```
PS D:\CMPM 146\P6\src> python train.py
Found 3838 files belonging to 3 classes.
Found 5000 images belonging to 3 classes.
* Training basic_model for 20 epochs
C:\Users\marco\AppData\Local\Programs\Python\Python312\Lib\site-packages\keras\src\layers\preprocessing\tf_data_layer.py:19: UserWarning: Do not pass an `input_sh
ape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `Input(shape)` object as the first layer in the model instead.
  super().__init__(**kwargs)
```

Model: "sequential"

Layer (type)	Output Shape	Param #
rescaling (Rescaling)	(None, 150, 150, 3)	0
conv2d (Conv2D)	(None, 148, 148, 32)	896
batch_normalization (BatchNormalization)	(None, 148, 148, 32)	128
max_pooling2d (MaxPooling2D)	(None, 74, 74, 32)	0
dropout (Dropout)	(None, 74, 74, 32)	0
conv2d_1 (Conv2D)	(None, 72, 72, 64)	18,496
batch_normalization_1 (BatchNormalization)	(None, 72, 72, 64)	256
max_pooling2d_1 (MaxPooling2D)	(None, 36, 36, 64)	0
dropout_1 (Dropout)	(None, 36, 36, 64)	0
conv2d_2 (Conv2D)	(None, 34, 34, 128)	73,856
batch_normalization_2 (BatchNormalization)	(None, 34, 34, 128)	512
max_pooling2d_2 (MaxPooling2D)	(None, 17, 17, 128)	0
dropout_2 (Dropout)	(None, 17, 17, 128)	0
conv2d_3 (Conv2D)	(None, 15, 15, 256)	295,168
batch_normalization_3 (BatchNormalization)	(None, 15, 15, 256)	1,024
max_pooling2d_3 (MaxPooling2D)	(None, 7, 7, 256)	0
dropout_3 (Dropout)	(None, 7, 7, 256)	0
flatten (Flatten)	(None, 12544)	0

```
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```

(BatchNormalization)		
max_pooling2d (MaxPooling2D)	(None, 74, 74, 32)	0
dropout (Dropout)	(None, 74, 74, 32)	0
conv2d_1 (Conv2D)	(None, 72, 72, 64)	18,496
batch_normalization_1 (BatchNormalization)	(None, 72, 72, 64)	256
max_pooling2d_1 (MaxPooling2D)	(None, 36, 36, 64)	0
dropout_1 (Dropout)	(None, 36, 36, 64)	0
conv2d_2 (Conv2D)	(None, 34, 34, 128)	73,856
batch_normalization_2 (BatchNormalization)	(None, 34, 34, 128)	512
max_pooling2d_2 (MaxPooling2D)	(None, 17, 17, 128)	0
dropout_2 (Dropout)	(None, 17, 17, 128)	0
conv2d_3 (Conv2D)	(None, 15, 15, 256)	295,168
batch_normalization_3 (BatchNormalization)	(None, 15, 15, 256)	1,024
max_pooling2d_3 (MaxPooling2D)	(None, 7, 7, 256)	0
dropout_3 (Dropout)	(None, 7, 7, 256)	0
flatten (Flatten)	(None, 12544)	0
dense (Dense)	(None, 512)	6,423,040
batch_normalization_4 (BatchNormalization)	(None, 512)	2,048
dropout_4 (Dropout)	(None, 512)	0
dense_1 (Dense)	(None, 3)	1,539

```
Total params: 6,816,963 (26.00 MB)
Trainable params: 6,814,979 (26.00 MB)
Non-trainable params: 1,984 (7.75 KB)
C:\Users\marco\AppData\Local\Programs\Python\Python312\Lib\site-packages\keras\src\trainers\data_adapters\py_dataset_adapter.py:121: UserWarning: Your `PyDataset`
  class should call `super().__init__(**kwargs)` in its constructor. `**kwargs` can include `workers`, `use_multiprocessing`, `max_queue_size`. Do not pass these a
  rguments to `fit()`, as they will be ignored.
```

