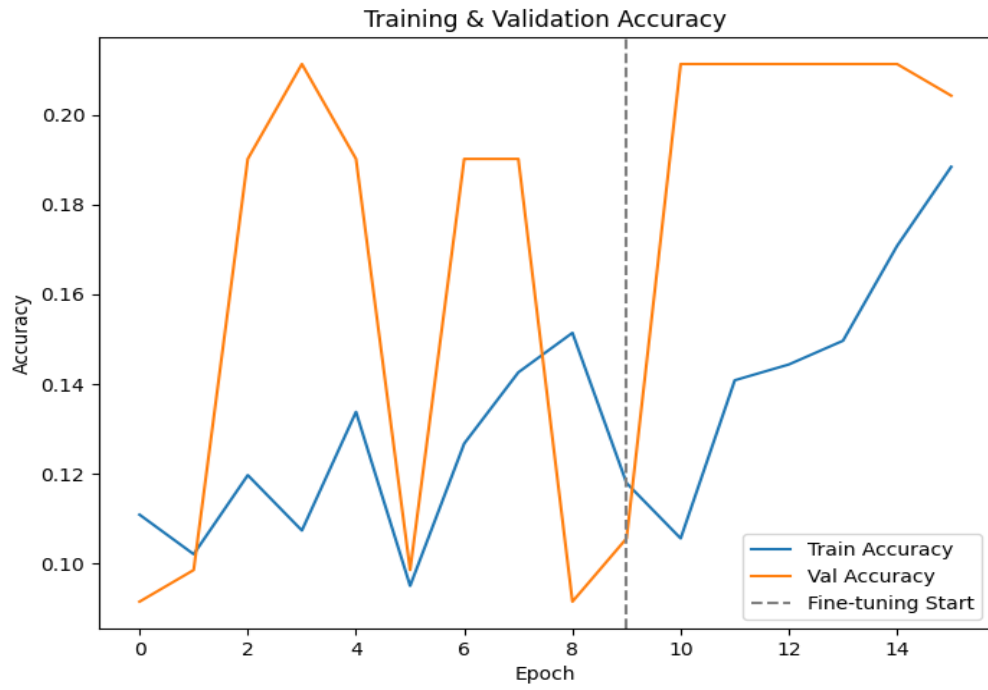
**Image Size:** (224, 224)  
**Batch Size:** 32  
**Number of Classes:** 8  
**Class Weights:** {0: 1.365, 1: 0.587, 2: 1.315, 3: 0.645, 4: 1.164, 5: 1.145, 6: 1.315, 7: 1.315}  
**Base Epochs:** 10  
**Epochs:** 30  
**Data Augmentation:** RandomFlip(horizontal), RandomRotation(0.1 radians), RandomZoom(0.1), RandomContrast(0.1), RandomBrightness(0.1)  
**Gaussian Noise STD:** 0.05  
**Salt-Pepper Noise Amount:** 0.02  
**Train Size:** 568  
**Validation Size:** 142  
**Test Size:** 79  
**Comments:** Using EfficientNetB0, train deeper layers, early stopping

## Model Summary:

Model: "sequential_1"		
Layer (type)	Output Shape	Param #
efficientnetb0 (Functional)	(None, 7, 7, 1280)	4,049,571
global_average_pooling2d (GlobalAveragePooling2D)	(None, 1280)	0
dropout (Dropout)	(None, 1280)	0
dense (Dense)	(None, 8)	10,248
Total params: 12,095,413 (46.14 MB)		
Trainable params: 4,017,796 (15.33 MB)		
Non-trainable params: 42,023 (164.16 KB)		
Optimizer params: 8,035,594 (30.65 MB)		

**Test Accuracy:** 0.2152

## Training Accuracy over Epochs:



# Model Training Report

## Configuration and Parameters:

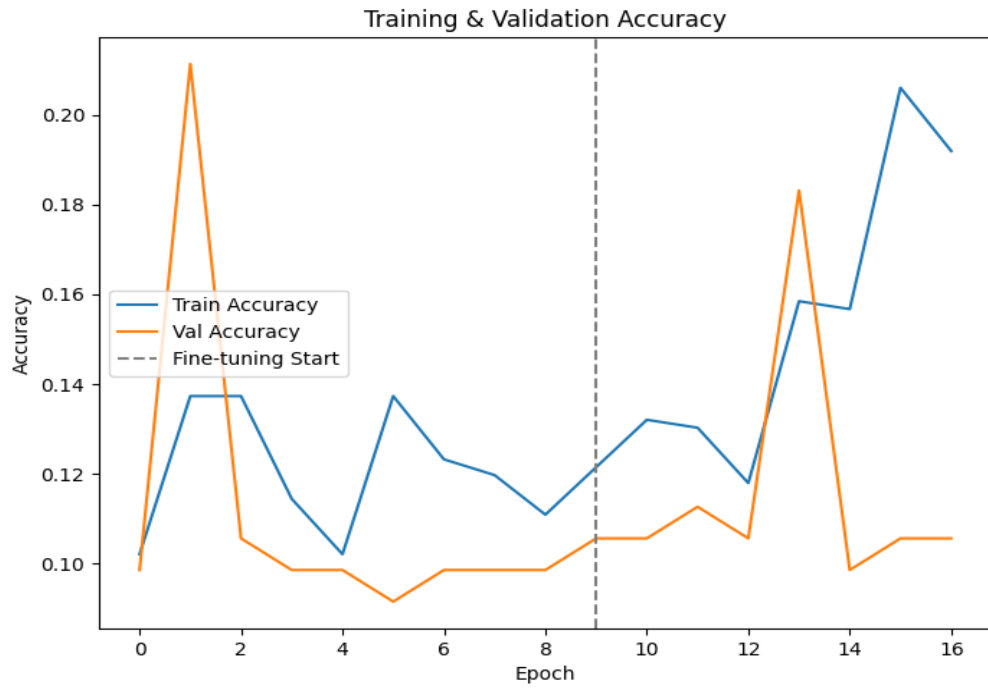
**Image Size:** (224, 224)  
**Batch Size:** 32  
**Number of Classes:** 8  
**Class Weights:** {0: 1.365, 1: 0.587, 2: 1.315, 3: 0.645, 4: 1.164, 5: 1.145, 6: 1.315, 7: 1.315}  
**Base Epochs:** 10  
**Epochs:** 30  
**Data Augmentation:** RandomFlip(none), RandomRotation(0.05 radians), RandomZoom(0.05), RandomContrast(0.05), RandomBrightness(0.05)  
**Gaussian Noise STD:** 0.01  
**Salt-Pepper Noise Amount:** 0.01  
**Train Size:** 568  
**Validation Size:** 142  
**Test Size:** 79  
**Comments:** Using EfficientNetB0, train deeper layers, early stopping, reduced aggressive augmentation

## Model Summary:

Model: "sequential_1"		
Layer (type)	Output Shape	Param #
efficientnetb0 (Functional)	(None, 7, 7, 1280)	4,049,571
global_average_pooling2d (GlobalAveragePooling2D)	(None, 1280)	0
dropout (Dropout)	(None, 1280)	0
dense (Dense)	(None, 8)	10,248
Total params: 12,095,413 (46.14 MB)		
Trainable params: 4,017,796 (15.33 MB)		
Non-trainable params: 42,023 (164.16 KB)		
Optimizer params: 8,035,594 (30.65 MB)		

**Test Accuracy:** 0.1139

## Training Accuracy over Epochs:



# Model Training Report

## Configuration and Parameters:

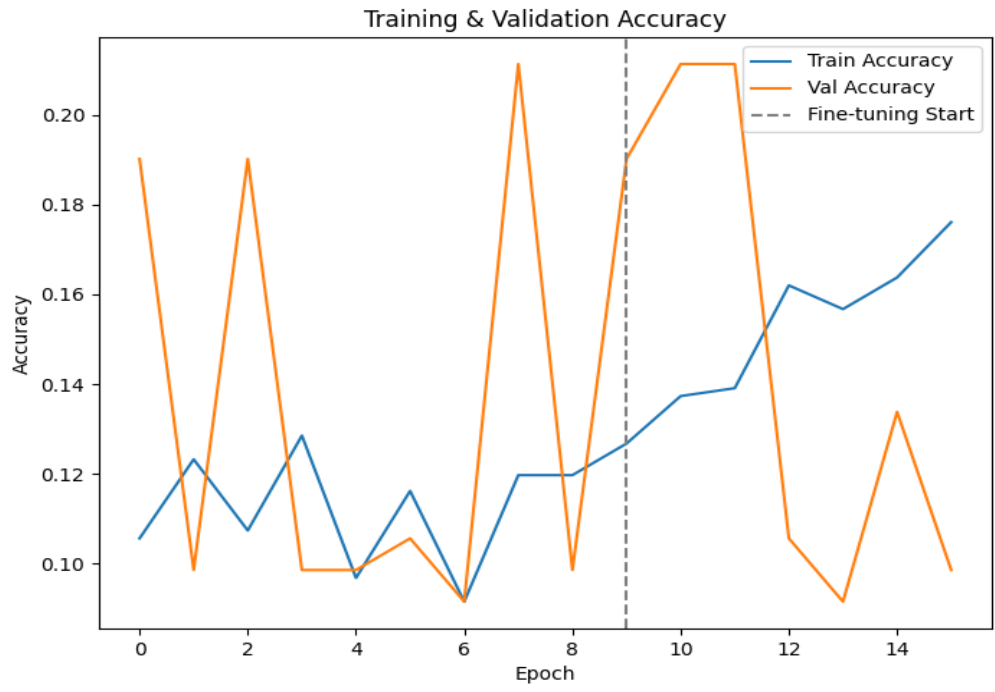
**Image Size:** (224, 224)  
**Batch Size:** 32  
**Number of Classes:** 8  
**Class Weights:** {0: 1.365, 1: 0.587, 2: 1.315, 3: 0.645, 4: 1.164, 5: 1.145, 6: 1.315, 7: 1.315}  
**Base Epochs:** 10  
**Epochs:** 30  
**Data Augmentation:** RandomFlip(none), RandomRotation(0.05 radians), RandomZoom(0.05), RandomContrast(0.05), RandomBrightness(0.05)  
**Gaussian Noise STD:** 0.0  
**Salt-Pepper Noise Amount:** 0.0  
**Train Size:** 568  
**Validation Size:** 142  
**Test Size:** 79  
**Comments:** Using EfficientNetB0, train deeper layers, early stopping, removed gaussian and salt and pepper

## Model Summary:

Model: "sequential_1"		
Layer (type)	Output Shape	Param #
efficientnetb0 (Functional)	(None, 7, 7, 1280)	4,049,571
global_average_pooling2d (GlobalAveragePooling2D)	(None, 1280)	0
dropout (Dropout)	(None, 1280)	0
dense (Dense)	(None, 8)	10,248
Total params: 12,095,413 (46.14 MB)		
Trainable params: 4,017,796 (15.33 MB)		
Non-trainable params: 42,023 (164.16 KB)		
Optimizer params: 8,035,594 (30.65 MB)		