```
Epoch 4/20
40/40 ──────────── 72s 2s/step - accuracy: 0.4506 - loss: 1.2464 - val_accuracy: 0.3280 - val_loss: 2.0789
Epoch 5/20
40/40 ──────────── 74s 2s/step - accuracy: 0.4799 - loss: 1.1337 - val_accuracy: 0.3260 - val_loss: 1.4353
Epoch 6/20
40/40 ──────────── 74s 2s/step - accuracy: 0.4962 - loss: 1.0764 - val_accuracy: 0.3490 - val_loss: 2.0146
Epoch 7/20
40/40 ──────────── 72s 2s/step - accuracy: 0.5350 - loss: 1.0278 - val_accuracy: 0.3500 - val_loss: 1.3190
Epoch 8/20
40/40 ──────────── 73s 2s/step - accuracy: 0.5681 - loss: 0.9375 - val_accuracy: 0.4560 - val_loss: 1.2040
Epoch 9/20
40/40 ──────────── 73s 2s/step - accuracy: 0.5966 - loss: 0.8596 - val_accuracy: 0.4350 - val_loss: 1.0461
Epoch 10/20
40/40 ──────────── 73s 2s/step - accuracy: 0.6185 - loss: 0.8566 - val_accuracy: 0.3600 - val_loss: 1.2067
Epoch 11/20
40/40 ──────────── 74s 2s/step - accuracy: 0.6341 - loss: 0.8112 - val_accuracy: 0.5090 - val_loss: 1.0880
Epoch 12/20
40/40 ──────────── 74s 2s/step - accuracy: 0.6539 - loss: 0.7758 - val_accuracy: 0.4910 - val_loss: 1.1167
Epoch 13/20
40/40 ──────────── 73s 2s/step - accuracy: 0.6789 - loss: 0.7525 - val_accuracy: 0.4540 - val_loss: 1.2240
Epoch 14/20
40/40 ──────────── 73s 2s/step - accuracy: 0.6810 - loss: 0.7291 - val_accuracy: 0.4650 - val_loss: 1.3229
Epoch 15/20
40/40 ──────────── 73s 2s/step - accuracy: 0.6849 - loss: 0.7141 - val_accuracy: 0.4360 - val_loss: 3.4003
Epoch 16/20
40/40 ──────────── 73s 2s/step - accuracy: 0.6940 - loss: 0.7075 - val_accuracy: 0.6880 - val_loss: 0.7526
Epoch 17/20
40/40 ──────────── 73s 2s/step - accuracy: 0.7115 - loss: 0.6729 - val_accuracy: 0.5440 - val_loss: 1.0375
Epoch 18/20
40/40 ──────────── 76s 2s/step - accuracy: 0.7169 - loss: 0.6728 - val_accuracy: 0.5830 - val_loss: 1.1948
Epoch 19/20
40/40 ──────────── 73s 2s/step - accuracy: 0.7281 - loss: 0.6639 - val_accuracy: 0.4350 - val_loss: 1.5572
40/40 ──────────── 72s 2s/step - accuracy: 0.7168 - loss: 0.6556 - val_accuracy: 0.7310 - val_loss: 0.6769
* Evaluating basic_model
30/30 ──────────── 9s 297ms/step - accuracy: 0.6870 - loss: 0.6553
* Confusion Matrix for basic_model
30/30 ──────────── 9s 296ms/step
2025-02-18 20:50:51.910588: I tensorflow/core/framework/local_rendezvous.cc:405] Local rendezvous is aborting with status: OUT_OF_RANGE: End of sequence
[[1146  565   63]
 [ 122 1093   18]
 [  83  208  540]]
* Model saved as results/basic_model_20_epochs_timestamp_1739940651.keras
Training Accuracy: [0.4000000059604645, 0.4203999936580658, 0.4449999928474426, 0.4447999975681305, 0.48660001158714294, 0.5175999999046326, 0.546000038146973, 0
.572600007057189, 0.5899999737739563, 0.6169999837875366, 0.645600020854675, 0.6502000093460083, 0.6844000220298767, 0.6815999746322632, 0.6805999875068665, 0.7
006000280380249, 0.7071999907493591, 0.7178000211715698, 0.7305999994277954, 0.7264000177383423]
Validation Accuracy: [0.3490000069141388, 0.328000009059906, 0.3659999966621399, 0.328000009059906, 0.32600000500679016, 0.3490000069141388, 0.349999994039535, 0
.4560000002384186, 0.4350000023841858, 0.36000001430511475, 0.5090000033378601, 0.4909999966621399, 0.45399999618530273, 0.4650000035762787, 0.4359999895095825, 0
.6880000233650208, 0.5440000295639038, 0.5830000042915344, 0.4350000023841858, 0.7310000061988831]
Training Loss: [1.755144715309143, 1.394848108291626, 1.2527685165405273, 1.2328165769577026, 1.1174354553222656, 1.0501110553741455, 1.0031254291534424, 0.921974
5397567749, 0.8809623122215271, 0.846251368522644, 0.801044762134552, 0.7792332768440247, 0.7412984371185303, 0.7263500690460205, 0.724699854850769, 0.69136291742
32483, 0.6812498569488525, 0.6700064539909363, 0.6547539234161377, 0.6459265351295471]
Validation Loss: [3.498161554336548, 1.8656947612762451, 2.100598096847534, 2.078855514526367, 1.4353210926055908, 2.0146071910858154, 1.3189858198165894, 1.20403
90968322754, 1.0460736751556396, 1.2067193984985352, 1.0879969596862793, 1.1167036294937134, 1.223968744277954, 1.322891354560852, 3.4003469944000244, 0.752600610
2561951, 1.037490725517273, 1.1947981119155884, 1.557210087776184, 0.6768568158149719]
Epochs: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20]
```