**Test Accuracy:** 0.2152

## Training Accuracy over Epochs:



# Model Training Report

## Configuration and Parameters:

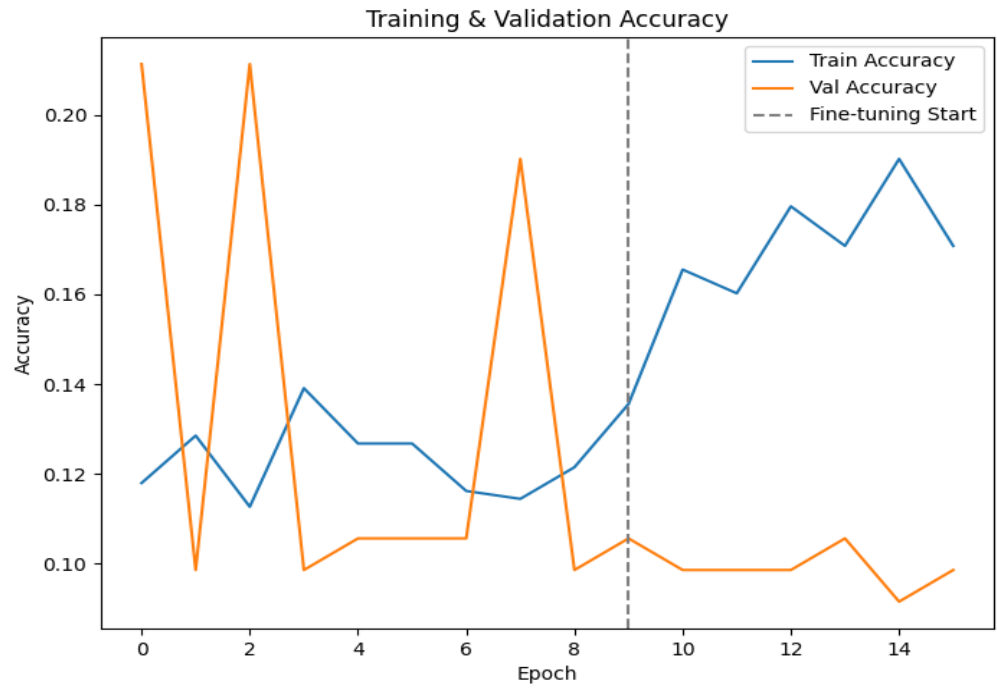
**Image Size:** (224, 224)  
**Batch Size:** 32  
**Number of Classes:** 8  
**Class Weights:** {0: 1.365, 1: 0.587, 2: 1.315, 3: 0.645, 4: 1.164, 5: 1.145, 6: 1.315, 7: 1.315}  
**Base Epochs:** 10  
**Epochs:** 30  
**Data Augmentation:** RandomFlip(none), RandomRotation(0.05 radians), RandomZoom(0.05), RandomContrast(0.05), RandomBrightness(0.05)  
**Gaussian Noise STD:** 0.0  
**Salt-Pepper Noise Amount:** 0.0  
**Train Size:** 568  
**Validation Size:** 142  
**Test Size:** 79  
**Comments:** Using EfficientNetB0, fine tune only the top 20 layers, actually removed gaussian and salt & pepper

## Model Summary:

Model: "sequential_1"		
Layer (type)	Output Shape	Param #
efficientnetb0 (Functional)	(None, 7, 7, 1280)	4,049,571
global_average_pooling2d (GlobalAveragePooling2D)	(None, 1280)	0
dropout (Dropout)	(None, 1280)	0
dense (Dense)	(None, 8)	10,248
Total params: 6,782,237 (25.87 MB)		
Trainable params: 1,361,208 (5.19 MB)		
Non-trainable params: 2,698,611 (10.29 MB)		
Optimizer params: 2,722,418 (10.39 MB)		

**Test Accuracy:** 0.0886

## Training Accuracy over Epochs:





# Model Training Report

## Configuration and Parameters:

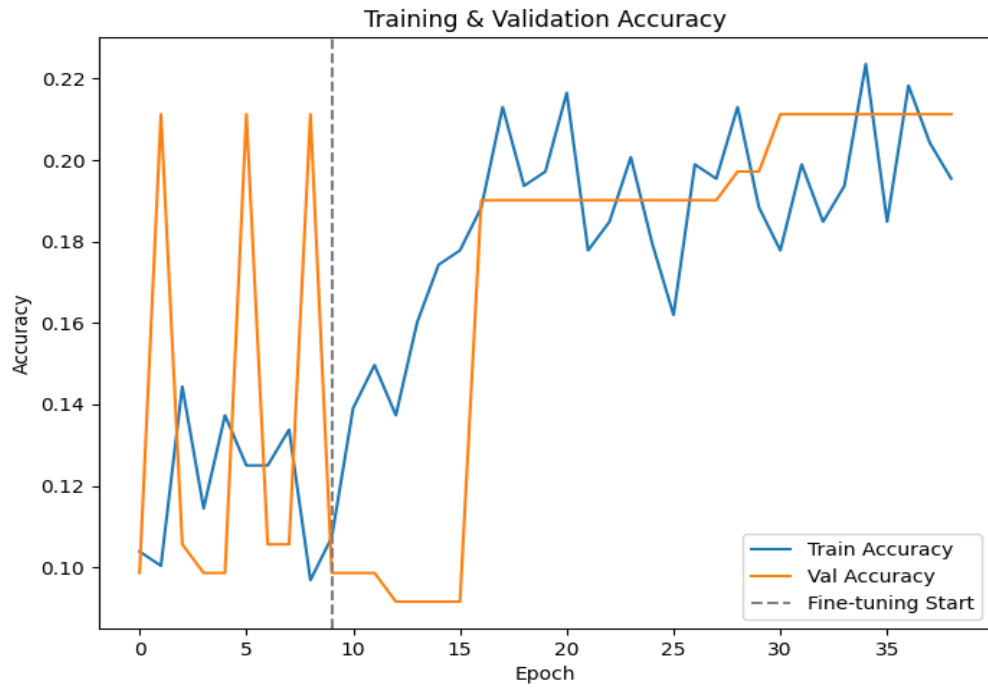
**Image Size:** (224, 224)  
**Batch Size:** 32  
**Number of Classes:** 8  
**Class Weights:** {0: 1.365, 1: 0.587, 2: 1.315, 3: 0.645, 4: 1.164, 5: 1.145, 6: 1.315, 7: 1.315}  
**Base Epochs:** 10  
**Epochs:** 30  
**Data Augmentation:** RandomFlip(horizontal), RandomRotation(0.1 radians), RandomZoom(0.1), RandomContrast(0.1), RandomBrightness(0.1)  
**Gaussian Noise STD:** 0.01  
**Salt-Pepper Noise Amount:** 0.01  
**Train Size:** 568  
**Validation Size:** 142  
**Test Size:** 79  
**Comments:** Using EfficientNetB0, fine tune only the top 50 layers, increased augmentation

## Model Summary:

Model: "sequential_1"		
Layer (type)	Output Shape	Param #
efficientnetb0 (Functional)	(None, 7, 7, 1280)	4,049,571
global_average_pooling2d (GlobalAveragePooling2D)	(None, 1280)	0
dropout (Dropout)	(None, 1280)	0
dense (Dense)	(None, 8)	10,248
Total params: 9,134,045 (34.84 MB)		
Trainable params: 2,537,112 (9.68 MB)		
Non-trainable params: 1,522,707 (5.81 MB)		
Optimizer params: 5,074,226 (19.36 MB)		

**Test Accuracy:** 0.2152

## Training Accuracy over Epochs:



# Model Training Report

## Configuration and Parameters:

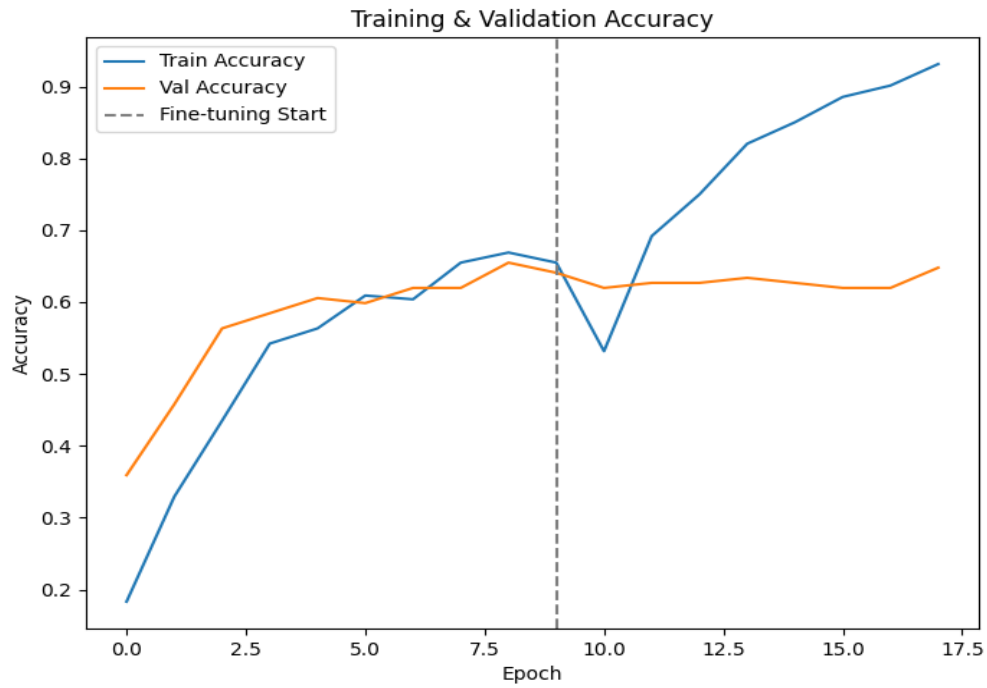
**Image Size:** (224, 224)  
**Batch Size:** 32  
**Number of Classes:** 8  
**Class Weights:** {0: 1.365, 1: 0.587, 2: 1.315, 3: 0.645, 4: 1.164, 5: 1.145, 6: 1.315, 7: 1.315}  
**Base Epochs:** 10  
**Epochs:** 30  
**Data Augmentation:** RandomFlip(horizontal), RandomRotation(0.1 radians), RandomZoom(0.1), RandomContrast(0.1), RandomBrightness(0.1)  
**Gaussian Noise STD:** 0  
**Salt-Pepper Noise Amount:** 0.0  
**Train Size:** 568  
**Validation Size:** 142  
**Test Size:** 79  
**Comments:** Using MobileNetV2

## Model Summary:

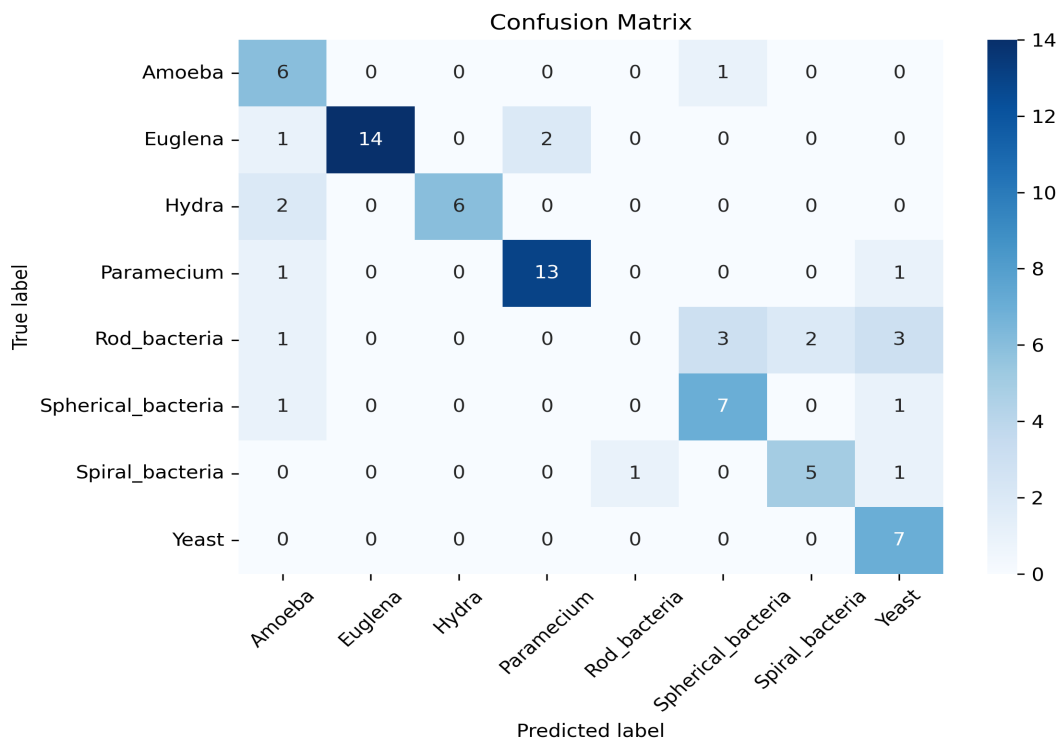
Model: "sequential_1"		
Layer (type)	Output Shape	Param #
mobilenetv2_1.00_224 (Functional)	(None, 7, 7, 1280)	2,257,984
global_average_pooling2d (GlobalAveragePooling2D)	(None, 1280)	0
dropout (Dropout)	(None, 1280)	0
dense (Dense)	(None, 8)	10,248
Total params: 5,998,937 (22.88 MB)		
Trainable params: 1,865,352 (7.12 MB)		
Non-trainable params: 402,880 (1.54 MB)		
Optimizer params: 3,730,705 (14.23 MB)		

**Test Accuracy:** 0.7342

## Training Accuracy over Epochs:



## Confusion Matrix:



# Model Training Report

## Configuration and Parameters:

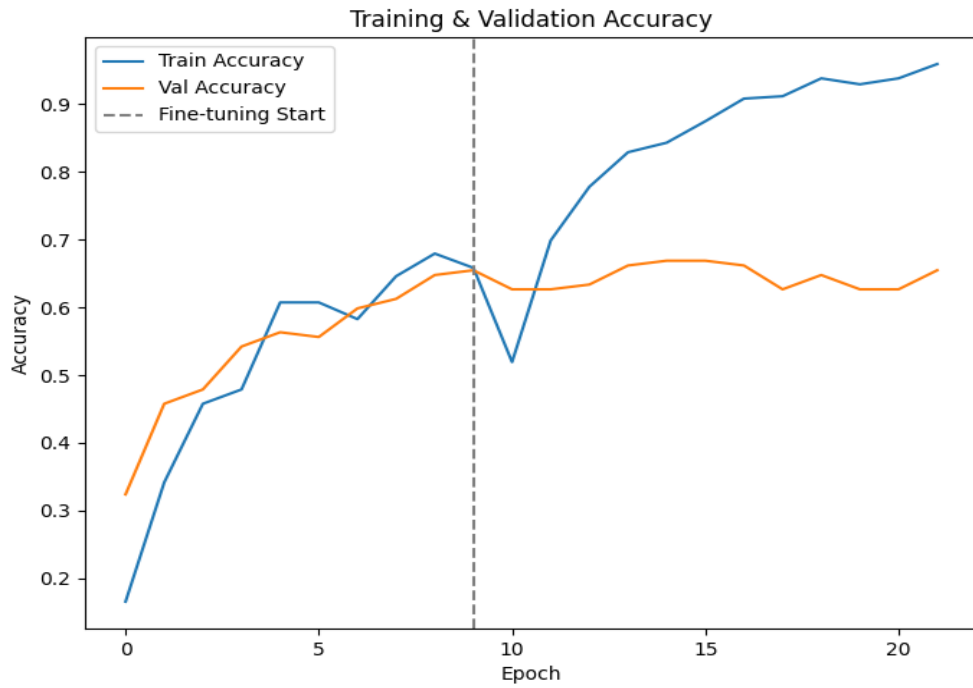
**Image Size:** (224, 224)  
**Batch Size:** 32  
**Number of Classes:** 8  
**Class Weights:** {0: 1.365, 1: 0.587, 2: 1.315, 3: 0.645, 4: 1.164, 5: 1.145, 6: 1.315, 7: 1.315}  
**Base Epochs:** 10  
**Epochs:** 30  
**Data Augmentation:** RandomFlip(horizontal), RandomRotation(0.1 radians), RandomZoom(0.1), RandomContrast(0.1), RandomBrightness(0.1)  
**Gaussian Noise STD:** 0.01  
**Salt-Pepper Noise Amount:** 0.01  
**Train Size:** 568  
**Validation Size:** 142  
**Test Size:** 79  
**Comments:** Using MobileNetV2, reintroduced salt and pepper + gaussian

## Model Summary:

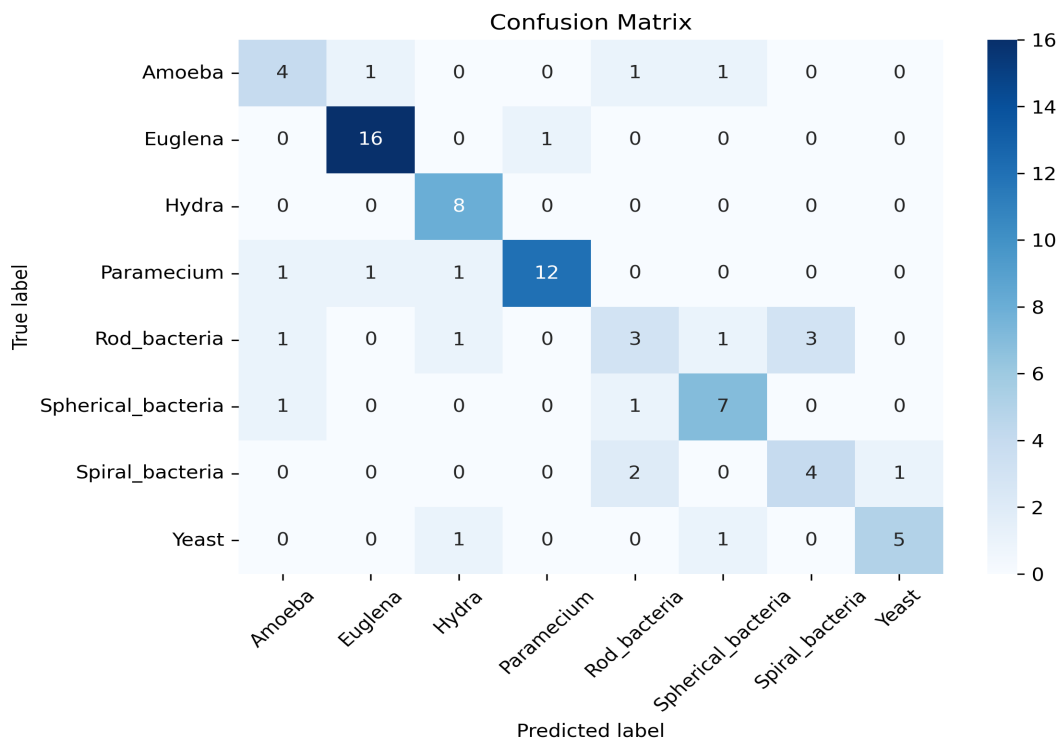
Model: "sequential_1"		
Layer (type)	Output Shape	Param #
mobilenetv2_1.00_224 (Functional)	(None, 7, 7, 1280)	2,257,984
global_average_pooling2d (GlobalAveragePooling2D)	(None, 1280)	0
dropout (Dropout)	(None, 1280)	0
dense (Dense)	(None, 8)	10,248
Total params: 5,998,937 (22.88 MB)		
Trainable params: 1,865,352 (7.12 MB)		
Non-trainable params: 402,880 (1.54 MB)		
Optimizer params: 3,730,705 (14.23 MB)		

**Test Accuracy:** 0.7468

## Training Accuracy over Epochs:



## Confusion Matrix:



# Model Training Report

## Configuration and Parameters:

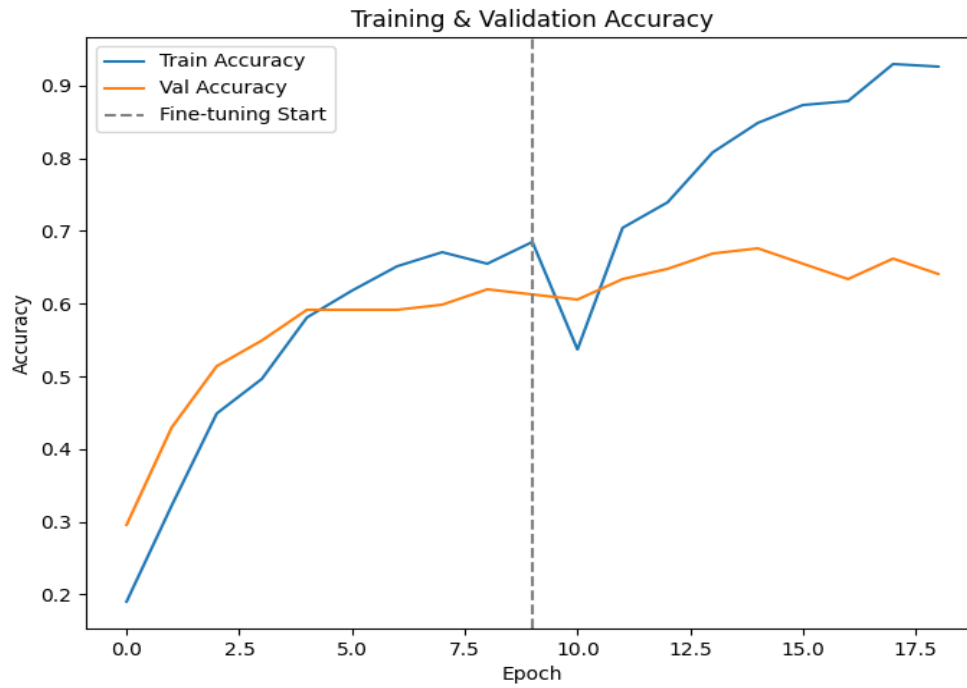
**Image Size:** (224, 224)  
**Batch Size:** 32  
**Number of Classes:** 8  
**Class Weights:** {0: 1.365, 1: 0.587, 2: 1.315, 3: 0.645, 4: 1.164, 5: 1.145, 6: 1.315, 7: 1.315}  
**Base Epochs:** 10  
**Epochs:** 30  
**Data Augmentation:** RandomFlip(horizontal), RandomRotation(0.1 radians), RandomZoom(0.1), RandomContrast(0.1), RandomBrightness(0.1)  
**Gaussian Noise STD:** 0.05  
**Salt-Pepper Noise Amount:** 0.05  
**Train Size:** 568  
**Validation Size:** 142  
**Test Size:** 79  
**Comments:** Using MobileNetV2, increased salt and pepper + gaussian

## Model Summary:

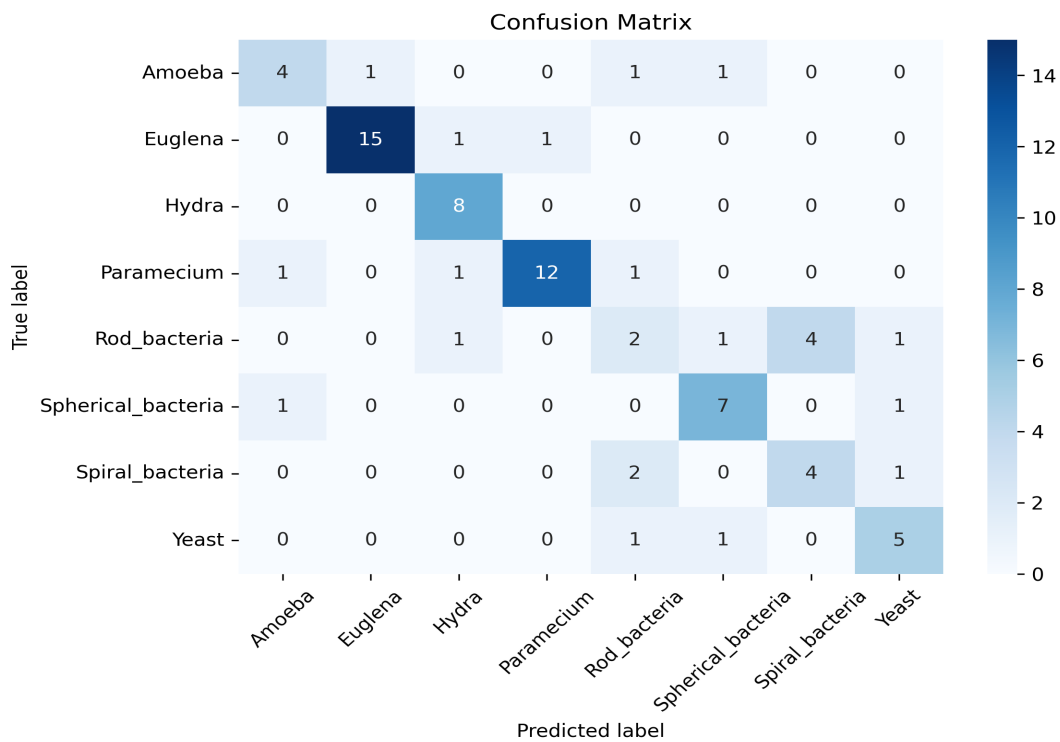
Model: "sequential_1"		
Layer (type)	Output Shape	Param #
mobilenetv2_1.00_224 (Functional)	(None, 7, 7, 1280)	2,257,984
global_average_pooling2d (GlobalAveragePooling2D)	(None, 1280)	0
dropout (Dropout)	(None, 1280)	0
dense (Dense)	(None, 8)	10,248
Total params: 5,998,937 (22.88 MB)		
Trainable params: 1,865,352 (7.12 MB)		
Non-trainable params: 402,880 (1.54 MB)		
Optimizer params: 3,730,705 (14.23 MB)		

**Test Accuracy:** 0.7215

## Training Accuracy over Epochs:



## Confusion Matrix:





# Model Training Report

## Configuration and Parameters:

**Image Size:** (224, 224)  
**Batch Size:** 32  
**Number of Classes:** 8  
**Class Weights:** {0: 1.365, 1: 0.587, 2: 1.315, 3: 0.645, 4: 1.164, 5: 1.145, 6: 1.315, 7: 1.315}  
**Base Epochs:** 10  
**Epochs:** 30  
**Data Augmentation:** RandomFlip({FLIP}), RandomRotation({ROTATION} radians), RandomZoom({ZOOM}), RandomContrast({CONTRAST}), RandomBrightness({LAMBDA})  
**Gaussian Noise STD:** 0.01  
**Salt-Pepper Noise Amount:** 0.01  
**Train Size:** 568  
**Validation Size:** 142  
**Test Size:** 79  
**Comments:** Using MobileNetV2, reduced salt and pepper + gaussian, increased brightness and contrast

## Model Summary:

Model: "sequential_1"		
Layer (type)	Output Shape	Param #
mobilenetv2_1.00_224 (Functional)	(None, 7, 7, 1280)	2,257,984
global_average_pooling2d (GlobalAveragePooling2D)	(None, 1280)	0
dropout (Dropout)	(None, 1280)	0
dense (Dense)	(None, 8)	10,248
Total params: 5,998,937 (22.88 MB)		
Trainable params: 1,865,352 (7.12 MB)		
Non-trainable params: 402,880 (1.54 MB)		
Optimizer params: 3,730,705 (14.23 MB)		

**Test Accuracy:** 0.7595

## Training Accuracy over Epochs:



# Model Training Report

## Configuration and Parameters:

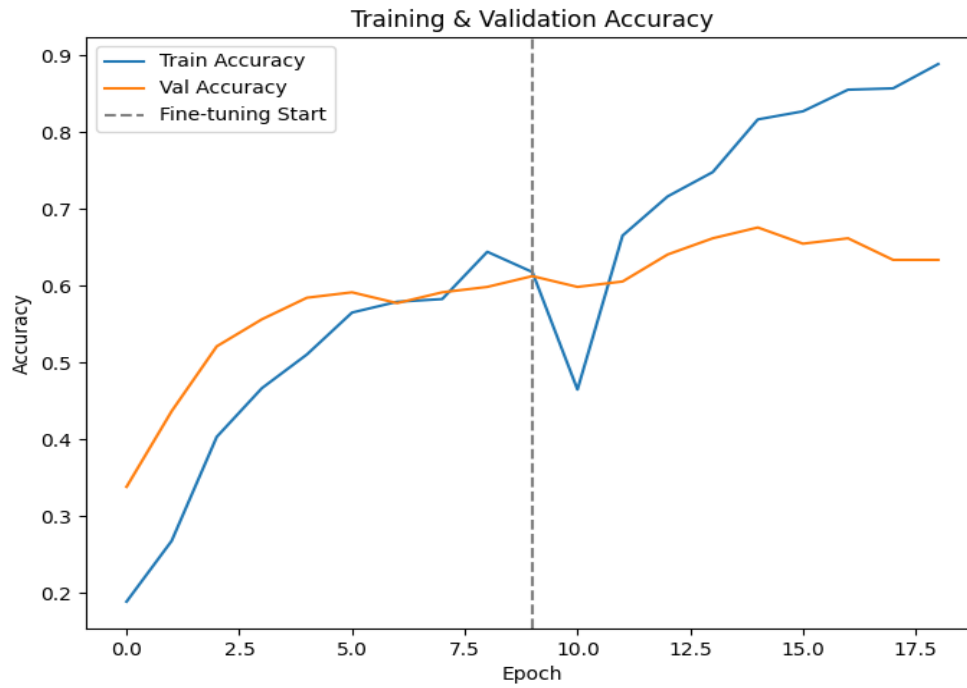
**Image Size:** (224, 224)  
**Batch Size:** 32  
**Number of Classes:** 8  
**Class Weights:** {0: 1.365, 1: 0.587, 2: 1.315, 3: 0.645, 4: 1.164, 5: 1.145, 6: 1.315, 7: 1.315}  
**Base Epochs:** 10  
**Epochs:** 30  
**Data Augmentation:** RandomFlip({FLIP}), RandomRotation({ROTATION} radians), RandomZoom({ZOOM}), RandomContrast({CONTRAST}), RandomBrightness({LAMBDA})  
**Gaussian Noise STD:** 0.01  
**Salt-Pepper Noise Amount:** 0.01  
**Train Size:** 568  
**Validation Size:** 142  
**Test Size:** 79  
**Comments:** Using MobileNetV2, stronger dropout

## Model Summary:

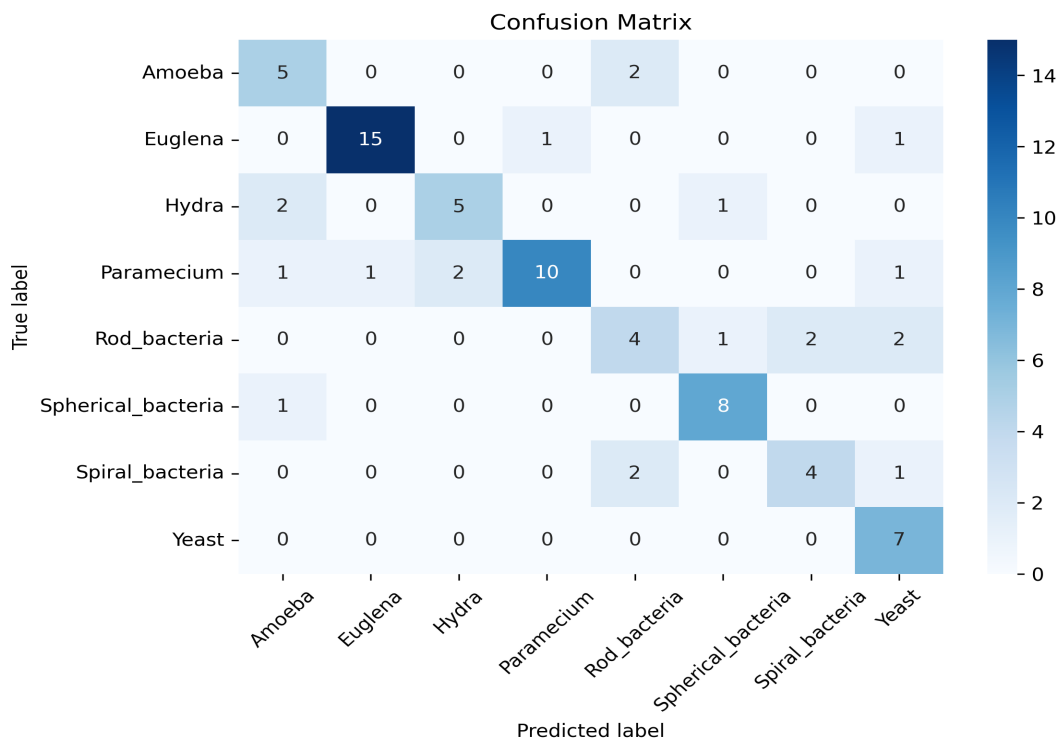
Model: "sequential_1"		
Layer (type)	Output Shape	Param #
mobilenetv2_1.00_224 (Functional)	(None, 7, 7, 1280)	2,257,984
global_average_pooling2d (GlobalAveragePooling2D)	(None, 1280)	0
dropout (Dropout)	(None, 1280)	0
dense (Dense)	(None, 8)	10,248
Total params: 5,998,937 (22.88 MB)		
Trainable params: 1,865,352 (7.12 MB)		
Non-trainable params: 402,880 (1.54 MB)		
Optimizer params: 3,730,705 (14.23 MB)		

**Test Accuracy:** 0.7342

## Training Accuracy over Epochs:



## Confusion Matrix:



# Model Training Report

## Configuration and Parameters:

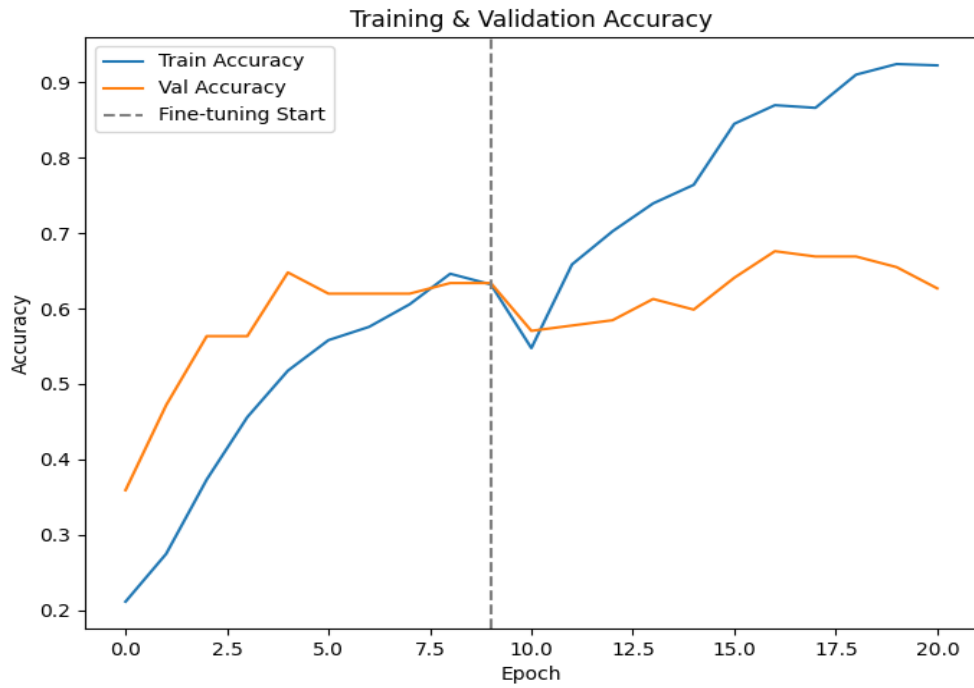
**Image Size:** (224, 224)  
**Batch Size:** 32  
**Number of Classes:** 8  
**Class Weights:** {0: 1.365, 1: 0.587, 2: 1.315, 3: 0.645, 4: 1.164, 5: 1.145, 6: 1.315, 7: 1.315}  
**Base Epochs:** 10  
**Epochs:** 30  
**Data Augmentation:** RandomFlip({FLIP}), RandomRotation({ROTATION} radians), RandomZoom({ZOOM}), RandomContrast({CONTRAST}), RandomBrightness({LAMBDA})  
**Gaussian Noise STD:** 0.01  
**Salt-Pepper Noise Amount:** 0.01  
**Train Size:** 568  
**Validation Size:** 142  
**Test Size:** 79  
**Comments:** Using MobileNetV2, increased zoom and rotation augmentation

## Model Summary:

Model: "sequential_1"		
Layer (type)	Output Shape	Param #
mobilenetv2_1.00_224 (Functional)	(None, 7, 7, 1280)	2,257,984
global_average_pooling2d (GlobalAveragePooling2D)	(None, 1280)	0
dropout (Dropout)	(None, 1280)	0
dense (Dense)	(None, 8)	10,248
Total params: 5,998,937 (22.88 MB)		
Trainable params: 1,865,352 (7.12 MB)		
Non-trainable params: 402,880 (1.54 MB)		
Optimizer params: 3,730,705 (14.23 MB)		

**Test Accuracy:** 0.7722

## Training Accuracy over Epochs:



## Confusion Matrix:

