

# AML\_HW6

May 4, 2018

## 1 Task 1 [10 Points]

- Run a multilayer perceptron (feed forward neural network) with two hidden layers and rectified linear nonlinearities on the iris dataset using the keras Sequential interface .
- Include code for selecting regularization strength and number of hidden units using GridSearchCV and evaluation on an independent test-set.

```
In [2]: from sklearn import datasets
        from keras.datasets import mnist
        from keras.wrappers.scikit_learn import KerasClassifier
        from sklearn.model_selection import GridSearchCV, StratifiedShuffleSplit
        from keras.models import Sequential
        from keras.layers import Dense, Dropout, Flatten, Activation
        from keras.layers import Conv2D, MaxPooling2D
        from keras.layers import BatchNormalization
        import keras
        import scipy
        import numpy as np
        import matplotlib.pyplot as plt
        import pandas as pd
        from keras import regularizers
        import tensorflow as tf
        sess = tf.Session(config=tf.ConfigProto(log_device_placement=True))
```

**Loading dataset:**

```
In [3]: iris = datasets.load_iris()

        X = iris['data']
        y = iris['target']

        num_classes = np.unique(y).shape[0]
```

**StratifiedShuffleSplit of the dataset:**

```
In [4]: sss = StratifiedShuffleSplit(n_splits=1, random_state=0)

        for train_idx, test_idx in sss.split(X, y):
```

```

X_train = X[train_idx]
X_test = X[test_idx]
y_train = y[train_idx]
y_test = y[test_idx]

```

```

In [5]: y_train = keras.utils.to_categorical(y_train, num_classes)
        y_test = keras.utils.to_categorical(y_test, num_classes)

```

### Model definition:

```

In [6]: def make_model( num_classes=3, input_shape=4,
                        optimizer="adam", hidden_size_L1=32,
                        hidden_size_L2=32, regularize=0.01):
    model = Sequential([
        Dense(hidden_size_L1,
              input_shape=(input_shape,),
              activation='relu',
              kernel_regularizer=regularizers.l2(regularize)),
        Dense(hidden_size_L2,
              activation='relu',
              kernel_regularizer=regularizers.l2(regularize)),
        Dense(num_classes,
              activation='softmax')
    ])
    model.compile(optimizer=optimizer,
                  loss="categorical_crossentropy",
                  metrics=['accuracy'])
    return model

```

```

In [7]: clf = KerasClassifier(make_model)
        param_grid = {'epochs': [10,20],
                      'batch_size': [50],
                      'regularize': [0.01,0.1,1],
                      'hidden_size_L1': [32,64,128],
                      'hidden_size_L2': [64,128,256]}
        grid = GridSearchCV(clf, param_grid=param_grid, cv=5)
        grid.fit(X_train, y_train)

```

Epoch 1/10

108/108 [=====] - 1s 6ms/step - loss: 1.6186 - acc: 0.3426

Epoch 2/10

108/108 [=====] - 0s 111us/step - loss: 1.5266 - acc: 0.4352

Epoch 3/10

108/108 [=====] - 0s 111us/step - loss: 1.4580 - acc: 0.6667

Epoch 4/10

108/108 [=====] - 0s 115us/step - loss: 1.4047 - acc: 0.6852

Epoch 5/10

108/108 [=====] - 0s 107us/step - loss: 1.3574 - acc: 0.6852

Epoch 6/10  
108/108 [=====] - 0s 104us/step - loss: 1.3194 - acc: 0.6852  
Epoch 7/10  
108/108 [=====] - 0s 103us/step - loss: 1.2785 - acc: 0.6852  
Epoch 8/10  
108/108 [=====] - 0s 103us/step - loss: 1.2400 - acc: 0.6852  
Epoch 9/10  
108/108 [=====] - 0s 103us/step - loss: 1.2038 - acc: 0.6852  
Epoch 10/10  
108/108 [=====] - 0s 111us/step - loss: 1.1711 - acc: 0.6852  
27/27 [=====] - 0s 2ms/step  
108/108 [=====] - 0s 60us/step  
Epoch 1/10  
108/108 [=====] - 0s 5ms/step - loss: 1.6519 - acc: 0.2778  
Epoch 2/10  
108/108 [=====] - 0s 111us/step - loss: 1.5725 - acc: 0.3148  
Epoch 3/10  
108/108 [=====] - 0s 107us/step - loss: 1.4967 - acc: 0.3426  
Epoch 4/10  
108/108 [=====] - 0s 103us/step - loss: 1.4257 - acc: 0.6204  
Epoch 5/10  
108/108 [=====] - 0s 112us/step - loss: 1.3616 - acc: 0.6852  
Epoch 6/10  
108/108 [=====] - 0s 106us/step - loss: 1.2997 - acc: 0.6852  
Epoch 7/10  
108/108 [=====] - 0s 110us/step - loss: 1.2469 - acc: 0.6852  
Epoch 8/10  
108/108 [=====] - 0s 105us/step - loss: 1.2015 - acc: 0.6852  
Epoch 9/10  
108/108 [=====] - 0s 101us/step - loss: 1.1566 - acc: 0.6852  
Epoch 10/10  
108/108 [=====] - 0s 109us/step - loss: 1.1139 - acc: 0.6944  
27/27 [=====] - 0s 3ms/step  
108/108 [=====] - 0s 46us/step  
Epoch 1/10  
108/108 [=====] - 1s 5ms/step - loss: 1.8667 - acc: 0.3704  
Epoch 2/10  
108/108 [=====] - 0s 108us/step - loss: 1.6696 - acc: 0.3796  
Epoch 3/10  
108/108 [=====] - 0s 105us/step - loss: 1.5200 - acc: 0.5556  
Epoch 4/10  
108/108 [=====] - 0s 105us/step - loss: 1.4394 - acc: 0.7870  
Epoch 5/10  
108/108 [=====] - 0s 117us/step - loss: 1.4097 - acc: 0.6296  
Epoch 6/10  
108/108 [=====] - 0s 111us/step - loss: 1.3909 - acc: 0.6204  
Epoch 7/10  
108/108 [=====] - 0s 108us/step - loss: 1.3463 - acc: 0.6296

Epoch 8/10  
108/108 [=====] - 0s 104us/step - loss: 1.2926 - acc: 0.6296  
Epoch 9/10  
108/108 [=====] - 0s 111us/step - loss: 1.2405 - acc: 0.6759  
Epoch 10/10  
108/108 [=====] - 0s 104us/step - loss: 1.2095 - acc: 0.9630  
27/27 [=====] - 0s 3ms/step  
108/108 [=====] - 0s 49us/step  
Epoch 1/10  
108/108 [=====] - 1s 5ms/step - loss: 2.0657 - acc: 0.3333  
Epoch 2/10  
108/108 [=====] - 0s 104us/step - loss: 1.8741 - acc: 0.2870  
Epoch 3/10  
108/108 [=====] - 0s 101us/step - loss: 1.7167 - acc: 0.3519  
Epoch 4/10  
108/108 [=====] - 0s 104us/step - loss: 1.6089 - acc: 0.3611  
Epoch 5/10  
108/108 [=====] - 0s 103us/step - loss: 1.5153 - acc: 0.3611  
Epoch 6/10  
108/108 [=====] - 0s 106us/step - loss: 1.4310 - acc: 0.3611  
Epoch 7/10  
108/108 [=====] - 0s 106us/step - loss: 1.3652 - acc: 0.3981  
Epoch 8/10  
108/108 [=====] - 0s 102us/step - loss: 1.3131 - acc: 0.6667  
Epoch 9/10  
108/108 [=====] - 0s 106us/step - loss: 1.2660 - acc: 0.6667  
Epoch 10/10  
108/108 [=====] - 0s 119us/step - loss: 1.2233 - acc: 0.6667  
27/27 [=====] - 0s 3ms/step  
108/108 [=====] - 0s 44us/step  
Epoch 1/10  
108/108 [=====] - 1s 5ms/step - loss: 1.8785 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 103us/step - loss: 1.6388 - acc: 0.3148  
Epoch 3/10  
108/108 [=====] - 0s 109us/step - loss: 1.5100 - acc: 0.2963  
Epoch 4/10  
108/108 [=====] - 0s 105us/step - loss: 1.4762 - acc: 0.4352  
Epoch 5/10  
108/108 [=====] - 0s 106us/step - loss: 1.4500 - acc: 0.6389  
Epoch 6/10  
108/108 [=====] - 0s 110us/step - loss: 1.3919 - acc: 0.6852  
Epoch 7/10  
108/108 [=====] - 0s 108us/step - loss: 1.3301 - acc: 0.7037  
Epoch 8/10  
108/108 [=====] - 0s 104us/step - loss: 1.2939 - acc: 0.7037  
Epoch 9/10  
108/108 [=====] - 0s 103us/step - loss: 1.2605 - acc: 0.6667

Epoch 10/10  
108/108 [=====] - 0s 104us/step - loss: 1.2253 - acc: 0.7222  
27/27 [=====] - 0s 4ms/step  
108/108 [=====] - 0s 41us/step  
Epoch 1/10  
108/108 [=====] - 1s 5ms/step - loss: 6.1561 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 110us/step - loss: 5.9268 - acc: 0.3148  
Epoch 3/10  
108/108 [=====] - 0s 103us/step - loss: 5.7049 - acc: 0.6389  
Epoch 4/10  
108/108 [=====] - 0s 105us/step - loss: 5.5047 - acc: 0.6574  
Epoch 5/10  
108/108 [=====] - 0s 98us/step - loss: 5.3164 - acc: 0.6759  
Epoch 6/10  
108/108 [=====] - 0s 112us/step - loss: 5.1511 - acc: 0.7963  
Epoch 7/10  
108/108 [=====] - 0s 104us/step - loss: 4.9992 - acc: 0.6852  
Epoch 8/10  
108/108 [=====] - 0s 106us/step - loss: 4.8566 - acc: 0.6852  
Epoch 9/10  
108/108 [=====] - 0s 104us/step - loss: 4.7210 - acc: 0.6852  
Epoch 10/10  
108/108 [=====] - 0s 100us/step - loss: 4.5860 - acc: 0.6852  
27/27 [=====] - 0s 4ms/step  
108/108 [=====] - 0s 63us/step  
Epoch 1/10  
108/108 [=====] - 1s 6ms/step - loss: 6.9620 - acc: 0.3519  
Epoch 2/10  
108/108 [=====] - 0s 120us/step - loss: 6.4606 - acc: 0.2593  
Epoch 3/10  
108/108 [=====] - 0s 109us/step - loss: 6.0937 - acc: 0.0093  
Epoch 4/10  
108/108 [=====] - 0s 112us/step - loss: 5.8422 - acc: 0.3241  
Epoch 5/10  
108/108 [=====] - 0s 122us/step - loss: 5.6945 - acc: 0.5648  
Epoch 6/10  
108/108 [=====] - 0s 135us/step - loss: 5.5537 - acc: 0.6204  
Epoch 7/10  
108/108 [=====] - 0s 132us/step - loss: 5.3985 - acc: 0.5185  
Epoch 8/10  
108/108 [=====] - 0s 139us/step - loss: 5.2364 - acc: 0.3611  
Epoch 9/10  
108/108 [=====] - 0s 106us/step - loss: 5.0851 - acc: 0.3426  
Epoch 10/10  
108/108 [=====] - 0s 107us/step - loss: 4.9419 - acc: 0.3611  
27/27 [=====] - 0s 5ms/step  
108/108 [=====] - 0s 44us/step

Epoch 1/10  
108/108 [=====] - 1s 6ms/step - loss: 6.7716 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 106us/step - loss: 6.3966 - acc: 0.3148  
Epoch 3/10  
108/108 [=====] - 0s 107us/step - loss: 6.0560 - acc: 0.3056  
Epoch 4/10  
108/108 [=====] - 0s 107us/step - loss: 5.7760 - acc: 0.2593  
Epoch 5/10  
108/108 [=====] - 0s 131us/step - loss: 5.5546 - acc: 0.3704  
Epoch 6/10  
108/108 [=====] - 0s 106us/step - loss: 5.3652 - acc: 0.3704  
Epoch 7/10  
108/108 [=====] - 0s 110us/step - loss: 5.1950 - acc: 0.3704  
Epoch 8/10  
108/108 [=====] - 0s 110us/step - loss: 5.0418 - acc: 0.6574  
Epoch 9/10  
108/108 [=====] - 0s 117us/step - loss: 4.8938 - acc: 0.6852  
Epoch 10/10  
108/108 [=====] - 0s 111us/step - loss: 4.7489 - acc: 0.6852  
27/27 [=====] - 0s 5ms/step  
108/108 [=====] - 0s 48us/step  
Epoch 1/10  
108/108 [=====] - 1s 6ms/step - loss: 6.3021 - acc: 0.3333  
Epoch 2/10  
108/108 [=====] - 0s 103us/step - loss: 6.0644 - acc: 0.3333  
Epoch 3/10  
108/108 [=====] - 0s 111us/step - loss: 5.8529 - acc: 0.4630  
Epoch 4/10  
108/108 [=====] - 0s 115us/step - loss: 5.6707 - acc: 0.3611  
Epoch 5/10  
108/108 [=====] - 0s 137us/step - loss: 5.5072 - acc: 0.4352  
Epoch 6/10  
108/108 [=====] - 0s 118us/step - loss: 5.3471 - acc: 0.6667  
Epoch 7/10  
108/108 [=====] - 0s 106us/step - loss: 5.1907 - acc: 0.6667  
Epoch 8/10  
108/108 [=====] - 0s 111us/step - loss: 5.0406 - acc: 0.6667  
Epoch 9/10  
108/108 [=====] - 0s 114us/step - loss: 4.8961 - acc: 0.6667  
Epoch 10/10  
108/108 [=====] - 0s 106us/step - loss: 4.7563 - acc: 0.6852  
27/27 [=====] - 0s 5ms/step  
108/108 [=====] - 0s 48us/step  
Epoch 1/10  
108/108 [=====] - 1s 6ms/step - loss: 6.8984 - acc: 0.3519  
Epoch 2/10  
108/108 [=====] - 0s 110us/step - loss: 6.4806 - acc: 0.3519

Epoch 3/10  
108/108 [=====] - 0s 101us/step - loss: 6.1090 - acc: 0.3519  
Epoch 4/10  
108/108 [=====] - 0s 107us/step - loss: 5.8093 - acc: 0.4444  
Epoch 5/10  
108/108 [=====] - 0s 102us/step - loss: 5.5933 - acc: 0.7037  
Epoch 6/10  
108/108 [=====] - 0s 107us/step - loss: 5.4224 - acc: 0.8241  
Epoch 7/10  
108/108 [=====] - 0s 101us/step - loss: 5.2709 - acc: 0.6667  
Epoch 8/10  
108/108 [=====] - 0s 101us/step - loss: 5.1255 - acc: 0.6667  
Epoch 9/10  
108/108 [=====] - 0s 105us/step - loss: 4.9835 - acc: 0.6667  
Epoch 10/10  
108/108 [=====] - 0s 110us/step - loss: 4.8384 - acc: 0.6667  
27/27 [=====] - 0s 6ms/step  
108/108 [=====] - 0s 44us/step  
Epoch 1/10  
108/108 [=====] - 1s 6ms/step - loss: 50.8991 - acc: 0.6574  
Epoch 2/10  
108/108 [=====] - 0s 109us/step - loss: 49.4295 - acc: 0.6759  
Epoch 3/10  
108/108 [=====] - 0s 119us/step - loss: 47.8502 - acc: 0.6852  
Epoch 4/10  
108/108 [=====] - 0s 113us/step - loss: 46.2726 - acc: 0.6852  
Epoch 5/10  
108/108 [=====] - 0s 109us/step - loss: 44.7214 - acc: 0.6852  
Epoch 6/10  
108/108 [=====] - 0s 120us/step - loss: 43.2070 - acc: 0.6852  
Epoch 7/10  
108/108 [=====] - 0s 109us/step - loss: 41.7341 - acc: 0.6852  
Epoch 8/10  
108/108 [=====] - 0s 102us/step - loss: 40.3049 - acc: 0.6944  
Epoch 9/10  
108/108 [=====] - 0s 118us/step - loss: 38.9184 - acc: 0.6944  
Epoch 10/10  
108/108 [=====] - 0s 115us/step - loss: 37.5754 - acc: 0.6944  
27/27 [=====] - 0s 6ms/step  
108/108 [=====] - 0s 46us/step  
Epoch 1/10  
108/108 [=====] - 1s 7ms/step - loss: 53.4633 - acc: 0.3333  
Epoch 2/10  
108/108 [=====] - 0s 114us/step - loss: 51.7200 - acc: 0.3333  
Epoch 3/10  
108/108 [=====] - 0s 109us/step - loss: 49.8695 - acc: 0.3333  
Epoch 4/10  
108/108 [=====] - 0s 116us/step - loss: 48.0459 - acc: 0.3333

Epoch 5/10  
108/108 [=====] - 0s 120us/step - loss: 46.3054 - acc: 0.3333  
Epoch 6/10  
108/108 [=====] - 0s 104us/step - loss: 44.6576 - acc: 0.3333  
Epoch 7/10  
108/108 [=====] - 0s 108us/step - loss: 43.1088 - acc: 0.3333  
Epoch 8/10  
108/108 [=====] - 0s 113us/step - loss: 41.6394 - acc: 0.3333  
Epoch 9/10  
108/108 [=====] - 0s 155us/step - loss: 40.2194 - acc: 0.3333  
Epoch 10/10  
108/108 [=====] - 0s 112us/step - loss: 38.8514 - acc: 0.2963  
27/27 [=====] - 0s 6ms/step  
108/108 [=====] - 0s 48us/step  
Epoch 1/10  
108/108 [=====] - 1s 7ms/step - loss: 50.8849 - acc: 0.6852  
Epoch 2/10  
108/108 [=====] - 0s 108us/step - loss: 49.3338 - acc: 0.6852  
Epoch 3/10  
108/108 [=====] - 0s 121us/step - loss: 47.6826 - acc: 0.6759  
Epoch 4/10  
108/108 [=====] - 0s 143us/step - loss: 46.0703 - acc: 0.6574  
Epoch 5/10  
108/108 [=====] - 0s 150us/step - loss: 44.4935 - acc: 0.7407  
Epoch 6/10  
108/108 [=====] - 0s 141us/step - loss: 42.9771 - acc: 0.8056  
Epoch 7/10  
108/108 [=====] - 0s 106us/step - loss: 41.5010 - acc: 0.6296  
Epoch 8/10  
108/108 [=====] - 0s 126us/step - loss: 40.0652 - acc: 0.6204  
Epoch 9/10  
108/108 [=====] - 0s 114us/step - loss: 38.6706 - acc: 0.6389  
Epoch 10/10  
108/108 [=====] - 0s 101us/step - loss: 37.3198 - acc: 0.6759  
27/27 [=====] - 0s 7ms/step  
108/108 [=====] - 0s 58us/step  
Epoch 1/10  
108/108 [=====] - 1s 7ms/step - loss: 51.5996 - acc: 0.3056  
Epoch 2/10  
108/108 [=====] - 0s 109us/step - loss: 49.9625 - acc: 0.3056  
Epoch 3/10  
108/108 [=====] - 0s 121us/step - loss: 48.2509 - acc: 0.3056  
Epoch 4/10  
108/108 [=====] - 0s 106us/step - loss: 46.5877 - acc: 0.3056  
Epoch 5/10  
108/108 [=====] - 0s 135us/step - loss: 44.9977 - acc: 0.4074  
Epoch 6/10  
108/108 [=====] - 0s 117us/step - loss: 43.4594 - acc: 0.6944



Epoch 7/10  
108/108 [=====] - 0s 116us/step - loss: 41.9727 - acc: 0.7130  
Epoch 8/10  
108/108 [=====] - 0s 110us/step - loss: 40.5297 - acc: 0.7778  
Epoch 9/10  
108/108 [=====] - 0s 118us/step - loss: 39.1321 - acc: 0.8056  
Epoch 10/10  
108/108 [=====] - 0s 117us/step - loss: 37.7764 - acc: 0.6759  
27/27 [=====] - 0s 7ms/step  
108/108 [=====] - 0s 50us/step  
Epoch 1/10  
108/108 [=====] - 1s 7ms/step - loss: 52.2596 - acc: 0.1574  
Epoch 2/10  
108/108 [=====] - 0s 112us/step - loss: 50.6382 - acc: 0.0000e+00  
Epoch 3/10  
108/108 [=====] - 0s 103us/step - loss: 48.9528 - acc: 0.0000e+00  
Epoch 4/10  
108/108 [=====] - 0s 104us/step - loss: 47.3072 - acc: 0.0093  
Epoch 5/10  
108/108 [=====] - 0s 118us/step - loss: 45.7049 - acc: 0.2778  
Epoch 6/10  
108/108 [=====] - 0s 106us/step - loss: 44.1542 - acc: 0.3148  
Epoch 7/10  
108/108 [=====] - 0s 104us/step - loss: 42.6575 - acc: 0.3426  
Epoch 8/10  
108/108 [=====] - 0s 101us/step - loss: 41.2027 - acc: 0.4722  
Epoch 9/10  
108/108 [=====] - 0s 116us/step - loss: 39.7967 - acc: 0.4907  
Epoch 10/10  
108/108 [=====] - 0s 103us/step - loss: 38.4346 - acc: 0.5185  
27/27 [=====] - 0s 8ms/step  
108/108 [=====] - 0s 45us/step  
Epoch 1/10  
108/108 [=====] - 1s 8ms/step - loss: 2.3203 - acc: 0.3426  
Epoch 2/10  
108/108 [=====] - 0s 115us/step - loss: 1.9641 - acc: 0.4167  
Epoch 3/10  
108/108 [=====] - 0s 148us/step - loss: 1.6811 - acc: 0.5556  
Epoch 4/10  
108/108 [=====] - 0s 105us/step - loss: 1.5080 - acc: 0.8333  
Epoch 5/10  
108/108 [=====] - 0s 106us/step - loss: 1.4486 - acc: 0.5741  
Epoch 6/10  
108/108 [=====] - 0s 107us/step - loss: 1.4235 - acc: 0.4630  
Epoch 7/10  
108/108 [=====] - 0s 103us/step - loss: 1.3720 - acc: 0.5463  
Epoch 8/10  
108/108 [=====] - 0s 110us/step - loss: 1.3040 - acc: 0.6667

Epoch 9/10  
108/108 [=====] - 0s 112us/step - loss: 1.2460 - acc: 0.6852  
Epoch 10/10  
108/108 [=====] - 0s 106us/step - loss: 1.1976 - acc: 0.6944  
27/27 [=====] - 0s 14ms/step  
108/108 [=====] - 0s 54us/step  
Epoch 1/10  
108/108 [=====] - 1s 8ms/step - loss: 1.8099 - acc: 0.3796  
Epoch 2/10  
108/108 [=====] - 0s 110us/step - loss: 1.5957 - acc: 0.3426  
Epoch 3/10  
108/108 [=====] - 0s 104us/step - loss: 1.4609 - acc: 0.3611  
Epoch 4/10  
108/108 [=====] - 0s 109us/step - loss: 1.3687 - acc: 0.6852  
Epoch 5/10  
108/108 [=====] - 0s 111us/step - loss: 1.2995 - acc: 0.6852  
Epoch 6/10  
108/108 [=====] - 0s 109us/step - loss: 1.2256 - acc: 0.6852  
Epoch 7/10  
108/108 [=====] - 0s 115us/step - loss: 1.1490 - acc: 0.7685  
Epoch 8/10  
108/108 [=====] - 0s 109us/step - loss: 1.0865 - acc: 0.8148  
Epoch 9/10  
108/108 [=====] - 0s 108us/step - loss: 1.0390 - acc: 0.7963  
Epoch 10/10  
108/108 [=====] - 0s 110us/step - loss: 1.0028 - acc: 0.7870  
27/27 [=====] - 0s 9ms/step  
108/108 [=====] - 0s 57us/step  
Epoch 1/10  
108/108 [=====] - 1s 8ms/step - loss: 1.8856 - acc: 0.2407  
Epoch 2/10  
108/108 [=====] - 0s 116us/step - loss: 1.6626 - acc: 0.3704  
Epoch 3/10  
108/108 [=====] - 0s 116us/step - loss: 1.4833 - acc: 0.6019  
Epoch 4/10  
108/108 [=====] - 0s 108us/step - loss: 1.3623 - acc: 0.9352  
Epoch 5/10  
108/108 [=====] - 0s 114us/step - loss: 1.2805 - acc: 0.6574  
Epoch 6/10  
108/108 [=====] - 0s 111us/step - loss: 1.2101 - acc: 0.6389  
Epoch 7/10  
108/108 [=====] - 0s 109us/step - loss: 1.1434 - acc: 0.7130  
Epoch 8/10  
108/108 [=====] - 0s 108us/step - loss: 1.0816 - acc: 0.8796  
Epoch 9/10  
108/108 [=====] - 0s 107us/step - loss: 1.0302 - acc: 0.9815  
Epoch 10/10  
108/108 [=====] - 0s 106us/step - loss: 0.9829 - acc: 0.9722

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27/27 [=====] - 0s 10ms/step
108/108 [=====] - 0s 45us/step
Epoch 1/10
108/108 [=====] - 1s 8ms/step - loss: 2.0419 - acc: 0.3611
Epoch 2/10
108/108 [=====] - 0s 133us/step - loss: 1.6543 - acc: 0.3611
Epoch 3/10
108/108 [=====] - 0s 124us/step - loss: 1.5707 - acc: 0.3333
Epoch 4/10
108/108 [=====] - 0s 114us/step - loss: 1.5205 - acc: 0.3796
Epoch 5/10
108/108 [=====] - 0s 127us/step - loss: 1.3908 - acc: 0.6667
Epoch 6/10
108/108 [=====] - 0s 121us/step - loss: 1.3035 - acc: 0.6667
Epoch 7/10
108/108 [=====] - 0s 118us/step - loss: 1.2756 - acc: 0.6667
Epoch 8/10
108/108 [=====] - 0s 112us/step - loss: 1.2351 - acc: 0.6667
Epoch 9/10
108/108 [=====] - 0s 108us/step - loss: 1.1633 - acc: 0.6667
Epoch 10/10
108/108 [=====] - 0s 108us/step - loss: 1.1063 - acc: 0.7685
27/27 [=====] - 0s 10ms/step
108/108 [=====] - 0s 46us/step
Epoch 1/10
108/108 [=====] - 1s 8ms/step - loss: 2.3272 - acc: 0.3519
Epoch 2/10
108/108 [=====] - 0s 123us/step - loss: 1.8358 - acc: 0.3426
Epoch 3/10
108/108 [=====] - 0s 115us/step - loss: 1.6450 - acc: 0.3148
Epoch 4/10
108/108 [=====] - 0s 117us/step - loss: 1.6108 - acc: 0.3148
Epoch 5/10
108/108 [=====] - 0s 124us/step - loss: 1.6098 - acc: 0.4722
Epoch 6/10
108/108 [=====] - 0s 110us/step - loss: 1.5694 - acc: 0.3333
Epoch 7/10
108/108 [=====] - 0s 107us/step - loss: 1.4766 - acc: 0.5556
Epoch 8/10
108/108 [=====] - 0s 109us/step - loss: 1.3841 - acc: 0.4815
Epoch 9/10
108/108 [=====] - 0s 111us/step - loss: 1.3173 - acc: 0.6111
Epoch 10/10
108/108 [=====] - 0s 105us/step - loss: 1.2684 - acc: 0.6667
27/27 [=====] - 0s 10ms/step
108/108 [=====] - 0s 67us/step
Epoch 1/10
108/108 [=====] - 1s 9ms/step - loss: 6.9702 - acc: 0.3148

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Epoch 2/10  
108/108 [=====] - 0s 123us/step - loss: 6.6324 - acc: 0.3704  
Epoch 3/10  
108/108 [=====] - 0s 130us/step - loss: 6.3787 - acc: 0.3426  
Epoch 4/10  
108/108 [=====] - 0s 114us/step - loss: 6.1661 - acc: 0.5556  
Epoch 5/10  
108/108 [=====] - 0s 106us/step - loss: 5.9404 - acc: 0.6852  
Epoch 6/10  
108/108 [=====] - 0s 112us/step - loss: 5.7053 - acc: 0.6852  
Epoch 7/10  
108/108 [=====] - 0s 108us/step - loss: 5.4800 - acc: 0.6852  
Epoch 8/10  
108/108 [=====] - 0s 105us/step - loss: 5.2794 - acc: 0.7037  
Epoch 9/10  
108/108 [=====] - 0s 115us/step - loss: 5.0943 - acc: 0.8426  
Epoch 10/10  
108/108 [=====] - 0s 117us/step - loss: 4.9164 - acc: 0.8981  
27/27 [=====] - 0s 12ms/step  
108/108 [=====] - 0s 62us/step  
Epoch 1/10  
108/108 [=====] - 1s 9ms/step - loss: 7.1712 - acc: 0.3333  
Epoch 2/10  
108/108 [=====] - 0s 115us/step - loss: 6.7079 - acc: 0.3333  
Epoch 3/10  
108/108 [=====] - 0s 114us/step - loss: 6.3124 - acc: 0.4259  
Epoch 4/10  
108/108 [=====] - 0s 106us/step - loss: 6.0158 - acc: 0.6852  
Epoch 5/10  
108/108 [=====] - 0s 120us/step - loss: 5.7484 - acc: 0.7407  
Epoch 6/10  
108/108 [=====] - 0s 135us/step - loss: 5.5171 - acc: 0.8519  
Epoch 7/10  
108/108 [=====] - 0s 120us/step - loss: 5.2953 - acc: 0.8704  
Epoch 8/10  
108/108 [=====] - 0s 117us/step - loss: 5.0845 - acc: 0.8333  
Epoch 9/10  
108/108 [=====] - 0s 178us/step - loss: 4.8899 - acc: 0.7222  
Epoch 10/10  
108/108 [=====] - 0s 134us/step - loss: 4.7115 - acc: 0.7037  
27/27 [=====] - 0s 11ms/step  
108/108 [=====] - 0s 83us/step  
Epoch 1/10  
108/108 [=====] - 1s 10ms/step - loss: 6.7728 - acc: 0.3796  
Epoch 2/10  
108/108 [=====] - 0s 104us/step - loss: 6.5062 - acc: 0.6481  
Epoch 3/10  
108/108 [=====] - 0s 108us/step - loss: 6.2469 - acc: 0.5648

Epoch 4/10  
108/108 [=====] - 0s 108us/step - loss: 5.9981 - acc: 0.5556  
Epoch 5/10  
108/108 [=====] - 0s 103us/step - loss: 5.7598 - acc: 0.6759  
Epoch 6/10  
108/108 [=====] - 0s 102us/step - loss: 5.5355 - acc: 0.9167  
Epoch 7/10  
108/108 [=====] - 0s 101us/step - loss: 5.3267 - acc: 0.7870  
Epoch 8/10  
108/108 [=====] - 0s 102us/step - loss: 5.1215 - acc: 0.8148  
Epoch 9/10  
108/108 [=====] - 0s 113us/step - loss: 4.9236 - acc: 0.9630  
Epoch 10/10  
108/108 [=====] - 0s 103us/step - loss: 4.7273 - acc: 0.8611  
27/27 [=====] - 0s 12ms/step  
108/108 [=====] - 0s 50us/step  
Epoch 1/10  
108/108 [=====] - 1s 10ms/step - loss: 7.3104 - acc: 0.3519  
Epoch 2/10  
108/108 [=====] - 0s 111us/step - loss: 6.8817 - acc: 0.3611  
Epoch 3/10  
108/108 [=====] - 0s 109us/step - loss: 6.5174 - acc: 0.3611  
Epoch 4/10  
108/108 [=====] - 0s 109us/step - loss: 6.2393 - acc: 0.3611  
Epoch 5/10  
108/108 [=====] - 0s 119us/step - loss: 6.0191 - acc: 0.3796  
Epoch 6/10  
108/108 [=====] - 0s 107us/step - loss: 5.8173 - acc: 0.4907  
Epoch 7/10  
108/108 [=====] - 0s 104us/step - loss: 5.6202 - acc: 0.5556  
Epoch 8/10  
108/108 [=====] - 0s 107us/step - loss: 5.4154 - acc: 0.7407  
Epoch 9/10  
108/108 [=====] - 0s 105us/step - loss: 5.2126 - acc: 0.7963  
Epoch 10/10  
108/108 [=====] - 0s 108us/step - loss: 5.0127 - acc: 0.7037  
27/27 [=====] - 0s 12ms/step  
108/108 [=====] - 0s 47us/step  
Epoch 1/10  
108/108 [=====] - 1s 10ms/step - loss: 7.0332 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 104us/step - loss: 6.7296 - acc: 0.3148  
Epoch 3/10  
108/108 [=====] - 0s 107us/step - loss: 6.4487 - acc: 0.4722  
Epoch 4/10  
108/108 [=====] - 0s 111us/step - loss: 6.1940 - acc: 0.6111  
Epoch 5/10  
108/108 [=====] - 0s 108us/step - loss: 5.9441 - acc: 0.5648

Epoch 6/10  
108/108 [=====] - 0s 107us/step - loss: 5.7114 - acc: 0.3426  
Epoch 7/10  
108/108 [=====] - 0s 108us/step - loss: 5.4912 - acc: 0.3333  
Epoch 8/10  
108/108 [=====] - 0s 107us/step - loss: 5.2774 - acc: 0.6574  
Epoch 9/10  
108/108 [=====] - 0s 105us/step - loss: 5.0769 - acc: 0.6667  
Epoch 10/10  
108/108 [=====] - 0s 106us/step - loss: 4.8821 - acc: 0.6667  
27/27 [=====] - 0s 12ms/step  
108/108 [=====] - 0s 50us/step  
Epoch 1/10  
108/108 [=====] - 1s 10ms/step - loss: 61.0148 - acc: 0.3426  
Epoch 2/10  
108/108 [=====] - 0s 116us/step - loss: 58.4913 - acc: 0.3426  
Epoch 3/10  
108/108 [=====] - 0s 110us/step - loss: 55.8335 - acc: 0.3426  
Epoch 4/10  
108/108 [=====] - 0s 115us/step - loss: 53.2941 - acc: 0.3426  
Epoch 5/10  
108/108 [=====] - 0s 124us/step - loss: 50.8955 - acc: 0.3426  
Epoch 6/10  
108/108 [=====] - 0s 121us/step - loss: 48.6470 - acc: 0.3426  
Epoch 7/10  
108/108 [=====] - 0s 108us/step - loss: 46.5282 - acc: 0.3981  
Epoch 8/10  
108/108 [=====] - 0s 105us/step - loss: 44.5157 - acc: 0.2407  
Epoch 9/10  
108/108 [=====] - 0s 119us/step - loss: 42.5836 - acc: 0.3333  
Epoch 10/10  
108/108 [=====] - 0s 109us/step - loss: 40.7222 - acc: 0.3426  
27/27 [=====] - 0s 13ms/step  
108/108 [=====] - 0s 60us/step  
Epoch 1/10  
108/108 [=====] - 1s 11ms/step - loss: 59.7208 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 106us/step - loss: 57.4109 - acc: 0.3148  
Epoch 3/10  
108/108 [=====] - 0s 105us/step - loss: 54.9626 - acc: 0.3148  
Epoch 4/10  
108/108 [=====] - 0s 108us/step - loss: 52.5515 - acc: 0.3148  
Epoch 5/10  
108/108 [=====] - 0s 104us/step - loss: 50.2165 - acc: 0.3148  
Epoch 6/10  
108/108 [=====] - 0s 105us/step - loss: 47.9789 - acc: 0.3148  
Epoch 7/10  
108/108 [=====] - 0s 102us/step - loss: 45.8278 - acc: 0.3148

Epoch 8/10  
108/108 [=====] - 0s 103us/step - loss: 43.7710 - acc: 0.5000  
Epoch 9/10  
108/108 [=====] - 0s 102us/step - loss: 41.8004 - acc: 0.6204  
Epoch 10/10  
108/108 [=====] - 0s 105us/step - loss: 39.9126 - acc: 0.7593  
27/27 [=====] - 0s 14ms/step  
108/108 [=====] - 0s 58us/step  
Epoch 1/10  
108/108 [=====] - 1s 10ms/step - loss: 59.8100 - acc: 0.2963  
Epoch 2/10  
108/108 [=====] - 0s 107us/step - loss: 57.5181 - acc: 0.2222  
Epoch 3/10  
108/108 [=====] - 0s 107us/step - loss: 55.0989 - acc: 0.0185  
Epoch 4/10  
108/108 [=====] - 0s 105us/step - loss: 52.7177 - acc: 0.0000e+00  
Epoch 5/10  
108/108 [=====] - 0s 106us/step - loss: 50.4162 - acc: 0.0926  
Epoch 6/10  
108/108 [=====] - 0s 103us/step - loss: 48.2021 - acc: 0.3611  
Epoch 7/10  
108/108 [=====] - 0s 104us/step - loss: 46.0731 - acc: 0.3704  
Epoch 8/10  
108/108 [=====] - 0s 110us/step - loss: 44.0263 - acc: 0.3704  
Epoch 9/10  
108/108 [=====] - 0s 108us/step - loss: 42.0633 - acc: 0.3704  
Epoch 10/10  
108/108 [=====] - 0s 106us/step - loss: 40.1826 - acc: 0.3704  
27/27 [=====] - 0s 13ms/step  
108/108 [=====] - 0s 51us/step  
Epoch 1/10  
108/108 [=====] - 1s 11ms/step - loss: 56.0421 - acc: 0.3611  
Epoch 2/10  
108/108 [=====] - 0s 110us/step - loss: 53.9115 - acc: 0.3611  
Epoch 3/10  
108/108 [=====] - 0s 110us/step - loss: 51.6386 - acc: 0.3611  
Epoch 4/10  
108/108 [=====] - 0s 116us/step - loss: 49.3886 - acc: 0.3611  
Epoch 5/10  
108/108 [=====] - 0s 112us/step - loss: 47.1973 - acc: 0.3611  
Epoch 6/10  
108/108 [=====] - 0s 112us/step - loss: 45.0752 - acc: 0.3611  
Epoch 7/10  
108/108 [=====] - 0s 110us/step - loss: 43.0297 - acc: 0.3611  
Epoch 8/10  
108/108 [=====] - 0s 113us/step - loss: 41.0636 - acc: 0.3889  
Epoch 9/10  
108/108 [=====] - 0s 108us/step - loss: 39.1791 - acc: 0.5278

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Epoch 10/10
108/108 [=====] - 0s 110us/step - loss: 37.3723 - acc: 0.6481
27/27 [=====] - 0s 15ms/step
108/108 [=====] - 0s 51us/step
Epoch 1/10
108/108 [=====] - 1s 12ms/step - loss: 59.3055 - acc: 0.3333
Epoch 2/10
108/108 [=====] - 0s 108us/step - loss: 57.0431 - acc: 0.3333
Epoch 3/10
108/108 [=====] - 0s 107us/step - loss: 54.6626 - acc: 0.3333
Epoch 4/10
108/108 [=====] - 0s 105us/step - loss: 52.3145 - acc: 0.3333
Epoch 5/10
108/108 [=====] - 0s 105us/step - loss: 50.0443 - acc: 0.3241
Epoch 6/10
108/108 [=====] - 0s 105us/step - loss: 47.8651 - acc: 0.3148
Epoch 7/10
108/108 [=====] - 0s 107us/step - loss: 45.7597 - acc: 0.3148
Epoch 8/10
108/108 [=====] - 0s 104us/step - loss: 43.7350 - acc: 0.3148
Epoch 9/10
108/108 [=====] - 0s 108us/step - loss: 41.7888 - acc: 0.3148
Epoch 10/10
108/108 [=====] - 0s 108us/step - loss: 39.9223 - acc: 0.3148
27/27 [=====] - 0s 16ms/step
108/108 [=====] - 0s 52us/step
Epoch 1/10
108/108 [=====] - 1s 12ms/step - loss: 1.8136 - acc: 0.3148
Epoch 2/10
108/108 [=====] - 0s 110us/step - loss: 1.5836 - acc: 0.3056
Epoch 3/10
108/108 [=====] - 0s 107us/step - loss: 1.4992 - acc: 0.6852
Epoch 4/10
108/108 [=====] - 0s 113us/step - loss: 1.4259 - acc: 0.6852
Epoch 5/10
108/108 [=====] - 0s 111us/step - loss: 1.3516 - acc: 0.6852
Epoch 6/10
108/108 [=====] - 0s 110us/step - loss: 1.2822 - acc: 0.6852
Epoch 7/10
108/108 [=====] - 0s 110us/step - loss: 1.2104 - acc: 0.6852
Epoch 8/10
108/108 [=====] - 0s 106us/step - loss: 1.1488 - acc: 0.6852
Epoch 9/10
108/108 [=====] - 0s 110us/step - loss: 1.0995 - acc: 0.6852
Epoch 10/10
108/108 [=====] - 0s 112us/step - loss: 1.0473 - acc: 0.6852
27/27 [=====] - 0s 16ms/step
108/108 [=====] - 0s 56us/step

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Epoch 1/10  
108/108 [=====] - 1s 12ms/step - loss: 1.7808 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 120us/step - loss: 1.6226 - acc: 0.3333  
Epoch 3/10  
108/108 [=====] - 0s 117us/step - loss: 1.5557 - acc: 0.5926  
Epoch 4/10  
108/108 [=====] - 0s 116us/step - loss: 1.4534 - acc: 0.6852  
Epoch 5/10  
108/108 [=====] - 0s 112us/step - loss: 1.3366 - acc: 0.6852  
Epoch 6/10  
108/108 [=====] - 0s 112us/step - loss: 1.2639 - acc: 0.8241  
Epoch 7/10  
108/108 [=====] - 0s 108us/step - loss: 1.2174 - acc: 0.7037  
Epoch 8/10  
108/108 [=====] - 0s 111us/step - loss: 1.1500 - acc: 0.8056  
Epoch 9/10  
108/108 [=====] - 0s 111us/step - loss: 1.0702 - acc: 0.8426  
Epoch 10/10  
108/108 [=====] - 0s 111us/step - loss: 1.0291 - acc: 0.6852  
27/27 [=====] - 0s 16ms/step  
108/108 [=====] - 0s 53us/step  
Epoch 1/10  
108/108 [=====] - 1s 12ms/step - loss: 1.7435 - acc: 0.3796  
Epoch 2/10  
108/108 [=====] - 0s 112us/step - loss: 1.6286 - acc: 0.3241  
Epoch 3/10  
108/108 [=====] - 0s 107us/step - loss: 1.5358 - acc: 0.3333  
Epoch 4/10  
108/108 [=====] - 0s 110us/step - loss: 1.4509 - acc: 0.6574  
Epoch 5/10  
108/108 [=====] - 0s 110us/step - loss: 1.3875 - acc: 0.6852  
Epoch 6/10  
108/108 [=====] - 0s 108us/step - loss: 1.3061 - acc: 0.7130  
Epoch 7/10  
108/108 [=====] - 0s 106us/step - loss: 1.2296 - acc: 0.8981  
Epoch 8/10  
108/108 [=====] - 0s 110us/step - loss: 1.1760 - acc: 0.6389  
Epoch 9/10  
108/108 [=====] - 0s 110us/step - loss: 1.1297 - acc: 0.6574  
Epoch 10/10  
108/108 [=====] - 0s 120us/step - loss: 1.0675 - acc: 0.7500  
27/27 [=====] - 0s 16ms/step  
108/108 [=====] - 0s 65us/step  
Epoch 1/10  
108/108 [=====] - 1s 13ms/step - loss: 1.7109 - acc: 0.4815  
Epoch 2/10  
108/108 [=====] - 0s 113us/step - loss: 1.6163 - acc: 0.3611

Epoch 3/10  
108/108 [=====] - 0s 106us/step - loss: 1.5517 - acc: 0.3704  
Epoch 4/10  
108/108 [=====] - 0s 122us/step - loss: 1.4723 - acc: 0.6481  
Epoch 5/10  
108/108 [=====] - 0s 109us/step - loss: 1.3957 - acc: 0.6667  
Epoch 6/10  
108/108 [=====] - 0s 106us/step - loss: 1.3374 - acc: 0.7778  
Epoch 7/10  
108/108 [=====] - 0s 107us/step - loss: 1.2779 - acc: 0.9259  
Epoch 8/10  
108/108 [=====] - 0s 107us/step - loss: 1.2160 - acc: 0.6852  
Epoch 9/10  
108/108 [=====] - 0s 107us/step - loss: 1.1609 - acc: 0.6852  
Epoch 10/10  
108/108 [=====] - 0s 107us/step - loss: 1.1068 - acc: 0.6852  
27/27 [=====] - 0s 18ms/step  
108/108 [=====] - 0s 56us/step  
Epoch 1/10  
108/108 [=====] - 1s 12ms/step - loss: 1.8365 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 111us/step - loss: 1.5636 - acc: 0.6574  
Epoch 3/10  
108/108 [=====] - 0s 111us/step - loss: 1.4385 - acc: 0.6852  
Epoch 4/10  
108/108 [=====] - 0s 110us/step - loss: 1.3422 - acc: 0.6852  
Epoch 5/10  
108/108 [=====] - 0s 109us/step - loss: 1.2366 - acc: 0.7037  
Epoch 6/10  
108/108 [=====] - 0s 108us/step - loss: 1.1486 - acc: 0.9537  
Epoch 7/10  
108/108 [=====] - 0s 111us/step - loss: 1.0886 - acc: 0.6759  
Epoch 8/10  
108/108 [=====] - 0s 111us/step - loss: 1.0406 - acc: 0.6667  
Epoch 9/10  
108/108 [=====] - 0s 108us/step - loss: 0.9800 - acc: 0.7130  
Epoch 10/10  
108/108 [=====] - 0s 111us/step - loss: 0.9275 - acc: 0.8981  
27/27 [=====] - 0s 17ms/step  
108/108 [=====] - 0s 64us/step  
Epoch 1/10  
108/108 [=====] - 1s 13ms/step - loss: 7.5565 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 111us/step - loss: 7.1674 - acc: 0.3981  
Epoch 3/10  
108/108 [=====] - 0s 109us/step - loss: 6.7962 - acc: 0.6667  
Epoch 4/10  
108/108 [=====] - 0s 113us/step - loss: 6.4362 - acc: 0.7130

Epoch 5/10  
108/108 [=====] - 0s 109us/step - loss: 6.1015 - acc: 0.9352  
Epoch 6/10  
108/108 [=====] - 0s 109us/step - loss: 5.7842 - acc: 0.9444  
Epoch 7/10  
108/108 [=====] - 0s 109us/step - loss: 5.4887 - acc: 0.7870  
Epoch 8/10  
108/108 [=====] - 0s 112us/step - loss: 5.2145 - acc: 0.6852  
Epoch 9/10  
108/108 [=====] - 0s 107us/step - loss: 4.9625 - acc: 0.6852  
Epoch 10/10  
108/108 [=====] - 0s 110us/step - loss: 4.7147 - acc: 0.6852  
27/27 [=====] - 0s 18ms/step  
108/108 [=====] - 0s 62us/step  
Epoch 1/10  
108/108 [=====] - 1s 13ms/step - loss: 7.2987 - acc: 0.5093  
Epoch 2/10  
108/108 [=====] - 0s 122us/step - loss: 6.9545 - acc: 0.4722  
Epoch 3/10  
108/108 [=====] - 0s 110us/step - loss: 6.6037 - acc: 0.5741  
Epoch 4/10  
108/108 [=====] - 0s 107us/step - loss: 6.2617 - acc: 0.6389  
Epoch 5/10  
108/108 [=====] - 0s 109us/step - loss: 5.9543 - acc: 0.6667  
Epoch 6/10  
108/108 [=====] - 0s 110us/step - loss: 5.6513 - acc: 0.6574  
Epoch 7/10  
108/108 [=====] - 0s 106us/step - loss: 5.3560 - acc: 0.6852  
Epoch 8/10  
108/108 [=====] - 0s 109us/step - loss: 5.0792 - acc: 0.6852  
Epoch 9/10  
108/108 [=====] - 0s 110us/step - loss: 4.8221 - acc: 0.6852  
Epoch 10/10  
108/108 [=====] - 0s 106us/step - loss: 4.5776 - acc: 0.6852  
27/27 [=====] - 1s 19ms/step  
108/108 [=====] - 0s 53us/step  
Epoch 1/10  
108/108 [=====] - 1s 14ms/step - loss: 7.8874 - acc: 0.0648  
Epoch 2/10  
108/108 [=====] - 0s 116us/step - loss: 7.3678 - acc: 0.3148  
Epoch 3/10  
108/108 [=====] - 0s 110us/step - loss: 6.9521 - acc: 0.6296  
Epoch 4/10  
108/108 [=====] - 0s 112us/step - loss: 6.5926 - acc: 0.8148  
Epoch 5/10  
108/108 [=====] - 0s 111us/step - loss: 6.2545 - acc: 0.9444  
Epoch 6/10  
108/108 [=====] - 0s 112us/step - loss: 5.9334 - acc: 0.8426

Epoch 7/10  
108/108 [=====] - 0s 111us/step - loss: 5.6330 - acc: 0.8148  
Epoch 8/10  
108/108 [=====] - 0s 110us/step - loss: 5.3441 - acc: 0.8981  
Epoch 9/10  
108/108 [=====] - 0s 113us/step - loss: 5.0830 - acc: 0.9630  
Epoch 10/10  
108/108 [=====] - 0s 131us/step - loss: 4.8373 - acc: 0.9630  
27/27 [=====] - 1s 20ms/step  
108/108 [=====] - 0s 55us/step  
Epoch 1/10  
108/108 [=====] - 2s 14ms/step - loss: 7.5533 - acc: 0.3611  
Epoch 2/10  
108/108 [=====] - 0s 110us/step - loss: 7.1806 - acc: 0.3889  
Epoch 3/10  
108/108 [=====] - 0s 122us/step - loss: 6.7973 - acc: 0.6667  
Epoch 4/10  
108/108 [=====] - 0s 109us/step - loss: 6.4359 - acc: 0.6852  
Epoch 5/10  
108/108 [=====] - 0s 111us/step - loss: 6.1080 - acc: 0.8796  
Epoch 6/10  
108/108 [=====] - 0s 110us/step - loss: 5.7957 - acc: 0.9537  
Epoch 7/10  
108/108 [=====] - 0s 107us/step - loss: 5.5011 - acc: 0.8519  
Epoch 8/10  
108/108 [=====] - 0s 108us/step - loss: 5.2264 - acc: 0.6759  
Epoch 9/10  
108/108 [=====] - 0s 113us/step - loss: 4.9748 - acc: 0.6667  
Epoch 10/10  
108/108 [=====] - 0s 110us/step - loss: 4.7340 - acc: 0.6667  
27/27 [=====] - 1s 20ms/step  
108/108 [=====] - 0s 53us/step  
Epoch 1/10  
108/108 [=====] - 2s 15ms/step - loss: 7.3644 - acc: 0.2037  
Epoch 2/10  
108/108 [=====] - 0s 116us/step - loss: 6.9516 - acc: 0.3241  
Epoch 3/10  
108/108 [=====] - 0s 127us/step - loss: 6.5834 - acc: 0.6667  
Epoch 4/10  
108/108 [=====] - 0s 120us/step - loss: 6.2327 - acc: 0.6667  
Epoch 5/10  
108/108 [=====] - 0s 111us/step - loss: 5.8964 - acc: 0.6852  
Epoch 6/10  
108/108 [=====] - 0s 111us/step - loss: 5.5854 - acc: 0.6667  
Epoch 7/10  
108/108 [=====] - 0s 108us/step - loss: 5.2993 - acc: 0.6667  
Epoch 8/10  
108/108 [=====] - 0s 108us/step - loss: 5.0277 - acc: 0.6667

Epoch 9/10  
108/108 [=====] - 0s 110us/step - loss: 4.7691 - acc: 0.7685  
Epoch 10/10  
108/108 [=====] - 0s 112us/step - loss: 4.5280 - acc: 0.9537  
27/27 [=====] - 1s 20ms/step  
108/108 [=====] - 0s 64us/step  
Epoch 1/10  
108/108 [=====] - 2s 15ms/step - loss: 65.1131 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 122us/step - loss: 61.7954 - acc: 0.3148  
Epoch 3/10  
108/108 [=====] - 0s 115us/step - loss: 58.3727 - acc: 0.5463  
Epoch 4/10  
108/108 [=====] - 0s 118us/step - loss: 55.0697 - acc: 0.3704  
Epoch 5/10  
108/108 [=====] - 0s 112us/step - loss: 51.9144 - acc: 0.7130  
Epoch 6/10  
108/108 [=====] - 0s 110us/step - loss: 48.9060 - acc: 0.6759  
Epoch 7/10  
108/108 [=====] - 0s 106us/step - loss: 46.0362 - acc: 0.7500  
Epoch 8/10  
108/108 [=====] - 0s 110us/step - loss: 43.3082 - acc: 0.9630  
Epoch 9/10  
108/108 [=====] - 0s 111us/step - loss: 40.7308 - acc: 0.9630  
Epoch 10/10  
108/108 [=====] - 0s 108us/step - loss: 38.2984 - acc: 0.8889  
27/27 [=====] - 1s 20ms/step  
108/108 [=====] - 0s 77us/step  
Epoch 1/10  
108/108 [=====] - 2s 15ms/step - loss: 63.0369 - acc: 0.3333  
Epoch 2/10  
108/108 [=====] - 0s 116us/step - loss: 59.8703 - acc: 0.3333  
Epoch 3/10  
108/108 [=====] - 0s 127us/step - loss: 56.5369 - acc: 0.3333  
Epoch 4/10  
108/108 [=====] - 0s 126us/step - loss: 53.2815 - acc: 0.4630  
Epoch 5/10  
108/108 [=====] - 0s 123us/step - loss: 50.1415 - acc: 0.5648  
Epoch 6/10  
108/108 [=====] - 0s 116us/step - loss: 47.1383 - acc: 0.3426  
Epoch 7/10  
108/108 [=====] - 0s 114us/step - loss: 44.2861 - acc: 0.3333  
Epoch 8/10  
108/108 [=====] - 0s 124us/step - loss: 41.5854 - acc: 0.3333  
Epoch 9/10  
108/108 [=====] - 0s 111us/step - loss: 39.0371 - acc: 0.6204  
Epoch 10/10  
108/108 [=====] - 0s 108us/step - loss: 36.6281 - acc: 0.6759

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27/27 [=====] - 1s 22ms/step
108/108 [=====] - 0s 67us/step
Epoch 1/10
108/108 [=====] - 2s 15ms/step - loss: 64.9342 - acc: 0.1759
Epoch 2/10
108/108 [=====] - 0s 123us/step - loss: 61.7515 - acc: 0.3148
Epoch 3/10
108/108 [=====] - 0s 114us/step - loss: 58.4179 - acc: 0.3148
Epoch 4/10
108/108 [=====] - 0s 112us/step - loss: 55.1401 - acc: 0.3148
Epoch 5/10
108/108 [=====] - 0s 113us/step - loss: 51.9766 - acc: 0.3148
Epoch 6/10
108/108 [=====] - 0s 115us/step - loss: 48.9443 - acc: 0.3148
Epoch 7/10
108/108 [=====] - 0s 108us/step - loss: 46.0567 - acc: 0.3148
Epoch 8/10
108/108 [=====] - 0s 114us/step - loss: 43.3188 - acc: 0.4537
Epoch 9/10
108/108 [=====] - 0s 119us/step - loss: 40.7303 - acc: 0.6111
Epoch 10/10
108/108 [=====] - 0s 127us/step - loss: 38.2850 - acc: 0.5093
27/27 [=====] - 1s 23ms/step
108/108 [=====] - 0s 60us/step
Epoch 1/10
108/108 [=====] - 2s 16ms/step - loss: 65.7056 - acc: 0.3611
Epoch 2/10
108/108 [=====] - 0s 125us/step - loss: 62.4858 - acc: 0.3611
Epoch 3/10
108/108 [=====] - 0s 118us/step - loss: 59.1055 - acc: 0.3611
Epoch 4/10
108/108 [=====] - 0s 112us/step - loss: 55.7877 - acc: 0.2315
Epoch 5/10
108/108 [=====] - 0s 113us/step - loss: 52.5832 - acc: 0.3148
Epoch 6/10
108/108 [=====] - 0s 114us/step - loss: 49.5158 - acc: 0.3889
Epoch 7/10
108/108 [=====] - 0s 114us/step - loss: 46.5967 - acc: 0.6389
Epoch 8/10
108/108 [=====] - 0s 115us/step - loss: 43.8294 - acc: 0.6574
Epoch 9/10
108/108 [=====] - 0s 124us/step - loss: 41.2119 - acc: 0.6667
Epoch 10/10
108/108 [=====] - 0s 113us/step - loss: 38.7401 - acc: 0.6667
27/27 [=====] - 1s 23ms/step
108/108 [=====] - 0s 87us/step
Epoch 1/10
108/108 [=====] - 2s 16ms/step - loss: 65.2705 - acc: 0.3333

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Epoch 2/10  
108/108 [=====] - 0s 119us/step - loss: 62.0762 - acc: 0.3333  
Epoch 3/10  
108/108 [=====] - 0s 123us/step - loss: 58.7056 - acc: 0.3333  
Epoch 4/10  
108/108 [=====] - 0s 117us/step - loss: 55.4038 - acc: 0.4630  
Epoch 5/10  
108/108 [=====] - 0s 117us/step - loss: 52.2213 - acc: 0.5833  
Epoch 6/10  
108/108 [=====] - 0s 116us/step - loss: 49.1803 - acc: 0.4352  
Epoch 7/10  
108/108 [=====] - 0s 129us/step - loss: 46.2857 - acc: 0.6019  
Epoch 8/10  
108/108 [=====] - 0s 117us/step - loss: 43.5440 - acc: 0.6574  
Epoch 9/10  
108/108 [=====] - 0s 118us/step - loss: 40.9510 - acc: 0.7130  
Epoch 10/10  
108/108 [=====] - 0s 135us/step - loss: 38.5048 - acc: 0.8056  
27/27 [=====] - 1s 24ms/step  
108/108 [=====] - 0s 67us/step  
Epoch 1/10  
108/108 [=====] - 2s 16ms/step - loss: 2.0180 - acc: 0.3333  
Epoch 2/10  
108/108 [=====] - 0s 119us/step - loss: 1.8861 - acc: 0.2963  
Epoch 3/10  
108/108 [=====] - 0s 139us/step - loss: 1.7590 - acc: 0.3148  
Epoch 4/10  
108/108 [=====] - 0s 118us/step - loss: 1.6525 - acc: 0.4352  
Epoch 5/10  
108/108 [=====] - 0s 121us/step - loss: 1.5716 - acc: 0.6111  
Epoch 6/10  
108/108 [=====] - 0s 127us/step - loss: 1.5041 - acc: 0.6852  
Epoch 7/10  
108/108 [=====] - 0s 141us/step - loss: 1.4482 - acc: 0.6852  
Epoch 8/10  
108/108 [=====] - 0s 121us/step - loss: 1.3949 - acc: 0.6852  
Epoch 9/10  
108/108 [=====] - 0s 127us/step - loss: 1.3440 - acc: 0.6852  
Epoch 10/10  
108/108 [=====] - 0s 137us/step - loss: 1.2952 - acc: 0.6852  
27/27 [=====] - 1s 25ms/step  
108/108 [=====] - 0s 61us/step  
Epoch 1/10  
108/108 [=====] - 2s 16ms/step - loss: 1.6908 - acc: 0.4352  
Epoch 2/10  
108/108 [=====] - 0s 113us/step - loss: 1.5891 - acc: 0.7130  
Epoch 3/10  
108/108 [=====] - 0s 112us/step - loss: 1.5015 - acc: 0.8056

Epoch 4/10  
108/108 [=====] - 0s 123us/step - loss: 1.4262 - acc: 0.6944  
Epoch 5/10  
108/108 [=====] - 0s 116us/step - loss: 1.3702 - acc: 0.6852  
Epoch 6/10  
108/108 [=====] - 0s 114us/step - loss: 1.3228 - acc: 0.6852  
Epoch 7/10  
108/108 [=====] - 0s 108us/step - loss: 1.2712 - acc: 0.6852  
Epoch 8/10  
108/108 [=====] - 0s 128us/step - loss: 1.2230 - acc: 0.6852  
Epoch 9/10  
108/108 [=====] - 0s 119us/step - loss: 1.1777 - acc: 0.6852  
Epoch 10/10  
108/108 [=====] - 0s 148us/step - loss: 1.1363 - acc: 0.7222  
27/27 [=====] - 1s 25ms/step  
108/108 [=====] - 0s 62us/step  
Epoch 1/10  
108/108 [=====] - 2s 18ms/step - loss: 2.2119 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 131us/step - loss: 1.8768 - acc: 0.3148  
Epoch 3/10  
108/108 [=====] - 0s 123us/step - loss: 1.6755 - acc: 0.4722  
Epoch 4/10  
108/108 [=====] - 0s 116us/step - loss: 1.5860 - acc: 0.3704  
Epoch 5/10  
108/108 [=====] - 0s 128us/step - loss: 1.5360 - acc: 0.4352  
Epoch 6/10  
108/108 [=====] - 0s 109us/step - loss: 1.4746 - acc: 0.6852  
Epoch 7/10  
108/108 [=====] - 0s 116us/step - loss: 1.4244 - acc: 0.6852  
Epoch 8/10  
108/108 [=====] - 0s 117us/step - loss: 1.3698 - acc: 0.6852  
Epoch 9/10  
108/108 [=====] - 0s 113us/step - loss: 1.3150 - acc: 0.8796  
Epoch 10/10  
108/108 [=====] - 0s 125us/step - loss: 1.2707 - acc: 0.8704  
27/27 [=====] - 1s 26ms/step  
108/108 [=====] - 0s 57us/step  
Epoch 1/10  
108/108 [=====] - 2s 17ms/step - loss: 1.7928 - acc: 0.3611  
Epoch 2/10  
108/108 [=====] - 0s 113us/step - loss: 1.6525 - acc: 0.3796  
Epoch 3/10  
108/108 [=====] - 0s 111us/step - loss: 1.5764 - acc: 0.6389  
Epoch 4/10  
108/108 [=====] - 0s 122us/step - loss: 1.5199 - acc: 0.6389  
Epoch 5/10  
108/108 [=====] - 0s 115us/step - loss: 1.4453 - acc: 0.6574



Epoch 6/10  
108/108 [=====] - 0s 110us/step - loss: 1.3735 - acc: 0.7037  
Epoch 7/10  
108/108 [=====] - 0s 108us/step - loss: 1.3192 - acc: 0.6667  
Epoch 8/10  
108/108 [=====] - 0s 109us/step - loss: 1.2688 - acc: 0.6667  
Epoch 9/10  
108/108 [=====] - 0s 115us/step - loss: 1.2271 - acc: 0.6667  
Epoch 10/10  
108/108 [=====] - 0s 119us/step - loss: 1.1860 - acc: 0.6667  
27/27 [=====] - 1s 26ms/step  
108/108 [=====] - 0s 60us/step  
Epoch 1/10  
108/108 [=====] - 2s 18ms/step - loss: 2.6280 - acc: 0.3519  
Epoch 2/10  
108/108 [=====] - 0s 116us/step - loss: 2.2354 - acc: 0.3519  
Epoch 3/10  
108/108 [=====] - 0s 107us/step - loss: 1.8877 - acc: 0.3519  
Epoch 4/10  
108/108 [=====] - 0s 114us/step - loss: 1.6575 - acc: 0.3519  
Epoch 5/10  
108/108 [=====] - 0s 108us/step - loss: 1.5225 - acc: 0.6481  
Epoch 6/10  
108/108 [=====] - 0s 114us/step - loss: 1.4478 - acc: 0.7778  
Epoch 7/10  
108/108 [=====] - 0s 111us/step - loss: 1.4037 - acc: 0.6944  
Epoch 8/10  
108/108 [=====] - 0s 113us/step - loss: 1.3606 - acc: 0.8056  
Epoch 9/10  
108/108 [=====] - 0s 110us/step - loss: 1.3160 - acc: 0.8241  
Epoch 10/10  
108/108 [=====] - 0s 109us/step - loss: 1.2686 - acc: 0.8148  
27/27 [=====] - 1s 27ms/step  
108/108 [=====] - 0s 58us/step  
Epoch 1/10  
108/108 [=====] - 2s 18ms/step - loss: 8.1742 - acc: 0.3426  
Epoch 2/10  
108/108 [=====] - 0s 115us/step - loss: 7.8619 - acc: 0.3426  
Epoch 3/10  
108/108 [=====] - 0s 118us/step - loss: 7.5548 - acc: 0.5000  
Epoch 4/10  
108/108 [=====] - 0s 110us/step - loss: 7.2641 - acc: 0.6852  
Epoch 5/10  
108/108 [=====] - 0s 109us/step - loss: 6.9909 - acc: 0.6852  
Epoch 6/10  
108/108 [=====] - 0s 106us/step - loss: 6.7304 - acc: 0.7130  
Epoch 7/10  
108/108 [=====] - 0s 110us/step - loss: 6.4841 - acc: 0.7593

Epoch 8/10  
108/108 [=====] - 0s 110us/step - loss: 6.2437 - acc: 0.7870  
Epoch 9/10  
108/108 [=====] - 0s 111us/step - loss: 6.0110 - acc: 0.7870  
Epoch 10/10  
108/108 [=====] - 0s 111us/step - loss: 5.7891 - acc: 0.6944  
27/27 [=====] - 1s 27ms/step  
108/108 [=====] - 0s 60us/step  
Epoch 1/10  
108/108 [=====] - 2s 18ms/step - loss: 8.1732 - acc: 0.3333  
Epoch 2/10  
108/108 [=====] - 0s 142us/step - loss: 7.8584 - acc: 0.1852  
Epoch 3/10  
108/108 [=====] - 0s 118us/step - loss: 7.5612 - acc: 0.3333  
Epoch 4/10  
108/108 [=====] - 0s 124us/step - loss: 7.2855 - acc: 0.3333  
Epoch 5/10  
108/108 [=====] - 0s 126us/step - loss: 7.0142 - acc: 0.4907  
Epoch 6/10  
108/108 [=====] - 0s 139us/step - loss: 6.7487 - acc: 0.6852  
Epoch 7/10  
108/108 [=====] - 0s 139us/step - loss: 6.4983 - acc: 0.6852  
Epoch 8/10  
108/108 [=====] - 0s 123us/step - loss: 6.2640 - acc: 0.8704  
Epoch 9/10  
108/108 [=====] - 0s 127us/step - loss: 6.0351 - acc: 0.8241  
Epoch 10/10  
108/108 [=====] - 0s 119us/step - loss: 5.8109 - acc: 0.8981  
27/27 [=====] - 1s 28ms/step  
108/108 [=====] - 0s 63us/step  
Epoch 1/10  
108/108 [=====] - 2s 18ms/step - loss: 8.4694 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 120us/step - loss: 8.0860 - acc: 0.3148  
Epoch 3/10  
108/108 [=====] - 0s 116us/step - loss: 7.7572 - acc: 0.5093  
Epoch 4/10  
108/108 [=====] - 0s 110us/step - loss: 7.4759 - acc: 0.6852  
Epoch 5/10  
108/108 [=====] - 0s 122us/step - loss: 7.2500 - acc: 0.5278  
Epoch 6/10  
108/108 [=====] - 0s 119us/step - loss: 7.0025 - acc: 0.5648  
Epoch 7/10  
108/108 [=====] - 0s 140us/step - loss: 6.7424 - acc: 0.6852  
Epoch 8/10  
108/108 [=====] - 0s 137us/step - loss: 6.4971 - acc: 0.6852  
Epoch 9/10  
108/108 [=====] - 0s 131us/step - loss: 6.2700 - acc: 0.7315

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Epoch 10/10
108/108 [=====] - 0s 127us/step - loss: 6.0572 - acc: 0.8611
27/27 [=====] - 1s 28ms/step
108/108 [=====] - 0s 69us/step
Epoch 1/10
108/108 [=====] - 2s 19ms/step - loss: 8.4180 - acc: 0.3611
Epoch 2/10
108/108 [=====] - 0s 132us/step - loss: 8.0741 - acc: 0.3611
Epoch 3/10
108/108 [=====] - 0s 122us/step - loss: 7.7691 - acc: 0.4074
Epoch 4/10
108/108 [=====] - 0s 114us/step - loss: 7.5053 - acc: 0.6667
Epoch 5/10
108/108 [=====] - 0s 123us/step - loss: 7.2554 - acc: 0.6667
Epoch 6/10
108/108 [=====] - 0s 158us/step - loss: 7.0001 - acc: 0.6667
Epoch 7/10
108/108 [=====] - 0s 141us/step - loss: 6.7510 - acc: 0.7037
Epoch 8/10
108/108 [=====] - 0s 127us/step - loss: 6.5152 - acc: 0.8241
Epoch 9/10
108/108 [=====] - 0s 118us/step - loss: 6.2938 - acc: 0.8611
Epoch 10/10
108/108 [=====] - 0s 119us/step - loss: 6.0780 - acc: 0.8611
27/27 [=====] - 1s 28ms/step
108/108 [=====] - 0s 59us/step
Epoch 1/10
108/108 [=====] - 2s 19ms/step - loss: 8.4799 - acc: 0.3148
Epoch 2/10
108/108 [=====] - 0s 119us/step - loss: 8.1589 - acc: 0.3704
Epoch 3/10
108/108 [=====] - 0s 123us/step - loss: 7.8671 - acc: 0.5093
Epoch 4/10
108/108 [=====] - 0s 155us/step - loss: 7.5826 - acc: 0.4722
Epoch 5/10
108/108 [=====] - 0s 117us/step - loss: 7.3145 - acc: 0.6667
Epoch 6/10
108/108 [=====] - 0s 113us/step - loss: 7.0540 - acc: 0.6667
Epoch 7/10
108/108 [=====] - 0s 118us/step - loss: 6.8032 - acc: 0.6667
Epoch 8/10
108/108 [=====] - 0s 117us/step - loss: 6.5580 - acc: 0.6667
Epoch 9/10
108/108 [=====] - 0s 114us/step - loss: 6.3178 - acc: 0.6759
Epoch 10/10
108/108 [=====] - 0s 121us/step - loss: 6.0932 - acc: 0.8796
27/27 [=====] - 1s 31ms/step
108/108 [=====] - 0s 75us/step

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Epoch 1/10  
108/108 [=====] - 2s 19ms/step - loss: 73.3571 - acc: 0.3426  
Epoch 2/10  
108/108 [=====] - 0s 115us/step - loss: 70.7944 - acc: 0.3426  
Epoch 3/10  
108/108 [=====] - 0s 121us/step - loss: 68.0661 - acc: 0.3426  
Epoch 4/10  
108/108 [=====] - 0s 121us/step - loss: 65.3709 - acc: 0.3426  
Epoch 5/10  
108/108 [=====] - 0s 128us/step - loss: 62.7421 - acc: 0.3426  
Epoch 6/10  
108/108 [=====] - 0s 119us/step - loss: 60.1992 - acc: 0.3426  
Epoch 7/10  
108/108 [=====] - 0s 115us/step - loss: 57.7297 - acc: 0.3426  
Epoch 8/10  
108/108 [=====] - 0s 116us/step - loss: 55.3451 - acc: 0.5278  
Epoch 9/10  
108/108 [=====] - 0s 113us/step - loss: 53.0441 - acc: 0.6852  
Epoch 10/10  
108/108 [=====] - 0s 119us/step - loss: 50.8260 - acc: 0.6852  
27/27 [=====] - 1s 29ms/step  
108/108 [=====] - 0s 62us/step  
Epoch 1/10  
108/108 [=====] - 2s 20ms/step - loss: 73.8395 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 182us/step - loss: 71.2969 - acc: 0.0833  
Epoch 3/10  
108/108 [=====] - 0s 176us/step - loss: 68.5785 - acc: 0.2407  
Epoch 4/10  
108/108 [=====] - 0s 171us/step - loss: 65.8775 - acc: 0.3333  
Epoch 5/10  
108/108 [=====] - 0s 149us/step - loss: 63.2421 - acc: 0.3333  
Epoch 6/10  
108/108 [=====] - 0s 151us/step - loss: 60.6734 - acc: 0.3333  
Epoch 7/10  
108/108 [=====] - 0s 127us/step - loss: 58.1898 - acc: 0.3333  
Epoch 8/10  
108/108 [=====] - 0s 137us/step - loss: 55.7885 - acc: 0.3333  
Epoch 9/10  
108/108 [=====] - 0s 117us/step - loss: 53.4734 - acc: 0.3333  
Epoch 10/10  
108/108 [=====] - 0s 121us/step - loss: 51.2431 - acc: 0.3333  
27/27 [=====] - 1s 30ms/step  
108/108 [=====] - 0s 74us/step  
Epoch 1/10  
108/108 [=====] - 2s 22ms/step - loss: 71.9247 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 112us/step - loss: 69.3667 - acc: 0.3148

Epoch 3/10  
108/108 [=====] - 0s 127us/step - loss: 66.6780 - acc: 0.3148  
Epoch 4/10  
108/108 [=====] - 0s 132us/step - loss: 64.0186 - acc: 0.4537  
Epoch 5/10  
108/108 [=====] - 0s 111us/step - loss: 61.4346 - acc: 0.6852  
Epoch 6/10  
108/108 [=====] - 0s 109us/step - loss: 58.9189 - acc: 0.5463  
Epoch 7/10  
108/108 [=====] - 0s 112us/step - loss: 56.4868 - acc: 0.4537  
Epoch 8/10  
108/108 [=====] - 0s 117us/step - loss: 54.1347 - acc: 0.4167  
Epoch 9/10  
108/108 [=====] - 0s 111us/step - loss: 51.8644 - acc: 0.5185  
Epoch 10/10  
108/108 [=====] - 0s 125us/step - loss: 49.6770 - acc: 0.6019  
27/27 [=====] - 1s 31ms/step  
108/108 [=====] - 0s 82us/step  
Epoch 1/10  
108/108 [=====] - 2s 20ms/step - loss: 73.1284 - acc: 0.3056  
Epoch 2/10  
108/108 [=====] - 0s 112us/step - loss: 70.5192 - acc: 0.3148  
Epoch 3/10  
108/108 [=====] - 0s 124us/step - loss: 67.8076 - acc: 0.6574  
Epoch 4/10  
108/108 [=====] - 0s 119us/step - loss: 65.1530 - acc: 0.6759  
Epoch 5/10  
108/108 [=====] - 0s 111us/step - loss: 62.5642 - acc: 0.6667  
Epoch 6/10  
108/108 [=====] - 0s 113us/step - loss: 60.0424 - acc: 0.6759  
Epoch 7/10  
108/108 [=====] - 0s 112us/step - loss: 57.5992 - acc: 0.7500  
Epoch 8/10  
108/108 [=====] - 0s 117us/step - loss: 55.2345 - acc: 0.7500  
Epoch 9/10  
108/108 [=====] - 0s 115us/step - loss: 52.9534 - acc: 0.7315  
Epoch 10/10  
108/108 [=====] - 0s 116us/step - loss: 50.7587 - acc: 0.7870  
27/27 [=====] - 1s 32ms/step  
108/108 [=====] - 0s 79us/step  
Epoch 1/10  
108/108 [=====] - 2s 21ms/step - loss: 72.0435 - acc: 0.3519  
Epoch 2/10  
108/108 [=====] - 0s 117us/step - loss: 69.5230 - acc: 0.3519  
Epoch 3/10  
108/108 [=====] - 0s 109us/step - loss: 66.8459 - acc: 0.3796  
Epoch 4/10  
108/108 [=====] - 0s 113us/step - loss: 64.1822 - acc: 0.7593

Epoch 5/10  
108/108 [=====] - 0s 114us/step - loss: 61.5798 - acc: 0.8241  
Epoch 6/10  
108/108 [=====] - 0s 117us/step - loss: 59.0517 - acc: 0.8241  
Epoch 7/10  
108/108 [=====] - 0s 114us/step - loss: 56.6027 - acc: 0.8241  
Epoch 8/10  
108/108 [=====] - 0s 115us/step - loss: 54.2381 - acc: 0.7685  
Epoch 9/10  
108/108 [=====] - 0s 113us/step - loss: 51.9559 - acc: 0.7222  
Epoch 10/10  
108/108 [=====] - 0s 113us/step - loss: 49.7565 - acc: 0.8056  
27/27 [=====] - 1s 31ms/step  
108/108 [=====] - 0s 58us/step  
Epoch 1/10  
108/108 [=====] - 2s 21ms/step - loss: 2.1153 - acc: 0.3426  
Epoch 2/10  
108/108 [=====] - 0s 118us/step - loss: 1.8248 - acc: 0.4815  
Epoch 3/10  
108/108 [=====] - 0s 123us/step - loss: 1.7455 - acc: 0.4630  
Epoch 4/10  
108/108 [=====] - 0s 122us/step - loss: 1.6345 - acc: 0.8981  
Epoch 5/10  
108/108 [=====] - 0s 117us/step - loss: 1.5529 - acc: 0.6852  
Epoch 6/10  
108/108 [=====] - 0s 115us/step - loss: 1.4770 - acc: 0.6852  
Epoch 7/10  
108/108 [=====] - 0s 114us/step - loss: 1.4020 - acc: 0.6852  
Epoch 8/10  
108/108 [=====] - 0s 114us/step - loss: 1.3377 - acc: 0.8056  
Epoch 9/10  
108/108 [=====] - 0s 118us/step - loss: 1.2829 - acc: 0.8796  
Epoch 10/10  
108/108 [=====] - 0s 120us/step - loss: 1.2283 - acc: 0.8333  
27/27 [=====] - 1s 32ms/step  
108/108 [=====] - 0s 64us/step  
Epoch 1/10  
108/108 [=====] - 2s 22ms/step - loss: 2.3386 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 119us/step - loss: 1.9930 - acc: 0.3148  
Epoch 3/10  
108/108 [=====] - 0s 124us/step - loss: 1.8130 - acc: 0.7963  
Epoch 4/10  
108/108 [=====] - 0s 125us/step - loss: 1.7196 - acc: 0.6852  
Epoch 5/10  
108/108 [=====] - 0s 137us/step - loss: 1.6405 - acc: 0.6852  
Epoch 6/10  
108/108 [=====] - 0s 131us/step - loss: 1.5668 - acc: 0.6852

Epoch 7/10  
108/108 [=====] - 0s 117us/step - loss: 1.4888 - acc: 0.6852  
Epoch 8/10  
108/108 [=====] - 0s 118us/step - loss: 1.4041 - acc: 0.6852  
Epoch 9/10  
108/108 [=====] - 0s 119us/step - loss: 1.3392 - acc: 0.6852  
Epoch 10/10  
108/108 [=====] - 0s 116us/step - loss: 1.2823 - acc: 0.6944  
27/27 [=====] - 1s 33ms/step  
108/108 [=====] - 0s 86us/step  
Epoch 1/10  
108/108 [=====] - 3s 24ms/step - loss: 2.2070 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 128us/step - loss: 1.9557 - acc: 0.3148  
Epoch 3/10  
108/108 [=====] - 0s 119us/step - loss: 1.8231 - acc: 0.5648  
Epoch 4/10  
108/108 [=====] - 0s 118us/step - loss: 1.7360 - acc: 0.7407  
Epoch 5/10  
108/108 [=====] - 0s 122us/step - loss: 1.6540 - acc: 0.9815  
Epoch 6/10  
108/108 [=====] - 0s 122us/step - loss: 1.5769 - acc: 0.6481  
Epoch 7/10  
108/108 [=====] - 0s 119us/step - loss: 1.5121 - acc: 0.6296  
Epoch 8/10  
108/108 [=====] - 0s 124us/step - loss: 1.4463 - acc: 0.7407  
Epoch 9/10  
108/108 [=====] - 0s 123us/step - loss: 1.3789 - acc: 0.7222  
Epoch 10/10  
108/108 [=====] - 0s 125us/step - loss: 1.3351 - acc: 0.6296  
27/27 [=====] - 1s 35ms/step  
108/108 [=====] - 0s 90us/step  
Epoch 1/10  
108/108 [=====] - 2s 22ms/step - loss: 2.1188 - acc: 0.3056  
Epoch 2/10  
108/108 [=====] - 0s 160us/step - loss: 1.9388 - acc: 0.5093  
Epoch 3/10  
108/108 [=====] - 0s 147us/step - loss: 1.8200 - acc: 0.3611  
Epoch 4/10  
108/108 [=====] - 0s 136us/step - loss: 1.7411 - acc: 0.3704  
Epoch 5/10  
108/108 [=====] - 0s 130us/step - loss: 1.6674 - acc: 0.5000  
Epoch 6/10  
108/108 [=====] - 0s 138us/step - loss: 1.5915 - acc: 0.7963  
Epoch 7/10  
108/108 [=====] - 0s 151us/step - loss: 1.5161 - acc: 0.8704  
Epoch 8/10  
108/108 [=====] - 0s 164us/step - loss: 1.4424 - acc: 0.9074

Epoch 9/10  
108/108 [=====] - 0s 151us/step - loss: 1.3726 - acc: 0.8704  
Epoch 10/10  
108/108 [=====] - 0s 139us/step - loss: 1.3068 - acc: 0.7685  
27/27 [=====] - 1s 35ms/step  
108/108 [=====] - 0s 69us/step  
Epoch 1/10  
108/108 [=====] - 3s 23ms/step - loss: 1.9951 - acc: 0.3519  
Epoch 2/10  
108/108 [=====] - 0s 139us/step - loss: 1.8677 - acc: 0.6296  
Epoch 3/10  
108/108 [=====] - 0s 149us/step - loss: 1.7715 - acc: 0.6667  
Epoch 4/10  
108/108 [=====] - 0s 244us/step - loss: 1.6881 - acc: 0.6852  
Epoch 5/10  
108/108 [=====] - 0s 147us/step - loss: 1.6126 - acc: 0.6667  
Epoch 6/10  
108/108 [=====] - 0s 134us/step - loss: 1.5391 - acc: 0.6667  
Epoch 7/10  
108/108 [=====] - 0s 121us/step - loss: 1.4777 - acc: 0.6944  
Epoch 8/10  
108/108 [=====] - 0s 122us/step - loss: 1.4237 - acc: 0.8796  
Epoch 9/10  
108/108 [=====] - 0s 128us/step - loss: 1.3733 - acc: 0.7778  
Epoch 10/10  
108/108 [=====] - 0s 124us/step - loss: 1.3224 - acc: 0.7037  
27/27 [=====] - 1s 34ms/step  
108/108 [=====] - 0s 87us/step  
Epoch 1/10  
108/108 [=====] - 2s 22ms/step - loss: 10.7002 - acc: 0.3426  
Epoch 2/10  
108/108 [=====] - 0s 129us/step - loss: 10.0047 - acc: 0.5185  
Epoch 3/10  
108/108 [=====] - 0s 131us/step - loss: 9.4686 - acc: 0.6852  
Epoch 4/10  
108/108 [=====] - 0s 150us/step - loss: 9.0925 - acc: 0.7870  
Epoch 5/10  
108/108 [=====] - 0s 133us/step - loss: 8.7298 - acc: 0.6574  
Epoch 6/10  
108/108 [=====] - 0s 134us/step - loss: 8.3296 - acc: 0.7315  
Epoch 7/10  
108/108 [=====] - 0s 127us/step - loss: 7.9483 - acc: 0.7963  
Epoch 8/10  
108/108 [=====] - 0s 125us/step - loss: 7.6132 - acc: 0.6852  
Epoch 9/10  
108/108 [=====] - 0s 130us/step - loss: 7.2956 - acc: 0.6852  
Epoch 10/10  
108/108 [=====] - 0s 127us/step - loss: 6.9864 - acc: 0.6852



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27/27 [=====] - 1s 36ms/step
108/108 [=====] - 0s 82us/step
Epoch 1/10
108/108 [=====] - 3s 23ms/step - loss: 10.2031 - acc: 0.3333
Epoch 2/10
108/108 [=====] - 0s 128us/step - loss: 9.7939 - acc: 0.3704
Epoch 3/10
108/108 [=====] - 0s 140us/step - loss: 9.3839 - acc: 0.3704
Epoch 4/10
108/108 [=====] - 0s 124us/step - loss: 8.9676 - acc: 0.7685
Epoch 5/10
108/108 [=====] - 0s 122us/step - loss: 8.5815 - acc: 0.6852
Epoch 6/10
108/108 [=====] - 0s 121us/step - loss: 8.2155 - acc: 0.6852
Epoch 7/10
108/108 [=====] - 0s 122us/step - loss: 7.8558 - acc: 0.6852
Epoch 8/10
108/108 [=====] - 0s 124us/step - loss: 7.4986 - acc: 0.6852
Epoch 9/10
108/108 [=====] - 0s 133us/step - loss: 7.1582 - acc: 0.6852
Epoch 10/10
108/108 [=====] - 0s 132us/step - loss: 6.8430 - acc: 0.7870
27/27 [=====] - 1s 43ms/step
108/108 [=====] - 0s 87us/step
Epoch 1/10
108/108 [=====] - 3s 24ms/step - loss: 10.2529 - acc: 0.2778
Epoch 2/10
108/108 [=====] - 0s 139us/step - loss: 9.8256 - acc: 0.6481
Epoch 3/10
108/108 [=====] - 0s 146us/step - loss: 9.3822 - acc: 0.6852
Epoch 4/10
108/108 [=====] - 0s 126us/step - loss: 8.9605 - acc: 0.6852
Epoch 5/10
108/108 [=====] - 0s 126us/step - loss: 8.5576 - acc: 0.7963
Epoch 6/10
108/108 [=====] - 0s 135us/step - loss: 8.1715 - acc: 0.9537
Epoch 7/10
108/108 [=====] - 0s 123us/step - loss: 7.8013 - acc: 0.9630
Epoch 8/10
108/108 [=====] - 0s 137us/step - loss: 7.4486 - acc: 0.9352
Epoch 9/10
108/108 [=====] - 0s 122us/step - loss: 7.1127 - acc: 0.9630
Epoch 10/10
108/108 [=====] - 0s 121us/step - loss: 6.7863 - acc: 0.9444
27/27 [=====] - 1s 38ms/step
108/108 [=====] - 0s 81us/step
Epoch 1/10
108/108 [=====] - 3s 25ms/step - loss: 10.3481 - acc: 0.3333

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Epoch 2/10  
108/108 [=====] - 0s 141us/step - loss: 9.7918 - acc: 0.4537  
Epoch 3/10  
108/108 [=====] - 0s 129us/step - loss: 9.3726 - acc: 0.6667  
Epoch 4/10  
108/108 [=====] - 0s 124us/step - loss: 8.9851 - acc: 0.6667  
Epoch 5/10  
108/108 [=====] - 0s 147us/step - loss: 8.5978 - acc: 0.6667  
Epoch 6/10  
108/108 [=====] - 0s 145us/step - loss: 8.2232 - acc: 0.7037  
Epoch 7/10  
108/108 [=====] - 0s 131us/step - loss: 7.8634 - acc: 0.8519  
Epoch 8/10  
108/108 [=====] - 0s 186us/step - loss: 7.5225 - acc: 0.9537  
Epoch 9/10  
108/108 [=====] - 0s 117us/step - loss: 7.1923 - acc: 0.9167  
Epoch 10/10  
108/108 [=====] - 0s 119us/step - loss: 6.8754 - acc: 0.8241  
27/27 [=====] - 1s 37ms/step  
108/108 [=====] - 0s 96us/step  
Epoch 1/10  
108/108 [=====] - 3s 24ms/step - loss: 10.5372 - acc: 0.3519  
Epoch 2/10  
108/108 [=====] - 0s 150us/step - loss: 9.9835 - acc: 0.5278  
Epoch 3/10  
108/108 [=====] - 0s 127us/step - loss: 9.4797 - acc: 0.7037  
Epoch 4/10  
108/108 [=====] - 0s 122us/step - loss: 9.0670 - acc: 0.6667  
Epoch 5/10  
108/108 [=====] - 0s 140us/step - loss: 8.6959 - acc: 0.6667  
Epoch 6/10  
108/108 [=====] - 0s 134us/step - loss: 8.3082 - acc: 0.6667  
Epoch 7/10  
108/108 [=====] - 0s 145us/step - loss: 7.9206 - acc: 0.6667  
Epoch 8/10  
108/108 [=====] - 0s 148us/step - loss: 7.5597 - acc: 0.6759  
Epoch 9/10  
108/108 [=====] - 0s 154us/step - loss: 7.2243 - acc: 0.8056  
Epoch 10/10  
108/108 [=====] - 0s 126us/step - loss: 6.9039 - acc: 0.8148  
27/27 [=====] - 1s 45ms/step  
108/108 [=====] - 0s 85us/step  
Epoch 1/10  
108/108 [=====] - 3s 27ms/step - loss: 95.1702 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 138us/step - loss: 91.1346 - acc: 0.3148  
Epoch 3/10  
108/108 [=====] - 0s 123us/step - loss: 86.8511 - acc: 0.3148

Epoch 4/10  
108/108 [=====] - 0s 119us/step - loss: 82.6229 - acc: 0.4074  
Epoch 5/10  
108/108 [=====] - 0s 123us/step - loss: 78.5184 - acc: 0.6481  
Epoch 6/10  
108/108 [=====] - 0s 145us/step - loss: 74.5591 - acc: 0.6574  
Epoch 7/10  
108/108 [=====] - 0s 124us/step - loss: 70.7600 - acc: 0.5185  
Epoch 8/10  
108/108 [=====] - 0s 136us/step - loss: 67.1254 - acc: 0.6852  
Epoch 9/10  
108/108 [=====] - 0s 143us/step - loss: 63.6532 - acc: 0.6852  
Epoch 10/10  
108/108 [=====] - 0s 126us/step - loss: 60.3391 - acc: 0.6852  
27/27 [=====] - 1s 39ms/step  
108/108 [=====] - 0s 70us/step  
Epoch 1/10  
108/108 [=====] - 3s 25ms/step - loss: 92.0220 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 126us/step - loss: 88.0916 - acc: 0.3241  
Epoch 3/10  
108/108 [=====] - 0s 119us/step - loss: 83.9178 - acc: 0.4630  
Epoch 4/10  
108/108 [=====] - 0s 123us/step - loss: 79.7991 - acc: 0.3333  
Epoch 5/10  
108/108 [=====] - 0s 128us/step - loss: 75.7984 - acc: 0.3333  
Epoch 6/10  
108/108 [=====] - 0s 127us/step - loss: 71.9430 - acc: 0.3333  
Epoch 7/10  
108/108 [=====] - 0s 136us/step - loss: 68.2419 - acc: 0.3796  
Epoch 8/10  
108/108 [=====] - 0s 129us/step - loss: 64.6995 - acc: 0.6019  
Epoch 9/10  
108/108 [=====] - 0s 130us/step - loss: 61.3159 - acc: 0.6852  
Epoch 10/10  
108/108 [=====] - 0s 133us/step - loss: 58.0886 - acc: 0.6852  
27/27 [=====] - 1s 41ms/step  
108/108 [=====] - 0s 66us/step  
Epoch 1/10  
108/108 [=====] - 3s 25ms/step - loss: 93.5114 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 124us/step - loss: 89.3783 - acc: 0.3148  
Epoch 3/10  
108/108 [=====] - 0s 129us/step - loss: 85.0681 - acc: 0.3148  
Epoch 4/10  
108/108 [=====] - 0s 126us/step - loss: 80.8589 - acc: 0.3611  
Epoch 5/10  
108/108 [=====] - 0s 126us/step - loss: 76.8218 - acc: 0.4537

Epoch 6/10  
108/108 [=====] - 0s 138us/step - loss: 72.9558 - acc: 0.3148  
Epoch 7/10  
108/108 [=====] - 0s 144us/step - loss: 69.2544 - acc: 0.3148  
Epoch 8/10  
108/108 [=====] - 0s 133us/step - loss: 65.7100 - acc: 0.3241  
Epoch 9/10  
108/108 [=====] - 0s 139us/step - loss: 62.3188 - acc: 0.4352  
Epoch 10/10  
108/108 [=====] - 0s 130us/step - loss: 59.0766 - acc: 0.5926  
27/27 [=====] - 1s 40ms/step  
108/108 [=====] - 0s 72us/step  
Epoch 1/10  
108/108 [=====] - 3s 25ms/step - loss: 94.5450 - acc: 0.3611  
Epoch 2/10  
108/108 [=====] - 0s 123us/step - loss: 90.5848 - acc: 0.3611  
Epoch 3/10  
108/108 [=====] - 0s 126us/step - loss: 86.3833 - acc: 0.3611  
Epoch 4/10  
108/108 [=====] - 0s 123us/step - loss: 82.2288 - acc: 0.3611  
Epoch 5/10  
108/108 [=====] - 0s 119us/step - loss: 78.1830 - acc: 0.3611  
Epoch 6/10  
108/108 [=====] - 0s 127us/step - loss: 74.2736 - acc: 0.3611  
Epoch 7/10  
108/108 [=====] - 0s 118us/step - loss: 70.5163 - acc: 0.3704  
Epoch 8/10  
108/108 [=====] - 0s 125us/step - loss: 66.9129 - acc: 0.6019  
Epoch 9/10  
108/108 [=====] - 0s 115us/step - loss: 63.4696 - acc: 0.6667  
Epoch 10/10  
108/108 [=====] - 0s 116us/step - loss: 60.1826 - acc: 0.6667  
27/27 [=====] - 1s 41ms/step  
108/108 [=====] - 0s 80us/step  
Epoch 1/10  
108/108 [=====] - 3s 26ms/step - loss: 94.8645 - acc: 0.3333  
Epoch 2/10  
108/108 [=====] - 0s 134us/step - loss: 90.6308 - acc: 0.3333  
Epoch 3/10  
108/108 [=====] - 0s 127us/step - loss: 86.2105 - acc: 0.3333  
Epoch 4/10  
108/108 [=====] - 0s 132us/step - loss: 81.9207 - acc: 0.3333  
Epoch 5/10  
108/108 [=====] - 0s 126us/step - loss: 77.8227 - acc: 0.3333  
Epoch 6/10  
108/108 [=====] - 0s 128us/step - loss: 73.9204 - acc: 0.5278  
Epoch 7/10  
108/108 [=====] - 0s 122us/step - loss: 70.1765 - acc: 0.6852

Epoch 8/10  
108/108 [=====] - 0s 127us/step - loss: 66.6020 - acc: 0.6574  
Epoch 9/10  
108/108 [=====] - 0s 128us/step - loss: 63.1897 - acc: 0.3796  
Epoch 10/10  
108/108 [=====] - 0s 148us/step - loss: 59.9373 - acc: 0.3148  
27/27 [=====] - 1s 47ms/step  
108/108 [=====] - 0s 71us/step  
Epoch 1/10  
108/108 [=====] - 3s 26ms/step - loss: 2.1419 - acc: 0.4444  
Epoch 2/10  
108/108 [=====] - 0s 121us/step - loss: 1.9356 - acc: 0.6852  
Epoch 3/10  
108/108 [=====] - 0s 116us/step - loss: 1.7751 - acc: 0.6852  
Epoch 4/10  
108/108 [=====] - 0s 127us/step - loss: 1.6486 - acc: 0.8056  
Epoch 5/10  
108/108 [=====] - 0s 127us/step - loss: 1.5378 - acc: 0.9722  
Epoch 6/10  
108/108 [=====] - 0s 134us/step - loss: 1.4439 - acc: 0.7130  
Epoch 7/10  
108/108 [=====] - 0s 129us/step - loss: 1.3780 - acc: 0.6852  
Epoch 8/10  
108/108 [=====] - 0s 131us/step - loss: 1.3020 - acc: 0.7037  
Epoch 9/10  
108/108 [=====] - 0s 132us/step - loss: 1.2303 - acc: 0.9259  
Epoch 10/10  
108/108 [=====] - 0s 132us/step - loss: 1.1966 - acc: 0.9259  
27/27 [=====] - 1s 42ms/step  
108/108 [=====] - 0s 95us/step  
Epoch 1/10  
108/108 [=====] - 3s 26ms/step - loss: 2.3065 - acc: 0.3333  
Epoch 2/10  
108/108 [=====] - 0s 178us/step - loss: 2.0454 - acc: 0.5463  
Epoch 3/10  
108/108 [=====] - 0s 193us/step - loss: 1.9330 - acc: 0.6667  
Epoch 4/10  
108/108 [=====] - 0s 172us/step - loss: 1.8098 - acc: 0.6667  
Epoch 5/10  
108/108 [=====] - 0s 140us/step - loss: 1.6737 - acc: 0.7870  
Epoch 6/10  
108/108 [=====] - 0s 145us/step - loss: 1.5905 - acc: 0.6852  
Epoch 7/10  
108/108 [=====] - 0s 126us/step - loss: 1.5131 - acc: 0.6852  
Epoch 8/10  
108/108 [=====] - 0s 128us/step - loss: 1.4165 - acc: 0.6852  
Epoch 9/10  
108/108 [=====] - 0s 137us/step - loss: 1.3365 - acc: 0.7685

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Epoch 10/10
108/108 [=====] - 0s 141us/step - loss: 1.2739 - acc: 0.9444
27/27 [=====] - 1s 47ms/step
108/108 [=====] - 0s 88us/step
Epoch 1/10
108/108 [=====] - 3s 27ms/step - loss: 2.7420 - acc: 0.3148
Epoch 2/10
108/108 [=====] - 0s 139us/step - loss: 2.1488 - acc: 0.4444
Epoch 3/10
108/108 [=====] - 0s 136us/step - loss: 2.0020 - acc: 0.2407
Epoch 4/10
108/108 [=====] - 0s 147us/step - loss: 1.9496 - acc: 0.2963
Epoch 5/10
108/108 [=====] - 0s 135us/step - loss: 1.8498 - acc: 0.3889
Epoch 6/10
108/108 [=====] - 0s 128us/step - loss: 1.7306 - acc: 0.7870
Epoch 7/10
108/108 [=====] - 0s 157us/step - loss: 1.6205 - acc: 0.7500
Epoch 8/10
108/108 [=====] - 0s 160us/step - loss: 1.5265 - acc: 0.8981
Epoch 9/10
108/108 [=====] - 0s 124us/step - loss: 1.4646 - acc: 0.6389
Epoch 10/10
108/108 [=====] - 0s 125us/step - loss: 1.4015 - acc: 0.6481
27/27 [=====] - 1s 48ms/step
108/108 [=====] - 0s 71us/step
Epoch 1/10
108/108 [=====] - 3s 27ms/step - loss: 2.1514 - acc: 0.3796
Epoch 2/10
108/108 [=====] - 0s 123us/step - loss: 1.9815 - acc: 0.5648
Epoch 3/10
108/108 [=====] - 0s 128us/step - loss: 1.8777 - acc: 0.6667
Epoch 4/10
108/108 [=====] - 0s 123us/step - loss: 1.7668 - acc: 0.6667
Epoch 5/10
108/108 [=====] - 0s 137us/step - loss: 1.6617 - acc: 0.8056
Epoch 6/10
108/108 [=====] - 0s 121us/step - loss: 1.5923 - acc: 0.7315
Epoch 7/10
108/108 [=====] - 0s 122us/step - loss: 1.4978 - acc: 0.9167
Epoch 8/10
108/108 [=====] - 0s 127us/step - loss: 1.4114 - acc: 0.7315
Epoch 9/10
108/108 [=====] - 0s 151us/step - loss: 1.3422 - acc: 0.7037
Epoch 10/10
108/108 [=====] - 0s 155us/step - loss: 1.2743 - acc: 0.8333
27/27 [=====] - 1s 45ms/step
108/108 [=====] - 0s 78us/step

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Epoch 1/10  
108/108 [=====] - 3s 27ms/step - loss: 2.2133 - acc: 0.3241  
Epoch 2/10  
108/108 [=====] - 0s 126us/step - loss: 2.0098 - acc: 0.6111  
Epoch 3/10  
108/108 [=====] - 0s 116us/step - loss: 1.8580 - acc: 0.6667  
Epoch 4/10  
108/108 [=====] - 0s 124us/step - loss: 1.7336 - acc: 0.6667  
Epoch 5/10  
108/108 [=====] - 0s 124us/step - loss: 1.6266 - acc: 0.6852  
Epoch 6/10  
108/108 [=====] - 0s 133us/step - loss: 1.5281 - acc: 0.9167  
Epoch 7/10  
108/108 [=====] - 0s 119us/step - loss: 1.4477 - acc: 0.7685  
Epoch 8/10  
108/108 [=====] - 0s 127us/step - loss: 1.3772 - acc: 0.6852  
Epoch 9/10  
108/108 [=====] - 0s 126us/step - loss: 1.3020 - acc: 0.7963  
Epoch 10/10  
108/108 [=====] - 0s 120us/step - loss: 1.2373 - acc: 0.8241  
27/27 [=====] - 1s 44ms/step  
108/108 [=====] - 0s 73us/step  
Epoch 1/10  
108/108 [=====] - 3s 27ms/step - loss: 11.9395 - acc: 0.6481  
Epoch 2/10  
108/108 [=====] - 0s 139us/step - loss: 11.3144 - acc: 0.6111  
Epoch 3/10  
108/108 [=====] - 0s 154us/step - loss: 10.6756 - acc: 0.6759  
Epoch 4/10  
108/108 [=====] - 0s 170us/step - loss: 10.0660 - acc: 0.6852  
Epoch 5/10  
108/108 [=====] - 0s 151us/step - loss: 9.4908 - acc: 0.6852  
Epoch 6/10  
108/108 [=====] - 0s 149us/step - loss: 8.9289 - acc: 0.6852  
Epoch 7/10  
108/108 [=====] - 0s 158us/step - loss: 8.3916 - acc: 0.6852  
Epoch 8/10  
108/108 [=====] - 0s 159us/step - loss: 7.8950 - acc: 0.6852  
Epoch 9/10  
108/108 [=====] - 0s 166us/step - loss: 7.4238 - acc: 0.7407  
Epoch 10/10  
108/108 [=====] - 0s 160us/step - loss: 6.9726 - acc: 0.8056  
27/27 [=====] - 1s 45ms/step  
108/108 [=====] - 0s 92us/step  
Epoch 1/10  
108/108 [=====] - 3s 29ms/step - loss: 11.9587 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 129us/step - loss: 11.3487 - acc: 0.3333

Epoch 3/10  
108/108 [=====] - 0s 125us/step - loss: 10.7093 - acc: 0.4259  
Epoch 4/10  
108/108 [=====] - 0s 125us/step - loss: 10.0852 - acc: 0.6852  
Epoch 5/10  
108/108 [=====] - 0s 127us/step - loss: 9.4888 - acc: 0.6852  
Epoch 6/10  
108/108 [=====] - 0s 140us/step - loss: 8.9242 - acc: 0.6852  
Epoch 7/10  
108/108 [=====] - 0s 123us/step - loss: 8.3935 - acc: 0.6852  
Epoch 8/10  
108/108 [=====] - 0s 134us/step - loss: 7.8948 - acc: 0.6944  
Epoch 9/10  
108/108 [=====] - 0s 131us/step - loss: 7.4236 - acc: 0.6852  
Epoch 10/10  
108/108 [=====] - 0s 128us/step - loss: 6.9822 - acc: 0.6852  
27/27 [=====] - 1s 47ms/step  
108/108 [=====] - 0s 92us/step  
Epoch 1/10  
108/108 [=====] - 3s 29ms/step - loss: 12.0928 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 152us/step - loss: 11.4112 - acc: 0.5370  
Epoch 3/10  
108/108 [=====] - 0s 128us/step - loss: 10.8536 - acc: 0.3704  
Epoch 4/10  
108/108 [=====] - 0s 158us/step - loss: 10.2316 - acc: 0.4167  
Epoch 5/10  
108/108 [=====] - 0s 143us/step - loss: 9.6298 - acc: 0.7870  
Epoch 6/10  
108/108 [=====] - 0s 142us/step - loss: 9.1214 - acc: 0.6296  
Epoch 7/10  
108/108 [=====] - 0s 141us/step - loss: 8.6383 - acc: 0.6296  
Epoch 8/10  
108/108 [=====] - 0s 142us/step - loss: 8.1242 - acc: 0.6296  
Epoch 9/10  
108/108 [=====] - 0s 152us/step - loss: 7.6454 - acc: 0.7870  
Epoch 10/10  
108/108 [=====] - 0s 162us/step - loss: 7.2149 - acc: 0.8241  
27/27 [=====] - 2s 57ms/step  
108/108 [=====] - 0s 101us/step  
Epoch 1/10  
108/108 [=====] - 3s 29ms/step - loss: 12.0259 - acc: 0.2963  
Epoch 2/10  
108/108 [=====] - 0s 144us/step - loss: 11.2999 - acc: 0.3611  
Epoch 3/10  
108/108 [=====] - 0s 131us/step - loss: 10.6918 - acc: 0.3611  
Epoch 4/10  
108/108 [=====] - 0s 142us/step - loss: 10.0891 - acc: 0.3704



Epoch 5/10  
108/108 [=====] - 0s 131us/step - loss: 9.4946 - acc: 0.6667  
Epoch 6/10  
108/108 [=====] - 0s 158us/step - loss: 8.9544 - acc: 0.6759  
Epoch 7/10  
108/108 [=====] - 0s 152us/step - loss: 8.4401 - acc: 0.8241  
Epoch 8/10  
108/108 [=====] - 0s 152us/step - loss: 7.9508 - acc: 0.7963  
Epoch 9/10  
108/108 [=====] - 0s 136us/step - loss: 7.4972 - acc: 0.6667  
Epoch 10/10  
108/108 [=====] - 0s 142us/step - loss: 7.0709 - acc: 0.6667  
27/27 [=====] - 1s 49ms/step  
108/108 [=====] - 0s 97us/step  
Epoch 1/10  
108/108 [=====] - 3s 30ms/step - loss: 12.1465 - acc: 0.2685  
Epoch 2/10  
108/108 [=====] - 0s 132us/step - loss: 11.4725 - acc: 0.8056  
Epoch 3/10  
108/108 [=====] - 0s 138us/step - loss: 10.8257 - acc: 0.6481  
Epoch 4/10  
108/108 [=====] - 0s 164us/step - loss: 10.2047 - acc: 0.6667  
Epoch 5/10  
108/108 [=====] - 0s 146us/step - loss: 9.6090 - acc: 0.6852  
Epoch 6/10  
108/108 [=====] - 0s 131us/step - loss: 9.0404 - acc: 0.6759  
Epoch 7/10  
108/108 [=====] - 0s 134us/step - loss: 8.5090 - acc: 0.6667  
Epoch 8/10  
108/108 [=====] - 0s 132us/step - loss: 8.0075 - acc: 0.9444  
Epoch 9/10  
108/108 [=====] - 0s 143us/step - loss: 7.5408 - acc: 0.7593  
Epoch 10/10  
108/108 [=====] - 0s 154us/step - loss: 7.0999 - acc: 0.6852  
27/27 [=====] - 1s 52ms/step  
108/108 [=====] - 0s 87us/step  
Epoch 1/10  
108/108 [=====] - 3s 29ms/step - loss: 110.6264 - acc: 0.3333  
Epoch 2/10  
108/108 [=====] - 0s 155us/step - loss: 104.6242 - acc: 0.6019  
Epoch 3/10  
108/108 [=====] - 0s 133us/step - loss: 98.3480 - acc: 0.6574  
Epoch 4/10  
108/108 [=====] - 0s 152us/step - loss: 92.2115 - acc: 0.6574  
Epoch 5/10  
108/108 [=====] - 0s 165us/step - loss: 86.3136 - acc: 0.6759  
Epoch 6/10  
108/108 [=====] - 0s 138us/step - loss: 80.6935 - acc: 0.7685

Epoch 7/10  
108/108 [=====] - 0s 140us/step - loss: 75.3657 - acc: 0.6852  
Epoch 8/10  
108/108 [=====] - 0s 129us/step - loss: 70.3345 - acc: 0.6852  
Epoch 9/10  
108/108 [=====] - 0s 140us/step - loss: 65.5940 - acc: 0.6852  
Epoch 10/10  
108/108 [=====] - 0s 138us/step - loss: 61.1387 - acc: 0.6852  
27/27 [=====] - 1s 49ms/step  
108/108 [=====] - 0s 110us/step  
Epoch 1/10  
108/108 [=====] - 3s 30ms/step - loss: 109.5178 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 129us/step - loss: 103.5765 - acc: 0.5278  
Epoch 3/10  
108/108 [=====] - 0s 126us/step - loss: 97.3328 - acc: 0.6852  
Epoch 4/10  
108/108 [=====] - 0s 135us/step - loss: 91.2454 - acc: 0.6852  
Epoch 5/10  
108/108 [=====] - 0s 134us/step - loss: 85.4061 - acc: 0.6852  
Epoch 6/10  
108/108 [=====] - 0s 130us/step - loss: 79.8424 - acc: 0.6852  
Epoch 7/10  
108/108 [=====] - 0s 127us/step - loss: 74.5669 - acc: 0.6852  
Epoch 8/10  
108/108 [=====] - 0s 130us/step - loss: 69.5881 - acc: 0.6852  
Epoch 9/10  
108/108 [=====] - 0s 139us/step - loss: 64.9045 - acc: 0.8426  
Epoch 10/10  
108/108 [=====] - 0s 141us/step - loss: 60.5047 - acc: 0.9815  
27/27 [=====] - 1s 49ms/step  
108/108 [=====] - 0s 89us/step  
Epoch 1/10  
108/108 [=====] - 3s 30ms/step - loss: 109.7443 - acc: 0.3704  
Epoch 2/10  
108/108 [=====] - 0s 124us/step - loss: 103.7593 - acc: 0.3704  
Epoch 3/10  
108/108 [=====] - 0s 139us/step - loss: 97.5027 - acc: 0.4352  
Epoch 4/10  
108/108 [=====] - 0s 128us/step - loss: 91.4166 - acc: 0.6574  
Epoch 5/10  
108/108 [=====] - 0s 130us/step - loss: 85.5700 - acc: 0.6296  
Epoch 6/10  
108/108 [=====] - 0s 136us/step - loss: 79.9963 - acc: 0.6389  
Epoch 7/10  
108/108 [=====] - 0s 152us/step - loss: 74.7169 - acc: 0.6852  
Epoch 8/10  
108/108 [=====] - 0s 126us/step - loss: 69.7358 - acc: 0.8148

Epoch 9/10  
108/108 [=====] - 0s 127us/step - loss: 65.0447 - acc: 0.7593  
Epoch 10/10  
108/108 [=====] - 0s 126us/step - loss: 60.6428 - acc: 0.6296  
27/27 [=====] - 1s 50ms/step  
108/108 [=====] - 0s 76us/step  
Epoch 1/10  
108/108 [=====] - 3s 31ms/step - loss: 109.2589 - acc: 0.3426  
Epoch 2/10  
108/108 [=====] - 0s 125us/step - loss: 103.3102 - acc: 0.3611  
Epoch 3/10  
108/108 [=====] - 0s 127us/step - loss: 97.0550 - acc: 0.3611  
Epoch 4/10  
108/108 [=====] - 0s 127us/step - loss: 90.9590 - acc: 0.3611  
Epoch 5/10  
108/108 [=====] - 0s 127us/step - loss: 85.0925 - acc: 0.3611  
Epoch 6/10  
108/108 [=====] - 0s 166us/step - loss: 79.4992 - acc: 0.5093  
Epoch 7/10  
108/108 [=====] - 0s 143us/step - loss: 74.2051 - acc: 0.6574  
Epoch 8/10  
108/108 [=====] - 0s 129us/step - loss: 69.2081 - acc: 0.6667  
Epoch 9/10  
108/108 [=====] - 0s 142us/step - loss: 64.5118 - acc: 0.9167  
Epoch 10/10  
108/108 [=====] - 0s 134us/step - loss: 60.1006 - acc: 0.7407  
27/27 [=====] - 1s 51ms/step  
108/108 [=====] - 0s 85us/step  
Epoch 1/10  
108/108 [=====] - 3s 30ms/step - loss: 110.4419 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 148us/step - loss: 104.4243 - acc: 0.3148  
Epoch 3/10  
108/108 [=====] - 0s 130us/step - loss: 98.1312 - acc: 0.3148  
Epoch 4/10  
108/108 [=====] - 0s 125us/step - loss: 92.0008 - acc: 0.5926  
Epoch 5/10  
108/108 [=====] - 0s 134us/step - loss: 86.1219 - acc: 0.7500  
Epoch 6/10  
108/108 [=====] - 0s 135us/step - loss: 80.5232 - acc: 0.7685  
Epoch 7/10  
108/108 [=====] - 0s 128us/step - loss: 75.2154 - acc: 0.7315  
Epoch 8/10  
108/108 [=====] - 0s 140us/step - loss: 70.1987 - acc: 0.7778  
Epoch 9/10  
108/108 [=====] - 0s 122us/step - loss: 65.4758 - acc: 0.8519  
Epoch 10/10  
108/108 [=====] - 0s 126us/step - loss: 61.0376 - acc: 0.9074

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27/27 [=====] - 1s 55ms/step
108/108 [=====] - 0s 89us/step
Epoch 1/10
108/108 [=====] - 4s 33ms/step - loss: 1.9131 - acc: 0.6204
Epoch 2/10
108/108 [=====] - 0s 146us/step - loss: 1.7738 - acc: 0.7500
Epoch 3/10
108/108 [=====] - 0s 129us/step - loss: 1.6801 - acc: 0.6574
Epoch 4/10
108/108 [=====] - 0s 142us/step - loss: 1.5945 - acc: 0.6574
Epoch 5/10
108/108 [=====] - 0s 147us/step - loss: 1.5056 - acc: 0.6852
Epoch 6/10
108/108 [=====] - 0s 121us/step - loss: 1.4297 - acc: 0.7037
Epoch 7/10
108/108 [=====] - 0s 124us/step - loss: 1.3705 - acc: 0.6852
Epoch 8/10
108/108 [=====] - 0s 131us/step - loss: 1.3061 - acc: 0.6852
Epoch 9/10
108/108 [=====] - 0s 121us/step - loss: 1.2475 - acc: 0.7037
Epoch 10/10
108/108 [=====] - 0s 123us/step - loss: 1.2000 - acc: 0.8796
27/27 [=====] - 1s 52ms/step
108/108 [=====] - 0s 97us/step
Epoch 1/10
108/108 [=====] - 3s 32ms/step - loss: 2.2762 - acc: 0.3148
Epoch 2/10
108/108 [=====] - 0s 126us/step - loss: 1.9715 - acc: 0.3981
Epoch 3/10
108/108 [=====] - 0s 133us/step - loss: 1.8211 - acc: 0.3611
Epoch 4/10
108/108 [=====] - 0s 125us/step - loss: 1.7409 - acc: 0.6852
Epoch 5/10
108/108 [=====] - 0s 126us/step - loss: 1.6583 - acc: 0.6852
Epoch 6/10
108/108 [=====] - 0s 130us/step - loss: 1.5766 - acc: 0.6852
Epoch 7/10
108/108 [=====] - 0s 120us/step - loss: 1.4964 - acc: 0.6852
Epoch 8/10
108/108 [=====] - 0s 126us/step - loss: 1.4291 - acc: 0.6944
Epoch 9/10
108/108 [=====] - 0s 124us/step - loss: 1.3695 - acc: 0.7870
Epoch 10/10
108/108 [=====] - 0s 126us/step - loss: 1.3091 - acc: 0.7778
27/27 [=====] - 1s 53ms/step
108/108 [=====] - 0s 99us/step
Epoch 1/10
108/108 [=====] - 3s 32ms/step - loss: 2.2251 - acc: 0.3148

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Epoch 2/10  
108/108 [=====] - 0s 152us/step - loss: 2.0013 - acc: 0.2778  
Epoch 3/10  
108/108 [=====] - 0s 150us/step - loss: 1.8734 - acc: 0.3889  
Epoch 4/10  
108/108 [=====] - 0s 129us/step - loss: 1.7700 - acc: 0.5278  
Epoch 5/10  
108/108 [=====] - 0s 124us/step - loss: 1.6833 - acc: 0.6667  
Epoch 6/10  
108/108 [=====] - 0s 122us/step - loss: 1.6084 - acc: 0.6296  
Epoch 7/10  
108/108 [=====] - 0s 126us/step - loss: 1.5532 - acc: 0.6296  
Epoch 8/10  
108/108 [=====] - 0s 125us/step - loss: 1.4918 - acc: 0.6296  
Epoch 9/10  
108/108 [=====] - 0s 120us/step - loss: 1.4209 - acc: 0.6389  
Epoch 10/10  
108/108 [=====] - 0s 126us/step - loss: 1.3608 - acc: 0.7130  
27/27 [=====] - 1s 55ms/step  
108/108 [=====] - 0s 86us/step  
Epoch 1/10  
108/108 [=====] - 3s 32ms/step - loss: 2.0790 - acc: 0.5185  
Epoch 2/10  
108/108 [=====] - 0s 133us/step - loss: 1.8712 - acc: 0.6389  
Epoch 3/10  
108/108 [=====] - 0s 128us/step - loss: 1.7434 - acc: 0.6481  
Epoch 4/10  
108/108 [=====] - 0s 124us/step - loss: 1.6563 - acc: 0.6759  
Epoch 5/10  
108/108 [=====] - 0s 128us/step - loss: 1.5826 - acc: 0.6667  
Epoch 6/10  
108/108 [=====] - 0s 135us/step - loss: 1.5136 - acc: 0.6667  
Epoch 7/10  
108/108 [=====] - 0s 125us/step - loss: 1.4463 - acc: 0.6667  
Epoch 8/10  
108/108 [=====] - 0s 125us/step - loss: 1.3897 - acc: 0.6667  
Epoch 9/10  
108/108 [=====] - 0s 120us/step - loss: 1.3457 - acc: 0.6667  
Epoch 10/10  
108/108 [=====] - 0s 138us/step - loss: 1.2981 - acc: 0.6667  
27/27 [=====] - 1s 53ms/step  
108/108 [=====] - 0s 87us/step  
Epoch 1/10  
108/108 [=====] - 4s 33ms/step - loss: 2.1221 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 128us/step - loss: 1.8846 - acc: 0.6574  
Epoch 3/10  
108/108 [=====] - 0s 127us/step - loss: 1.8232 - acc: 0.6852

Epoch 4/10  
108/108 [=====] - 0s 130us/step - loss: 1.7278 - acc: 0.6852  
Epoch 5/10  
108/108 [=====] - 0s 122us/step - loss: 1.6270 - acc: 0.7130  
Epoch 6/10  
108/108 [=====] - 0s 127us/step - loss: 1.5786 - acc: 0.6667  
Epoch 7/10  
108/108 [=====] - 0s 119us/step - loss: 1.5253 - acc: 0.6667  
Epoch 8/10  
108/108 [=====] - 0s 129us/step - loss: 1.4492 - acc: 0.6667  
Epoch 9/10  
108/108 [=====] - 0s 124us/step - loss: 1.3727 - acc: 0.7500  
Epoch 10/10  
108/108 [=====] - 0s 123us/step - loss: 1.3085 - acc: 0.9444  
27/27 [=====] - 1s 55ms/step  
108/108 [=====] - 0s 82us/step  
Epoch 1/10  
108/108 [=====] - 4s 34ms/step - loss: 10.6006 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 141us/step - loss: 9.9871 - acc: 0.3796  
Epoch 3/10  
108/108 [=====] - 0s 146us/step - loss: 9.4373 - acc: 0.3704  
Epoch 4/10  
108/108 [=====] - 0s 142us/step - loss: 9.0143 - acc: 0.6852  
Epoch 5/10  
108/108 [=====] - 0s 128us/step - loss: 8.6299 - acc: 0.6852  
Epoch 6/10  
108/108 [=====] - 0s 130us/step - loss: 8.2385 - acc: 0.6852  
Epoch 7/10  
108/108 [=====] - 0s 137us/step - loss: 7.8547 - acc: 0.6852  
Epoch 8/10  
108/108 [=====] - 0s 138us/step - loss: 7.4967 - acc: 0.6852  
Epoch 9/10  
108/108 [=====] - 0s 146us/step - loss: 7.1642 - acc: 0.6944  
Epoch 10/10  
108/108 [=====] - 0s 141us/step - loss: 6.8502 - acc: 0.6944  
27/27 [=====] - 2s 60ms/step  
108/108 [=====] - 0s 92us/step  
Epoch 1/10  
108/108 [=====] - 4s 34ms/step - loss: 10.6218 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 135us/step - loss: 10.0190 - acc: 0.3148  
Epoch 3/10  
108/108 [=====] - 0s 121us/step - loss: 9.5516 - acc: 0.4537  
Epoch 4/10  
108/108 [=====] - 0s 125us/step - loss: 9.1430 - acc: 0.6852  
Epoch 5/10  
108/108 [=====] - 0s 125us/step - loss: 8.7494 - acc: 0.6852

Epoch 6/10  
108/108 [=====] - 0s 127us/step - loss: 8.3527 - acc: 0.6852  
Epoch 7/10  
108/108 [=====] - 0s 123us/step - loss: 7.9735 - acc: 0.6852  
Epoch 8/10  
108/108 [=====] - 0s 125us/step - loss: 7.6147 - acc: 0.6852  
Epoch 9/10  
108/108 [=====] - 0s 127us/step - loss: 7.2769 - acc: 0.6852  
Epoch 10/10  
108/108 [=====] - 0s 126us/step - loss: 6.9530 - acc: 0.6852  
27/27 [=====] - 2s 56ms/step  
108/108 [=====] - 0s 85us/step  
Epoch 1/10  
108/108 [=====] - 4s 34ms/step - loss: 10.3550 - acc: 0.3889  
Epoch 2/10  
108/108 [=====] - 0s 143us/step - loss: 9.8212 - acc: 0.4259  
Epoch 3/10  
108/108 [=====] - 0s 138us/step - loss: 9.3449 - acc: 0.5278  
Epoch 4/10  
108/108 [=====] - 0s 134us/step - loss: 8.9440 - acc: 0.8056  
Epoch 5/10  
108/108 [=====] - 0s 142us/step - loss: 8.5545 - acc: 0.9352  
Epoch 6/10  
108/108 [=====] - 0s 162us/step - loss: 8.1637 - acc: 0.9630  
Epoch 7/10  
108/108 [=====] - 0s 165us/step - loss: 7.7847 - acc: 0.9537  
Epoch 8/10  
108/108 [=====] - 0s 136us/step - loss: 7.4347 - acc: 0.9722  
Epoch 9/10  
108/108 [=====] - 0s 151us/step - loss: 7.1125 - acc: 0.8796  
Epoch 10/10  
108/108 [=====] - 0s 135us/step - loss: 6.8083 - acc: 0.8056  
27/27 [=====] - 2s 57ms/step  
108/108 [=====] - 0s 87us/step  
Epoch 1/10  
108/108 [=====] - 4s 34ms/step - loss: 10.1443 - acc: 0.6667  
Epoch 2/10  
108/108 [=====] - 0s 142us/step - loss: 9.7199 - acc: 0.6759  
Epoch 3/10  
108/108 [=====] - 0s 125us/step - loss: 9.3024 - acc: 0.9444  
Epoch 4/10  
108/108 [=====] - 0s 124us/step - loss: 8.8845 - acc: 0.8981  
Epoch 5/10  
108/108 [=====] - 0s 142us/step - loss: 8.4750 - acc: 0.7963  
Epoch 6/10  
108/108 [=====] - 0s 127us/step - loss: 8.0903 - acc: 0.6944  
Epoch 7/10  
108/108 [=====] - 0s 128us/step - loss: 7.7252 - acc: 0.7870

Epoch 8/10  
108/108 [=====] - 0s 128us/step - loss: 7.3728 - acc: 0.8148  
Epoch 9/10  
108/108 [=====] - 0s 127us/step - loss: 7.0338 - acc: 0.8148  
Epoch 10/10  
108/108 [=====] - 0s 128us/step - loss: 6.7113 - acc: 0.7963  
27/27 [=====] - 2s 57ms/step  
108/108 [=====] - 0s 79us/step  
Epoch 1/10  
108/108 [=====] - 4s 34ms/step - loss: 10.6653 - acc: 0.1296  
Epoch 2/10  
108/108 [=====] - 0s 129us/step - loss: 10.1601 - acc: 0.3333  
Epoch 3/10  
108/108 [=====] - 0s 158us/step - loss: 9.7245 - acc: 0.3241  
Epoch 4/10  
108/108 [=====] - 0s 166us/step - loss: 9.3036 - acc: 0.3148  
Epoch 5/10  
108/108 [=====] - 0s 156us/step - loss: 8.8796 - acc: 0.5278  
Epoch 6/10  
108/108 [=====] - 0s 126us/step - loss: 8.4716 - acc: 0.6667  
Epoch 7/10  
108/108 [=====] - 0s 134us/step - loss: 8.0940 - acc: 0.8056  
Epoch 8/10  
108/108 [=====] - 0s 128us/step - loss: 7.7585 - acc: 0.6852  
Epoch 9/10  
108/108 [=====] - 0s 126us/step - loss: 7.4219 - acc: 0.6852  
Epoch 10/10  
108/108 [=====] - 0s 139us/step - loss: 7.0847 - acc: 0.7593  
27/27 [=====] - 2s 58ms/step  
108/108 [=====] - 0s 80us/step  
Epoch 1/10  
108/108 [=====] - 4s 34ms/step - loss: 92.5780 - acc: 0.3426  
Epoch 2/10  
108/108 [=====] - 0s 129us/step - loss: 88.5742 - acc: 0.3426  
Epoch 3/10  
108/108 [=====] - 0s 139us/step - loss: 84.3134 - acc: 0.3426  
Epoch 4/10  
108/108 [=====] - 0s 144us/step - loss: 80.1121 - acc: 0.3426  
Epoch 5/10  
108/108 [=====] - 0s 131us/step - loss: 76.0399 - acc: 0.3426  
Epoch 6/10  
108/108 [=====] - 0s 131us/step - loss: 72.1099 - acc: 0.3426  
Epoch 7/10  
108/108 [=====] - 0s 159us/step - loss: 68.3436 - acc: 0.3426  
Epoch 8/10  
108/108 [=====] - 0s 161us/step - loss: 64.7450 - acc: 0.3426  
Epoch 9/10  
108/108 [=====] - 0s 161us/step - loss: 61.3067 - acc: 0.3426



Epoch 10/10  
108/108 [=====] - 0s 143us/step - loss: 58.0326 - acc: 0.3426  
27/27 [=====] - 2s 59ms/step  
108/108 [=====] - 0s 90us/step  
Epoch 1/10  
108/108 [=====] - 4s 35ms/step - loss: 95.3841 - acc: 0.3519  
Epoch 2/10  
108/108 [=====] - 0s 160us/step - loss: 91.1976 - acc: 0.3241  
Epoch 3/10  
108/108 [=====] - 0s 162us/step - loss: 86.7880 - acc: 0.3241  
Epoch 4/10  
108/108 [=====] - 0s 164us/step - loss: 82.4646 - acc: 0.4444  
Epoch 5/10  
108/108 [=====] - 0s 130us/step - loss: 78.2901 - acc: 0.6667  
Epoch 6/10  
108/108 [=====] - 0s 153us/step - loss: 74.2735 - acc: 0.6852  
Epoch 7/10  
108/108 [=====] - 0s 147us/step - loss: 70.4200 - acc: 0.6852  
Epoch 8/10  
108/108 [=====] - 0s 128us/step - loss: 66.7302 - acc: 0.6852  
Epoch 9/10  
108/108 [=====] - 0s 121us/step - loss: 63.2067 - acc: 0.6852  
Epoch 10/10  
108/108 [=====] - 0s 140us/step - loss: 59.8506 - acc: 0.6852  
27/27 [=====] - 2s 59ms/step  
108/108 [=====] - 0s 91us/step  
Epoch 1/10  
108/108 [=====] - 4s 36ms/step - loss: 93.4646 - acc: 0.3611  
Epoch 2/10  
108/108 [=====] - 0s 134us/step - loss: 89.3969 - acc: 0.6852  
Epoch 3/10  
108/108 [=====] - 0s 134us/step - loss: 85.0980 - acc: 0.6852  
Epoch 4/10  
108/108 [=====] - 0s 133us/step - loss: 80.8734 - acc: 0.6852  
Epoch 5/10  
108/108 [=====] - 0s 126us/step - loss: 76.7678 - acc: 0.7037  
Epoch 6/10  
108/108 [=====] - 0s 128us/step - loss: 72.8127 - acc: 0.7963  
Epoch 7/10  
108/108 [=====] - 0s 128us/step - loss: 69.0162 - acc: 0.7778  
Epoch 8/10  
108/108 [=====] - 0s 123us/step - loss: 65.3811 - acc: 0.7778  
Epoch 9/10  
108/108 [=====] - 0s 124us/step - loss: 61.9073 - acc: 0.7963  
Epoch 10/10  
108/108 [=====] - 0s 123us/step - loss: 58.5932 - acc: 0.8148  
27/27 [=====] - 2s 59ms/step  
108/108 [=====] - 0s 85us/step

Epoch 1/10  
108/108 [=====] - 4s 37ms/step - loss: 92.1791 - acc: 0.3241  
Epoch 2/10  
108/108 [=====] - 0s 130us/step - loss: 88.1963 - acc: 0.3611  
Epoch 3/10  
108/108 [=====] - 0s 130us/step - loss: 83.9624 - acc: 0.3611  
Epoch 4/10  
108/108 [=====] - 0s 125us/step - loss: 79.7891 - acc: 0.3611  
Epoch 5/10  
108/108 [=====] - 0s 130us/step - loss: 75.7398 - acc: 0.3611  
Epoch 6/10  
108/108 [=====] - 0s 128us/step - loss: 71.8358 - acc: 0.3889  
Epoch 7/10  
108/108 [=====] - 0s 123us/step - loss: 68.0867 - acc: 0.4444  
Epoch 8/10  
108/108 [=====] - 0s 128us/step - loss: 64.5010 - acc: 0.4907  
Epoch 9/10  
108/108 [=====] - 0s 123us/step - loss: 61.0764 - acc: 0.5556  
Epoch 10/10  
108/108 [=====] - 0s 124us/step - loss: 57.8121 - acc: 0.6481  
27/27 [=====] - 2s 62ms/step  
108/108 [=====] - 0s 83us/step  
Epoch 1/10  
108/108 [=====] - 4s 37ms/step - loss: 93.1839 - acc: 0.3333  
Epoch 2/10  
108/108 [=====] - 0s 125us/step - loss: 89.1354 - acc: 0.3333  
Epoch 3/10  
108/108 [=====] - 0s 132us/step - loss: 84.8495 - acc: 0.3333  
Epoch 4/10  
108/108 [=====] - 0s 125us/step - loss: 80.6342 - acc: 0.3333  
Epoch 5/10  
108/108 [=====] - 0s 123us/step - loss: 76.5492 - acc: 0.3333  
Epoch 6/10  
108/108 [=====] - 0s 123us/step - loss: 72.6128 - acc: 0.3333  
Epoch 7/10  
108/108 [=====] - 0s 125us/step - loss: 68.8334 - acc: 0.4352  
Epoch 8/10  
108/108 [=====] - 0s 129us/step - loss: 65.2199 - acc: 0.6667  
Epoch 9/10  
108/108 [=====] - 0s 124us/step - loss: 61.7650 - acc: 0.6667  
Epoch 10/10  
108/108 [=====] - 0s 122us/step - loss: 58.4695 - acc: 0.6204  
27/27 [=====] - 2s 61ms/step  
108/108 [=====] - 0s 90us/step  
Epoch 1/10  
108/108 [=====] - 4s 37ms/step - loss: 2.6365 - acc: 0.3704  
Epoch 2/10  
108/108 [=====] - 0s 141us/step - loss: 2.2643 - acc: 0.7222

Epoch 3/10  
108/108 [=====] - 0s 138us/step - loss: 2.1534 - acc: 0.3981  
Epoch 4/10  
108/108 [=====] - 0s 143us/step - loss: 2.0072 - acc: 0.6667  
Epoch 5/10  
108/108 [=====] - 0s 212us/step - loss: 1.8768 - acc: 0.9259  
Epoch 6/10  
108/108 [=====] - 0s 184us/step - loss: 1.8199 - acc: 0.6944  
Epoch 7/10  
108/108 [=====] - 0s 146us/step - loss: 1.7220 - acc: 0.7593  
Epoch 8/10  
108/108 [=====] - 0s 136us/step - loss: 1.6094 - acc: 0.9167  
Epoch 9/10  
108/108 [=====] - 0s 131us/step - loss: 1.5241 - acc: 0.7685  
Epoch 10/10  
108/108 [=====] - 0s 133us/step - loss: 1.4527 - acc: 0.8426  
27/27 [=====] - 2s 63ms/step  
108/108 [=====] - 0s 90us/step  
Epoch 1/10  
108/108 [=====] - 4s 37ms/step - loss: 2.9463 - acc: 0.3333  
Epoch 2/10  
108/108 [=====] - 0s 138us/step - loss: 2.4423 - acc: 0.5000  
Epoch 3/10  
108/108 [=====] - 0s 147us/step - loss: 2.2367 - acc: 0.6296  
Epoch 4/10  
108/108 [=====] - 0s 161us/step - loss: 2.1866 - acc: 0.3519  
Epoch 5/10  
108/108 [=====] - 0s 149us/step - loss: 2.0503 - acc: 0.5093  
Epoch 6/10  
108/108 [=====] - 0s 147us/step - loss: 1.8814 - acc: 0.8426  
Epoch 7/10  
108/108 [=====] - 0s 136us/step - loss: 1.7777 - acc: 0.6852  
Epoch 8/10  
108/108 [=====] - 0s 148us/step - loss: 1.6988 - acc: 0.6944  
Epoch 9/10  
108/108 [=====] - 0s 136us/step - loss: 1.6276 - acc: 0.8056  
Epoch 10/10  
108/108 [=====] - 0s 134us/step - loss: 1.5540 - acc: 0.8241  
27/27 [=====] - 2s 62ms/step  
108/108 [=====] - 0s 96us/step  
Epoch 1/10  
108/108 [=====] - 4s 38ms/step - loss: 2.3927 - acc: 0.3426  
Epoch 2/10  
108/108 [=====] - 0s 167us/step - loss: 2.2681 - acc: 0.3796  
Epoch 3/10  
108/108 [=====] - 0s 155us/step - loss: 2.1575 - acc: 0.3889  
Epoch 4/10  
108/108 [=====] - 0s 141us/step - loss: 2.0204 - acc: 0.7315

Epoch 5/10  
108/108 [=====] - 0s 138us/step - loss: 1.8993 - acc: 0.6296  
Epoch 6/10  
108/108 [=====] - 0s 137us/step - loss: 1.7916 - acc: 0.7315  
Epoch 7/10  
108/108 [=====] - 0s 160us/step - loss: 1.6955 - acc: 0.9630  
Epoch 8/10  
108/108 [=====] - 0s 143us/step - loss: 1.6076 - acc: 0.9722  
Epoch 9/10  
108/108 [=====] - 0s 139us/step - loss: 1.5337 - acc: 0.8241  
Epoch 10/10  
108/108 [=====] - 0s 135us/step - loss: 1.4628 - acc: 0.8148  
27/27 [=====] - 2s 65ms/step  
108/108 [=====] - 0s 102us/step  
Epoch 1/10  
108/108 [=====] - 4s 37ms/step - loss: 2.6579 - acc: 0.3056  
Epoch 2/10  
108/108 [=====] - 0s 142us/step - loss: 2.2504 - acc: 0.6759  
Epoch 3/10  
108/108 [=====] - 0s 131us/step - loss: 2.1548 - acc: 0.3704  
Epoch 4/10  
108/108 [=====] - 0s 133us/step - loss: 2.0656 - acc: 0.4167  
Epoch 5/10  
108/108 [=====] - 0s 136us/step - loss: 1.9324 - acc: 0.6296  
Epoch 6/10  
108/108 [=====] - 0s 145us/step - loss: 1.8156 - acc: 0.6944  
Epoch 7/10  
108/108 [=====] - 0s 133us/step - loss: 1.7164 - acc: 0.7037  
Epoch 8/10  
108/108 [=====] - 0s 140us/step - loss: 1.6447 - acc: 0.6852  
Epoch 9/10  
108/108 [=====] - 0s 168us/step - loss: 1.5791 - acc: 0.6852  
Epoch 10/10  
108/108 [=====] - 0s 184us/step - loss: 1.5043 - acc: 0.7407  
27/27 [=====] - 2s 76ms/step  
108/108 [=====] - 0s 95us/step  
Epoch 1/10  
108/108 [=====] - 4s 39ms/step - loss: 2.8047 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 146us/step - loss: 2.4326 - acc: 0.4815  
Epoch 3/10  
108/108 [=====] - 0s 157us/step - loss: 2.2467 - acc: 0.5463  
Epoch 4/10  
108/108 [=====] - 0s 136us/step - loss: 2.1217 - acc: 0.4259  
Epoch 5/10  
108/108 [=====] - 0s 139us/step - loss: 1.9941 - acc: 0.5556  
Epoch 6/10  
108/108 [=====] - 0s 139us/step - loss: 1.8842 - acc: 0.6667

Epoch 7/10  
108/108 [=====] - 0s 166us/step - loss: 1.7765 - acc: 0.7222  
Epoch 8/10  
108/108 [=====] - 0s 151us/step - loss: 1.6778 - acc: 0.8611  
Epoch 9/10  
108/108 [=====] - 0s 140us/step - loss: 1.5965 - acc: 0.8796  
Epoch 10/10  
108/108 [=====] - 0s 138us/step - loss: 1.5163 - acc: 0.8333  
27/27 [=====] - 2s 69ms/step  
108/108 [=====] - 0s 93us/step  
Epoch 1/10  
108/108 [=====] - 4s 38ms/step - loss: 14.4515 - acc: 0.3426  
Epoch 2/10  
108/108 [=====] - 0s 142us/step - loss: 13.7433 - acc: 0.5185  
Epoch 3/10  
108/108 [=====] - 0s 158us/step - loss: 13.0155 - acc: 0.6852  
Epoch 4/10  
108/108 [=====] - 0s 145us/step - loss: 12.3042 - acc: 0.6852  
Epoch 5/10  
108/108 [=====] - 0s 145us/step - loss: 11.6297 - acc: 0.7593  
Epoch 6/10  
108/108 [=====] - 0s 145us/step - loss: 11.0079 - acc: 0.9630  
Epoch 7/10  
108/108 [=====] - 0s 140us/step - loss: 10.3927 - acc: 0.8704  
Epoch 8/10  
108/108 [=====] - 0s 153us/step - loss: 9.8070 - acc: 0.6852  
Epoch 9/10  
108/108 [=====] - 0s 143us/step - loss: 9.2729 - acc: 0.6852  
Epoch 10/10  
108/108 [=====] - 0s 137us/step - loss: 8.7530 - acc: 0.6852  
27/27 [=====] - 2s 64ms/step  
108/108 [=====] - 0s 116us/step  
Epoch 1/10  
108/108 [=====] - 4s 38ms/step - loss: 14.5863 - acc: 0.3241  
Epoch 2/10  
108/108 [=====] - 0s 151us/step - loss: 13.8504 - acc: 0.5278  
Epoch 3/10  
108/108 [=====] - 0s 151us/step - loss: 13.1193 - acc: 0.6852  
Epoch 4/10  
108/108 [=====] - 0s 164us/step - loss: 12.4089 - acc: 0.6852  
Epoch 5/10  
108/108 [=====] - 0s 145us/step - loss: 11.7204 - acc: 0.6852  
Epoch 6/10  
108/108 [=====] - 0s 153us/step - loss: 11.0651 - acc: 0.7130  
Epoch 7/10  
108/108 [=====] - 0s 153us/step - loss: 10.4589 - acc: 0.8981  
Epoch 8/10  
108/108 [=====] - 0s 193us/step - loss: 9.8703 - acc: 0.8704

Epoch 9/10  
108/108 [=====] - 0s 225us/step - loss: 9.3107 - acc: 0.8704  
Epoch 10/10  
108/108 [=====] - 0s 155us/step - loss: 8.7834 - acc: 0.7037  
27/27 [=====] - 2s 65ms/step  
108/108 [=====] - 0s 97us/step  
Epoch 1/10  
108/108 [=====] - 4s 39ms/step - loss: 14.7195 - acc: 0.3704  
Epoch 2/10  
108/108 [=====] - 0s 159us/step - loss: 13.9825 - acc: 0.4630  
Epoch 3/10  
108/108 [=====] - 0s 139us/step - loss: 13.2871 - acc: 0.6296  
Epoch 4/10  
108/108 [=====] - 0s 157us/step - loss: 12.6086 - acc: 0.6481  
Epoch 5/10  
108/108 [=====] - 0s 171us/step - loss: 11.9608 - acc: 0.6852  
Epoch 6/10  
108/108 [=====] - 0s 144us/step - loss: 11.3387 - acc: 0.7870  
Epoch 7/10  
108/108 [=====] - 0s 136us/step - loss: 10.7449 - acc: 0.8704  
Epoch 8/10  
108/108 [=====] - 0s 149us/step - loss: 10.1839 - acc: 0.6852  
Epoch 9/10  
108/108 [=====] - 0s 154us/step - loss: 9.6438 - acc: 0.7037  
Epoch 10/10  
108/108 [=====] - 0s 195us/step - loss: 9.1289 - acc: 0.7778  
27/27 [=====] - 2s 70ms/step  
108/108 [=====] - 0s 117us/step  
Epoch 1/10  
108/108 [=====] - 4s 39ms/step - loss: 14.6043 - acc: 0.4537  
Epoch 2/10  
108/108 [=====] - 0s 163us/step - loss: 13.8930 - acc: 0.3704  
Epoch 3/10  
108/108 [=====] - 0s 150us/step - loss: 13.1787 - acc: 0.6667  
Epoch 4/10  
108/108 [=====] - 0s 178us/step - loss: 12.4835 - acc: 0.6667  
Epoch 5/10  
108/108 [=====] - 0s 158us/step - loss: 11.8285 - acc: 0.6852  
Epoch 6/10  
108/108 [=====] - 0s 145us/step - loss: 11.1926 - acc: 0.8611  
Epoch 7/10  
108/108 [=====] - 0s 185us/step - loss: 10.5848 - acc: 0.7593  
Epoch 8/10  
108/108 [=====] - 0s 174us/step - loss: 10.0077 - acc: 0.6667  
Epoch 9/10  
108/108 [=====] - 0s 192us/step - loss: 9.4618 - acc: 0.6667  
Epoch 10/10  
108/108 [=====] - 0s 149us/step - loss: 8.9419 - acc: 0.6667

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27/27 [=====] - 2s 65ms/step
108/108 [=====] - 0s 84us/step
Epoch 1/10
108/108 [=====] - 4s 40ms/step - loss: 14.4435 - acc: 0.3333
Epoch 2/10
108/108 [=====] - 0s 144us/step - loss: 13.7152 - acc: 0.5185
Epoch 3/10
108/108 [=====] - 0s 159us/step - loss: 13.0546 - acc: 0.6111
Epoch 4/10
108/108 [=====] - 0s 134us/step - loss: 12.3753 - acc: 0.6667
Epoch 5/10
108/108 [=====] - 0s 133us/step - loss: 11.7143 - acc: 0.6667
Epoch 6/10
108/108 [=====] - 0s 134us/step - loss: 11.0891 - acc: 0.6667
Epoch 7/10
108/108 [=====] - 0s 157us/step - loss: 10.4919 - acc: 0.6667
Epoch 8/10
108/108 [=====] - 0s 223us/step - loss: 9.9296 - acc: 0.6759
Epoch 9/10
108/108 [=====] - 0s 173us/step - loss: 9.3874 - acc: 0.7037
Epoch 10/10
108/108 [=====] - 0s 169us/step - loss: 8.8689 - acc: 0.6852
27/27 [=====] - 2s 69ms/step
108/108 [=====] - 0s 112us/step
Epoch 1/10
108/108 [=====] - 4s 40ms/step - loss: 136.3106 - acc: 0.3426
Epoch 2/10
108/108 [=====] - 0s 137us/step - loss: 129.4116 - acc: 0.3426
Epoch 3/10
108/108 [=====] - 0s 149us/step - loss: 122.1659 - acc: 0.3426
Epoch 4/10
108/108 [=====] - 0s 129us/step - loss: 115.1320 - acc: 0.3426
Epoch 5/10
108/108 [=====] - 0s 132us/step - loss: 108.3541 - acc: 0.4630
Epoch 6/10
108/108 [=====] - 0s 162us/step - loss: 101.8840 - acc: 0.6759
Epoch 7/10
108/108 [=====] - 0s 168us/step - loss: 95.7210 - acc: 0.6852
Epoch 8/10
108/108 [=====] - 0s 142us/step - loss: 89.8639 - acc: 0.6852
Epoch 9/10
108/108 [=====] - 0s 142us/step - loss: 84.3063 - acc: 0.6852
Epoch 10/10
108/108 [=====] - 0s 145us/step - loss: 79.0487 - acc: 0.6852
27/27 [=====] - 2s 72ms/step
108/108 [=====] - 0s 106us/step
Epoch 1/10
108/108 [=====] - 4s 42ms/step - loss: 136.7383 - acc: 0.3519

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Epoch 2/10  
108/108 [=====] - 0s 177us/step - loss: 129.8872 - acc: 0.3704  
Epoch 3/10  
108/108 [=====] - 0s 165us/step - loss: 122.6912 - acc: 0.5926  
Epoch 4/10  
108/108 [=====] - 0s 161us/step - loss: 115.6709 - acc: 0.6574  
Epoch 5/10  
108/108 [=====] - 0s 153us/step - loss: 108.9261 - acc: 0.6852  
Epoch 6/10  
108/108 [=====] - 0s 174us/step - loss: 102.4780 - acc: 0.6667  
Epoch 7/10  
108/108 [=====] - 0s 211us/step - loss: 96.3109 - acc: 0.6667  
Epoch 8/10  
108/108 [=====] - 0s 170us/step - loss: 90.4366 - acc: 0.6759  
Epoch 9/10  
108/108 [=====] - 0s 159us/step - loss: 84.8641 - acc: 0.6852  
Epoch 10/10  
108/108 [=====] - 0s 189us/step - loss: 79.5964 - acc: 0.6852  
27/27 [=====] - 2s 70ms/step  
108/108 [=====] - 0s 103us/step  
Epoch 1/10  
108/108 [=====] - 4s 41ms/step - loss: 134.7499 - acc: 0.3704  
Epoch 2/10  
108/108 [=====] - 0s 143us/step - loss: 128.0263 - acc: 0.3704  
Epoch 3/10  
108/108 [=====] - 0s 134us/step - loss: 120.9277 - acc: 0.3704  
Epoch 4/10  
108/108 [=====] - 0s 137us/step - loss: 113.9821 - acc: 0.4167  
Epoch 5/10  
108/108 [=====] - 0s 139us/step - loss: 107.2834 - acc: 0.3148  
Epoch 6/10  
108/108 [=====] - 0s 130us/step - loss: 100.8644 - acc: 0.3148  
Epoch 7/10  
108/108 [=====] - 0s 139us/step - loss: 94.7401 - acc: 0.3796  
Epoch 8/10  
108/108 [=====] - 0s 168us/step - loss: 88.9242 - acc: 0.4259  
Epoch 9/10  
108/108 [=====] - 0s 142us/step - loss: 83.4163 - acc: 0.3704  
Epoch 10/10  
108/108 [=====] - 0s 136us/step - loss: 78.2060 - acc: 0.3704  
27/27 [=====] - 2s 70ms/step  
108/108 [=====] - 0s 102us/step  
Epoch 1/10  
108/108 [=====] - 4s 41ms/step - loss: 135.7709 - acc: 0.3333  
Epoch 2/10  
108/108 [=====] - 0s 144us/step - loss: 129.0102 - acc: 0.3333  
Epoch 3/10  
108/108 [=====] - 0s 137us/step - loss: 121.8877 - acc: 0.3611



Epoch 4/10  
108/108 [=====] - 0s 161us/step - loss: 114.9054 - acc: 0.3611  
Epoch 5/10  
108/108 [=====] - 0s 140us/step - loss: 108.1657 - acc: 0.3611  
Epoch 6/10  
108/108 [=====] - 0s 145us/step - loss: 101.7033 - acc: 0.4259  
Epoch 7/10  
108/108 [=====] - 0s 149us/step - loss: 95.5429 - acc: 0.6667  
Epoch 8/10  
108/108 [=====] - 0s 157us/step - loss: 89.6937 - acc: 0.6667  
Epoch 9/10  
108/108 [=====] - 0s 143us/step - loss: 84.1475 - acc: 0.6667  
Epoch 10/10  
108/108 [=====] - 0s 225us/step - loss: 78.8968 - acc: 0.6667  
27/27 [=====] - 2s 70ms/step  
108/108 [=====] - 0s 86us/step  
Epoch 1/10  
108/108 [=====] - 4s 41ms/step - loss: 136.2989 - acc: 0.3333  
Epoch 2/10  
108/108 [=====] - 0s 160us/step - loss: 129.5072 - acc: 0.3333  
Epoch 3/10  
108/108 [=====] - 0s 154us/step - loss: 122.3448 - acc: 0.3333  
Epoch 4/10  
108/108 [=====] - 0s 133us/step - loss: 115.3302 - acc: 0.3333  
Epoch 5/10  
108/108 [=====] - 0s 133us/step - loss: 108.5603 - acc: 0.3333  
Epoch 6/10  
108/108 [=====] - 0s 152us/step - loss: 102.0758 - acc: 0.3333  
Epoch 7/10  
108/108 [=====] - 0s 138us/step - loss: 95.8955 - acc: 0.4722  
Epoch 8/10  
108/108 [=====] - 0s 158us/step - loss: 90.0230 - acc: 0.5000  
Epoch 9/10  
108/108 [=====] - 0s 133us/step - loss: 84.4594 - acc: 0.3519  
Epoch 10/10  
108/108 [=====] - 0s 149us/step - loss: 79.1926 - acc: 0.3333  
27/27 [=====] - 2s 76ms/step  
108/108 [=====] - 0s 107us/step  
Epoch 1/10  
108/108 [=====] - 5s 43ms/step - loss: 2.8437 - acc: 0.2685  
Epoch 2/10  
108/108 [=====] - 0s 146us/step - loss: 2.6320 - acc: 0.4907  
Epoch 3/10  
108/108 [=====] - 0s 140us/step - loss: 2.4613 - acc: 0.6204  
Epoch 4/10  
108/108 [=====] - 0s 136us/step - loss: 2.2849 - acc: 0.7963  
Epoch 5/10  
108/108 [=====] - 0s 133us/step - loss: 2.1339 - acc: 0.6852

Epoch 6/10  
108/108 [=====] - 0s 131us/step - loss: 1.9960 - acc: 0.6852  
Epoch 7/10  
108/108 [=====] - 0s 128us/step - loss: 1.8610 - acc: 0.7037  
Epoch 8/10  
108/108 [=====] - 0s 128us/step - loss: 1.7457 - acc: 0.7407  
Epoch 9/10  
108/108 [=====] - 0s 129us/step - loss: 1.6418 - acc: 0.9074  
Epoch 10/10  
108/108 [=====] - 0s 130us/step - loss: 1.5461 - acc: 0.9722  
27/27 [=====] - 2s 71ms/step  
108/108 [=====] - 0s 95us/step  
Epoch 1/10  
108/108 [=====] - 5s 43ms/step - loss: 2.8897 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 160us/step - loss: 2.5851 - acc: 0.6852  
Epoch 3/10  
108/108 [=====] - 0s 147us/step - loss: 2.3885 - acc: 0.6852  
Epoch 4/10  
108/108 [=====] - 0s 142us/step - loss: 2.2063 - acc: 0.7685  
Epoch 5/10  
108/108 [=====] - 0s 132us/step - loss: 2.0619 - acc: 0.7037  
Epoch 6/10  
108/108 [=====] - 0s 129us/step - loss: 1.9375 - acc: 0.7500  
Epoch 7/10  
108/108 [=====] - 0s 134us/step - loss: 1.8363 - acc: 0.9259  
Epoch 8/10  
108/108 [=====] - 0s 129us/step - loss: 1.7248 - acc: 0.9444  
Epoch 9/10  
108/108 [=====] - 0s 138us/step - loss: 1.6316 - acc: 0.8426  
Epoch 10/10  
108/108 [=====] - 0s 133us/step - loss: 1.5473 - acc: 0.8796  
27/27 [=====] - 2s 74ms/step  
108/108 [=====] - 0s 105us/step  
Epoch 1/10  
108/108 [=====] - 5s 43ms/step - loss: 2.8555 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 135us/step - loss: 2.6376 - acc: 0.6852  
Epoch 3/10  
108/108 [=====] - 0s 130us/step - loss: 2.5002 - acc: 0.6852  
Epoch 4/10  
108/108 [=====] - 0s 134us/step - loss: 2.2911 - acc: 0.6852  
Epoch 5/10  
108/108 [=====] - 0s 130us/step - loss: 2.1331 - acc: 0.6574  
Epoch 6/10  
108/108 [=====] - 0s 132us/step - loss: 2.0846 - acc: 0.6296  
Epoch 7/10  
108/108 [=====] - 0s 136us/step - loss: 1.9501 - acc: 0.6296

Epoch 8/10  
108/108 [=====] - 0s 140us/step - loss: 1.7895 - acc: 0.8333  
Epoch 9/10  
108/108 [=====] - 0s 130us/step - loss: 1.7208 - acc: 0.6852  
Epoch 10/10  
108/108 [=====] - 0s 128us/step - loss: 1.6427 - acc: 0.6852  
27/27 [=====] - 2s 73ms/step  
108/108 [=====] - 0s 113us/step  
Epoch 1/10  
108/108 [=====] - 5s 47ms/step - loss: 2.8494 - acc: 0.3056  
Epoch 2/10  
108/108 [=====] - 0s 200us/step - loss: 2.5921 - acc: 0.5370  
Epoch 3/10  
108/108 [=====] - 0s 209us/step - loss: 2.4198 - acc: 0.6667  
Epoch 4/10  
108/108 [=====] - 0s 170us/step - loss: 2.2470 - acc: 0.7685  
Epoch 5/10  
108/108 [=====] - 0s 152us/step - loss: 2.1199 - acc: 0.7222  
Epoch 6/10  
108/108 [=====] - 0s 161us/step - loss: 1.9839 - acc: 0.7407  
Epoch 7/10  
108/108 [=====] - 0s 149us/step - loss: 1.8697 - acc: 0.6667  
Epoch 8/10  
108/108 [=====] - 0s 157us/step - loss: 1.7744 - acc: 0.8704  
Epoch 9/10  
108/108 [=====] - 0s 167us/step - loss: 1.6954 - acc: 0.8148  
Epoch 10/10  
108/108 [=====] - 0s 225us/step - loss: 1.5914 - acc: 0.9722  
27/27 [=====] - 2s 87ms/step  
108/108 [=====] - 0s 125us/step  
Epoch 1/10  
108/108 [=====] - 6s 51ms/step - loss: 2.8488 - acc: 0.4352  
Epoch 2/10  
108/108 [=====] - 0s 144us/step - loss: 2.6082 - acc: 0.6204  
Epoch 3/10  
108/108 [=====] - 0s 162us/step - loss: 2.4080 - acc: 0.6852  
Epoch 4/10  
108/108 [=====] - 0s 196us/step - loss: 2.2392 - acc: 0.6667  
Epoch 5/10  
108/108 [=====] - 0s 221us/step - loss: 2.1115 - acc: 0.6667  
Epoch 6/10  
108/108 [=====] - 0s 221us/step - loss: 1.9866 - acc: 0.6667  
Epoch 7/10  
108/108 [=====] - 0s 228us/step - loss: 1.8536 - acc: 0.6667  
Epoch 8/10  
108/108 [=====] - 0s 180us/step - loss: 1.7512 - acc: 0.6759  
Epoch 9/10  
108/108 [=====] - 0s 194us/step - loss: 1.6573 - acc: 0.7315

Epoch 10/10  
108/108 [=====] - 0s 175us/step - loss: 1.5716 - acc: 0.8611  
27/27 [=====] - 2s 91ms/step  
108/108 [=====] - 0s 123us/step  
Epoch 1/10  
108/108 [=====] - 5s 45ms/step - loss: 18.7780 - acc: 0.3519  
Epoch 2/10  
108/108 [=====] - 0s 148us/step - loss: 17.7237 - acc: 0.5741  
Epoch 3/10  
108/108 [=====] - 0s 189us/step - loss: 16.5939 - acc: 0.6852  
Epoch 4/10  
108/108 [=====] - 0s 148us/step - loss: 15.5168 - acc: 0.6852  
Epoch 5/10  
108/108 [=====] - 0s 148us/step - loss: 14.4938 - acc: 0.6852  
Epoch 6/10  
108/108 [=====] - 0s 146us/step - loss: 13.5082 - acc: 0.6852  
Epoch 7/10  
108/108 [=====] - 0s 140us/step - loss: 12.5785 - acc: 0.7685  
Epoch 8/10  
108/108 [=====] - 0s 155us/step - loss: 11.7402 - acc: 0.9074  
Epoch 9/10  
108/108 [=====] - 0s 180us/step - loss: 10.9167 - acc: 0.9074  
Epoch 10/10  
108/108 [=====] - 0s 143us/step - loss: 10.1738 - acc: 0.6852  
27/27 [=====] - 2s 78ms/step  
108/108 [=====] - 0s 99us/step  
Epoch 1/10  
108/108 [=====] - 5s 45ms/step - loss: 18.8040 - acc: 0.4167  
Epoch 2/10  
108/108 [=====] - 0s 139us/step - loss: 17.6662 - acc: 0.3426  
Epoch 3/10  
108/108 [=====] - 0s 151us/step - loss: 16.5368 - acc: 0.5093  
Epoch 4/10  
108/108 [=====] - 0s 166us/step - loss: 15.4457 - acc: 0.9074  
Epoch 5/10  
108/108 [=====] - 0s 173us/step - loss: 14.3973 - acc: 0.8519  
Epoch 6/10  
108/108 [=====] - 0s 161us/step - loss: 13.4114 - acc: 0.7037  
Epoch 7/10  
108/108 [=====] - 0s 154us/step - loss: 12.4794 - acc: 0.7685  
Epoch 8/10  
108/108 [=====] - 0s 155us/step - loss: 11.6048 - acc: 0.8148  
Epoch 9/10  
108/108 [=====] - 0s 150us/step - loss: 10.7953 - acc: 0.7222  
Epoch 10/10  
108/108 [=====] - 0s 163us/step - loss: 10.0310 - acc: 0.8148  
27/27 [=====] - 2s 77ms/step  
108/108 [=====] - 0s 125us/step

Epoch 1/10  
108/108 [=====] - 5s 45ms/step - loss: 18.9205 - acc: 0.3333  
Epoch 2/10  
108/108 [=====] - 0s 151us/step - loss: 17.7915 - acc: 0.5093  
Epoch 3/10  
108/108 [=====] - 0s 138us/step - loss: 16.6500 - acc: 0.6204  
Epoch 4/10  
108/108 [=====] - 0s 166us/step - loss: 15.5556 - acc: 0.6389  
Epoch 5/10  
108/108 [=====] - 0s 157us/step - loss: 14.5125 - acc: 0.8704  
Epoch 6/10  
108/108 [=====] - 0s 157us/step - loss: 13.5358 - acc: 0.7500  
Epoch 7/10  
108/108 [=====] - 0s 154us/step - loss: 12.6155 - acc: 0.6296  
Epoch 8/10  
108/108 [=====] - 0s 168us/step - loss: 11.7481 - acc: 0.6296  
Epoch 9/10  
108/108 [=====] - 0s 195us/step - loss: 10.9230 - acc: 0.6481  
Epoch 10/10  
108/108 [=====] - 0s 164us/step - loss: 10.1563 - acc: 0.9537  
27/27 [=====] - 2s 84ms/step  
108/108 [=====] - 0s 138us/step  
Epoch 1/10  
108/108 [=====] - 5s 47ms/step - loss: 18.9263 - acc: 0.1389  
Epoch 2/10  
108/108 [=====] - 0s 154us/step - loss: 17.8056 - acc: 0.2037  
Epoch 3/10  
108/108 [=====] - 0s 144us/step - loss: 16.7316 - acc: 0.3333  
Epoch 4/10  
108/108 [=====] - 0s 155us/step - loss: 15.6464 - acc: 0.6111  
Epoch 5/10  
108/108 [=====] - 0s 144us/step - loss: 14.6370 - acc: 0.6667  
Epoch 6/10  
108/108 [=====] - 0s 165us/step - loss: 13.7056 - acc: 0.6667  
Epoch 7/10  
108/108 [=====] - 0s 186us/step - loss: 12.7820 - acc: 0.6667  
Epoch 8/10  
108/108 [=====] - 0s 153us/step - loss: 11.9235 - acc: 0.7037  
Epoch 9/10  
108/108 [=====] - 0s 157us/step - loss: 11.1193 - acc: 0.6852  
Epoch 10/10  
108/108 [=====] - 0s 156us/step - loss: 10.3669 - acc: 0.6667  
27/27 [=====] - 2s 81ms/step  
108/108 [=====] - 0s 111us/step  
Epoch 1/10  
108/108 [=====] - 5s 46ms/step - loss: 18.7223 - acc: 0.3056  
Epoch 2/10  
108/108 [=====] - 0s 138us/step - loss: 17.6319 - acc: 0.3333

Epoch 3/10  
108/108 [=====] - 0s 143us/step - loss: 16.5288 - acc: 0.7500  
Epoch 4/10  
108/108 [=====] - 0s 134us/step - loss: 15.4721 - acc: 0.7315  
Epoch 5/10  
108/108 [=====] - 0s 157us/step - loss: 14.4630 - acc: 0.6667  
Epoch 6/10  
108/108 [=====] - 0s 153us/step - loss: 13.4964 - acc: 0.6667  
Epoch 7/10  
108/108 [=====] - 0s 149us/step - loss: 12.5821 - acc: 0.6667  
Epoch 8/10  
108/108 [=====] - 0s 142us/step - loss: 11.7173 - acc: 0.7778  
Epoch 9/10  
108/108 [=====] - 0s 152us/step - loss: 10.9120 - acc: 0.9167  
Epoch 10/10  
108/108 [=====] - 0s 138us/step - loss: 10.1556 - acc: 0.8796  
27/27 [=====] - 2s 91ms/step  
108/108 [=====] - 0s 87us/step  
Epoch 1/10  
108/108 [=====] - 5s 49ms/step - loss: 178.4405 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 179us/step - loss: 167.6545 - acc: 0.3333  
Epoch 3/10  
108/108 [=====] - 0s 177us/step - loss: 156.3465 - acc: 0.3426  
Epoch 4/10  
108/108 [=====] - 0s 157us/step - loss: 145.3490 - acc: 0.6759  
Epoch 5/10  
108/108 [=====] - 0s 183us/step - loss: 134.8445 - acc: 0.6852  
Epoch 6/10  
108/108 [=====] - 0s 182us/step - loss: 124.9030 - acc: 0.6852  
Epoch 7/10  
108/108 [=====] - 0s 208us/step - loss: 115.5440 - acc: 0.6667  
Epoch 8/10  
108/108 [=====] - 0s 194us/step - loss: 106.7654 - acc: 0.7037  
Epoch 9/10  
108/108 [=====] - 0s 163us/step - loss: 98.5548 - acc: 0.6852  
Epoch 10/10  
108/108 [=====] - 0s 146us/step - loss: 90.8929 - acc: 0.6852  
27/27 [=====] - 2s 78ms/step  
108/108 [=====] - 0s 131us/step  
Epoch 1/10  
108/108 [=====] - 5s 47ms/step - loss: 174.9697 - acc: 0.3611  
Epoch 2/10  
108/108 [=====] - 0s 134us/step - loss: 164.3425 - acc: 0.5093  
Epoch 3/10  
108/108 [=====] - 0s 133us/step - loss: 153.2096 - acc: 0.6852  
Epoch 4/10  
108/108 [=====] - 0s 139us/step - loss: 142.3899 - acc: 0.6852

Epoch 5/10  
108/108 [=====] - 0s 144us/step - loss: 132.0672 - acc: 0.6852  
Epoch 6/10  
108/108 [=====] - 0s 141us/step - loss: 122.3051 - acc: 0.6852  
Epoch 7/10  
108/108 [=====] - 0s 142us/step - loss: 113.1127 - acc: 0.6852  
Epoch 8/10  
108/108 [=====] - 0s 141us/step - loss: 104.4910 - acc: 0.6852  
Epoch 9/10  
108/108 [=====] - 0s 191us/step - loss: 96.4322 - acc: 0.8611  
Epoch 10/10  
108/108 [=====] - 0s 151us/step - loss: 88.9164 - acc: 0.9352  
27/27 [=====] - 2s 80ms/step  
108/108 [=====] - 0s 107us/step  
Epoch 1/10  
108/108 [=====] - 5s 47ms/step - loss: 177.5669 - acc: 0.3148  
Epoch 2/10  
108/108 [=====] - 0s 139us/step - loss: 166.8054 - acc: 0.3148  
Epoch 3/10  
108/108 [=====] - 0s 161us/step - loss: 155.5372 - acc: 0.6667  
Epoch 4/10  
108/108 [=====] - 0s 156us/step - loss: 144.5956 - acc: 0.8889  
Epoch 5/10  
108/108 [=====] - 0s 153us/step - loss: 134.1542 - acc: 0.7685  
Epoch 6/10  
108/108 [=====] - 0s 149us/step - loss: 124.2732 - acc: 0.7870  
Epoch 7/10  
108/108 [=====] - 0s 146us/step - loss: 114.9723 - acc: 0.9352  
Epoch 8/10  
108/108 [=====] - 0s 139us/step - loss: 106.2528 - acc: 0.6667  
Epoch 9/10  
108/108 [=====] - 0s 141us/step - loss: 98.1016 - acc: 0.6296  
Epoch 10/10  
108/108 [=====] - 0s 148us/step - loss: 90.4981 - acc: 0.6296  
27/27 [=====] - 2s 83ms/step  
108/108 [=====] - 0s 132us/step  
Epoch 1/10  
108/108 [=====] - 5s 46ms/step - loss: 178.2587 - acc: 0.3611  
Epoch 2/10  
108/108 [=====] - 0s 172us/step - loss: 167.4791 - acc: 0.3611  
Epoch 3/10  
108/108 [=====] - 0s 165us/step - loss: 156.1903 - acc: 0.6019  
Epoch 4/10  
108/108 [=====] - 0s 154us/step - loss: 145.2128 - acc: 0.3426  
Epoch 5/10  
108/108 [=====] - 0s 161us/step - loss: 134.7148 - acc: 0.6296  
Epoch 6/10  
108/108 [=====] - 0s 146us/step - loss: 124.7718 - acc: 0.3611

Epoch 7/10  
108/108 [=====] - 0s 158us/step - loss: 115.4157 - acc: 0.6667  
Epoch 8/10  
108/108 [=====] - 0s 190us/step - loss: 106.6467 - acc: 0.6667  
Epoch 9/10  
108/108 [=====] - 0s 208us/step - loss: 98.4517 - acc: 0.6667  
Epoch 10/10  
108/108 [=====] - 0s 237us/step - loss: 90.7937 - acc: 0.6667  
27/27 [=====] - 2s 87ms/step  
108/108 [=====] - 0s 110us/step  
Epoch 1/10  
108/108 [=====] - 5s 47ms/step - loss: 178.2835 - acc: 0.3519  
Epoch 2/10  
108/108 [=====] - 0s 139us/step - loss: 167.4483 - acc: 0.3519  
Epoch 3/10  
108/108 [=====] - 0s 143us/step - loss: 156.1360 - acc: 0.6574  
Epoch 4/10  
108/108 [=====] - 0s 154us/step - loss: 145.1659 - acc: 0.6296  
Epoch 5/10  
108/108 [=====] - 0s 136us/step - loss: 134.6911 - acc: 0.6019  
Epoch 6/10  
108/108 [=====] - 0s 134us/step - loss: 124.7768 - acc: 0.6389  
Epoch 7/10  
108/108 [=====] - 0s 139us/step - loss: 115.4426 - acc: 0.6759  
Epoch 8/10  
108/108 [=====] - 0s 171us/step - loss: 106.6918 - acc: 0.6759  
Epoch 9/10  
108/108 [=====] - 0s 149us/step - loss: 98.5103 - acc: 0.6667  
Epoch 10/10  
108/108 [=====] - 0s 181us/step - loss: 90.8796 - acc: 0.6667  
27/27 [=====] - 2s 83ms/step  
108/108 [=====] - 0s 97us/step  
Epoch 1/20  
108/108 [=====] - 5s 49ms/step - loss: 1.7017 - acc: 0.3426  
Epoch 2/20  
108/108 [=====] - 0s 143us/step - loss: 1.6211 - acc: 0.4259  
Epoch 3/20  
108/108 [=====] - 0s 132us/step - loss: 1.5545 - acc: 0.3426  
Epoch 4/20  
108/108 [=====] - 0s 153us/step - loss: 1.5031 - acc: 0.3889  
Epoch 5/20  
108/108 [=====] - 0s 141us/step - loss: 1.4529 - acc: 0.5093  
Epoch 6/20  
108/108 [=====] - 0s 145us/step - loss: 1.4047 - acc: 0.6574  
Epoch 7/20  
108/108 [=====] - 0s 135us/step - loss: 1.3591 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 137us/step - loss: 1.3140 - acc: 0.6852



Epoch 9/20  
108/108 [=====] - 0s 137us/step - loss: 1.2739 - acc: 0.6852  
Epoch 10/20  
108/108 [=====] - 0s 134us/step - loss: 1.2368 - acc: 0.6852  
Epoch 11/20  
108/108 [=====] - 0s 142us/step - loss: 1.2015 - acc: 0.6852  
Epoch 12/20  
108/108 [=====] - 0s 167us/step - loss: 1.1648 - acc: 0.6852  
Epoch 13/20  
108/108 [=====] - 0s 142us/step - loss: 1.1311 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 151us/step - loss: 1.0985 - acc: 0.6852  
Epoch 15/20  
108/108 [=====] - 0s 136us/step - loss: 1.0659 - acc: 0.6852  
Epoch 16/20  
108/108 [=====] - 0s 137us/step - loss: 1.0386 - acc: 0.7315  
Epoch 17/20  
108/108 [=====] - 0s 134us/step - loss: 1.0112 - acc: 0.8056  
Epoch 18/20  
108/108 [=====] - 0s 154us/step - loss: 0.9848 - acc: 0.8241  
Epoch 19/20  
108/108 [=====] - 0s 149us/step - loss: 0.9592 - acc: 0.7963  
Epoch 20/20  
108/108 [=====] - 0s 136us/step - loss: 0.9333 - acc: 0.6852  
27/27 [=====] - 2s 82ms/step  
108/108 [=====] - 0s 94us/step  
Epoch 1/20  
108/108 [=====] - 5s 49ms/step - loss: 1.5698 - acc: 0.3333  
Epoch 2/20  
108/108 [=====] - 0s 141us/step - loss: 1.4921 - acc: 0.3426  
Epoch 3/20  
108/108 [=====] - 0s 151us/step - loss: 1.4323 - acc: 0.6296  
Epoch 4/20  
108/108 [=====] - 0s 135us/step - loss: 1.3835 - acc: 0.6852  
Epoch 5/20  
108/108 [=====] - 0s 138us/step - loss: 1.3387 - acc: 0.6852  
Epoch 6/20  
108/108 [=====] - 0s 143us/step - loss: 1.2960 - acc: 0.6852  
Epoch 7/20  
108/108 [=====] - 0s 145us/step - loss: 1.2537 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 146us/step - loss: 1.2143 - acc: 0.6852  
Epoch 9/20  
108/108 [=====] - 0s 146us/step - loss: 1.1780 - acc: 0.6852  
Epoch 10/20  
108/108 [=====] - 0s 150us/step - loss: 1.1447 - acc: 0.6852  
Epoch 11/20  
108/108 [=====] - 0s 180us/step - loss: 1.1163 - acc: 0.6852

Epoch 12/20  
108/108 [=====] - 0s 147us/step - loss: 1.0908 - acc: 0.6852  
Epoch 13/20  
108/108 [=====] - 0s 172us/step - loss: 1.0611 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 156us/step - loss: 1.0301 - acc: 0.6852  
Epoch 15/20  
108/108 [=====] - 0s 140us/step - loss: 1.0020 - acc: 0.6852  
Epoch 16/20  
108/108 [=====] - 0s 157us/step - loss: 0.9759 - acc: 0.7037  
Epoch 17/20  
108/108 [=====] - 0s 145us/step - loss: 0.9507 - acc: 0.7963  
Epoch 18/20  
108/108 [=====] - 0s 165us/step - loss: 0.9251 - acc: 0.8519  
Epoch 19/20  
108/108 [=====] - 0s 142us/step - loss: 0.8981 - acc: 0.8704  
Epoch 20/20  
108/108 [=====] - 0s 134us/step - loss: 0.8749 - acc: 0.8333  
27/27 [=====] - 2s 84ms/step  
108/108 [=====] - 0s 115us/step  
Epoch 1/20  
108/108 [=====] - 5s 49ms/step - loss: 2.8180 - acc: 0.3148  
Epoch 2/20  
108/108 [=====] - 0s 145us/step - loss: 2.4157 - acc: 0.3148  
Epoch 3/20  
108/108 [=====] - 0s 143us/step - loss: 2.0634 - acc: 0.3148  
Epoch 4/20  
108/108 [=====] - 0s 147us/step - loss: 1.7749 - acc: 0.3148  
Epoch 5/20  
108/108 [=====] - 0s 143us/step - loss: 1.5722 - acc: 0.3148  
Epoch 6/20  
108/108 [=====] - 0s 136us/step - loss: 1.4503 - acc: 0.3889  
Epoch 7/20  
108/108 [=====] - 0s 162us/step - loss: 1.3725 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 182us/step - loss: 1.3203 - acc: 0.7593  
Epoch 9/20  
108/108 [=====] - 0s 173us/step - loss: 1.2845 - acc: 0.7037  
Epoch 10/20  
108/108 [=====] - 0s 152us/step - loss: 1.2525 - acc: 0.6944  
Epoch 11/20  
108/108 [=====] - 0s 138us/step - loss: 1.2206 - acc: 0.8333  
Epoch 12/20  
108/108 [=====] - 0s 137us/step - loss: 1.1850 - acc: 0.9259  
Epoch 13/20  
108/108 [=====] - 0s 135us/step - loss: 1.1508 - acc: 0.9444  
Epoch 14/20  
108/108 [=====] - 0s 145us/step - loss: 1.1217 - acc: 0.9259

Epoch 15/20  
108/108 [=====] - 0s 138us/step - loss: 1.0943 - acc: 0.9259  
Epoch 16/20  
108/108 [=====] - 0s 134us/step - loss: 1.0664 - acc: 0.9167  
Epoch 17/20  
108/108 [=====] - 0s 137us/step - loss: 1.0446 - acc: 0.8426  
Epoch 18/20  
108/108 [=====] - 0s 143us/step - loss: 1.0233 - acc: 0.8241  
Epoch 19/20  
108/108 [=====] - 0s 134us/step - loss: 1.0008 - acc: 0.8333  
Epoch 20/20  
108/108 [=====] - 0s 137us/step - loss: 0.9778 - acc: 0.8889  
27/27 [=====] - 2s 83ms/step  
108/108 [=====] - 0s 102us/step  
Epoch 1/20  
108/108 [=====] - 5s 49ms/step - loss: 1.9208 - acc: 0.3056  
Epoch 2/20  
108/108 [=====] - 0s 140us/step - loss: 1.7131 - acc: 0.3056  
Epoch 3/20  
108/108 [=====] - 0s 135us/step - loss: 1.5804 - acc: 0.5278  
Epoch 4/20  
108/108 [=====] - 0s 140us/step - loss: 1.4933 - acc: 0.3611  
Epoch 5/20  
108/108 [=====] - 0s 161us/step - loss: 1.4409 - acc: 0.3611  
Epoch 6/20  
108/108 [=====] - 0s 139us/step - loss: 1.3924 - acc: 0.3611  
Epoch 7/20  
108/108 [=====] - 0s 136us/step - loss: 1.3539 - acc: 0.4167  
Epoch 8/20  
108/108 [=====] - 0s 133us/step - loss: 1.3178 - acc: 0.4907  
Epoch 9/20  
108/108 [=====] - 0s 135us/step - loss: 1.2877 - acc: 0.7870  
Epoch 10/20  
108/108 [=====] - 0s 173us/step - loss: 1.2549 - acc: 0.6574  
Epoch 11/20  
108/108 [=====] - 0s 145us/step - loss: 1.2175 - acc: 0.8241  
Epoch 12/20  
108/108 [=====] - 0s 146us/step - loss: 1.1793 - acc: 0.9444  
Epoch 13/20  
108/108 [=====] - 0s 149us/step - loss: 1.1453 - acc: 0.7870  
Epoch 14/20  
108/108 [=====] - 0s 140us/step - loss: 1.1148 - acc: 0.6759  
Epoch 15/20  
108/108 [=====] - 0s 133us/step - loss: 1.0842 - acc: 0.6667  
Epoch 16/20  
108/108 [=====] - 0s 150us/step - loss: 1.0570 - acc: 0.6667  
Epoch 17/20  
108/108 [=====] - 0s 134us/step - loss: 1.0319 - acc: 0.6667

Epoch 18/20  
108/108 [=====] - 0s 131us/step - loss: 1.0081 - acc: 0.6667  
Epoch 19/20  
108/108 [=====] - 0s 155us/step - loss: 0.9874 - acc: 0.6667  
Epoch 20/20  
108/108 [=====] - 0s 140us/step - loss: 0.9646 - acc: 0.6667  
27/27 [=====] - 2s 83ms/step  
108/108 [=====] - 0s 95us/step  
Epoch 1/20  
108/108 [=====] - 6s 51ms/step - loss: 1.6645 - acc: 0.4722  
Epoch 2/20  
108/108 [=====] - 0s 195us/step - loss: 1.5625 - acc: 0.6667  
Epoch 3/20  
108/108 [=====] - 0s 180us/step - loss: 1.4807 - acc: 0.6667  
Epoch 4/20  
108/108 [=====] - 0s 157us/step - loss: 1.4089 - acc: 0.6667  
Epoch 5/20  
108/108 [=====] - 0s 157us/step - loss: 1.3527 - acc: 0.6667  
Epoch 6/20  
108/108 [=====] - 0s 176us/step - loss: 1.3052 - acc: 0.6574  
Epoch 7/20  
108/108 [=====] - 0s 166us/step - loss: 1.2566 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 153us/step - loss: 1.2132 - acc: 0.6852  
Epoch 9/20  
108/108 [=====] - 0s 151us/step - loss: 1.1716 - acc: 0.7130  
Epoch 10/20  
108/108 [=====] - 0s 172us/step - loss: 1.1303 - acc: 0.8981  
Epoch 11/20  
108/108 [=====] - 0s 193us/step - loss: 1.0920 - acc: 0.8333  
Epoch 12/20  
108/108 [=====] - 0s 184us/step - loss: 1.0558 - acc: 0.6667  
Epoch 13/20  
108/108 [=====] - 0s 162us/step - loss: 1.0245 - acc: 0.6667  
Epoch 14/20  
108/108 [=====] - 0s 175us/step - loss: 0.9986 - acc: 0.6667  
Epoch 15/20  
108/108 [=====] - 0s 150us/step - loss: 0.9714 - acc: 0.6667  
Epoch 16/20  
108/108 [=====] - 0s 145us/step - loss: 0.9428 - acc: 0.6667  
Epoch 17/20  
108/108 [=====] - 0s 153us/step - loss: 0.9152 - acc: 0.7222  
Epoch 18/20  
108/108 [=====] - 0s 164us/step - loss: 0.8894 - acc: 0.8426  
Epoch 19/20  
108/108 [=====] - 0s 162us/step - loss: 0.8682 - acc: 0.9352  
Epoch 20/20  
108/108 [=====] - 0s 139us/step - loss: 0.8454 - acc: 0.9630

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27/27 [=====] - 2s 83ms/step
108/108 [=====] - 0s 110us/step
Epoch 1/20
108/108 [=====] - 5s 49ms/step - loss: 6.2550 - acc: 0.0000e+00
Epoch 2/20
108/108 [=====] - 0s 157us/step - loss: 6.0054 - acc: 0.0000e+00
Epoch 3/20
108/108 [=====] - 0s 150us/step - loss: 5.7875 - acc: 0.0185
Epoch 4/20
108/108 [=====] - 0s 155us/step - loss: 5.5969 - acc: 0.3426
Epoch 5/20
108/108 [=====] - 0s 154us/step - loss: 5.4347 - acc: 0.3426
Epoch 6/20
108/108 [=====] - 0s 141us/step - loss: 5.2865 - acc: 0.3426
Epoch 7/20
108/108 [=====] - 0s 153us/step - loss: 5.1398 - acc: 0.4815
Epoch 8/20
108/108 [=====] - 0s 150us/step - loss: 4.9924 - acc: 0.5926
Epoch 9/20
108/108 [=====] - 0s 160us/step - loss: 4.8492 - acc: 0.4907
Epoch 10/20
108/108 [=====] - 0s 186us/step - loss: 4.7121 - acc: 0.4259
Epoch 11/20
108/108 [=====] - 0s 171us/step - loss: 4.5800 - acc: 0.6019
Epoch 12/20
108/108 [=====] - 0s 148us/step - loss: 4.4521 - acc: 0.8519
Epoch 13/20
108/108 [=====] - 0s 139us/step - loss: 4.3285 - acc: 0.9352
Epoch 14/20
108/108 [=====] - 0s 152us/step - loss: 4.2026 - acc: 0.8981
Epoch 15/20
108/108 [=====] - 0s 144us/step - loss: 4.0819 - acc: 0.7870
Epoch 16/20
108/108 [=====] - 0s 145us/step - loss: 3.9705 - acc: 0.7037
Epoch 17/20
108/108 [=====] - 0s 138us/step - loss: 3.8614 - acc: 0.6944
Epoch 18/20
108/108 [=====] - 0s 141us/step - loss: 3.7565 - acc: 0.7315
Epoch 19/20
108/108 [=====] - 0s 160us/step - loss: 3.6519 - acc: 0.8333
Epoch 20/20
108/108 [=====] - 0s 145us/step - loss: 3.5509 - acc: 0.8333
27/27 [=====] - 2s 85ms/step
108/108 [=====] - 0s 111us/step
Epoch 1/20
108/108 [=====] - 5s 49ms/step - loss: 6.3140 - acc: 0.3519
Epoch 2/20
108/108 [=====] - 0s 186us/step - loss: 6.0180 - acc: 0.3519

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Epoch 3/20  
108/108 [=====] - 0s 193us/step - loss: 5.7742 - acc: 0.3704  
Epoch 4/20  
108/108 [=====] - 0s 174us/step - loss: 5.5872 - acc: 0.3333  
Epoch 5/20  
108/108 [=====] - 0s 173us/step - loss: 5.4219 - acc: 0.3333  
Epoch 6/20  
108/108 [=====] - 0s 199us/step - loss: 5.2707 - acc: 0.3333  
Epoch 7/20  
108/108 [=====] - 0s 193us/step - loss: 5.1242 - acc: 0.3333  
Epoch 8/20  
108/108 [=====] - 0s 194us/step - loss: 4.9812 - acc: 0.3333  
Epoch 9/20  
108/108 [=====] - 0s 193us/step - loss: 4.8410 - acc: 0.6574  
Epoch 10/20  
108/108 [=====] - 0s 137us/step - loss: 4.7057 - acc: 0.6852  
Epoch 11/20  
108/108 [=====] - 0s 190us/step - loss: 4.5760 - acc: 0.6852  
Epoch 12/20  
108/108 [=====] - 0s 215us/step - loss: 4.4515 - acc: 0.6852  
Epoch 13/20  
108/108 [=====] - 0s 173us/step - loss: 4.3319 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 164us/step - loss: 4.2156 - acc: 0.7130  
Epoch 15/20  
108/108 [=====] - 0s 157us/step - loss: 4.1062 - acc: 0.9167  
Epoch 16/20  
108/108 [=====] - 0s 167us/step - loss: 4.0006 - acc: 0.9630  
Epoch 17/20  
108/108 [=====] - 0s 152us/step - loss: 3.8989 - acc: 0.8981  
Epoch 18/20  
108/108 [=====] - 0s 135us/step - loss: 3.7943 - acc: 0.9630  
Epoch 19/20  
108/108 [=====] - 0s 163us/step - loss: 3.6933 - acc: 0.8519  
Epoch 20/20  
108/108 [=====] - 0s 142us/step - loss: 3.5945 - acc: 0.7222  
27/27 [=====] - 3s 93ms/step  
108/108 [=====] - 0s 114us/step  
Epoch 1/20  
108/108 [=====] - 5s 50ms/step - loss: 6.0988 - acc: 0.3704  
Epoch 2/20  
108/108 [=====] - 0s 165us/step - loss: 5.9084 - acc: 0.3704  
Epoch 3/20  
108/108 [=====] - 0s 174us/step - loss: 5.7203 - acc: 0.4074  
Epoch 4/20  
108/108 [=====] - 0s 149us/step - loss: 5.5385 - acc: 0.7222  
Epoch 5/20  
108/108 [=====] - 0s 156us/step - loss: 5.3653 - acc: 0.9259

Epoch 6/20  
108/108 [=====] - 0s 150us/step - loss: 5.1981 - acc: 0.8148  
Epoch 7/20  
108/108 [=====] - 0s 173us/step - loss: 5.0349 - acc: 0.7963  
Epoch 8/20  
108/108 [=====] - 0s 168us/step - loss: 4.8798 - acc: 0.7778  
Epoch 9/20  
108/108 [=====] - 0s 144us/step - loss: 4.7306 - acc: 0.7963  
Epoch 10/20  
108/108 [=====] - 0s 138us/step - loss: 4.5871 - acc: 0.8519  
Epoch 11/20  
108/108 [=====] - 0s 163us/step - loss: 4.4485 - acc: 0.9444  
Epoch 12/20  
108/108 [=====] - 0s 140us/step - loss: 4.3159 - acc: 0.9537  
Epoch 13/20  
108/108 [=====] - 0s 140us/step - loss: 4.1867 - acc: 0.9630  
Epoch 14/20  
108/108 [=====] - 0s 158us/step - loss: 4.0615 - acc: 0.9722  
Epoch 15/20  
108/108 [=====] - 0s 139us/step - loss: 3.9403 - acc: 0.9352  
Epoch 16/20  
108/108 [=====] - 0s 143us/step - loss: 3.8243 - acc: 0.8796  
Epoch 17/20  
108/108 [=====] - 0s 137us/step - loss: 3.7145 - acc: 0.8148  
Epoch 18/20  
108/108 [=====] - 0s 147us/step - loss: 3.6074 - acc: 0.8148  
Epoch 19/20  
108/108 [=====] - 0s 186us/step - loss: 3.5030 - acc: 0.8426  
Epoch 20/20  
108/108 [=====] - 0s 163us/step - loss: 3.4032 - acc: 0.9352  
27/27 [=====] - 3s 99ms/step  
108/108 [=====] - 0s 122us/step  
Epoch 1/20  
108/108 [=====] - 6s 52ms/step - loss: 6.1315 - acc: 0.3611  
Epoch 2/20  
108/108 [=====] - 0s 152us/step - loss: 5.9369 - acc: 0.3611  
Epoch 3/20  
108/108 [=====] - 0s 154us/step - loss: 5.7646 - acc: 0.3611  
Epoch 4/20  
108/108 [=====] - 0s 148us/step - loss: 5.5977 - acc: 0.4630  
Epoch 5/20  
108/108 [=====] - 0s 158us/step - loss: 5.4354 - acc: 0.6667  
Epoch 6/20  
108/108 [=====] - 0s 144us/step - loss: 5.2845 - acc: 0.6667  
Epoch 7/20  
108/108 [=====] - 0s 142us/step - loss: 5.1385 - acc: 0.6667  
Epoch 8/20  
108/108 [=====] - 0s 145us/step - loss: 4.9939 - acc: 0.6667

Epoch 9/20  
108/108 [=====] - 0s 144us/step - loss: 4.8497 - acc: 0.6667  
Epoch 10/20  
108/108 [=====] - 0s 181us/step - loss: 4.7116 - acc: 0.6667  
Epoch 11/20  
108/108 [=====] - 0s 146us/step - loss: 4.5741 - acc: 0.6667  
Epoch 12/20  
108/108 [=====] - 0s 152us/step - loss: 4.4371 - acc: 0.6667  
Epoch 13/20  
108/108 [=====] - 0s 143us/step - loss: 4.3082 - acc: 0.6667  
Epoch 14/20  
108/108 [=====] - 0s 183us/step - loss: 4.1925 - acc: 0.6852  
Epoch 15/20  
108/108 [=====] - 0s 149us/step - loss: 4.0761 - acc: 0.6852  
Epoch 16/20  
108/108 [=====] - 0s 153us/step - loss: 3.9651 - acc: 0.6667  
Epoch 17/20  
108/108 [=====] - 0s 142us/step - loss: 3.8586 - acc: 0.6667  
Epoch 18/20  
108/108 [=====] - 0s 178us/step - loss: 3.7552 - acc: 0.6667  
Epoch 19/20  
108/108 [=====] - 0s 155us/step - loss: 3.6524 - acc: 0.6667  
Epoch 20/20  
108/108 [=====] - 0s 145us/step - loss: 3.5536 - acc: 0.6852  
27/27 [=====] - 2s 91ms/step  
108/108 [=====] - 0s 91us/step  
Epoch 1/20  
108/108 [=====] - 6s 53ms/step - loss: 6.4435 - acc: 0.3148  
Epoch 2/20  
108/108 [=====] - 0s 150us/step - loss: 6.1277 - acc: 0.3148  
Epoch 3/20  
108/108 [=====] - 0s 171us/step - loss: 5.8375 - acc: 0.3148  
Epoch 4/20  
108/108 [=====] - 0s 162us/step - loss: 5.6134 - acc: 0.3148  
Epoch 5/20  
108/108 [=====] - 0s 163us/step - loss: 5.4361 - acc: 0.3148  
Epoch 6/20  
108/108 [=====] - 0s 152us/step - loss: 5.2783 - acc: 0.3148  
Epoch 7/20  
108/108 [=====] - 0s 159us/step - loss: 5.1224 - acc: 0.6019  
Epoch 8/20  
108/108 [=====] - 0s 174us/step - loss: 4.9806 - acc: 0.6667  
Epoch 9/20  
108/108 [=====] - 0s 234us/step - loss: 4.8433 - acc: 0.6667  
Epoch 10/20  
108/108 [=====] - 0s 157us/step - loss: 4.7093 - acc: 0.6667  
Epoch 11/20  
108/108 [=====] - 0s 141us/step - loss: 4.5777 - acc: 0.6667



Epoch 12/20  
108/108 [=====] - 0s 146us/step - loss: 4.4512 - acc: 0.6667  
Epoch 13/20  
108/108 [=====] - 0s 142us/step - loss: 4.3285 - acc: 0.6667  
Epoch 14/20  
108/108 [=====] - 0s 149us/step - loss: 4.2099 - acc: 0.6667  
Epoch 15/20  
108/108 [=====] - 0s 167us/step - loss: 4.0956 - acc: 0.6667  
Epoch 16/20  
108/108 [=====] - 0s 171us/step - loss: 3.9847 - acc: 0.6667  
Epoch 17/20  
108/108 [=====] - 0s 165us/step - loss: 3.8755 - acc: 0.6667  
Epoch 18/20  
108/108 [=====] - 0s 167us/step - loss: 3.7707 - acc: 0.6667  
Epoch 19/20  
108/108 [=====] - 0s 185us/step - loss: 3.6669 - acc: 0.6944  
Epoch 20/20  
108/108 [=====] - 0s 175us/step - loss: 3.5676 - acc: 0.6944  
27/27 [=====] - 2s 88ms/step  
108/108 [=====] - 0s 101us/step  
Epoch 1/20  
108/108 [=====] - 5s 51ms/step - loss: 51.1382 - acc: 0.3426  
Epoch 2/20  
108/108 [=====] - 0s 151us/step - loss: 49.6396 - acc: 0.5093  
Epoch 3/20  
108/108 [=====] - 0s 139us/step - loss: 48.0508 - acc: 0.6296  
Epoch 4/20  
108/108 [=====] - 0s 139us/step - loss: 46.4613 - acc: 0.8704  
Epoch 5/20  
108/108 [=====] - 0s 134us/step - loss: 44.9054 - acc: 0.9167  
Epoch 6/20  
108/108 [=====] - 0s 140us/step - loss: 43.3862 - acc: 0.7778  
Epoch 7/20  
108/108 [=====] - 0s 139us/step - loss: 41.9084 - acc: 0.6389  
Epoch 8/20  
108/108 [=====] - 0s 151us/step - loss: 40.4713 - acc: 0.6019  
Epoch 9/20  
108/108 [=====] - 0s 144us/step - loss: 39.0799 - acc: 0.6204  
Epoch 10/20  
108/108 [=====] - 0s 133us/step - loss: 37.7314 - acc: 0.6574  
Epoch 11/20  
108/108 [=====] - 0s 141us/step - loss: 36.4245 - acc: 0.6667  
Epoch 12/20  
108/108 [=====] - 0s 167us/step - loss: 35.1592 - acc: 0.6759  
Epoch 13/20  
108/108 [=====] - 0s 138us/step - loss: 33.9356 - acc: 0.6759  
Epoch 14/20  
108/108 [=====] - 0s 157us/step - loss: 32.7545 - acc: 0.6759

Epoch 15/20  
108/108 [=====] - 0s 149us/step - loss: 31.6154 - acc: 0.7037  
Epoch 16/20  
108/108 [=====] - 0s 146us/step - loss: 30.5153 - acc: 0.8241  
Epoch 17/20  
108/108 [=====] - 0s 140us/step - loss: 29.4536 - acc: 0.8611  
Epoch 18/20  
108/108 [=====] - 0s 174us/step - loss: 28.4274 - acc: 0.7778  
Epoch 19/20  
108/108 [=====] - 0s 157us/step - loss: 27.4376 - acc: 0.6852  
Epoch 20/20  
108/108 [=====] - 0s 153us/step - loss: 26.4818 - acc: 0.6852  
27/27 [=====] - 2s 89ms/step  
108/108 [=====] - 0s 122us/step  
Epoch 1/20  
108/108 [=====] - 6s 53ms/step - loss: 50.7624 - acc: 0.5741  
Epoch 2/20  
108/108 [=====] - 0s 145us/step - loss: 49.2058 - acc: 0.6481  
Epoch 3/20  
108/108 [=====] - 0s 139us/step - loss: 47.5651 - acc: 0.6574  
Epoch 4/20  
108/108 [=====] - 0s 145us/step - loss: 45.9715 - acc: 0.5833  
Epoch 5/20  
108/108 [=====] - 0s 143us/step - loss: 44.4333 - acc: 0.5556  
Epoch 6/20  
108/108 [=====] - 0s 148us/step - loss: 42.9322 - acc: 0.6759  
Epoch 7/20  
108/108 [=====] - 0s 138us/step - loss: 41.4759 - acc: 0.6759  
Epoch 8/20  
108/108 [=====] - 0s 142us/step - loss: 40.0590 - acc: 0.6759  
Epoch 9/20  
108/108 [=====] - 0s 163us/step - loss: 38.6857 - acc: 0.6852  
Epoch 10/20  
108/108 [=====] - 0s 164us/step - loss: 37.3554 - acc: 0.6852  
Epoch 11/20  
108/108 [=====] - 0s 148us/step - loss: 36.0673 - acc: 0.6852  
Epoch 12/20  
108/108 [=====] - 0s 155us/step - loss: 34.8181 - acc: 0.6852  
Epoch 13/20  
108/108 [=====] - 0s 142us/step - loss: 33.6103 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 149us/step - loss: 32.4436 - acc: 0.6852  
Epoch 15/20  
108/108 [=====] - 0s 150us/step - loss: 31.3147 - acc: 0.6852  
Epoch 16/20  
108/108 [=====] - 0s 178us/step - loss: 30.2238 - acc: 0.6852  
Epoch 17/20  
108/108 [=====] - 0s 145us/step - loss: 29.1712 - acc: 0.6852

Epoch 18/20  
108/108 [=====] - 0s 144us/step - loss: 28.1514 - acc: 0.6852  
Epoch 19/20  
108/108 [=====] - 0s 149us/step - loss: 27.1671 - acc: 0.6852  
Epoch 20/20  
108/108 [=====] - 0s 140us/step - loss: 26.2179 - acc: 0.6852  
27/27 [=====] - 3s 93ms/step  
108/108 [=====] - 0s 143us/step  
Epoch 1/20  
108/108 [=====] - 6s 52ms/step - loss: 53.3415 - acc: 0.3148  
Epoch 2/20  
108/108 [=====] - 0s 142us/step - loss: 51.6904 - acc: 0.3148  
Epoch 3/20  
108/108 [=====] - 0s 143us/step - loss: 49.9345 - acc: 0.3148  
Epoch 4/20  
108/108 [=====] - 0s 138us/step - loss: 48.2010 - acc: 0.3148  
Epoch 5/20  
108/108 [=====] - 0s 139us/step - loss: 46.5199 - acc: 0.3148  
Epoch 6/20  
108/108 [=====] - 0s 139us/step - loss: 44.8981 - acc: 0.3148  
Epoch 7/20  
108/108 [=====] - 0s 141us/step - loss: 43.3388 - acc: 0.3148  
Epoch 8/20  
108/108 [=====] - 0s 153us/step - loss: 41.8411 - acc: 0.3148  
Epoch 9/20  
108/108 [=====] - 0s 160us/step - loss: 40.3977 - acc: 0.3148  
Epoch 10/20  
108/108 [=====] - 0s 155us/step - loss: 39.0058 - acc: 0.3148  
Epoch 11/20  
108/108 [=====] - 0s 144us/step - loss: 37.6628 - acc: 0.3148  
Epoch 12/20  
108/108 [=====] - 0s 145us/step - loss: 36.3695 - acc: 0.3148  
Epoch 13/20  
108/108 [=====] - 0s 146us/step - loss: 35.1189 - acc: 0.3148  
Epoch 14/20  
108/108 [=====] - 0s 153us/step - loss: 33.9134 - acc: 0.3148  
Epoch 15/20  
108/108 [=====] - 0s 152us/step - loss: 32.7480 - acc: 0.3148  
Epoch 16/20  
108/108 [=====] - 0s 141us/step - loss: 31.6234 - acc: 0.3981  
Epoch 17/20  
108/108 [=====] - 0s 142us/step - loss: 30.5371 - acc: 0.5000  
Epoch 18/20  
108/108 [=====] - 0s 142us/step - loss: 29.4884 - acc: 0.5556  
Epoch 19/20  
108/108 [=====] - 0s 168us/step - loss: 28.4753 - acc: 0.6019  
Epoch 20/20  
108/108 [=====] - 0s 142us/step - loss: 27.4970 - acc: 0.6111

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27/27 [=====] - 2s 92ms/step
108/108 [=====] - 0s 132us/step
Epoch 1/20
108/108 [=====] - 6s 53ms/step - loss: 52.1754 - acc: 0.3519
Epoch 2/20
108/108 [=====] - 0s 148us/step - loss: 50.6725 - acc: 0.3611
Epoch 3/20
108/108 [=====] - 0s 137us/step - loss: 49.0588 - acc: 0.3611
Epoch 4/20
108/108 [=====] - 0s 144us/step - loss: 47.4440 - acc: 0.3611
Epoch 5/20
108/108 [=====] - 0s 136us/step - loss: 45.8542 - acc: 0.3611
Epoch 6/20
108/108 [=====] - 0s 137us/step - loss: 44.3027 - acc: 0.3611
Epoch 7/20
108/108 [=====] - 0s 136us/step - loss: 42.7903 - acc: 0.3611
Epoch 8/20
108/108 [=====] - 0s 136us/step - loss: 41.3200 - acc: 0.3611
Epoch 9/20
108/108 [=====] - 0s 132us/step - loss: 39.8933 - acc: 0.3611
Epoch 10/20
108/108 [=====] - 0s 131us/step - loss: 38.5124 - acc: 0.3611
Epoch 11/20
108/108 [=====] - 0s 136us/step - loss: 37.1744 - acc: 0.3611
Epoch 12/20
108/108 [=====] - 0s 140us/step - loss: 35.8808 - acc: 0.3611
Epoch 13/20
108/108 [=====] - 0s 148us/step - loss: 34.6285 - acc: 0.3611
Epoch 14/20
108/108 [=====] - 0s 159us/step - loss: 33.4178 - acc: 0.3611
Epoch 15/20
108/108 [=====] - 0s 150us/step - loss: 32.2472 - acc: 0.3611
Epoch 16/20
108/108 [=====] - 0s 150us/step - loss: 31.1152 - acc: 0.3611
Epoch 17/20
108/108 [=====] - 0s 168us/step - loss: 30.0228 - acc: 0.3611
Epoch 18/20
108/108 [=====] - 0s 221us/step - loss: 28.9666 - acc: 0.3611
Epoch 19/20
108/108 [=====] - 0s 181us/step - loss: 27.9469 - acc: 0.3889
Epoch 20/20
108/108 [=====] - 0s 182us/step - loss: 26.9627 - acc: 0.4259
27/27 [=====] - 3s 94ms/step
108/108 [=====] - 0s 100us/step
Epoch 1/20
108/108 [=====] - 6s 53ms/step - loss: 50.8944 - acc: 0.3333
Epoch 2/20
108/108 [=====] - 0s 222us/step - loss: 49.2777 - acc: 0.3333

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Epoch 3/20  
108/108 [=====] - 0s 234us/step - loss: 47.5986 - acc: 0.3333  
Epoch 4/20  
108/108 [=====] - 0s 149us/step - loss: 45.9548 - acc: 0.3333  
Epoch 5/20  
108/108 [=====] - 0s 141us/step - loss: 44.3853 - acc: 0.3333  
Epoch 6/20  
108/108 [=====] - 0s 137us/step - loss: 42.8638 - acc: 0.3333  
Epoch 7/20  
108/108 [=====] - 0s 143us/step - loss: 41.3938 - acc: 0.2778  
Epoch 8/20  
108/108 [=====] - 0s 145us/step - loss: 39.9664 - acc: 0.2130  
Epoch 9/20  
108/108 [=====] - 0s 141us/step - loss: 38.5801 - acc: 0.3333  
Epoch 10/20  
108/108 [=====] - 0s 138us/step - loss: 37.2397 - acc: 0.3241  
Epoch 11/20  
108/108 [=====] - 0s 141us/step - loss: 35.9403 - acc: 0.3241  
Epoch 12/20  
108/108 [=====] - 0s 140us/step - loss: 34.6834 - acc: 0.3056  
Epoch 13/20  
108/108 [=====] - 0s 150us/step - loss: 33.4676 - acc: 0.3056  
Epoch 14/20  
108/108 [=====] - 0s 135us/step - loss: 32.2947 - acc: 0.3519  
Epoch 15/20  
108/108 [=====] - 0s 137us/step - loss: 31.1622 - acc: 0.3333  
Epoch 16/20  
108/108 [=====] - 0s 131us/step - loss: 30.0676 - acc: 0.4352  
Epoch 17/20  
108/108 [=====] - 0s 134us/step - loss: 29.0131 - acc: 0.3611  
Epoch 18/20  
108/108 [=====] - 0s 138us/step - loss: 27.9960 - acc: 0.3426  
Epoch 19/20  
108/108 [=====] - 0s 139us/step - loss: 27.0129 - acc: 0.3426  
Epoch 20/20  
108/108 [=====] - 0s 138us/step - loss: 26.0619 - acc: 0.3519  
27/27 [=====] - 2s 92ms/step  
108/108 [=====] - 0s 116us/step  
Epoch 1/20  
108/108 [=====] - 6s 55ms/step - loss: 1.7337 - acc: 0.3148  
Epoch 2/20  
108/108 [=====] - 0s 196us/step - loss: 1.6158 - acc: 0.3519  
Epoch 3/20  
108/108 [=====] - 0s 240us/step - loss: 1.5460 - acc: 0.3426  
Epoch 4/20  
108/108 [=====] - 0s 244us/step - loss: 1.4770 - acc: 0.5463  
Epoch 5/20  
108/108 [=====] - 0s 264us/step - loss: 1.4170 - acc: 0.6852

Epoch 6/20  
108/108 [=====] - 0s 227us/step - loss: 1.3602 - acc: 0.6944  
Epoch 7/20  
108/108 [=====] - 0s 163us/step - loss: 1.3081 - acc: 0.7685  
Epoch 8/20  
108/108 [=====] - 0s 151us/step - loss: 1.2570 - acc: 0.7037  
Epoch 9/20  
108/108 [=====] - 0s 154us/step - loss: 1.2049 - acc: 0.6852  
Epoch 10/20  
108/108 [=====] - 0s 167us/step - loss: 1.1561 - acc: 0.6852  
Epoch 11/20  
108/108 [=====] - 0s 154us/step - loss: 1.1114 - acc: 0.6852  
Epoch 12/20  
108/108 [=====] - 0s 157us/step - loss: 1.0764 - acc: 0.6852  
Epoch 13/20  
108/108 [=====] - 0s 181us/step - loss: 1.0440 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 156us/step - loss: 1.0054 - acc: 0.6852  
Epoch 15/20  
108/108 [=====] - 0s 188us/step - loss: 0.9638 - acc: 0.7315  
Epoch 16/20  
108/108 [=====] - 0s 177us/step - loss: 0.9501 - acc: 0.9352  
Epoch 17/20  
108/108 [=====] - 0s 159us/step - loss: 0.9382 - acc: 0.7685  
Epoch 18/20  
108/108 [=====] - 0s 155us/step - loss: 0.9066 - acc: 0.8704  
Epoch 19/20  
108/108 [=====] - 0s 148us/step - loss: 0.8650 - acc: 0.9722  
Epoch 20/20  
108/108 [=====] - 0s 139us/step - loss: 0.8402 - acc: 0.8056  
27/27 [=====] - 2s 91ms/step  
108/108 [=====] - 0s 141us/step  
Epoch 1/20  
108/108 [=====] - 7s 64ms/step - loss: 1.7795 - acc: 0.3519  
Epoch 2/20  
108/108 [=====] - 0s 200us/step - loss: 1.6408 - acc: 0.3611  
Epoch 3/20  
108/108 [=====] - 0s 187us/step - loss: 1.5391 - acc: 0.3796  
Epoch 4/20  
108/108 [=====] - 0s 170us/step - loss: 1.4630 - acc: 0.6852  
Epoch 5/20  
108/108 [=====] - 0s 190us/step - loss: 1.3994 - acc: 0.6852  
Epoch 6/20  
108/108 [=====] - 0s 145us/step - loss: 1.3416 - acc: 0.6852  
Epoch 7/20  
108/108 [=====] - 0s 152us/step - loss: 1.2878 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 197us/step - loss: 1.2349 - acc: 0.6852

Epoch 9/20  
108/108 [=====] - 0s 153us/step - loss: 1.1829 - acc: 0.6852  
Epoch 10/20  
108/108 [=====] - 0s 146us/step - loss: 1.1351 - acc: 0.6944  
Epoch 11/20  
108/108 [=====] - 0s 142us/step - loss: 1.0919 - acc: 0.7315  
Epoch 12/20  
108/108 [=====] - 0s 170us/step - loss: 1.0497 - acc: 0.7130  
Epoch 13/20  
108/108 [=====] - 0s 141us/step - loss: 1.0099 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 138us/step - loss: 0.9748 - acc: 0.6852  
Epoch 15/20  
108/108 [=====] - 0s 141us/step - loss: 0.9428 - acc: 0.6852  
Epoch 16/20  
108/108 [=====] - 0s 136us/step - loss: 0.9101 - acc: 0.6852  
Epoch 17/20  
108/108 [=====] - 0s 173us/step - loss: 0.8787 - acc: 0.6944  
Epoch 18/20  
108/108 [=====] - 0s 141us/step - loss: 0.8482 - acc: 0.7130  
Epoch 19/20  
108/108 [=====] - 0s 145us/step - loss: 0.8208 - acc: 0.7778  
Epoch 20/20  
108/108 [=====] - 0s 154us/step - loss: 0.7957 - acc: 0.8426  
27/27 [=====] - 3s 94ms/step  
108/108 [=====] - 0s 108us/step  
Epoch 1/20  
108/108 [=====] - 6s 55ms/step - loss: 1.6666 - acc: 0.3519  
Epoch 2/20  
108/108 [=====] - 0s 177us/step - loss: 1.5428 - acc: 0.4352  
Epoch 3/20  
108/108 [=====] - 0s 190us/step - loss: 1.4535 - acc: 0.6852  
Epoch 4/20  
108/108 [=====] - 0s 183us/step - loss: 1.3820 - acc: 0.7130  
Epoch 5/20  
108/108 [=====] - 0s 141us/step - loss: 1.3233 - acc: 0.8981  
Epoch 6/20  
108/108 [=====] - 0s 157us/step - loss: 1.2754 - acc: 0.6389  
Epoch 7/20  
108/108 [=====] - 0s 188us/step - loss: 1.2360 - acc: 0.6296  
Epoch 8/20  
108/108 [=====] - 0s 160us/step - loss: 1.1942 - acc: 0.6296  
Epoch 9/20  
108/108 [=====] - 0s 166us/step - loss: 1.1478 - acc: 0.6389  
Epoch 10/20  
108/108 [=====] - 0s 142us/step - loss: 1.1069 - acc: 0.8704  
Epoch 11/20  
108/108 [=====] - 0s 143us/step - loss: 1.0718 - acc: 0.9352

Epoch 12/20  
108/108 [=====] - 0s 136us/step - loss: 1.0357 - acc: 0.9352  
Epoch 13/20  
108/108 [=====] - 0s 140us/step - loss: 1.0011 - acc: 0.9537  
Epoch 14/20  
108/108 [=====] - 0s 133us/step - loss: 0.9729 - acc: 0.8704  
Epoch 15/20  
108/108 [=====] - 0s 135us/step - loss: 0.9506 - acc: 0.7963  
Epoch 16/20  
108/108 [=====] - 0s 135us/step - loss: 0.9239 - acc: 0.7963  
Epoch 17/20  
108/108 [=====] - 0s 135us/step - loss: 0.8975 - acc: 0.8333  
Epoch 18/20  
108/108 [=====] - 0s 135us/step - loss: 0.8746 - acc: 0.8611  
Epoch 19/20  
108/108 [=====] - 0s 134us/step - loss: 0.8506 - acc: 0.8981  
Epoch 20/20  
108/108 [=====] - 0s 141us/step - loss: 0.8281 - acc: 0.9352  
27/27 [=====] - 2s 93ms/step  
108/108 [=====] - 0s 101us/step  
Epoch 1/20  
108/108 [=====] - 6s 55ms/step - loss: 1.5284 - acc: 0.5185  
Epoch 2/20  
108/108 [=====] - 0s 141us/step - loss: 1.3816 - acc: 0.7222  
Epoch 3/20  
108/108 [=====] - 0s 143us/step - loss: 1.2991 - acc: 0.9167  
Epoch 4/20  
108/108 [=====] - 0s 139us/step - loss: 1.2162 - acc: 0.8519  
Epoch 5/20  
108/108 [=====] - 0s 136us/step - loss: 1.1663 - acc: 0.6759  
Epoch 6/20  
108/108 [=====] - 0s 135us/step - loss: 1.1113 - acc: 0.6759  
Epoch 7/20  
108/108 [=====] - 0s 138us/step - loss: 1.0585 - acc: 0.7870  
Epoch 8/20  
108/108 [=====] - 0s 145us/step - loss: 1.0147 - acc: 0.8148  
Epoch 9/20  
108/108 [=====] - 0s 137us/step - loss: 0.9816 - acc: 0.7315  
Epoch 10/20  
108/108 [=====] - 0s 134us/step - loss: 0.9486 - acc: 0.8056  
Epoch 11/20  
108/108 [=====] - 0s 149us/step - loss: 0.9106 - acc: 0.9444  
Epoch 12/20  
108/108 [=====] - 0s 137us/step - loss: 0.8843 - acc: 0.9444  
Epoch 13/20  
108/108 [=====] - 0s 138us/step - loss: 0.8536 - acc: 0.9259  
Epoch 14/20  
108/108 [=====] - 0s 137us/step - loss: 0.8279 - acc: 0.9630



Epoch 15/20  
108/108 [=====] - 0s 138us/step - loss: 0.8065 - acc: 0.9722  
Epoch 16/20  
108/108 [=====] - 0s 139us/step - loss: 0.7856 - acc: 0.9722  
Epoch 17/20  
108/108 [=====] - 0s 137us/step - loss: 0.7642 - acc: 0.9815  
Epoch 18/20  
108/108 [=====] - 0s 137us/step - loss: 0.7415 - acc: 0.9537  
Epoch 19/20  
108/108 [=====] - 0s 136us/step - loss: 0.7302 - acc: 0.8889  
Epoch 20/20  
108/108 [=====] - 0s 138us/step - loss: 0.7181 - acc: 0.8796  
27/27 [=====] - 3s 96ms/step  
108/108 [=====] - 0s 109us/step  
Epoch 1/20  
108/108 [=====] - 6s 55ms/step - loss: 1.7795 - acc: 0.1204  
Epoch 2/20  
108/108 [=====] - 0s 146us/step - loss: 1.6719 - acc: 0.2870  
Epoch 3/20  
108/108 [=====] - 0s 144us/step - loss: 1.5905 - acc: 0.3333  
Epoch 4/20  
108/108 [=====] - 0s 142us/step - loss: 1.5141 - acc: 0.3889  
Epoch 5/20  
108/108 [=====] - 0s 144us/step - loss: 1.4423 - acc: 0.6944  
Epoch 6/20  
108/108 [=====] - 0s 186us/step - loss: 1.3715 - acc: 0.6759  
Epoch 7/20  
108/108 [=====] - 0s 232us/step - loss: 1.3061 - acc: 0.6667  
Epoch 8/20  
108/108 [=====] - 0s 171us/step - loss: 1.2418 - acc: 0.6667  
Epoch 9/20  
108/108 [=====] - 0s 181us/step - loss: 1.1888 - acc: 0.8426  
Epoch 10/20  
108/108 [=====] - 0s 146us/step - loss: 1.1419 - acc: 0.8426  
Epoch 11/20  
108/108 [=====] - 0s 149us/step - loss: 1.0993 - acc: 0.8148  
Epoch 12/20  
108/108 [=====] - 0s 176us/step - loss: 1.0554 - acc: 0.8981  
Epoch 13/20  
108/108 [=====] - 0s 151us/step - loss: 1.0153 - acc: 0.8519  
Epoch 14/20  
108/108 [=====] - 0s 192us/step - loss: 0.9824 - acc: 0.9074  
Epoch 15/20  
108/108 [=====] - 0s 200us/step - loss: 0.9546 - acc: 0.9352  
Epoch 16/20  
108/108 [=====] - 0s 165us/step - loss: 0.9250 - acc: 0.9352  
Epoch 17/20  
108/108 [=====] - 0s 154us/step - loss: 0.8986 - acc: 0.7963

Epoch 18/20  
108/108 [=====] - 0s 155us/step - loss: 0.8741 - acc: 0.8056  
Epoch 19/20  
108/108 [=====] - 0s 178us/step - loss: 0.8495 - acc: 0.9167  
Epoch 20/20  
108/108 [=====] - 0s 168us/step - loss: 0.8350 - acc: 0.8981  
27/27 [=====] - 3s 113ms/step  
108/108 [=====] - 0s 114us/step  
Epoch 1/20  
108/108 [=====] - 6s 55ms/step - loss: 6.9382 - acc: 0.4074  
Epoch 2/20  
108/108 [=====] - 0s 154us/step - loss: 6.6687 - acc: 0.6852  
Epoch 3/20  
108/108 [=====] - 0s 169us/step - loss: 6.3986 - acc: 0.6852  
Epoch 4/20  
108/108 [=====] - 0s 204us/step - loss: 6.1446 - acc: 0.6852  
Epoch 5/20  
108/108 [=====] - 0s 159us/step - loss: 5.8941 - acc: 0.6852  
Epoch 6/20  
108/108 [=====] - 0s 152us/step - loss: 5.6607 - acc: 0.6852  
Epoch 7/20  
108/108 [=====] - 0s 146us/step - loss: 5.4358 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 161us/step - loss: 5.2214 - acc: 0.6852  
Epoch 9/20  
108/108 [=====] - 0s 158us/step - loss: 5.0152 - acc: 0.6852  
Epoch 10/20  
108/108 [=====] - 0s 148us/step - loss: 4.8178 - acc: 0.7222  
Epoch 11/20  
108/108 [=====] - 0s 159us/step - loss: 4.6289 - acc: 0.8333  
Epoch 12/20  
108/108 [=====] - 0s 142us/step - loss: 4.4464 - acc: 0.8148  
Epoch 13/20  
108/108 [=====] - 0s 147us/step - loss: 4.2768 - acc: 0.7407  
Epoch 14/20  
108/108 [=====] - 0s 141us/step - loss: 4.1152 - acc: 0.7222  
Epoch 15/20  
108/108 [=====] - 0s 141us/step - loss: 3.9588 - acc: 0.7222  
Epoch 16/20  
108/108 [=====] - 0s 163us/step - loss: 3.8080 - acc: 0.7222  
Epoch 17/20  
108/108 [=====] - 0s 142us/step - loss: 3.6629 - acc: 0.7685  
Epoch 18/20  
108/108 [=====] - 0s 150us/step - loss: 3.5238 - acc: 0.8889  
Epoch 19/20  
108/108 [=====] - 0s 156us/step - loss: 3.3961 - acc: 0.9444  
Epoch 20/20  
108/108 [=====] - 0s 171us/step - loss: 3.2737 - acc: 0.9630

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27/27 [=====] - 3s 116ms/step
108/108 [=====] - 0s 105us/step
Epoch 1/20
108/108 [=====] - 6s 57ms/step - loss: 6.7186 - acc: 0.6759
Epoch 2/20
108/108 [=====] - 0s 167us/step - loss: 6.4148 - acc: 0.6852
Epoch 3/20
108/108 [=====] - 0s 192us/step - loss: 6.1596 - acc: 0.6944
Epoch 4/20
108/108 [=====] - 0s 150us/step - loss: 5.9553 - acc: 0.7315
Epoch 5/20
108/108 [=====] - 0s 167us/step - loss: 5.7402 - acc: 0.6667
Epoch 6/20
108/108 [=====] - 0s 150us/step - loss: 5.5124 - acc: 0.6852
Epoch 7/20
108/108 [=====] - 0s 140us/step - loss: 5.2914 - acc: 0.9074
Epoch 8/20
108/108 [=====] - 0s 139us/step - loss: 5.0835 - acc: 0.7130
Epoch 9/20
108/108 [=====] - 0s 152us/step - loss: 4.8837 - acc: 0.6852
Epoch 10/20
108/108 [=====] - 0s 151us/step - loss: 4.6949 - acc: 0.7130
Epoch 11/20
108/108 [=====] - 0s 157us/step - loss: 4.5131 - acc: 0.7130
Epoch 12/20
108/108 [=====] - 0s 152us/step - loss: 4.3393 - acc: 0.6852
Epoch 13/20
108/108 [=====] - 0s 153us/step - loss: 4.1785 - acc: 0.6852
Epoch 14/20
108/108 [=====] - 0s 147us/step - loss: 4.0218 - acc: 0.6944
Epoch 15/20
108/108 [=====] - 0s 151us/step - loss: 3.8726 - acc: 0.7593
Epoch 16/20
108/108 [=====] - 0s 157us/step - loss: 3.7302 - acc: 0.8056
Epoch 17/20
108/108 [=====] - 0s 146us/step - loss: 3.5942 - acc: 0.8241
Epoch 18/20
108/108 [=====] - 0s 143us/step - loss: 3.4659 - acc: 0.8981
Epoch 19/20
108/108 [=====] - 0s 140us/step - loss: 3.3424 - acc: 0.9352
Epoch 20/20
108/108 [=====] - 0s 144us/step - loss: 3.2225 - acc: 0.8519
27/27 [=====] - 3s 98ms/step
108/108 [=====] - 0s 112us/step
Epoch 1/20
108/108 [=====] - 7s 66ms/step - loss: 6.9144 - acc: 0.3704
Epoch 2/20
108/108 [=====] - 0s 147us/step - loss: 6.6357 - acc: 0.4259

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Epoch 3/20  
108/108 [=====] - 0s 162us/step - loss: 6.3824 - acc: 0.6852  
Epoch 4/20  
108/108 [=====] - 0s 150us/step - loss: 6.1326 - acc: 0.6944  
Epoch 5/20  
108/108 [=====] - 0s 177us/step - loss: 5.8998 - acc: 0.7130  
Epoch 6/20  
108/108 [=====] - 0s 153us/step - loss: 5.6753 - acc: 0.8611  
Epoch 7/20  
108/108 [=====] - 0s 181us/step - loss: 5.4578 - acc: 0.9352  
Epoch 8/20  
108/108 [=====] - 0s 148us/step - loss: 5.2488 - acc: 0.9259  
Epoch 9/20  
108/108 [=====] - 0s 144us/step - loss: 5.0483 - acc: 0.9167  
Epoch 10/20  
108/108 [=====] - 0s 160us/step - loss: 4.8574 - acc: 0.8519  
Epoch 11/20  
108/108 [=====] - 0s 168us/step - loss: 4.6759 - acc: 0.8056  
Epoch 12/20  
108/108 [=====] - 0s 139us/step - loss: 4.4999 - acc: 0.8148  
Epoch 13/20  
108/108 [=====] - 0s 145us/step - loss: 4.3316 - acc: 0.8889  
Epoch 14/20  
108/108 [=====] - 0s 147us/step - loss: 4.1698 - acc: 0.9352  
Epoch 15/20  
108/108 [=====] - 0s 142us/step - loss: 4.0165 - acc: 0.9444  
Epoch 16/20  
108/108 [=====] - 0s 149us/step - loss: 3.8676 - acc: 0.9630  
Epoch 17/20  
108/108 [=====] - 0s 153us/step - loss: 3.7280 - acc: 0.9352  
Epoch 18/20  
108/108 [=====] - 0s 144us/step - loss: 3.5956 - acc: 0.8796  
Epoch 19/20  
108/108 [=====] - 0s 149us/step - loss: 3.4685 - acc: 0.8704  
Epoch 20/20  
108/108 [=====] - 0s 150us/step - loss: 3.3452 - acc: 0.8611  
27/27 [=====] - 3s 105ms/step  
108/108 [=====] - 0s 130us/step  
Epoch 1/20  
108/108 [=====] - 7s 66ms/step - loss: 6.8146 - acc: 0.0000e+00  
Epoch 2/20  
108/108 [=====] - 0s 150us/step - loss: 6.5172 - acc: 0.3241  
Epoch 3/20  
108/108 [=====] - 0s 143us/step - loss: 6.2483 - acc: 0.6019  
Epoch 4/20  
108/108 [=====] - 0s 163us/step - loss: 5.9906 - acc: 0.4537  
Epoch 5/20  
108/108 [=====] - 0s 176us/step - loss: 5.7530 - acc: 0.3611

Epoch 6/20  
108/108 [=====] - 0s 178us/step - loss: 5.5251 - acc: 0.6574  
Epoch 7/20  
108/108 [=====] - 0s 155us/step - loss: 5.3100 - acc: 0.6667  
Epoch 8/20  
108/108 [=====] - 0s 146us/step - loss: 5.1032 - acc: 0.6667  
Epoch 9/20  
108/108 [=====] - 0s 154us/step - loss: 4.9077 - acc: 0.6667  
Epoch 10/20  
108/108 [=====] - 0s 166us/step - loss: 4.7212 - acc: 0.6759  
Epoch 11/20  
108/108 [=====] - 0s 149us/step - loss: 4.5401 - acc: 0.6759  
Epoch 12/20  
108/108 [=====] - 0s 149us/step - loss: 4.3674 - acc: 0.6667  
Epoch 13/20  
108/108 [=====] - 0s 151us/step - loss: 4.2028 - acc: 0.6667  
Epoch 14/20  
108/108 [=====] - 0s 162us/step - loss: 4.0508 - acc: 0.6667  
Epoch 15/20  
108/108 [=====] - 0s 153us/step - loss: 3.9074 - acc: 0.6667  
Epoch 16/20  
108/108 [=====] - 0s 154us/step - loss: 3.7647 - acc: 0.6667  
Epoch 17/20  
108/108 [=====] - 0s 150us/step - loss: 3.6254 - acc: 0.6667  
Epoch 18/20  
108/108 [=====] - 0s 169us/step - loss: 3.4911 - acc: 0.6759  
Epoch 19/20  
108/108 [=====] - 0s 154us/step - loss: 3.3660 - acc: 0.7315  
Epoch 20/20  
108/108 [=====] - 0s 149us/step - loss: 3.2459 - acc: 0.7500  
27/27 [=====] - 3s 110ms/step  
108/108 [=====] - 0s 132us/step  
Epoch 1/20  
108/108 [=====] - 7s 67ms/step - loss: 6.8086 - acc: 0.3148  
Epoch 2/20  
108/108 [=====] - 0s 168us/step - loss: 6.5499 - acc: 0.3333  
Epoch 3/20  
108/108 [=====] - 0s 159us/step - loss: 6.3171 - acc: 0.5185  
Epoch 4/20  
108/108 [=====] - 0s 157us/step - loss: 6.0862 - acc: 0.6852  
Epoch 5/20  
108/108 [=====] - 0s 150us/step - loss: 5.8568 - acc: 0.7222  
Epoch 6/20  
108/108 [=====] - 0s 146us/step - loss: 5.6399 - acc: 0.6667  
Epoch 7/20  
108/108 [=====] - 0s 149us/step - loss: 5.4343 - acc: 0.6667  
Epoch 8/20  
108/108 [=====] - 0s 175us/step - loss: 5.2335 - acc: 0.6667

Epoch 9/20  
108/108 [=====] - 0s 148us/step - loss: 5.0366 - acc: 0.6667  
Epoch 10/20  
108/108 [=====] - 0s 147us/step - loss: 4.8471 - acc: 0.6667  
Epoch 11/20  
108/108 [=====] - 0s 146us/step - loss: 4.6667 - acc: 0.6667  
Epoch 12/20  
108/108 [=====] - 0s 171us/step - loss: 4.4958 - acc: 0.6667  
Epoch 13/20  
108/108 [=====] - 0s 157us/step - loss: 4.3307 - acc: 0.6667  
Epoch 14/20  
108/108 [=====] - 0s 148us/step - loss: 4.1699 - acc: 0.6667  
Epoch 15/20  
108/108 [=====] - 0s 168us/step - loss: 4.0160 - acc: 0.6667  
Epoch 16/20  
108/108 [=====] - 0s 153us/step - loss: 3.8706 - acc: 0.8426  
Epoch 17/20  
108/108 [=====] - 0s 152us/step - loss: 3.7452 - acc: 0.6944  
Epoch 18/20  
108/108 [=====] - 0s 203us/step - loss: 3.6188 - acc: 0.6852  
Epoch 19/20  
108/108 [=====] - 0s 213us/step - loss: 3.4875 - acc: 0.6852  
Epoch 20/20  
108/108 [=====] - 0s 179us/step - loss: 3.3549 - acc: 0.7130  
27/27 [=====] - 3s 108ms/step  
108/108 [=====] - 0s 133us/step  
Epoch 1/20  
108/108 [=====] - 7s 62ms/step - loss: 58.6886 - acc: 0.3148  
Epoch 2/20  
108/108 [=====] - 0s 143us/step - loss: 56.4479 - acc: 0.3148  
Epoch 3/20  
108/108 [=====] - 0s 180us/step - loss: 54.0796 - acc: 0.3148  
Epoch 4/20  
108/108 [=====] - 0s 148us/step - loss: 51.7413 - acc: 0.3148  
Epoch 5/20  
108/108 [=====] - 0s 165us/step - loss: 49.4686 - acc: 0.3981  
Epoch 6/20  
108/108 [=====] - 0s 152us/step - loss: 47.2725 - acc: 0.3889  
Epoch 7/20  
108/108 [=====] - 0s 144us/step - loss: 45.1623 - acc: 0.3426  
Epoch 8/20  
108/108 [=====] - 0s 162us/step - loss: 43.1291 - acc: 0.3426  
Epoch 9/20  
108/108 [=====] - 0s 165us/step - loss: 41.1755 - acc: 0.3519  
Epoch 10/20  
108/108 [=====] - 0s 184us/step - loss: 39.3015 - acc: 0.4815  
Epoch 11/20  
108/108 [=====] - 0s 197us/step - loss: 37.5058 - acc: 0.6111

Epoch 12/20  
108/108 [=====] - 0s 152us/step - loss: 35.7866 - acc: 0.6667  
Epoch 13/20  
108/108 [=====] - 0s 164us/step - loss: 34.1435 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 157us/step - loss: 32.5728 - acc: 0.6852  
Epoch 15/20  
108/108 [=====] - 0s 166us/step - loss: 31.0730 - acc: 0.6852  
Epoch 16/20  
108/108 [=====] - 0s 153us/step - loss: 29.6425 - acc: 0.6944  
Epoch 17/20  
108/108 [=====] - 0s 194us/step - loss: 28.2776 - acc: 0.6944  
Epoch 18/20  
108/108 [=====] - 0s 197us/step - loss: 26.9757 - acc: 0.6944  
Epoch 19/20  
108/108 [=====] - 0s 158us/step - loss: 25.7326 - acc: 0.6944  
Epoch 20/20  
108/108 [=====] - 0s 151us/step - loss: 24.5469 - acc: 0.6852  
27/27 [=====] - 3s 112ms/step  
108/108 [=====] - 0s 126us/step  
Epoch 1/20  
108/108 [=====] - 6s 57ms/step - loss: 57.9272 - acc: 0.3148  
Epoch 2/20  
108/108 [=====] - 0s 168us/step - loss: 55.7516 - acc: 0.3056  
Epoch 3/20  
108/108 [=====] - 0s 163us/step - loss: 53.4481 - acc: 0.2037  
Epoch 4/20  
108/108 [=====] - 0s 145us/step - loss: 51.1672 - acc: 0.3333  
Epoch 5/20  
108/108 [=====] - 0s 146us/step - loss: 48.9522 - acc: 0.3333  
Epoch 6/20  
108/108 [=====] - 0s 162us/step - loss: 46.8067 - acc: 0.3333  
Epoch 7/20  
108/108 [=====] - 0s 168us/step - loss: 44.7383 - acc: 0.3333  
Epoch 8/20  
108/108 [=====] - 0s 152us/step - loss: 42.7497 - acc: 0.3333  
Epoch 9/20  
108/108 [=====] - 0s 145us/step - loss: 40.8390 - acc: 0.3333  
Epoch 10/20  
108/108 [=====] - 0s 184us/step - loss: 39.0066 - acc: 0.3889  
Epoch 11/20  
108/108 [=====] - 0s 213us/step - loss: 37.2510 - acc: 0.5926  
Epoch 12/20  
108/108 [=====] - 0s 177us/step - loss: 35.5735 - acc: 0.6852  
Epoch 13/20  
108/108 [=====] - 0s 185us/step - loss: 33.9714 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 141us/step - loss: 32.4412 - acc: 0.6852

Epoch 15/20  
108/108 [=====] - 0s 170us/step - loss: 30.9760 - acc: 0.6852  
Epoch 16/20  
108/108 [=====] - 0s 150us/step - loss: 29.5786 - acc: 0.6852  
Epoch 17/20  
108/108 [=====] - 0s 154us/step - loss: 28.2429 - acc: 0.6852  
Epoch 18/20  
108/108 [=====] - 0s 169us/step - loss: 26.9716 - acc: 0.6852  
Epoch 19/20  
108/108 [=====] - 0s 189us/step - loss: 25.7573 - acc: 0.6852  
Epoch 20/20  
108/108 [=====] - 0s 148us/step - loss: 24.5984 - acc: 0.6852  
27/27 [=====] - 3s 101ms/step  
108/108 [=====] - 0s 116us/step  
Epoch 1/20  
108/108 [=====] - 6s 58ms/step - loss: 59.4723 - acc: 0.3148  
Epoch 2/20  
108/108 [=====] - 0s 166us/step - loss: 57.2221 - acc: 0.3148  
Epoch 3/20  
108/108 [=====] - 0s 160us/step - loss: 54.8691 - acc: 0.3148  
Epoch 4/20  
108/108 [=====] - 0s 173us/step - loss: 52.5682 - acc: 0.4444  
Epoch 5/20  
108/108 [=====] - 0s 160us/step - loss: 50.3187 - acc: 0.4537  
Epoch 6/20  
108/108 [=====] - 0s 155us/step - loss: 48.1383 - acc: 0.5093  
Epoch 7/20  
108/108 [=====] - 0s 179us/step - loss: 46.0277 - acc: 0.6111  
Epoch 8/20  
108/108 [=====] - 0s 203us/step - loss: 43.9963 - acc: 0.6759  
Epoch 9/20  
108/108 [=====] - 0s 188us/step - loss: 42.0436 - acc: 0.6944  
Epoch 10/20  
108/108 [=====] - 0s 174us/step - loss: 40.1710 - acc: 0.8148  
Epoch 11/20  
108/108 [=====] - 0s 161us/step - loss: 38.3760 - acc: 0.8981  
Epoch 12/20  
108/108 [=====] - 0s 153us/step - loss: 36.6602 - acc: 0.6852  
Epoch 13/20  
108/108 [=====] - 0s 143us/step - loss: 35.0194 - acc: 0.6296  
Epoch 14/20  
108/108 [=====] - 0s 144us/step - loss: 33.4494 - acc: 0.6296  
Epoch 15/20  
108/108 [=====] - 0s 143us/step - loss: 31.9479 - acc: 0.6296  
Epoch 16/20  
108/108 [=====] - 0s 192us/step - loss: 30.5132 - acc: 0.7315  
Epoch 17/20  
108/108 [=====] - 0s 166us/step - loss: 29.1424 - acc: 0.8704



Epoch 18/20  
108/108 [=====] - 0s 143us/step - loss: 27.8344 - acc: 0.8796  
Epoch 19/20  
108/108 [=====] - 0s 150us/step - loss: 26.5845 - acc: 0.8796  
Epoch 20/20  
108/108 [=====] - 0s 146us/step - loss: 25.3914 - acc: 0.8704  
27/27 [=====] - 3s 100ms/step  
108/108 [=====] - 0s 126us/step  
Epoch 1/20  
108/108 [=====] - 6s 59ms/step - loss: 59.8244 - acc: 0.1574  
Epoch 2/20  
108/108 [=====] - 0s 148us/step - loss: 57.4837 - acc: 0.0000e+00  
Epoch 3/20  
108/108 [=====] - 0s 146us/step - loss: 55.0493 - acc: 0.0000e+00  
Epoch 4/20  
108/108 [=====] - 0s 157us/step - loss: 52.6886 - acc: 0.1481  
Epoch 5/20  
108/108 [=====] - 0s 198us/step - loss: 50.4176 - acc: 0.3333  
Epoch 6/20  
108/108 [=====] - 0s 190us/step - loss: 48.2216 - acc: 0.3333  
Epoch 7/20  
108/108 [=====] - 0s 195us/step - loss: 46.1012 - acc: 0.3519  
Epoch 8/20  
108/108 [=====] - 0s 165us/step - loss: 44.0588 - acc: 0.3611  
Epoch 9/20  
108/108 [=====] - 0s 170us/step - loss: 42.0942 - acc: 0.3611  
Epoch 10/20  
108/108 [=====] - 0s 154us/step - loss: 40.2102 - acc: 0.3611  
Epoch 11/20  
108/108 [=====] - 0s 179us/step - loss: 38.4053 - acc: 0.3611  
Epoch 12/20  
108/108 [=====] - 0s 189us/step - loss: 36.6783 - acc: 0.3611  
Epoch 13/20  
108/108 [=====] - 0s 187us/step - loss: 35.0277 - acc: 0.3611  
Epoch 14/20  
108/108 [=====] - 0s 211us/step - loss: 33.4520 - acc: 0.3611  
Epoch 15/20  
108/108 [=====] - 0s 181us/step - loss: 31.9434 - acc: 0.3611  
Epoch 16/20  
108/108 [=====] - 0s 191us/step - loss: 30.5042 - acc: 0.3611  
Epoch 17/20  
108/108 [=====] - 0s 152us/step - loss: 29.1295 - acc: 0.3611  
Epoch 18/20  
108/108 [=====] - 0s 171us/step - loss: 27.8173 - acc: 0.5833  
Epoch 19/20  
108/108 [=====] - 0s 168us/step - loss: 26.5624 - acc: 0.6574  
Epoch 20/20  
108/108 [=====] - 0s 148us/step - loss: 25.3670 - acc: 0.6667

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27/27 [=====] - 3s 102ms/step
108/108 [=====] - 0s 119us/step
Epoch 1/20
108/108 [=====] - 6s 59ms/step - loss: 59.4229 - acc: 0.3241
Epoch 2/20
108/108 [=====] - 0s 137us/step - loss: 57.2067 - acc: 0.3981
Epoch 3/20
108/108 [=====] - 0s 139us/step - loss: 54.8447 - acc: 0.3148
Epoch 4/20
108/108 [=====] - 0s 152us/step - loss: 52.5012 - acc: 0.3148
Epoch 5/20
108/108 [=====] - 0s 143us/step - loss: 50.2130 - acc: 0.3241
Epoch 6/20
108/108 [=====] - 0s 147us/step - loss: 47.9930 - acc: 0.3519
Epoch 7/20
108/108 [=====] - 0s 143us/step - loss: 45.8513 - acc: 0.5463
Epoch 8/20
108/108 [=====] - 0s 143us/step - loss: 43.7928 - acc: 0.6667
Epoch 9/20
108/108 [=====] - 0s 140us/step - loss: 41.8167 - acc: 0.6667
Epoch 10/20
108/108 [=====] - 0s 163us/step - loss: 39.9264 - acc: 0.7963
Epoch 11/20
108/108 [=====] - 0s 143us/step - loss: 38.1160 - acc: 0.8981
Epoch 12/20
108/108 [=====] - 0s 156us/step - loss: 36.3855 - acc: 0.8519
Epoch 13/20
108/108 [=====] - 0s 183us/step - loss: 34.7273 - acc: 0.8148
Epoch 14/20
108/108 [=====] - 0s 174us/step - loss: 33.1391 - acc: 0.9074
Epoch 15/20
108/108 [=====] - 0s 168us/step - loss: 31.6200 - acc: 0.8519
Epoch 16/20
108/108 [=====] - 0s 136us/step - loss: 30.1690 - acc: 0.6667
Epoch 17/20
108/108 [=====] - 0s 141us/step - loss: 28.7849 - acc: 0.6667
Epoch 18/20
108/108 [=====] - 0s 153us/step - loss: 27.4610 - acc: 0.6667
Epoch 19/20
108/108 [=====] - 0s 149us/step - loss: 26.1972 - acc: 0.6667
Epoch 20/20
108/108 [=====] - 0s 160us/step - loss: 24.9926 - acc: 0.7407
27/27 [=====] - 3s 103ms/step
108/108 [=====] - 0s 104us/step
Epoch 1/20
108/108 [=====] - 6s 60ms/step - loss: 1.6613 - acc: 0.5463
Epoch 2/20
108/108 [=====] - 0s 148us/step - loss: 1.5248 - acc: 0.6944

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Epoch 3/20  
108/108 [=====] - 0s 160us/step - loss: 1.4373 - acc: 0.7407  
Epoch 4/20  
108/108 [=====] - 0s 148us/step - loss: 1.3577 - acc: 0.9074  
Epoch 5/20  
108/108 [=====] - 0s 141us/step - loss: 1.2873 - acc: 0.9722  
Epoch 6/20  
108/108 [=====] - 0s 154us/step - loss: 1.2142 - acc: 0.8148  
Epoch 7/20  
108/108 [=====] - 0s 141us/step - loss: 1.1566 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 150us/step - loss: 1.1153 - acc: 0.6852  
Epoch 9/20  
108/108 [=====] - 0s 167us/step - loss: 1.0559 - acc: 0.7037  
Epoch 10/20  
108/108 [=====] - 0s 152us/step - loss: 0.9997 - acc: 0.9167  
Epoch 11/20  
108/108 [=====] - 0s 159us/step - loss: 0.9687 - acc: 0.9537  
Epoch 12/20  
108/108 [=====] - 0s 158us/step - loss: 0.9209 - acc: 0.9815  
Epoch 13/20  
108/108 [=====] - 0s 149us/step - loss: 0.8829 - acc: 0.8796  
Epoch 14/20  
108/108 [=====] - 0s 162us/step - loss: 0.8504 - acc: 0.9630  
Epoch 15/20  
108/108 [=====] - 0s 142us/step - loss: 0.8242 - acc: 0.9815  
Epoch 16/20  
108/108 [=====] - 0s 147us/step - loss: 0.7917 - acc: 0.9722  
Epoch 17/20  
108/108 [=====] - 0s 160us/step - loss: 0.7700 - acc: 0.8981  
Epoch 18/20  
108/108 [=====] - 0s 155us/step - loss: 0.7481 - acc: 0.9167  
Epoch 19/20  
108/108 [=====] - 0s 155us/step - loss: 0.7225 - acc: 0.9722  
Epoch 20/20  
108/108 [=====] - 0s 149us/step - loss: 0.7027 - acc: 0.9815  
27/27 [=====] - 3s 110ms/step  
108/108 [=====] - 0s 129us/step  
Epoch 1/20  
108/108 [=====] - 7s 61ms/step - loss: 1.7729 - acc: 0.3333  
Epoch 2/20  
108/108 [=====] - 0s 191us/step - loss: 1.6310 - acc: 0.3333  
Epoch 3/20  
108/108 [=====] - 0s 165us/step - loss: 1.5050 - acc: 0.5463  
Epoch 4/20  
108/108 [=====] - 0s 216us/step - loss: 1.4204 - acc: 0.6852  
Epoch 5/20  
108/108 [=====] - 0s 189us/step - loss: 1.3484 - acc: 0.6852

Epoch 6/20  
108/108 [=====] - 0s 161us/step - loss: 1.2844 - acc: 0.6852  
Epoch 7/20  
108/108 [=====] - 0s 155us/step - loss: 1.2183 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 163us/step - loss: 1.1533 - acc: 0.6852  
Epoch 9/20  
108/108 [=====] - 0s 162us/step - loss: 1.0921 - acc: 0.6852  
Epoch 10/20  
108/108 [=====] - 0s 169us/step - loss: 1.0379 - acc: 0.6852  
Epoch 11/20  
108/108 [=====] - 0s 156us/step - loss: 0.9920 - acc: 0.6852  
Epoch 12/20  
108/108 [=====] - 0s 159us/step - loss: 0.9431 - acc: 0.7037  
Epoch 13/20  
108/108 [=====] - 0s 167us/step - loss: 0.9024 - acc: 0.8426  
Epoch 14/20  
108/108 [=====] - 0s 169us/step - loss: 0.8700 - acc: 0.9352  
Epoch 15/20  
108/108 [=====] - 0s 145us/step - loss: 0.8347 - acc: 0.9074  
Epoch 16/20  
108/108 [=====] - 0s 165us/step - loss: 0.8091 - acc: 0.7407  
Epoch 17/20  
108/108 [=====] - 0s 156us/step - loss: 0.7849 - acc: 0.7037  
Epoch 18/20  
108/108 [=====] - 0s 155us/step - loss: 0.7579 - acc: 0.7222  
Epoch 19/20  
108/108 [=====] - 0s 157us/step - loss: 0.7300 - acc: 0.8241  
Epoch 20/20  
108/108 [=====] - 0s 165us/step - loss: 0.7075 - acc: 0.9074  
27/27 [=====] - 3s 106ms/step  
108/108 [=====] - 0s 111us/step  
Epoch 1/20  
108/108 [=====] - 7s 60ms/step - loss: 1.8628 - acc: 0.3056  
Epoch 2/20  
108/108 [=====] - 0s 158us/step - loss: 1.6979 - acc: 0.3889  
Epoch 3/20  
108/108 [=====] - 0s 158us/step - loss: 1.5710 - acc: 0.6852  
Epoch 4/20  
108/108 [=====] - 0s 145us/step - loss: 1.4497 - acc: 0.6852  
Epoch 5/20  
108/108 [=====] - 0s 152us/step - loss: 1.3441 - acc: 0.8796  
Epoch 6/20  
108/108 [=====] - 0s 165us/step - loss: 1.2647 - acc: 0.7500  
Epoch 7/20  
108/108 [=====] - 0s 187us/step - loss: 1.1916 - acc: 0.7315  
Epoch 8/20  
108/108 [=====] - 0s 181us/step - loss: 1.1345 - acc: 0.6574

Epoch 9/20  
108/108 [=====] - 0s 193us/step - loss: 1.0738 - acc: 0.8519  
Epoch 10/20  
108/108 [=====] - 0s 198us/step - loss: 1.0231 - acc: 0.8889  
Epoch 11/20  
108/108 [=====] - 0s 228us/step - loss: 0.9838 - acc: 0.8056  
Epoch 12/20  
108/108 [=====] - 0s 199us/step - loss: 0.9447 - acc: 0.8333  
Epoch 13/20  
108/108 [=====] - 0s 197us/step - loss: 0.9039 - acc: 0.9352  
Epoch 14/20  
108/108 [=====] - 0s 196us/step - loss: 0.8688 - acc: 0.9630  
Epoch 15/20  
108/108 [=====] - 0s 221us/step - loss: 0.8392 - acc: 0.9722  
Epoch 16/20  
108/108 [=====] - 0s 217us/step - loss: 0.8107 - acc: 0.9722  
Epoch 17/20  
108/108 [=====] - 0s 214us/step - loss: 0.7895 - acc: 0.9352  
Epoch 18/20  
108/108 [=====] - 0s 159us/step - loss: 0.7616 - acc: 0.9630  
Epoch 19/20  
108/108 [=====] - 0s 154us/step - loss: 0.7385 - acc: 0.9167  
Epoch 20/20  
108/108 [=====] - 0s 183us/step - loss: 0.7168 - acc: 0.9630  
27/27 [=====] - 3s 106ms/step  
108/108 [=====] - 0s 107us/step  
Epoch 1/20  
108/108 [=====] - 7s 62ms/step - loss: 1.8664 - acc: 0.1296  
Epoch 2/20  
108/108 [=====] - 0s 171us/step - loss: 1.6013 - acc: 0.5278  
Epoch 3/20  
108/108 [=====] - 0s 159us/step - loss: 1.5091 - acc: 0.3611  
Epoch 4/20  
108/108 [=====] - 0s 165us/step - loss: 1.4513 - acc: 0.3704  
Epoch 5/20  
108/108 [=====] - 0s 163us/step - loss: 1.3718 - acc: 0.5093  
Epoch 6/20  
108/108 [=====] - 0s 210us/step - loss: 1.2816 - acc: 0.6667  
Epoch 7/20  
108/108 [=====] - 0s 164us/step - loss: 1.2063 - acc: 0.9630  
Epoch 8/20  
108/108 [=====] - 0s 151us/step - loss: 1.1461 - acc: 0.9259  
Epoch 9/20  
108/108 [=====] - 0s 177us/step - loss: 1.0869 - acc: 0.9630  
Epoch 10/20  
108/108 [=====] - 0s 150us/step - loss: 1.0382 - acc: 0.7870  
Epoch 11/20  
108/108 [=====] - 0s 142us/step - loss: 1.0058 - acc: 0.6944

Epoch 12/20  
108/108 [=====] - 0s 205us/step - loss: 0.9601 - acc: 0.7685  
Epoch 13/20  
108/108 [=====] - 0s 170us/step - loss: 0.9129 - acc: 0.8426  
Epoch 14/20  
108/108 [=====] - 0s 159us/step - loss: 0.8800 - acc: 0.8796  
Epoch 15/20  
108/108 [=====] - 0s 145us/step - loss: 0.8459 - acc: 0.9352  
Epoch 16/20  
108/108 [=====] - 0s 158us/step - loss: 0.8157 - acc: 0.9630  
Epoch 17/20  
108/108 [=====] - 0s 221us/step - loss: 0.7952 - acc: 0.9537  
Epoch 18/20  
108/108 [=====] - 0s 208us/step - loss: 0.7714 - acc: 0.9630  
Epoch 19/20  
108/108 [=====] - 0s 247us/step - loss: 0.7431 - acc: 0.9444  
Epoch 20/20  
108/108 [=====] - 0s 217us/step - loss: 0.7215 - acc: 0.9352  
27/27 [=====] - 3s 113ms/step  
108/108 [=====] - 0s 111us/step  
Epoch 1/20  
108/108 [=====] - 7s 64ms/step - loss: 1.7004 - acc: 0.6667  
Epoch 2/20  
108/108 [=====] - 0s 192us/step - loss: 1.5576 - acc: 0.7315  
Epoch 3/20  
108/108 [=====] - 0s 148us/step - loss: 1.4420 - acc: 0.9259  
Epoch 4/20  
108/108 [=====] - 0s 161us/step - loss: 1.3346 - acc: 0.9537  
Epoch 5/20  
108/108 [=====] - 0s 164us/step - loss: 1.2468 - acc: 0.7407  
Epoch 6/20  
108/108 [=====] - 0s 164us/step - loss: 1.1833 - acc: 0.6667  
Epoch 7/20  
108/108 [=====] - 0s 155us/step - loss: 1.1183 - acc: 0.6667  
Epoch 8/20  
108/108 [=====] - 0s 152us/step - loss: 1.0546 - acc: 0.7685  
Epoch 9/20  
108/108 [=====] - 0s 170us/step - loss: 1.0072 - acc: 0.9259  
Epoch 10/20  
108/108 [=====] - 0s 156us/step - loss: 0.9621 - acc: 0.9537  
Epoch 11/20  
108/108 [=====] - 0s 152us/step - loss: 0.9164 - acc: 0.9537  
Epoch 12/20  
108/108 [=====] - 0s 159us/step - loss: 0.8892 - acc: 0.8148  
Epoch 13/20  
108/108 [=====] - 0s 159us/step - loss: 0.8638 - acc: 0.7685  
Epoch 14/20  
108/108 [=====] - 0s 149us/step - loss: 0.8342 - acc: 0.7870

Epoch 15/20  
108/108 [=====] - 0s 163us/step - loss: 0.8026 - acc: 0.8148  
Epoch 16/20  
108/108 [=====] - 0s 151us/step - loss: 0.7744 - acc: 0.8981  
Epoch 17/20  
108/108 [=====] - 0s 155us/step - loss: 0.7487 - acc: 0.9630  
Epoch 18/20  
108/108 [=====] - 0s 159us/step - loss: 0.7337 - acc: 0.9167  
Epoch 19/20  
108/108 [=====] - 0s 194us/step - loss: 0.7152 - acc: 0.9352  
Epoch 20/20  
108/108 [=====] - 0s 243us/step - loss: 0.6864 - acc: 0.9630  
27/27 [=====] - 3s 110ms/step  
108/108 [=====] - 0s 103us/step  
Epoch 1/20  
108/108 [=====] - 7s 61ms/step - loss: 7.5668 - acc: 0.3426  
Epoch 2/20  
108/108 [=====] - 0s 201us/step - loss: 7.0824 - acc: 0.6574  
Epoch 3/20  
108/108 [=====] - 0s 162us/step - loss: 6.7274 - acc: 0.5278  
Epoch 4/20  
108/108 [=====] - 0s 149us/step - loss: 6.4286 - acc: 0.3426  
Epoch 5/20  
108/108 [=====] - 0s 159us/step - loss: 6.1049 - acc: 0.5556  
Epoch 6/20  
108/108 [=====] - 0s 148us/step - loss: 5.7782 - acc: 0.6852  
Epoch 7/20  
108/108 [=====] - 0s 145us/step - loss: 5.4870 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 179us/step - loss: 5.2277 - acc: 0.8704  
Epoch 9/20  
108/108 [=====] - 0s 164us/step - loss: 4.9827 - acc: 0.6574  
Epoch 10/20  
108/108 [=====] - 0s 164us/step - loss: 4.7467 - acc: 0.6574  
Epoch 11/20  
108/108 [=====] - 0s 164us/step - loss: 4.5036 - acc: 0.7685  
Epoch 12/20  
108/108 [=====] - 0s 158us/step - loss: 4.2708 - acc: 0.7130  
Epoch 13/20  
108/108 [=====] - 0s 172us/step - loss: 4.0733 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 161us/step - loss: 3.8873 - acc: 0.6852  
Epoch 15/20  
108/108 [=====] - 0s 149us/step - loss: 3.7007 - acc: 0.6852  
Epoch 16/20  
108/108 [=====] - 0s 164us/step - loss: 3.5232 - acc: 0.6852  
Epoch 17/20  
108/108 [=====] - 0s 144us/step - loss: 3.3590 - acc: 0.6852

Epoch 18/20  
108/108 [=====] - 0s 153us/step - loss: 3.2042 - acc: 0.6944  
Epoch 19/20  
108/108 [=====] - 0s 161us/step - loss: 3.0595 - acc: 0.7593  
Epoch 20/20  
108/108 [=====] - 0s 160us/step - loss: 2.9229 - acc: 0.7593  
27/27 [=====] - 3s 110ms/step  
108/108 [=====] - 0s 144us/step  
Epoch 1/20  
108/108 [=====] - 7s 63ms/step - loss: 7.5500 - acc: 0.3333  
Epoch 2/20  
108/108 [=====] - 0s 154us/step - loss: 7.2142 - acc: 0.3333  
Epoch 3/20  
108/108 [=====] - 0s 163us/step - loss: 6.8695 - acc: 0.3333  
Epoch 4/20  
108/108 [=====] - 0s 142us/step - loss: 6.5333 - acc: 0.3333  
Epoch 5/20  
108/108 [=====] - 0s 146us/step - loss: 6.2060 - acc: 0.4444  
Epoch 6/20  
108/108 [=====] - 0s 158us/step - loss: 5.8957 - acc: 0.6574  
Epoch 7/20  
108/108 [=====] - 0s 225us/step - loss: 5.5968 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 161us/step - loss: 5.3124 - acc: 0.6852  
Epoch 9/20  
108/108 [=====] - 0s 158us/step - loss: 5.0412 - acc: 0.6852  
Epoch 10/20  
108/108 [=====] - 0s 149us/step - loss: 4.7898 - acc: 0.6852  
Epoch 11/20  
108/108 [=====] - 0s 152us/step - loss: 4.5483 - acc: 0.6852  
Epoch 12/20  
108/108 [=====] - 0s 167us/step - loss: 4.3192 - acc: 0.6852  
Epoch 13/20  
108/108 [=====] - 0s 185us/step - loss: 4.1041 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 150us/step - loss: 3.9008 - acc: 0.6852  
Epoch 15/20  
108/108 [=====] - 0s 150us/step - loss: 3.7083 - acc: 0.6852  
Epoch 16/20  
108/108 [=====] - 0s 152us/step - loss: 3.5261 - acc: 0.6944  
Epoch 17/20  
108/108 [=====] - 0s 147us/step - loss: 3.3557 - acc: 0.7778  
Epoch 18/20  
108/108 [=====] - 0s 142us/step - loss: 3.1942 - acc: 0.8704  
Epoch 19/20  
108/108 [=====] - 0s 178us/step - loss: 3.0394 - acc: 0.8056  
Epoch 20/20  
108/108 [=====] - 0s 216us/step - loss: 2.8951 - acc: 0.7037



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27/27 [=====] - 3s 117ms/step
108/108 [=====] - 0s 161us/step
Epoch 1/20
108/108 [=====] - 7s 64ms/step - loss: 8.1055 - acc: 0.3148
Epoch 2/20
108/108 [=====] - 0s 246us/step - loss: 7.3624 - acc: 0.3241
Epoch 3/20
108/108 [=====] - 0s 225us/step - loss: 6.9278 - acc: 0.5926
Epoch 4/20
108/108 [=====] - 0s 307us/step - loss: 6.6179 - acc: 0.3704
Epoch 5/20
108/108 [=====] - 0s 187us/step - loss: 6.3339 - acc: 0.3704
Epoch 6/20
108/108 [=====] - 0s 194us/step - loss: 6.0311 - acc: 0.3704
Epoch 7/20
108/108 [=====] - 0s 175us/step - loss: 5.7131 - acc: 0.6667
Epoch 8/20
108/108 [=====] - 0s 262us/step - loss: 5.4191 - acc: 0.8704
Epoch 9/20
108/108 [=====] - 0s 251us/step - loss: 5.1598 - acc: 0.6667
Epoch 10/20
108/108 [=====] - 0s 199us/step - loss: 4.9267 - acc: 0.6574
Epoch 11/20
108/108 [=====] - 0s 174us/step - loss: 4.6998 - acc: 0.8056
Epoch 12/20
108/108 [=====] - 0s 210us/step - loss: 4.4856 - acc: 0.9630
Epoch 13/20
108/108 [=====] - 0s 172us/step - loss: 4.2811 - acc: 0.9630
Epoch 14/20
108/108 [=====] - 0s 175us/step - loss: 4.0872 - acc: 0.9074
Epoch 15/20
108/108 [=====] - 0s 157us/step - loss: 3.9091 - acc: 0.8241
Epoch 16/20
108/108 [=====] - 0s 183us/step - loss: 3.7407 - acc: 0.8704
Epoch 17/20
108/108 [=====] - 0s 196us/step - loss: 3.5726 - acc: 0.9444
Epoch 18/20
108/108 [=====] - 0s 195us/step - loss: 3.4155 - acc: 0.9630
Epoch 19/20
108/108 [=====] - 0s 150us/step - loss: 3.2735 - acc: 0.8519
Epoch 20/20
108/108 [=====] - 0s 160us/step - loss: 3.1373 - acc: 0.8426
27/27 [=====] - 3s 112ms/step
108/108 [=====] - 0s 115us/step
Epoch 1/20
108/108 [=====] - 7s 64ms/step - loss: 7.4810 - acc: 0.3611
Epoch 2/20
108/108 [=====] - 0s 163us/step - loss: 7.1207 - acc: 0.3241

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Epoch 3/20  
108/108 [=====] - 0s 168us/step - loss: 6.7857 - acc: 0.3611  
Epoch 4/20  
108/108 [=====] - 0s 159us/step - loss: 6.4516 - acc: 0.3611  
Epoch 5/20  
108/108 [=====] - 0s 163us/step - loss: 6.1192 - acc: 0.3704  
Epoch 6/20  
108/108 [=====] - 0s 200us/step - loss: 5.8173 - acc: 0.6111  
Epoch 7/20  
108/108 [=====] - 0s 192us/step - loss: 5.5423 - acc: 0.6389  
Epoch 8/20  
108/108 [=====] - 0s 165us/step - loss: 5.2602 - acc: 0.6944  
Epoch 9/20  
108/108 [=====] - 0s 162us/step - loss: 5.0016 - acc: 0.6667  
Epoch 10/20  
108/108 [=====] - 0s 157us/step - loss: 4.7723 - acc: 0.6667  
Epoch 11/20  
108/108 [=====] - 0s 174us/step - loss: 4.5605 - acc: 0.6667  
Epoch 12/20  
108/108 [=====] - 0s 174us/step - loss: 4.3380 - acc: 0.6667  
Epoch 13/20  
108/108 [=====] - 0s 166us/step - loss: 4.1142 - acc: 0.6667  
Epoch 14/20  
108/108 [=====] - 0s 157us/step - loss: 3.9087 - acc: 0.6667  
Epoch 15/20  
108/108 [=====] - 0s 159us/step - loss: 3.7328 - acc: 0.8519  
Epoch 16/20  
108/108 [=====] - 0s 150us/step - loss: 3.5681 - acc: 0.8426  
Epoch 17/20  
108/108 [=====] - 0s 185us/step - loss: 3.3993 - acc: 0.9352  
Epoch 18/20  
108/108 [=====] - 0s 164us/step - loss: 3.2439 - acc: 0.6667  
Epoch 19/20  
108/108 [=====] - 0s 338us/step - loss: 3.1098 - acc: 0.6667  
Epoch 20/20  
108/108 [=====] - 0s 250us/step - loss: 2.9835 - acc: 0.6667  
27/27 [=====] - 3s 114ms/step  
108/108 [=====] - 0s 162us/step  
Epoch 1/20  
108/108 [=====] - 7s 64ms/step - loss: 7.4089 - acc: 0.3333  
Epoch 2/20  
108/108 [=====] - 0s 152us/step - loss: 7.0475 - acc: 0.4167  
Epoch 3/20  
108/108 [=====] - 0s 146us/step - loss: 6.6880 - acc: 0.7593  
Epoch 4/20  
108/108 [=====] - 0s 155us/step - loss: 6.3397 - acc: 0.6852  
Epoch 5/20  
108/108 [=====] - 0s 148us/step - loss: 6.0103 - acc: 0.6667

Epoch 6/20  
108/108 [=====] - 0s 143us/step - loss: 5.7054 - acc: 0.6667  
Epoch 7/20  
108/108 [=====] - 0s 147us/step - loss: 5.4035 - acc: 0.6667  
Epoch 8/20  
108/108 [=====] - 0s 148us/step - loss: 5.1217 - acc: 0.7870  
Epoch 9/20  
108/108 [=====] - 0s 151us/step - loss: 4.8629 - acc: 0.8889  
Epoch 10/20  
108/108 [=====] - 0s 179us/step - loss: 4.6262 - acc: 0.7130  
Epoch 11/20  
108/108 [=====] - 0s 151us/step - loss: 4.3947 - acc: 0.6852  
Epoch 12/20  
108/108 [=====] - 0s 145us/step - loss: 4.1643 - acc: 0.8704  
Epoch 13/20  
108/108 [=====] - 0s 147us/step - loss: 3.9540 - acc: 0.8426  
Epoch 14/20  
108/108 [=====] - 0s 163us/step - loss: 3.7663 - acc: 0.6944  
Epoch 15/20  
108/108 [=====] - 0s 171us/step - loss: 3.5830 - acc: 0.7130  
Epoch 16/20  
108/108 [=====] - 0s 167us/step - loss: 3.4069 - acc: 0.8426  
Epoch 17/20  
108/108 [=====] - 0s 175us/step - loss: 3.2468 - acc: 0.9167  
Epoch 18/20  
108/108 [=====] - 0s 169us/step - loss: 3.0942 - acc: 0.9352  
Epoch 19/20  
108/108 [=====] - 0s 168us/step - loss: 2.9510 - acc: 0.9352  
Epoch 20/20  
108/108 [=====] - 0s 164us/step - loss: 2.8165 - acc: 0.8704  
27/27 [=====] - 3s 112ms/step  
108/108 [=====] - 0s 128us/step  
Epoch 1/20  
108/108 [=====] - 7s 64ms/step - loss: 63.7963 - acc: 0.3426  
Epoch 2/20  
108/108 [=====] - 0s 146us/step - loss: 60.5970 - acc: 0.3426  
Epoch 3/20  
108/108 [=====] - 0s 144us/step - loss: 57.2454 - acc: 0.3426  
Epoch 4/20  
108/108 [=====] - 0s 145us/step - loss: 53.9717 - acc: 0.5648  
Epoch 5/20  
108/108 [=====] - 0s 146us/step - loss: 50.8251 - acc: 0.6111  
Epoch 6/20  
108/108 [=====] - 0s 145us/step - loss: 47.8171 - acc: 0.6296  
Epoch 7/20  
108/108 [=====] - 0s 145us/step - loss: 44.9514 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 137us/step - loss: 42.2333 - acc: 0.6852

Epoch 9/20  
108/108 [=====] - 0s 143us/step - loss: 39.6683 - acc: 0.6852  
Epoch 10/20  
108/108 [=====] - 0s 140us/step - loss: 37.2478 - acc: 0.6852  
Epoch 11/20  
108/108 [=====] - 0s 141us/step - loss: 34.9678 - acc: 0.6852  
Epoch 12/20  
108/108 [=====] - 0s 141us/step - loss: 32.8209 - acc: 0.6852  
Epoch 13/20  
108/108 [=====] - 0s 141us/step - loss: 30.8040 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 145us/step - loss: 28.9094 - acc: 0.6852  
Epoch 15/20  
108/108 [=====] - 0s 145us/step - loss: 27.1309 - acc: 0.6852  
Epoch 16/20  
108/108 [=====] - 0s 149us/step - loss: 25.4630 - acc: 0.6852  
Epoch 17/20  
108/108 [=====] - 0s 182us/step - loss: 23.8993 - acc: 0.6852  
Epoch 18/20  
108/108 [=====] - 0s 208us/step - loss: 22.4343 - acc: 0.6852  
Epoch 19/20  
108/108 [=====] - 0s 187us/step - loss: 21.0629 - acc: 0.6852  
Epoch 20/20  
108/108 [=====] - 0s 167us/step - loss: 19.7805 - acc: 0.6852  
27/27 [=====] - 3s 112ms/step  
108/108 [=====] - 0s 109us/step  
Epoch 1/20  
108/108 [=====] - 7s 67ms/step - loss: 64.6429 - acc: 0.2778  
Epoch 2/20  
108/108 [=====] - 0s 170us/step - loss: 61.3346 - acc: 0.2778  
Epoch 3/20  
108/108 [=====] - 0s 162us/step - loss: 57.9303 - acc: 0.3519  
Epoch 4/20  
108/108 [=====] - 0s 226us/step - loss: 54.6614 - acc: 0.3333  
Epoch 5/20  
108/108 [=====] - 0s 202us/step - loss: 51.5076 - acc: 0.3333  
Epoch 6/20  
108/108 [=====] - 0s 212us/step - loss: 48.4928 - acc: 0.3333  
Epoch 7/20  
108/108 [=====] - 0s 192us/step - loss: 45.6241 - acc: 0.3333  
Epoch 8/20  
108/108 [=====] - 0s 178us/step - loss: 42.9019 - acc: 0.3426  
Epoch 9/20  
108/108 [=====] - 0s 194us/step - loss: 40.3236 - acc: 0.6019  
Epoch 10/20  
108/108 [=====] - 0s 155us/step - loss: 37.8921 - acc: 0.7315  
Epoch 11/20  
108/108 [=====] - 0s 149us/step - loss: 35.5993 - acc: 0.8148

Epoch 12/20  
108/108 [=====] - 0s 154us/step - loss: 33.4373 - acc: 0.6944  
Epoch 13/20  
108/108 [=====] - 0s 143us/step - loss: 31.4030 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 148us/step - loss: 29.4936 - acc: 0.6852  
Epoch 15/20  
108/108 [=====] - 0s 171us/step - loss: 27.6978 - acc: 0.6852  
Epoch 16/20  
108/108 [=====] - 0s 147us/step - loss: 26.0138 - acc: 0.6852  
Epoch 17/20  
108/108 [=====] - 0s 155us/step - loss: 24.4338 - acc: 0.6852  
Epoch 18/20  
108/108 [=====] - 0s 187us/step - loss: 22.9525 - acc: 0.6852  
Epoch 19/20  
108/108 [=====] - 0s 162us/step - loss: 21.5636 - acc: 0.6852  
Epoch 20/20  
108/108 [=====] - 0s 172us/step - loss: 20.2625 - acc: 0.6852  
27/27 [=====] - 3s 117ms/step  
108/108 [=====] - 0s 120us/step  
Epoch 1/20  
108/108 [=====] - 7s 66ms/step - loss: 64.2083 - acc: 0.3704  
Epoch 2/20  
108/108 [=====] - 0s 199us/step - loss: 60.9992 - acc: 0.6574  
Epoch 3/20  
108/108 [=====] - 0s 209us/step - loss: 57.6306 - acc: 0.7870  
Epoch 4/20  
108/108 [=====] - 0s 211us/step - loss: 54.3284 - acc: 0.6296  
Epoch 5/20  
108/108 [=====] - 0s 220us/step - loss: 51.1503 - acc: 0.6296  
Epoch 6/20  
108/108 [=====] - 0s 225us/step - loss: 48.1122 - acc: 0.6296  
Epoch 7/20  
108/108 [=====] - 0s 182us/step - loss: 45.2202 - acc: 0.7037  
Epoch 8/20  
108/108 [=====] - 0s 196us/step - loss: 42.4808 - acc: 0.9630  
Epoch 9/20  
108/108 [=====] - 0s 183us/step - loss: 39.8926 - acc: 0.8426  
Epoch 10/20  
108/108 [=====] - 0s 189us/step - loss: 37.4516 - acc: 0.7037  
Epoch 11/20  
108/108 [=====] - 0s 171us/step - loss: 35.1471 - acc: 0.7130  
Epoch 12/20  
108/108 [=====] - 0s 161us/step - loss: 32.9787 - acc: 0.8519  
Epoch 13/20  
108/108 [=====] - 0s 152us/step - loss: 30.9418 - acc: 0.9722  
Epoch 14/20  
108/108 [=====] - 0s 172us/step - loss: 29.0301 - acc: 0.9722

Epoch 15/20  
108/108 [=====] - 0s 161us/step - loss: 27.2340 - acc: 0.8889  
Epoch 16/20  
108/108 [=====] - 0s 160us/step - loss: 25.5528 - acc: 0.7037  
Epoch 17/20  
108/108 [=====] - 0s 203us/step - loss: 23.9760 - acc: 0.6481  
Epoch 18/20  
108/108 [=====] - 0s 161us/step - loss: 22.4956 - acc: 0.7315  
Epoch 19/20  
108/108 [=====] - 0s 155us/step - loss: 21.1104 - acc: 0.8796  
Epoch 20/20  
108/108 [=====] - 0s 186us/step - loss: 19.8151 - acc: 0.9444  
27/27 [=====] - 3s 118ms/step  
108/108 [=====] - 0s 109us/step  
Epoch 1/20  
108/108 [=====] - 7s 67ms/step - loss: 65.0874 - acc: 0.3056  
Epoch 2/20  
108/108 [=====] - 0s 151us/step - loss: 61.8152 - acc: 0.3056  
Epoch 3/20  
108/108 [=====] - 0s 149us/step - loss: 58.4179 - acc: 0.3796  
Epoch 4/20  
108/108 [=====] - 0s 149us/step - loss: 55.1168 - acc: 0.3611  
Epoch 5/20  
108/108 [=====] - 0s 147us/step - loss: 51.9440 - acc: 0.3611  
Epoch 6/20  
108/108 [=====] - 0s 144us/step - loss: 48.9136 - acc: 0.3611  
Epoch 7/20  
108/108 [=====] - 0s 152us/step - loss: 46.0187 - acc: 0.3611  
Epoch 8/20  
108/108 [=====] - 0s 150us/step - loss: 43.2723 - acc: 0.3611  
Epoch 9/20  
108/108 [=====] - 0s 151us/step - loss: 40.6814 - acc: 0.4907  
Epoch 10/20  
108/108 [=====] - 0s 141us/step - loss: 38.2401 - acc: 0.6574  
Epoch 11/20  
108/108 [=====] - 0s 146us/step - loss: 35.9405 - acc: 0.6667  
Epoch 12/20  
108/108 [=====] - 0s 149us/step - loss: 33.7696 - acc: 0.6667  
Epoch 13/20  
108/108 [=====] - 0s 146us/step - loss: 31.7300 - acc: 0.6667  
Epoch 14/20  
108/108 [=====] - 0s 145us/step - loss: 29.8122 - acc: 0.6852  
Epoch 15/20  
108/108 [=====] - 0s 149us/step - loss: 28.0129 - acc: 0.6944  
Epoch 16/20  
108/108 [=====] - 0s 145us/step - loss: 26.3256 - acc: 0.8519  
Epoch 17/20  
108/108 [=====] - 0s 156us/step - loss: 24.7410 - acc: 0.9630

Epoch 18/20  
108/108 [=====] - 0s 147us/step - loss: 23.2529 - acc: 0.9537  
Epoch 19/20  
108/108 [=====] - 0s 231us/step - loss: 21.8580 - acc: 0.7778  
Epoch 20/20  
108/108 [=====] - 0s 156us/step - loss: 20.5516 - acc: 0.6667  
27/27 [=====] - 3s 117ms/step  
108/108 [=====] - 0s 134us/step  
Epoch 1/20  
108/108 [=====] - 8s 79ms/step - loss: 65.7261 - acc: 0.3148  
Epoch 2/20  
108/108 [=====] - 0s 166us/step - loss: 62.4369 - acc: 0.2963  
Epoch 3/20  
108/108 [=====] - 0s 174us/step - loss: 59.0223 - acc: 0.2037  
Epoch 4/20  
108/108 [=====] - 0s 225us/step - loss: 55.7026 - acc: 0.3333  
Epoch 5/20  
108/108 [=====] - 0s 184us/step - loss: 52.5096 - acc: 0.4259  
Epoch 6/20  
108/108 [=====] - 0s 159us/step - loss: 49.4515 - acc: 0.6667  
Epoch 7/20  
108/108 [=====] - 0s 154us/step - loss: 46.5399 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 152us/step - loss: 43.7795 - acc: 0.6852  
Epoch 9/20  
108/108 [=====] - 0s 176us/step - loss: 41.1687 - acc: 0.6852  
Epoch 10/20  
108/108 [=====] - 0s 164us/step - loss: 38.7055 - acc: 0.6944  
Epoch 11/20  
108/108 [=====] - 0s 159us/step - loss: 36.3863 - acc: 0.6944  
Epoch 12/20  
108/108 [=====] - 0s 148us/step - loss: 34.2031 - acc: 0.6852  
Epoch 13/20  
108/108 [=====] - 0s 188us/step - loss: 32.1510 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 170us/step - loss: 30.2222 - acc: 0.6852  
Epoch 15/20  
108/108 [=====] - 0s 161us/step - loss: 28.4120 - acc: 0.6852  
Epoch 16/20  
108/108 [=====] - 0s 156us/step - loss: 26.7122 - acc: 0.6852  
Epoch 17/20  
108/108 [=====] - 0s 159us/step - loss: 25.1186 - acc: 0.8704  
Epoch 18/20  
108/108 [=====] - 0s 158us/step - loss: 23.6239 - acc: 0.9537  
Epoch 19/20  
108/108 [=====] - 0s 150us/step - loss: 22.2248 - acc: 0.8889  
Epoch 20/20  
108/108 [=====] - 0s 167us/step - loss: 20.9117 - acc: 0.9444

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27/27 [=====] - 4s 137ms/step
108/108 [=====] - 0s 113us/step
Epoch 1/20
108/108 [=====] - 7s 68ms/step - loss: 2.1698 - acc: 0.3056
Epoch 2/20
108/108 [=====] - 0s 155us/step - loss: 1.9637 - acc: 0.3426
Epoch 3/20
108/108 [=====] - 0s 162us/step - loss: 1.7945 - acc: 0.3426
Epoch 4/20
108/108 [=====] - 0s 161us/step - loss: 1.6601 - acc: 0.3426
Epoch 5/20
108/108 [=====] - 0s 156us/step - loss: 1.5615 - acc: 0.5463
Epoch 6/20
108/108 [=====] - 0s 149us/step - loss: 1.5026 - acc: 0.7222
Epoch 7/20
108/108 [=====] - 0s 160us/step - loss: 1.4763 - acc: 0.8981
Epoch 8/20
108/108 [=====] - 0s 162us/step - loss: 1.4341 - acc: 0.8704
Epoch 9/20
108/108 [=====] - 0s 158us/step - loss: 1.3709 - acc: 0.8981
Epoch 10/20
108/108 [=====] - 0s 162us/step - loss: 1.3240 - acc: 0.6852
Epoch 11/20
108/108 [=====] - 0s 166us/step - loss: 1.3063 - acc: 0.6852
Epoch 12/20
108/108 [=====] - 0s 155us/step - loss: 1.2756 - acc: 0.6852
Epoch 13/20
108/108 [=====] - 0s 175us/step - loss: 1.2212 - acc: 0.6852
Epoch 14/20
108/108 [=====] - 0s 166us/step - loss: 1.1721 - acc: 0.7222
Epoch 15/20
108/108 [=====] - 0s 204us/step - loss: 1.1368 - acc: 0.8889
Epoch 16/20
108/108 [=====] - 0s 188us/step - loss: 1.1066 - acc: 0.8981
Epoch 17/20
108/108 [=====] - 0s 157us/step - loss: 1.0735 - acc: 0.8981
Epoch 18/20
108/108 [=====] - 0s 162us/step - loss: 1.0442 - acc: 0.8056
Epoch 19/20
108/108 [=====] - 0s 166us/step - loss: 1.0201 - acc: 0.6944
Epoch 20/20
108/108 [=====] - 0s 171us/step - loss: 1.0041 - acc: 0.6852
27/27 [=====] - 3s 122ms/step
108/108 [=====] - 0s 113us/step
Epoch 1/20
108/108 [=====] - 7s 68ms/step - loss: 2.0004 - acc: 0.3148
Epoch 2/20
108/108 [=====] - 0s 171us/step - loss: 1.7734 - acc: 0.3148

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Epoch 3/20  
108/108 [=====] - 0s 182us/step - loss: 1.6685 - acc: 0.2407  
Epoch 4/20  
108/108 [=====] - 0s 158us/step - loss: 1.6247 - acc: 0.3333  
Epoch 5/20  
108/108 [=====] - 0s 159us/step - loss: 1.5733 - acc: 0.5185  
Epoch 6/20  
108/108 [=====] - 0s 172us/step - loss: 1.5175 - acc: 0.6759  
Epoch 7/20  
108/108 [=====] - 0s 162us/step - loss: 1.4682 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 160us/step - loss: 1.4253 - acc: 0.6759  
Epoch 9/20  
108/108 [=====] - 0s 175us/step - loss: 1.3871 - acc: 0.6389  
Epoch 10/20  
108/108 [=====] - 0s 158us/step - loss: 1.3481 - acc: 0.6574  
Epoch 11/20  
108/108 [=====] - 0s 163us/step - loss: 1.3067 - acc: 0.6667  
Epoch 12/20  
108/108 [=====] - 0s 186us/step - loss: 1.2606 - acc: 0.7315  
Epoch 13/20  
108/108 [=====] - 0s 158us/step - loss: 1.2191 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 163us/step - loss: 1.1825 - acc: 0.6852  
Epoch 15/20  
108/108 [=====] - 0s 149us/step - loss: 1.1414 - acc: 0.6852  
Epoch 16/20  
108/108 [=====] - 0s 163us/step - loss: 1.1011 - acc: 0.6852  
Epoch 17/20  
108/108 [=====] - 0s 156us/step - loss: 1.0665 - acc: 0.6852  
Epoch 18/20  
108/108 [=====] - 0s 159us/step - loss: 1.0369 - acc: 0.7130  
Epoch 19/20  
108/108 [=====] - 0s 219us/step - loss: 1.0083 - acc: 0.7500  
Epoch 20/20  
108/108 [=====] - 0s 190us/step - loss: 0.9824 - acc: 0.6944  
27/27 [=====] - 3s 125ms/step  
108/108 [=====] - 0s 108us/step  
Epoch 1/20  
108/108 [=====] - 7s 69ms/step - loss: 1.9201 - acc: 0.3333  
Epoch 2/20  
108/108 [=====] - 0s 155us/step - loss: 1.7336 - acc: 0.6296  
Epoch 3/20  
108/108 [=====] - 0s 158us/step - loss: 1.6230 - acc: 0.6296  
Epoch 4/20  
108/108 [=====] - 0s 157us/step - loss: 1.5618 - acc: 0.7778  
Epoch 5/20  
108/108 [=====] - 0s 161us/step - loss: 1.4979 - acc: 0.9444

Epoch 6/20  
 108/108 [=====] - 0s 149us/step - loss: 1.4291 - acc: 0.9352  
 Epoch 7/20  
 108/108 [=====] - 0s 160us/step - loss: 1.3759 - acc: 0.9630  
 Epoch 8/20  
 108/108 [=====] - 0s 192us/step - loss: 1.3279 - acc: 0.9722  
 Epoch 9/20  
 108/108 [=====] - 0s 172us/step - loss: 1.2851 - acc: 0.9444  
 Epoch 10/20  
 108/108 [=====] - 0s 168us/step - loss: 1.2440 - acc: 0.9537  
 Epoch 11/20  
 108/108 [=====] - 0s 153us/step - loss: 1.2028 - acc: 0.9815  
 Epoch 12/20  
 108/108 [=====] - 0s 157us/step - loss: 1.1663 - acc: 0.9722  
 Epoch 13/20  
 108/108 [=====] - 0s 144us/step - loss: 1.1311 - acc: 0.9630  
 Epoch 14/20  
 108/108 [=====] - 0s 160us/step - loss: 1.0980 - acc: 0.9630  
 Epoch 15/20  
 108/108 [=====] - 0s 158us/step - loss: 1.0669 - acc: 0.9074  
 Epoch 16/20  
 108/108 [=====] - 0s 150us/step - loss: 1.0356 - acc: 0.8981  
 Epoch 17/20  
 108/108 [=====] - 0s 198us/step - loss: 1.0068 - acc: 0.9259  
 Epoch 18/20  
 108/108 [=====] - 0s 154us/step - loss: 0.9811 - acc: 0.9444  
 Epoch 19/20  
 108/108 [=====] - 0s 165us/step - loss: 0.9566 - acc: 0.9630  
 Epoch 20/20  
 108/108 [=====] - 0s 159us/step - loss: 0.9318 - acc: 0.9630  
 27/27 [=====] - 4s 142ms/step  
 108/108 [=====] - 0s 180us/step  
 Epoch 1/20  
 108/108 [=====] - 8s 74ms/step - loss: 1.8101 - acc: 0.3796  
 Epoch 2/20  
 108/108 [=====] - 0s 203us/step - loss: 1.7059 - acc: 0.3611  
 Epoch 3/20  
 108/108 [=====] - 0s 216us/step - loss: 1.6209 - acc: 0.3611  
 Epoch 4/20  
 108/108 [=====] - 0s 188us/step - loss: 1.5367 - acc: 0.6574  
 Epoch 5/20  
 108/108 [=====] - 0s 192us/step - loss: 1.4689 - acc: 0.6759  
 Epoch 6/20  
 108/108 [=====] - 0s 169us/step - loss: 1.4118 - acc: 0.8704  
 Epoch 7/20  
 108/108 [=====] - 0s 186us/step - loss: 1.3626 - acc: 0.9630  
 Epoch 8/20  
 108/108 [=====] - 0s 163us/step - loss: 1.3115 - acc: 0.9722

Epoch 9/20  
108/108 [=====] - 0s 171us/step - loss: 1.2649 - acc: 0.8704  
Epoch 10/20  
108/108 [=====] - 0s 159us/step - loss: 1.2152 - acc: 0.8056  
Epoch 11/20  
108/108 [=====] - 0s 149us/step - loss: 1.1759 - acc: 0.7037  
Epoch 12/20  
108/108 [=====] - 0s 146us/step - loss: 1.1381 - acc: 0.6759  
Epoch 13/20  
108/108 [=====] - 0s 146us/step - loss: 1.1011 - acc: 0.7407  
Epoch 14/20  
108/108 [=====] - 0s 146us/step - loss: 1.0684 - acc: 0.8611  
Epoch 15/20  
108/108 [=====] - 0s 167us/step - loss: 1.0375 - acc: 0.9537  
Epoch 16/20  
108/108 [=====] - 0s 273us/step - loss: 1.0059 - acc: 0.9630  
Epoch 17/20  
108/108 [=====] - 0s 227us/step - loss: 0.9754 - acc: 0.9630  
Epoch 18/20  
108/108 [=====] - 0s 178us/step - loss: 0.9477 - acc: 0.9630  
Epoch 19/20  
108/108 [=====] - 0s 202us/step - loss: 0.9234 - acc: 0.9630  
Epoch 20/20  
108/108 [=====] - 0s 193us/step - loss: 0.8993 - acc: 0.9630  
27/27 [=====] - 3s 120ms/step  
108/108 [=====] - 0s 130us/step  
Epoch 1/20  
108/108 [=====] - 7s 68ms/step - loss: 1.8876 - acc: 0.5093  
Epoch 2/20  
108/108 [=====] - 0s 183us/step - loss: 1.7514 - acc: 0.6667  
Epoch 3/20  
108/108 [=====] - 0s 166us/step - loss: 1.6441 - acc: 0.6667  
Epoch 4/20  
108/108 [=====] - 0s 176us/step - loss: 1.5481 - acc: 0.6667  
Epoch 5/20  
108/108 [=====] - 0s 179us/step - loss: 1.4798 - acc: 0.9074  
Epoch 6/20  
108/108 [=====] - 0s 149us/step - loss: 1.4329 - acc: 0.7037  
Epoch 7/20  
108/108 [=====] - 0s 152us/step - loss: 1.3769 - acc: 0.6944  
Epoch 8/20  
108/108 [=====] - 0s 152us/step - loss: 1.3168 - acc: 0.8426  
Epoch 9/20  
108/108 [=====] - 0s 158us/step - loss: 1.2671 - acc: 0.9074  
Epoch 10/20  
108/108 [=====] - 0s 145us/step - loss: 1.2223 - acc: 0.7407  
Epoch 11/20  
108/108 [=====] - 0s 151us/step - loss: 1.1794 - acc: 0.6667

Epoch 12/20  
108/108 [=====] - 0s 142us/step - loss: 1.1410 - acc: 0.6667  
Epoch 13/20  
108/108 [=====] - 0s 151us/step - loss: 1.0960 - acc: 0.6667  
Epoch 14/20  
108/108 [=====] - 0s 216us/step - loss: 1.0526 - acc: 0.6852  
Epoch 15/20  
108/108 [=====] - 0s 238us/step - loss: 1.0149 - acc: 0.7778  
Epoch 16/20  
108/108 [=====] - 0s 173us/step - loss: 0.9788 - acc: 0.8611  
Epoch 17/20  
108/108 [=====] - 0s 159us/step - loss: 0.9469 - acc: 0.9537  
Epoch 18/20  
108/108 [=====] - 0s 153us/step - loss: 0.9234 - acc: 0.9259  
Epoch 19/20  
108/108 [=====] - 0s 181us/step - loss: 0.9010 - acc: 0.8981  
Epoch 20/20  
108/108 [=====] - 0s 154us/step - loss: 0.8746 - acc: 0.9167  
27/27 [=====] - 3s 123ms/step  
108/108 [=====] - 0s 114us/step  
Epoch 1/20  
108/108 [=====] - 8s 70ms/step - loss: 8.2516 - acc: 0.3148  
Epoch 2/20  
108/108 [=====] - 0s 158us/step - loss: 7.8813 - acc: 0.4444  
Epoch 3/20  
108/108 [=====] - 0s 157us/step - loss: 7.5588 - acc: 0.3426  
Epoch 4/20  
108/108 [=====] - 0s 150us/step - loss: 7.2778 - acc: 0.6852  
Epoch 5/20  
108/108 [=====] - 0s 182us/step - loss: 7.0365 - acc: 0.6852  
Epoch 6/20  
108/108 [=====] - 0s 153us/step - loss: 6.7919 - acc: 0.6852  
Epoch 7/20  
108/108 [=====] - 0s 148us/step - loss: 6.5543 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 164us/step - loss: 6.3240 - acc: 0.6852  
Epoch 9/20  
108/108 [=====] - 0s 153us/step - loss: 6.1044 - acc: 0.6852  
Epoch 10/20  
108/108 [=====] - 0s 146us/step - loss: 5.8966 - acc: 0.6852  
Epoch 11/20  
108/108 [=====] - 0s 148us/step - loss: 5.6969 - acc: 0.6944  
Epoch 12/20  
108/108 [=====] - 0s 147us/step - loss: 5.5015 - acc: 0.7407  
Epoch 13/20  
108/108 [=====] - 0s 192us/step - loss: 5.3135 - acc: 0.6944  
Epoch 14/20  
108/108 [=====] - 0s 159us/step - loss: 5.1312 - acc: 0.6852

Epoch 15/20  
108/108 [=====] - 0s 150us/step - loss: 4.9585 - acc: 0.6852  
Epoch 16/20  
108/108 [=====] - 0s 155us/step - loss: 4.7945 - acc: 0.6852  
Epoch 17/20  
108/108 [=====] - 0s 155us/step - loss: 4.6368 - acc: 0.6852  
Epoch 18/20  
108/108 [=====] - 0s 147us/step - loss: 4.4894 - acc: 0.6852  
Epoch 19/20  
108/108 [=====] - 0s 145us/step - loss: 4.3415 - acc: 0.6852  
Epoch 20/20  
108/108 [=====] - 0s 146us/step - loss: 4.1968 - acc: 0.6852  
27/27 [=====] - 3s 121ms/step  
108/108 [=====] - 0s 123us/step  
Epoch 1/20  
108/108 [=====] - 8s 71ms/step - loss: 8.1616 - acc: 0.3333  
Epoch 2/20  
108/108 [=====] - 0s 205us/step - loss: 7.8510 - acc: 0.3333  
Epoch 3/20  
108/108 [=====] - 0s 193us/step - loss: 7.5757 - acc: 0.3426  
Epoch 4/20  
108/108 [=====] - 0s 161us/step - loss: 7.3083 - acc: 0.6852  
Epoch 5/20  
108/108 [=====] - 0s 151us/step - loss: 7.0520 - acc: 0.6852  
Epoch 6/20  
108/108 [=====] - 0s 145us/step - loss: 6.8027 - acc: 0.6852  
Epoch 7/20  
108/108 [=====] - 0s 194us/step - loss: 6.5650 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 148us/step - loss: 6.3332 - acc: 0.6852  
Epoch 9/20  
108/108 [=====] - 0s 145us/step - loss: 6.1086 - acc: 0.6852  
Epoch 10/20  
108/108 [=====] - 0s 154us/step - loss: 5.8943 - acc: 0.6852  
Epoch 11/20  
108/108 [=====] - 0s 148us/step - loss: 5.6860 - acc: 0.6852  
Epoch 12/20  
108/108 [=====] - 0s 151us/step - loss: 5.4882 - acc: 0.6944  
Epoch 13/20  
108/108 [=====] - 0s 154us/step - loss: 5.2966 - acc: 0.7222  
Epoch 14/20  
108/108 [=====] - 0s 149us/step - loss: 5.1126 - acc: 0.7407  
Epoch 15/20  
108/108 [=====] - 0s 147us/step - loss: 4.9366 - acc: 0.8148  
Epoch 16/20  
108/108 [=====] - 0s 151us/step - loss: 4.7677 - acc: 0.8611  
Epoch 17/20  
108/108 [=====] - 0s 153us/step - loss: 4.6055 - acc: 0.9167

Epoch 18/20  
108/108 [=====] - 0s 152us/step - loss: 4.4490 - acc: 0.9167  
Epoch 19/20  
108/108 [=====] - 0s 146us/step - loss: 4.2958 - acc: 0.7870  
Epoch 20/20  
108/108 [=====] - 0s 158us/step - loss: 4.1472 - acc: 0.7037  
27/27 [=====] - 3s 125ms/step  
108/108 [=====] - 0s 116us/step  
Epoch 1/20  
108/108 [=====] - 8s 73ms/step - loss: 8.0015 - acc: 0.3704  
Epoch 2/20  
108/108 [=====] - 0s 180us/step - loss: 7.7062 - acc: 0.2500  
Epoch 3/20  
108/108 [=====] - 0s 171us/step - loss: 7.4506 - acc: 0.3889  
Epoch 4/20  
108/108 [=====] - 0s 177us/step - loss: 7.1804 - acc: 0.6296  
Epoch 5/20  
108/108 [=====] - 0s 171us/step - loss: 6.9218 - acc: 0.6574  
Epoch 6/20  
108/108 [=====] - 0s 173us/step - loss: 6.6750 - acc: 0.7037  
Epoch 7/20  
108/108 [=====] - 0s 163us/step - loss: 6.4376 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 168us/step - loss: 6.2033 - acc: 0.7778  
Epoch 9/20  
108/108 [=====] - 0s 185us/step - loss: 5.9770 - acc: 0.9907  
Epoch 10/20  
108/108 [=====] - 0s 168us/step - loss: 5.7621 - acc: 0.9537  
Epoch 11/20  
108/108 [=====] - 0s 179us/step - loss: 5.5594 - acc: 0.7870  
Epoch 12/20  
108/108 [=====] - 0s 185us/step - loss: 5.3569 - acc: 0.8333  
Epoch 13/20  
108/108 [=====] - 0s 212us/step - loss: 5.1639 - acc: 0.9630  
Epoch 14/20  
108/108 [=====] - 0s 216us/step - loss: 4.9837 - acc: 0.8889  
Epoch 15/20  
108/108 [=====] - 0s 167us/step - loss: 4.8044 - acc: 0.9352  
Epoch 16/20  
108/108 [=====] - 0s 218us/step - loss: 4.6344 - acc: 0.8889  
Epoch 17/20  
108/108 [=====] - 0s 191us/step - loss: 4.4727 - acc: 0.7130  
Epoch 18/20  
108/108 [=====] - 0s 222us/step - loss: 4.3167 - acc: 0.6944  
Epoch 19/20  
108/108 [=====] - 0s 194us/step - loss: 4.1649 - acc: 0.8056  
Epoch 20/20  
108/108 [=====] - 0s 171us/step - loss: 4.0186 - acc: 0.8889

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27/27 [=====] - 4s 142ms/step
108/108 [=====] - 0s 145us/step
Epoch 1/20
108/108 [=====] - 9s 81ms/step - loss: 8.1346 - acc: 0.4630
Epoch 2/20
108/108 [=====] - 0s 249us/step - loss: 7.8136 - acc: 0.3889
Epoch 3/20
108/108 [=====] - 0s 282us/step - loss: 7.5395 - acc: 0.5926
Epoch 4/20
108/108 [=====] - 0s 264us/step - loss: 7.2745 - acc: 0.6667
Epoch 5/20
108/108 [=====] - 0s 224us/step - loss: 7.0090 - acc: 0.6667
Epoch 6/20
108/108 [=====] - 0s 178us/step - loss: 6.7627 - acc: 0.7500
Epoch 7/20
108/108 [=====] - 0s 174us/step - loss: 6.5250 - acc: 0.9630
Epoch 8/20
108/108 [=====] - 0s 187us/step - loss: 6.3018 - acc: 0.9722
Epoch 9/20
108/108 [=====] - 0s 214us/step - loss: 6.0840 - acc: 0.9630
Epoch 10/20
108/108 [=====] - 0s 169us/step - loss: 5.8721 - acc: 0.9444
Epoch 11/20
108/108 [=====] - 0s 159us/step - loss: 5.6723 - acc: 0.8704
Epoch 12/20
108/108 [=====] - 0s 193us/step - loss: 5.4775 - acc: 0.8148
Epoch 13/20
108/108 [=====] - 0s 179us/step - loss: 5.2924 - acc: 0.7500
Epoch 14/20
108/108 [=====] - 0s 205us/step - loss: 5.1128 - acc: 0.8241
Epoch 15/20
108/108 [=====] - 0s 172us/step - loss: 4.9414 - acc: 0.8704
Epoch 16/20
108/108 [=====] - 0s 154us/step - loss: 4.7779 - acc: 0.9352
Epoch 17/20
108/108 [=====] - 0s 251us/step - loss: 4.6187 - acc: 0.9630
Epoch 18/20
108/108 [=====] - 0s 236us/step - loss: 4.4634 - acc: 0.9722
Epoch 19/20
108/108 [=====] - 0s 216us/step - loss: 4.3160 - acc: 0.9722
Epoch 20/20
108/108 [=====] - 0s 195us/step - loss: 4.1733 - acc: 0.9630
27/27 [=====] - 3s 126ms/step
108/108 [=====] - 0s 137us/step
Epoch 1/20
108/108 [=====] - 8s 71ms/step - loss: 8.3492 - acc: 0.3704
Epoch 2/20
108/108 [=====] - 0s 157us/step - loss: 8.0506 - acc: 0.5833

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Epoch 3/20  
108/108 [=====] - 0s 155us/step - loss: 7.7705 - acc: 0.7500  
Epoch 4/20  
108/108 [=====] - 0s 160us/step - loss: 7.5023 - acc: 0.9630  
Epoch 5/20  
108/108 [=====] - 0s 195us/step - loss: 7.2398 - acc: 0.8241  
Epoch 6/20  
108/108 [=====] - 0s 172us/step - loss: 7.0000 - acc: 0.6759  
Epoch 7/20  
108/108 [=====] - 0s 192us/step - loss: 6.7617 - acc: 0.6667  
Epoch 8/20  
108/108 [=====] - 0s 255us/step - loss: 6.5253 - acc: 0.6852  
Epoch 9/20  
108/108 [=====] - 0s 302us/step - loss: 6.2987 - acc: 0.8148  
Epoch 10/20  
108/108 [=====] - 0s 276us/step - loss: 6.0855 - acc: 0.9630  
Epoch 11/20  
108/108 [=====] - 0s 253us/step - loss: 5.8825 - acc: 0.8981  
Epoch 12/20  
108/108 [=====] - 0s 265us/step - loss: 5.6832 - acc: 0.8704  
Epoch 13/20  
108/108 [=====] - 0s 205us/step - loss: 5.4837 - acc: 0.9259  
Epoch 14/20  
108/108 [=====] - 0s 186us/step - loss: 5.2891 - acc: 0.9630  
Epoch 15/20  
108/108 [=====] - 0s 181us/step - loss: 5.1049 - acc: 0.9167  
Epoch 16/20  
108/108 [=====] - 0s 149us/step - loss: 4.9266 - acc: 0.8981  
Epoch 17/20  
108/108 [=====] - 0s 155us/step - loss: 4.7575 - acc: 0.9167  
Epoch 18/20  
108/108 [=====] - 0s 158us/step - loss: 4.5994 - acc: 0.8889  
Epoch 19/20  
108/108 [=====] - 0s 170us/step - loss: 4.4475 - acc: 0.8519  
Epoch 20/20  
108/108 [=====] - 0s 248us/step - loss: 4.3009 - acc: 0.8241  
27/27 [=====] - 3s 127ms/step  
108/108 [=====] - 0s 137us/step  
Epoch 1/20  
108/108 [=====] - 8s 71ms/step - loss: 72.1822 - acc: 0.3148  
Epoch 2/20  
108/108 [=====] - 0s 161us/step - loss: 69.6471 - acc: 0.3148  
Epoch 3/20  
108/108 [=====] - 0s 160us/step - loss: 66.9511 - acc: 0.3056  
Epoch 4/20  
108/108 [=====] - 0s 156us/step - loss: 64.2834 - acc: 0.1296  
Epoch 5/20  
108/108 [=====] - 0s 150us/step - loss: 61.6764 - acc: 0.3333



Epoch 6/20  
108/108 [=====] - 0s 162us/step - loss: 59.1444 - acc: 0.3611  
Epoch 7/20  
108/108 [=====] - 0s 159us/step - loss: 56.6896 - acc: 0.4074  
Epoch 8/20  
108/108 [=====] - 0s 185us/step - loss: 54.3172 - acc: 0.5556  
Epoch 9/20  
108/108 [=====] - 0s 235us/step - loss: 52.0329 - acc: 0.6759  
Epoch 10/20  
108/108 [=====] - 0s 259us/step - loss: 49.8320 - acc: 0.6852  
Epoch 11/20  
108/108 [=====] - 0s 196us/step - loss: 47.7163 - acc: 0.6389  
Epoch 12/20  
108/108 [=====] - 0s 158us/step - loss: 45.6832 - acc: 0.5185  
Epoch 13/20  
108/108 [=====] - 0s 173us/step - loss: 43.7283 - acc: 0.5648  
Epoch 14/20  
108/108 [=====] - 0s 183us/step - loss: 41.8504 - acc: 0.6204  
Epoch 15/20  
108/108 [=====] - 0s 218us/step - loss: 40.0473 - acc: 0.6667  
Epoch 16/20  
108/108 [=====] - 0s 193us/step - loss: 38.3176 - acc: 0.6759  
Epoch 17/20  
108/108 [=====] - 0s 190us/step - loss: 36.6613 - acc: 0.6852  
Epoch 18/20  
108/108 [=====] - 0s 169us/step - loss: 35.0725 - acc: 0.6852  
Epoch 19/20  
108/108 [=====] - 0s 164us/step - loss: 33.5496 - acc: 0.6852  
Epoch 20/20  
108/108 [=====] - 0s 165us/step - loss: 32.0918 - acc: 0.6852  
27/27 [=====] - 3s 126ms/step  
108/108 [=====] - 0s 157us/step  
Epoch 1/20  
108/108 [=====] - 8s 72ms/step - loss: 72.7963 - acc: 0.3519  
Epoch 2/20  
108/108 [=====] - 0s 200us/step - loss: 70.1772 - acc: 0.3519  
Epoch 3/20  
108/108 [=====] - 0s 154us/step - loss: 67.4277 - acc: 0.3519  
Epoch 4/20  
108/108 [=====] - 0s 180us/step - loss: 64.7118 - acc: 0.3611  
Epoch 5/20  
108/108 [=====] - 0s 172us/step - loss: 62.0888 - acc: 0.5926  
Epoch 6/20  
108/108 [=====] - 0s 157us/step - loss: 59.5484 - acc: 0.6852  
Epoch 7/20  
108/108 [=====] - 0s 156us/step - loss: 57.0901 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 153us/step - loss: 54.7189 - acc: 0.6852

Epoch 9/20  
108/108 [=====] - 0s 190us/step - loss: 52.4334 - acc: 0.6852  
Epoch 10/20  
108/108 [=====] - 0s 179us/step - loss: 50.2353 - acc: 0.6852  
Epoch 11/20  
108/108 [=====] - 0s 264us/step - loss: 48.1211 - acc: 0.6852  
Epoch 12/20  
108/108 [=====] - 0s 206us/step - loss: 46.0901 - acc: 0.6852  
Epoch 13/20  
108/108 [=====] - 0s 172us/step - loss: 44.1392 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 156us/step - loss: 42.2670 - acc: 0.6852  
Epoch 15/20  
108/108 [=====] - 0s 157us/step - loss: 40.4700 - acc: 0.6852  
Epoch 16/20  
108/108 [=====] - 0s 161us/step - loss: 38.7467 - acc: 0.6852  
Epoch 17/20  
108/108 [=====] - 0s 195us/step - loss: 37.0931 - acc: 0.6852  
Epoch 18/20  
108/108 [=====] - 0s 196us/step - loss: 35.5075 - acc: 0.6852  
Epoch 19/20  
108/108 [=====] - 0s 216us/step - loss: 33.9869 - acc: 0.6852  
Epoch 20/20  
108/108 [=====] - 0s 147us/step - loss: 32.5290 - acc: 0.6852  
27/27 [=====] - 4s 130ms/step  
108/108 [=====] - 0s 120us/step  
Epoch 1/20  
108/108 [=====] - 8s 72ms/step - loss: 73.1126 - acc: 0.3148  
Epoch 2/20  
108/108 [=====] - 0s 239us/step - loss: 70.5419 - acc: 0.3148  
Epoch 3/20  
108/108 [=====] - 0s 184us/step - loss: 67.8083 - acc: 0.3148  
Epoch 4/20  
108/108 [=====] - 0s 187us/step - loss: 65.1067 - acc: 0.3148  
Epoch 5/20  
108/108 [=====] - 0s 222us/step - loss: 62.4747 - acc: 0.5185  
Epoch 6/20  
108/108 [=====] - 0s 225us/step - loss: 59.9235 - acc: 0.6296  
Epoch 7/20  
108/108 [=====] - 0s 203us/step - loss: 57.4541 - acc: 0.6389  
Epoch 8/20  
108/108 [=====] - 0s 161us/step - loss: 55.0749 - acc: 0.7037  
Epoch 9/20  
108/108 [=====] - 0s 189us/step - loss: 52.7816 - acc: 0.8704  
Epoch 10/20  
108/108 [=====] - 0s 193us/step - loss: 50.5715 - acc: 0.9630  
Epoch 11/20  
108/108 [=====] - 0s 153us/step - loss: 48.4427 - acc: 0.9815

Epoch 12/20  
108/108 [=====] - 0s 171us/step - loss: 46.3940 - acc: 0.9537  
Epoch 13/20  
108/108 [=====] - 0s 204us/step - loss: 44.4270 - acc: 0.8148  
Epoch 14/20  
108/108 [=====] - 0s 190us/step - loss: 42.5399 - acc: 0.6759  
Epoch 15/20  
108/108 [=====] - 0s 202us/step - loss: 40.7307 - acc: 0.6389  
Epoch 16/20  
108/108 [=====] - 0s 254us/step - loss: 38.9933 - acc: 0.6296  
Epoch 17/20  
108/108 [=====] - 0s 242us/step - loss: 37.3252 - acc: 0.6296  
Epoch 18/20  
108/108 [=====] - 0s 194us/step - loss: 35.7249 - acc: 0.6389  
Epoch 19/20  
108/108 [=====] - 0s 187us/step - loss: 34.1890 - acc: 0.6389  
Epoch 20/20  
108/108 [=====] - 0s 188us/step - loss: 32.7162 - acc: 0.6574  
27/27 [=====] - 4s 136ms/step  
108/108 [=====] - 0s 118us/step  
Epoch 1/20  
108/108 [=====] - 8s 72ms/step - loss: 73.2412 - acc: 0.3333  
Epoch 2/20  
108/108 [=====] - 0s 248us/step - loss: 70.5796 - acc: 0.3333  
Epoch 3/20  
108/108 [=====] - 0s 252us/step - loss: 67.7914 - acc: 0.3333  
Epoch 4/20  
108/108 [=====] - 0s 216us/step - loss: 65.0994 - acc: 0.3333  
Epoch 5/20  
108/108 [=====] - 0s 173us/step - loss: 62.4943 - acc: 0.3611  
Epoch 6/20  
108/108 [=====] - 0s 188us/step - loss: 59.9750 - acc: 0.3611  
Epoch 7/20  
108/108 [=====] - 0s 207us/step - loss: 57.5279 - acc: 0.3611  
Epoch 8/20  
108/108 [=====] - 0s 181us/step - loss: 55.1587 - acc: 0.3796  
Epoch 9/20  
108/108 [=====] - 0s 162us/step - loss: 52.8698 - acc: 0.4167  
Epoch 10/20  
108/108 [=====] - 0s 217us/step - loss: 50.6683 - acc: 0.5741  
Epoch 11/20  
108/108 [=====] - 0s 214us/step - loss: 48.5519 - acc: 0.6759  
Epoch 12/20  
108/108 [=====] - 0s 180us/step - loss: 46.5149 - acc: 0.7315  
Epoch 13/20  
108/108 [=====] - 0s 219us/step - loss: 44.5554 - acc: 0.6759  
Epoch 14/20  
108/108 [=====] - 0s 159us/step - loss: 42.6734 - acc: 0.6759

Epoch 15/20  
108/108 [=====] - 0s 185us/step - loss: 40.8673 - acc: 0.6667  
Epoch 16/20  
108/108 [=====] - 0s 150us/step - loss: 39.1311 - acc: 0.6667  
Epoch 17/20  
108/108 [=====] - 0s 213us/step - loss: 37.4647 - acc: 0.6667  
Epoch 18/20  
108/108 [=====] - 0s 225us/step - loss: 35.8663 - acc: 0.6667  
Epoch 19/20  
108/108 [=====] - 0s 174us/step - loss: 34.3340 - acc: 0.6759  
Epoch 20/20  
108/108 [=====] - 0s 159us/step - loss: 32.8638 - acc: 0.6944  
27/27 [=====] - 3s 128ms/step  
108/108 [=====] - 0s 164us/step  
Epoch 1/20  
108/108 [=====] - 8s 73ms/step - loss: 73.6026 - acc: 0.3519  
Epoch 2/20  
108/108 [=====] - 0s 176us/step - loss: 70.9001 - acc: 0.3519  
Epoch 3/20  
108/108 [=====] - 0s 164us/step - loss: 68.0649 - acc: 0.3519  
Epoch 4/20  
108/108 [=====] - 0s 171us/step - loss: 65.2751 - acc: 0.3519  
Epoch 5/20  
108/108 [=====] - 0s 161us/step - loss: 62.5894 - acc: 0.3519  
Epoch 6/20  
108/108 [=====] - 0s 160us/step - loss: 59.9989 - acc: 0.3519  
Epoch 7/20  
108/108 [=====] - 0s 154us/step - loss: 57.5157 - acc: 0.3519  
Epoch 8/20  
108/108 [=====] - 0s 173us/step - loss: 55.1344 - acc: 0.3889  
Epoch 9/20  
108/108 [=====] - 0s 158us/step - loss: 52.8497 - acc: 0.6481  
Epoch 10/20  
108/108 [=====] - 0s 164us/step - loss: 50.6499 - acc: 0.6667  
Epoch 11/20  
108/108 [=====] - 0s 220us/step - loss: 48.5351 - acc: 0.7037  
Epoch 12/20  
108/108 [=====] - 0s 252us/step - loss: 46.5036 - acc: 0.8611  
Epoch 13/20  
108/108 [=====] - 0s 234us/step - loss: 44.5548 - acc: 0.9444  
Epoch 14/20  
108/108 [=====] - 0s 227us/step - loss: 42.6816 - acc: 0.9259  
Epoch 15/20  
108/108 [=====] - 0s 198us/step - loss: 40.8823 - acc: 0.9352  
Epoch 16/20  
108/108 [=====] - 0s 185us/step - loss: 39.1538 - acc: 0.9444  
Epoch 17/20  
108/108 [=====] - 0s 161us/step - loss: 37.4960 - acc: 0.9444

Epoch 18/20  
108/108 [=====] - 0s 183us/step - loss: 35.9044 - acc: 0.9537  
Epoch 19/20  
108/108 [=====] - 0s 268us/step - loss: 34.3786 - acc: 0.9444  
Epoch 20/20  
108/108 [=====] - 0s 265us/step - loss: 32.9158 - acc: 0.9537  
27/27 [=====] - 4s 134ms/step  
108/108 [=====] - 0s 118us/step  
Epoch 1/20  
108/108 [=====] - 8s 73ms/step - loss: 2.0115 - acc: 0.3426  
Epoch 2/20  
108/108 [=====] - 0s 166us/step - loss: 1.8378 - acc: 0.4167  
Epoch 3/20  
108/108 [=====] - 0s 210us/step - loss: 1.7002 - acc: 0.6852  
Epoch 4/20  
108/108 [=====] - 0s 190us/step - loss: 1.5929 - acc: 0.6852  
Epoch 5/20  
108/108 [=====] - 0s 234us/step - loss: 1.4952 - acc: 0.6852  
Epoch 6/20  
108/108 [=====] - 0s 182us/step - loss: 1.4143 - acc: 0.8148  
Epoch 7/20  
108/108 [=====] - 0s 167us/step - loss: 1.3445 - acc: 0.7870  
Epoch 8/20  
108/108 [=====] - 0s 209us/step - loss: 1.2808 - acc: 0.6944  
Epoch 9/20  
108/108 [=====] - 0s 200us/step - loss: 1.2306 - acc: 0.6852  
Epoch 10/20  
108/108 [=====] - 0s 246us/step - loss: 1.1800 - acc: 0.7222  
Epoch 11/20  
108/108 [=====] - 0s 241us/step - loss: 1.1294 - acc: 0.8889  
Epoch 12/20  
108/108 [=====] - 0s 229us/step - loss: 1.0997 - acc: 0.9444  
Epoch 13/20  
108/108 [=====] - 0s 231us/step - loss: 1.0652 - acc: 0.9352  
Epoch 14/20  
108/108 [=====] - 0s 185us/step - loss: 1.0213 - acc: 0.9537  
Epoch 15/20  
108/108 [=====] - 0s 220us/step - loss: 0.9925 - acc: 0.8611  
Epoch 16/20  
108/108 [=====] - 0s 251us/step - loss: 0.9728 - acc: 0.7870  
Epoch 17/20  
108/108 [=====] - 0s 229us/step - loss: 0.9377 - acc: 0.8704  
Epoch 18/20  
108/108 [=====] - 0s 156us/step - loss: 0.9030 - acc: 0.9630  
Epoch 19/20  
108/108 [=====] - 0s 192us/step - loss: 0.8847 - acc: 0.9630  
Epoch 20/20  
108/108 [=====] - 0s 162us/step - loss: 0.8576 - acc: 0.9630

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27/27 [=====] - 3s 127ms/step
108/108 [=====] - 0s 174us/step
Epoch 1/20
108/108 [=====] - 8s 74ms/step - loss: 2.1412 - acc: 0.0926
Epoch 2/20
108/108 [=====] - 0s 211us/step - loss: 1.9609 - acc: 0.4907
Epoch 3/20
108/108 [=====] - 0s 163us/step - loss: 1.8461 - acc: 0.6481
Epoch 4/20
108/108 [=====] - 0s 229us/step - loss: 1.7328 - acc: 0.7500
Epoch 5/20
108/108 [=====] - 0s 164us/step - loss: 1.6301 - acc: 0.6852
Epoch 6/20
108/108 [=====] - 0s 181us/step - loss: 1.5652 - acc: 0.6852
Epoch 7/20
108/108 [=====] - 0s 194us/step - loss: 1.4866 - acc: 0.6852
Epoch 8/20
108/108 [=====] - 0s 161us/step - loss: 1.4167 - acc: 0.6852
Epoch 9/20
108/108 [=====] - 0s 180us/step - loss: 1.3557 - acc: 0.8148
Epoch 10/20
108/108 [=====] - 0s 153us/step - loss: 1.3041 - acc: 0.9074
Epoch 11/20
108/108 [=====] - 0s 155us/step - loss: 1.2530 - acc: 0.9167
Epoch 12/20
108/108 [=====] - 0s 151us/step - loss: 1.2053 - acc: 0.8889
Epoch 13/20
108/108 [=====] - 0s 186us/step - loss: 1.1625 - acc: 0.8426
Epoch 14/20
108/108 [=====] - 0s 159us/step - loss: 1.1295 - acc: 0.7130
Epoch 15/20
108/108 [=====] - 0s 164us/step - loss: 1.0915 - acc: 0.7593
Epoch 16/20
108/108 [=====] - 0s 172us/step - loss: 1.0570 - acc: 0.9167
Epoch 17/20
108/108 [=====] - 0s 167us/step - loss: 1.0369 - acc: 0.8981
Epoch 18/20
108/108 [=====] - 0s 164us/step - loss: 1.0056 - acc: 0.9259
Epoch 19/20
108/108 [=====] - 0s 182us/step - loss: 0.9736 - acc: 0.9074
Epoch 20/20
108/108 [=====] - 0s 165us/step - loss: 0.9518 - acc: 0.8148
27/27 [=====] - 4s 137ms/step
108/108 [=====] - 0s 137us/step
Epoch 1/20
108/108 [=====] - 8s 75ms/step - loss: 2.0410 - acc: 0.3426
Epoch 2/20
108/108 [=====] - 0s 167us/step - loss: 1.9124 - acc: 0.3241

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Epoch 3/20  
108/108 [=====] - 0s 203us/step - loss: 1.8083 - acc: 0.6296  
Epoch 4/20  
108/108 [=====] - 0s 156us/step - loss: 1.7055 - acc: 0.6296  
Epoch 5/20  
108/108 [=====] - 0s 156us/step - loss: 1.6112 - acc: 0.6296  
Epoch 6/20  
108/108 [=====] - 0s 157us/step - loss: 1.5305 - acc: 0.7778  
Epoch 7/20  
108/108 [=====] - 0s 166us/step - loss: 1.4584 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 152us/step - loss: 1.3940 - acc: 0.6944  
Epoch 9/20  
108/108 [=====] - 0s 175us/step - loss: 1.3321 - acc: 0.8519  
Epoch 10/20  
108/108 [=====] - 0s 173us/step - loss: 1.2772 - acc: 0.8241  
Epoch 11/20  
108/108 [=====] - 0s 168us/step - loss: 1.2287 - acc: 0.7130  
Epoch 12/20  
108/108 [=====] - 0s 197us/step - loss: 1.1849 - acc: 0.9352  
Epoch 13/20  
108/108 [=====] - 0s 227us/step - loss: 1.1399 - acc: 0.8796  
Epoch 14/20  
108/108 [=====] - 0s 183us/step - loss: 1.1133 - acc: 0.6852  
Epoch 15/20  
108/108 [=====] - 0s 181us/step - loss: 1.0735 - acc: 0.8241  
Epoch 16/20  
108/108 [=====] - 0s 199us/step - loss: 1.0397 - acc: 0.9352  
Epoch 17/20  
108/108 [=====] - 0s 219us/step - loss: 1.0281 - acc: 0.6944  
Epoch 18/20  
108/108 [=====] - 0s 224us/step - loss: 0.9909 - acc: 0.7778  
Epoch 19/20  
108/108 [=====] - 0s 205us/step - loss: 0.9601 - acc: 0.8981  
Epoch 20/20  
108/108 [=====] - 0s 220us/step - loss: 0.9335 - acc: 0.8148  
27/27 [=====] - 4s 132ms/step  
108/108 [=====] - 0s 131us/step  
Epoch 1/20  
108/108 [=====] - 8s 75ms/step - loss: 1.9788 - acc: 0.3981  
Epoch 2/20  
108/108 [=====] - 0s 217us/step - loss: 1.8282 - acc: 0.6481  
Epoch 3/20  
108/108 [=====] - 0s 246us/step - loss: 1.7428 - acc: 0.6111  
Epoch 4/20  
108/108 [=====] - 0s 205us/step - loss: 1.6394 - acc: 0.6296  
Epoch 5/20  
108/108 [=====] - 0s 256us/step - loss: 1.5716 - acc: 0.9630

Epoch 6/20  
 108/108 [=====] - 0s 210us/step - loss: 1.4967 - acc: 0.9352  
 Epoch 7/20  
 108/108 [=====] - 0s 179us/step - loss: 1.4246 - acc: 0.7685  
 Epoch 8/20  
 108/108 [=====] - 0s 166us/step - loss: 1.3650 - acc: 0.7037  
 Epoch 9/20  
 108/108 [=====] - 0s 165us/step - loss: 1.3134 - acc: 0.8611  
 Epoch 10/20  
 108/108 [=====] - 0s 161us/step - loss: 1.2667 - acc: 0.9630  
 Epoch 11/20  
 108/108 [=====] - 0s 164us/step - loss: 1.2147 - acc: 0.9630  
 Epoch 12/20  
 108/108 [=====] - 0s 175us/step - loss: 1.1675 - acc: 0.8333  
 Epoch 13/20  
 108/108 [=====] - 0s 205us/step - loss: 1.1321 - acc: 0.7593  
 Epoch 14/20  
 108/108 [=====] - 0s 154us/step - loss: 1.0918 - acc: 0.7870  
 Epoch 15/20  
 108/108 [=====] - 0s 154us/step - loss: 1.0528 - acc: 0.8704  
 Epoch 16/20  
 108/108 [=====] - 0s 164us/step - loss: 1.0193 - acc: 0.8796  
 Epoch 17/20  
 108/108 [=====] - 0s 239us/step - loss: 0.9905 - acc: 0.8796  
 Epoch 18/20  
 108/108 [=====] - 0s 177us/step - loss: 0.9623 - acc: 0.9259  
 Epoch 19/20  
 108/108 [=====] - 0s 204us/step - loss: 0.9340 - acc: 0.9352  
 Epoch 20/20  
 108/108 [=====] - 0s 175us/step - loss: 0.9110 - acc: 0.9074  
 27/27 [=====] - 4s 133ms/step  
 108/108 [=====] - 0s 120us/step  
 Epoch 1/20  
 108/108 [=====] - 8s 74ms/step - loss: 2.0463 - acc: 0.3796  
 Epoch 2/20  
 108/108 [=====] - 0s 190us/step - loss: 1.9167 - acc: 0.5000  
 Epoch 3/20  
 108/108 [=====] - 0s 148us/step - loss: 1.8131 - acc: 0.6667  
 Epoch 4/20  
 108/108 [=====] - 0s 172us/step - loss: 1.7107 - acc: 0.8241  
 Epoch 5/20  
 108/108 [=====] - 0s 186us/step - loss: 1.6253 - acc: 0.8889  
 Epoch 6/20  
 108/108 [=====] - 0s 190us/step - loss: 1.5508 - acc: 0.7685  
 Epoch 7/20  
 108/108 [=====] - 0s 182us/step - loss: 1.4813 - acc: 0.6667  
 Epoch 8/20  
 108/108 [=====] - 0s 181us/step - loss: 1.4083 - acc: 0.6667



Epoch 9/20  
108/108 [=====] - 0s 161us/step - loss: 1.3416 - acc: 0.7778  
Epoch 10/20  
108/108 [=====] - 0s 174us/step - loss: 1.2815 - acc: 0.8148  
Epoch 11/20  
108/108 [=====] - 0s 217us/step - loss: 1.2301 - acc: 0.9722  
Epoch 12/20  
108/108 [=====] - 0s 242us/step - loss: 1.1834 - acc: 0.9352  
Epoch 13/20  
108/108 [=====] - 0s 198us/step - loss: 1.1369 - acc: 0.9630  
Epoch 14/20  
108/108 [=====] - 0s 161us/step - loss: 1.1098 - acc: 0.7963  
Epoch 15/20  
108/108 [=====] - 0s 150us/step - loss: 1.0718 - acc: 0.7778  
Epoch 16/20  
108/108 [=====] - 0s 152us/step - loss: 1.0357 - acc: 0.9352  
Epoch 17/20  
108/108 [=====] - 0s 148us/step - loss: 1.0139 - acc: 0.8056  
Epoch 18/20  
108/108 [=====] - 0s 154us/step - loss: 0.9659 - acc: 0.9537  
Epoch 19/20  
108/108 [=====] - 0s 161us/step - loss: 0.9507 - acc: 0.8148  
Epoch 20/20  
108/108 [=====] - 0s 156us/step - loss: 0.9420 - acc: 0.7778  
27/27 [=====] - 4s 138ms/step  
108/108 [=====] - 0s 115us/step  
Epoch 1/20  
108/108 [=====] - 8s 73ms/step - loss: 10.1042 - acc: 0.3519  
Epoch 2/20  
108/108 [=====] - 0s 239us/step - loss: 9.6584 - acc: 0.6852  
Epoch 3/20  
108/108 [=====] - 0s 218us/step - loss: 9.2348 - acc: 0.8148  
Epoch 4/20  
108/108 [=====] - 0s 224us/step - loss: 8.8205 - acc: 0.7870  
Epoch 5/20  
108/108 [=====] - 0s 169us/step - loss: 8.4088 - acc: 0.7037  
Epoch 6/20  
108/108 [=====] - 0s 160us/step - loss: 8.0329 - acc: 0.6852  
Epoch 7/20  
108/108 [=====] - 0s 159us/step - loss: 7.6741 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 164us/step - loss: 7.3264 - acc: 0.6852  
Epoch 9/20  
108/108 [=====] - 0s 209us/step - loss: 6.9948 - acc: 0.6852  
Epoch 10/20  
108/108 [=====] - 0s 215us/step - loss: 6.6784 - acc: 0.6852  
Epoch 11/20  
108/108 [=====] - 0s 172us/step - loss: 6.3731 - acc: 0.6852

Epoch 12/20  
108/108 [=====] - 0s 159us/step - loss: 6.0822 - acc: 0.6944  
Epoch 13/20  
108/108 [=====] - 0s 163us/step - loss: 5.8041 - acc: 0.8241  
Epoch 14/20  
108/108 [=====] - 0s 196us/step - loss: 5.5454 - acc: 0.9722  
Epoch 15/20  
108/108 [=====] - 0s 179us/step - loss: 5.2995 - acc: 0.9630  
Epoch 16/20  
108/108 [=====] - 0s 164us/step - loss: 5.0558 - acc: 0.9352  
Epoch 17/20  
108/108 [=====] - 0s 163us/step - loss: 4.8292 - acc: 0.8148  
Epoch 18/20  
108/108 [=====] - 0s 166us/step - loss: 4.6129 - acc: 0.7593  
Epoch 19/20  
108/108 [=====] - 0s 160us/step - loss: 4.4108 - acc: 0.7037  
Epoch 20/20  
108/108 [=====] - 0s 196us/step - loss: 4.2193 - acc: 0.6852  
27/27 [=====] - 4s 145ms/step  
108/108 [=====] - 0s 133us/step  
Epoch 1/20  
108/108 [=====] - 8s 75ms/step - loss: 10.6640 - acc: 0.3519  
Epoch 2/20  
108/108 [=====] - 0s 152us/step - loss: 10.0554 - acc: 0.3519  
Epoch 3/20  
108/108 [=====] - 0s 161us/step - loss: 9.6775 - acc: 0.3333  
Epoch 4/20  
108/108 [=====] - 0s 149us/step - loss: 9.2823 - acc: 0.3333  
Epoch 5/20  
108/108 [=====] - 0s 149us/step - loss: 8.8612 - acc: 0.3056  
Epoch 6/20  
108/108 [=====] - 0s 152us/step - loss: 8.4850 - acc: 0.6204  
Epoch 7/20  
108/108 [=====] - 0s 163us/step - loss: 8.1244 - acc: 0.6574  
Epoch 8/20  
108/108 [=====] - 0s 153us/step - loss: 7.7792 - acc: 0.6852  
Epoch 9/20  
108/108 [=====] - 0s 147us/step - loss: 7.4508 - acc: 0.6852  
Epoch 10/20  
108/108 [=====] - 0s 149us/step - loss: 7.1267 - acc: 0.6852  
Epoch 11/20  
108/108 [=====] - 0s 150us/step - loss: 6.8172 - acc: 0.6852  
Epoch 12/20  
108/108 [=====] - 0s 157us/step - loss: 6.5245 - acc: 0.6852  
Epoch 13/20  
108/108 [=====] - 0s 155us/step - loss: 6.2460 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 160us/step - loss: 5.9800 - acc: 0.7315

Epoch 15/20  
108/108 [=====] - 0s 194us/step - loss: 5.7222 - acc: 0.6852  
Epoch 16/20  
108/108 [=====] - 0s 228us/step - loss: 5.4850 - acc: 0.6852  
Epoch 17/20  
108/108 [=====] - 0s 235us/step - loss: 5.2566 - acc: 0.6852  
Epoch 18/20  
108/108 [=====] - 0s 190us/step - loss: 5.0335 - acc: 0.6852  
Epoch 19/20  
108/108 [=====] - 0s 159us/step - loss: 4.8218 - acc: 0.8796  
Epoch 20/20  
108/108 [=====] - 0s 160us/step - loss: 4.6198 - acc: 0.8148  
27/27 [=====] - 4s 134ms/step  
108/108 [=====] - 0s 135us/step  
Epoch 1/20  
108/108 [=====] - 9s 80ms/step - loss: 10.2900 - acc: 0.3704  
Epoch 2/20  
108/108 [=====] - 0s 164us/step - loss: 9.8488 - acc: 0.5556  
Epoch 3/20  
108/108 [=====] - 0s 155us/step - loss: 9.4340 - acc: 0.5000  
Epoch 4/20  
108/108 [=====] - 0s 154us/step - loss: 9.0260 - acc: 0.6296  
Epoch 5/20  
108/108 [=====] - 0s 165us/step - loss: 8.6235 - acc: 0.7130  
Epoch 6/20  
108/108 [=====] - 0s 164us/step - loss: 8.2421 - acc: 0.9259  
Epoch 7/20  
108/108 [=====] - 0s 166us/step - loss: 7.8747 - acc: 0.8519  
Epoch 8/20  
108/108 [=====] - 0s 157us/step - loss: 7.5212 - acc: 0.8981  
Epoch 9/20  
108/108 [=====] - 0s 158us/step - loss: 7.1805 - acc: 0.9630  
Epoch 10/20  
108/108 [=====] - 0s 225us/step - loss: 6.8557 - acc: 0.9444  
Epoch 11/20  
108/108 [=====] - 0s 181us/step - loss: 6.5455 - acc: 0.9630  
Epoch 12/20  
108/108 [=====] - 0s 192us/step - loss: 6.2519 - acc: 0.9444  
Epoch 13/20  
108/108 [=====] - 0s 238us/step - loss: 5.9659 - acc: 0.9630  
Epoch 14/20  
108/108 [=====] - 0s 251us/step - loss: 5.7012 - acc: 0.8333  
Epoch 15/20  
108/108 [=====] - 0s 226us/step - loss: 5.4457 - acc: 0.6852  
Epoch 16/20  
108/108 [=====] - 0s 289us/step - loss: 5.2011 - acc: 0.7130  
Epoch 17/20  
108/108 [=====] - 0s 199us/step - loss: 4.9653 - acc: 0.9259

Epoch 18/20  
108/108 [=====] - 0s 200us/step - loss: 4.7550 - acc: 0.8704  
Epoch 19/20  
108/108 [=====] - 0s 180us/step - loss: 4.5583 - acc: 0.6852  
Epoch 20/20  
108/108 [=====] - 0s 180us/step - loss: 4.3544 - acc: 0.7130  
27/27 [=====] - 4s 151ms/step  
108/108 [=====] - 0s 129us/step  
Epoch 1/20  
108/108 [=====] - 8s 76ms/step - loss: 10.3961 - acc: 0.3333  
Epoch 2/20  
108/108 [=====] - 0s 161us/step - loss: 9.9343 - acc: 0.3611  
Epoch 3/20  
108/108 [=====] - 0s 165us/step - loss: 9.5106 - acc: 0.3611  
Epoch 4/20  
108/108 [=====] - 0s 157us/step - loss: 9.1057 - acc: 0.3611  
Epoch 5/20  
108/108 [=====] - 0s 179us/step - loss: 8.7111 - acc: 0.3611  
Epoch 6/20  
108/108 [=====] - 0s 187us/step - loss: 8.3313 - acc: 0.3611  
Epoch 7/20  
108/108 [=====] - 0s 211us/step - loss: 7.9807 - acc: 0.3981  
Epoch 8/20  
108/108 [=====] - 0s 196us/step - loss: 7.6563 - acc: 0.3333  
Epoch 9/20  
108/108 [=====] - 0s 190us/step - loss: 7.3419 - acc: 0.3333  
Epoch 10/20  
108/108 [=====] - 0s 212us/step - loss: 7.0229 - acc: 0.4352  
Epoch 11/20  
108/108 [=====] - 0s 162us/step - loss: 6.7109 - acc: 0.3611  
Epoch 12/20  
108/108 [=====] - 0s 160us/step - loss: 6.4101 - acc: 0.4444  
Epoch 13/20  
108/108 [=====] - 0s 211us/step - loss: 6.1315 - acc: 0.6667  
Epoch 14/20  
108/108 [=====] - 0s 165us/step - loss: 5.8734 - acc: 0.6667  
Epoch 15/20  
108/108 [=====] - 0s 161us/step - loss: 5.6266 - acc: 0.6667  
Epoch 16/20  
108/108 [=====] - 0s 155us/step - loss: 5.3884 - acc: 0.6667  
Epoch 17/20  
108/108 [=====] - 0s 206us/step - loss: 5.1611 - acc: 0.6667  
Epoch 18/20  
108/108 [=====] - 0s 172us/step - loss: 4.9373 - acc: 0.6667  
Epoch 19/20  
108/108 [=====] - 0s 161us/step - loss: 4.7268 - acc: 0.6667  
Epoch 20/20  
108/108 [=====] - 0s 158us/step - loss: 4.5329 - acc: 0.7222

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27/27 [=====] - 4s 138ms/step
108/108 [=====] - 0s 148us/step
Epoch 1/20
108/108 [=====] - 9s 79ms/step - loss: 10.4444 - acc: 0.3333
Epoch 2/20
108/108 [=====] - 0s 179us/step - loss: 9.9559 - acc: 0.3426
Epoch 3/20
108/108 [=====] - 0s 167us/step - loss: 9.5119 - acc: 0.5000
Epoch 4/20
108/108 [=====] - 0s 170us/step - loss: 9.1127 - acc: 0.6574
Epoch 5/20
108/108 [=====] - 0s 185us/step - loss: 8.7104 - acc: 0.6667
Epoch 6/20
108/108 [=====] - 0s 163us/step - loss: 8.3177 - acc: 0.6852
Epoch 7/20
108/108 [=====] - 0s 164us/step - loss: 7.9547 - acc: 0.7963
Epoch 8/20
108/108 [=====] - 0s 162us/step - loss: 7.6028 - acc: 0.7222
Epoch 9/20
108/108 [=====] - 0s 170us/step - loss: 7.2612 - acc: 0.8056
Epoch 10/20
108/108 [=====] - 0s 150us/step - loss: 6.9361 - acc: 0.9167
Epoch 11/20
108/108 [=====] - 0s 211us/step - loss: 6.6268 - acc: 0.6944
Epoch 12/20
108/108 [=====] - 0s 153us/step - loss: 6.3355 - acc: 0.6667
Epoch 13/20
108/108 [=====] - 0s 152us/step - loss: 6.0582 - acc: 0.6667
Epoch 14/20
108/108 [=====] - 0s 175us/step - loss: 5.7897 - acc: 0.6667
Epoch 15/20
108/108 [=====] - 0s 157us/step - loss: 5.5313 - acc: 0.6759
Epoch 16/20
108/108 [=====] - 0s 157us/step - loss: 5.2849 - acc: 0.7593
Epoch 17/20
108/108 [=====] - 0s 173us/step - loss: 5.0516 - acc: 0.8519
Epoch 18/20
108/108 [=====] - 0s 155us/step - loss: 4.8313 - acc: 0.9630
Epoch 19/20
108/108 [=====] - 0s 150us/step - loss: 4.6276 - acc: 0.8519
Epoch 20/20
108/108 [=====] - 0s 149us/step - loss: 4.4271 - acc: 0.8611
27/27 [=====] - 4s 136ms/step
108/108 [=====] - 0s 132us/step
Epoch 1/20
108/108 [=====] - 9s 80ms/step - loss: 91.8708 - acc: 0.3426
Epoch 2/20
108/108 [=====] - 0s 167us/step - loss: 87.9232 - acc: 0.3426

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Epoch 3/20  
108/108 [=====] - 0s 221us/step - loss: 83.7412 - acc: 0.3704  
Epoch 4/20  
108/108 [=====] - 0s 163us/step - loss: 79.6222 - acc: 0.5463  
Epoch 5/20  
108/108 [=====] - 0s 189us/step - loss: 75.6240 - acc: 0.6296  
Epoch 6/20  
108/108 [=====] - 0s 168us/step - loss: 71.7664 - acc: 0.6019  
Epoch 7/20  
108/108 [=====] - 0s 152us/step - loss: 68.0637 - acc: 0.6667  
Epoch 8/20  
108/108 [=====] - 0s 158us/step - loss: 64.5216 - acc: 0.8704  
Epoch 9/20  
108/108 [=====] - 0s 152us/step - loss: 61.1390 - acc: 0.8981  
Epoch 10/20  
108/108 [=====] - 0s 162us/step - loss: 57.9132 - acc: 0.9074  
Epoch 11/20  
108/108 [=====] - 0s 174us/step - loss: 54.8379 - acc: 0.8611  
Epoch 12/20  
108/108 [=====] - 0s 155us/step - loss: 51.9116 - acc: 0.7222  
Epoch 13/20  
108/108 [=====] - 0s 170us/step - loss: 49.1350 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 155us/step - loss: 46.4955 - acc: 0.6852  
Epoch 15/20  
108/108 [=====] - 0s 158us/step - loss: 43.9908 - acc: 0.6852  
Epoch 16/20  
108/108 [=====] - 0s 283us/step - loss: 41.6134 - acc: 0.6852  
Epoch 17/20  
108/108 [=====] - 0s 236us/step - loss: 39.3573 - acc: 0.6852  
Epoch 18/20  
108/108 [=====] - 0s 195us/step - loss: 37.2168 - acc: 0.6852  
Epoch 19/20  
108/108 [=====] - 0s 187us/step - loss: 35.1874 - acc: 0.6852  
Epoch 20/20  
108/108 [=====] - 0s 166us/step - loss: 33.2665 - acc: 0.6852  
27/27 [=====] - 4s 139ms/step  
108/108 [=====] - 0s 146us/step  
Epoch 1/20  
108/108 [=====] - 9s 79ms/step - loss: 94.8624 - acc: 0.3796  
Epoch 2/20  
108/108 [=====] - 0s 177us/step - loss: 90.8797 - acc: 0.3333  
Epoch 3/20  
108/108 [=====] - 0s 193us/step - loss: 86.6417 - acc: 0.3333  
Epoch 4/20  
108/108 [=====] - 0s 166us/step - loss: 82.4617 - acc: 0.3519  
Epoch 5/20  
108/108 [=====] - 0s 152us/step - loss: 78.3958 - acc: 0.5833

Epoch 6/20  
108/108 [=====] - 0s 168us/step - loss: 74.4736 - acc: 0.6852  
Epoch 7/20  
108/108 [=====] - 0s 154us/step - loss: 70.7037 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 176us/step - loss: 67.0932 - acc: 0.6852  
Epoch 9/20  
108/108 [=====] - 0s 164us/step - loss: 63.6398 - acc: 0.6852  
Epoch 10/20  
108/108 [=====] - 0s 157us/step - loss: 60.3431 - acc: 0.6852  
Epoch 11/20  
108/108 [=====] - 0s 152us/step - loss: 57.2020 - acc: 0.6852  
Epoch 12/20  
108/108 [=====] - 0s 179us/step - loss: 54.2121 - acc: 0.6852  
Epoch 13/20  
108/108 [=====] - 0s 171us/step - loss: 51.3698 - acc: 0.6944  
Epoch 14/20  
108/108 [=====] - 0s 161us/step - loss: 48.6679 - acc: 0.7130  
Epoch 15/20  
108/108 [=====] - 0s 186us/step - loss: 46.1012 - acc: 0.7407  
Epoch 16/20  
108/108 [=====] - 0s 157us/step - loss: 43.6587 - acc: 0.7037  
Epoch 17/20  
108/108 [=====] - 0s 163us/step - loss: 41.3374 - acc: 0.6852  
Epoch 18/20  
108/108 [=====] - 0s 154us/step - loss: 39.1369 - acc: 0.6852  
Epoch 19/20  
108/108 [=====] - 0s 158us/step - loss: 37.0542 - acc: 0.6852  
Epoch 20/20  
108/108 [=====] - 0s 203us/step - loss: 35.0782 - acc: 0.6852  
27/27 [=====] - 4s 141ms/step  
108/108 [=====] - 0s 125us/step  
Epoch 1/20  
108/108 [=====] - 9s 80ms/step - loss: 92.5745 - acc: 0.3148  
Epoch 2/20  
108/108 [=====] - 0s 156us/step - loss: 88.6232 - acc: 0.1574  
Epoch 3/20  
108/108 [=====] - 0s 179us/step - loss: 84.4460 - acc: 0.3704  
Epoch 4/20  
108/108 [=====] - 0s 155us/step - loss: 80.3327 - acc: 0.3704  
Epoch 5/20  
108/108 [=====] - 0s 152us/step - loss: 76.3384 - acc: 0.3611  
Epoch 6/20  
108/108 [=====] - 0s 162us/step - loss: 72.4829 - acc: 0.3704  
Epoch 7/20  
108/108 [=====] - 0s 164us/step - loss: 68.7906 - acc: 0.3704  
Epoch 8/20  
108/108 [=====] - 0s 155us/step - loss: 65.2651 - acc: 0.3704

Epoch 9/20  
108/108 [=====] - 0s 198us/step - loss: 61.8929 - acc: 0.3704  
Epoch 10/20  
108/108 [=====] - 0s 163us/step - loss: 58.6683 - acc: 0.3704  
Epoch 11/20  
108/108 [=====] - 0s 190us/step - loss: 55.5901 - acc: 0.3796  
Epoch 12/20  
108/108 [=====] - 0s 166us/step - loss: 52.6560 - acc: 0.6759  
Epoch 13/20  
108/108 [=====] - 0s 153us/step - loss: 49.8736 - acc: 0.8704  
Epoch 14/20  
108/108 [=====] - 0s 155us/step - loss: 47.2294 - acc: 0.7315  
Epoch 15/20  
108/108 [=====] - 0s 152us/step - loss: 44.7175 - acc: 0.8519  
Epoch 16/20  
108/108 [=====] - 0s 162us/step - loss: 42.3326 - acc: 0.9537  
Epoch 17/20  
108/108 [=====] - 0s 162us/step - loss: 40.0686 - acc: 0.9722  
Epoch 18/20  
108/108 [=====] - 0s 195us/step - loss: 37.9204 - acc: 0.8611  
Epoch 19/20  
108/108 [=====] - 0s 151us/step - loss: 35.8852 - acc: 0.6574  
Epoch 20/20  
108/108 [=====] - 0s 157us/step - loss: 33.9540 - acc: 0.6296  
27/27 [=====] - 4s 141ms/step  
108/108 [=====] - 0s 125us/step  
Epoch 1/20  
108/108 [=====] - 9s 80ms/step - loss: 93.5506 - acc: 0.3056  
Epoch 2/20  
108/108 [=====] - 0s 179us/step - loss: 89.5664 - acc: 0.2778  
Epoch 3/20  
108/108 [=====] - 0s 170us/step - loss: 85.3727 - acc: 0.3426  
Epoch 4/20  
108/108 [=====] - 0s 165us/step - loss: 81.2463 - acc: 0.3611  
Epoch 5/20  
108/108 [=====] - 0s 166us/step - loss: 77.2374 - acc: 0.3611  
Epoch 6/20  
108/108 [=====] - 0s 168us/step - loss: 73.3666 - acc: 0.3611  
Epoch 7/20  
108/108 [=====] - 0s 174us/step - loss: 69.6446 - acc: 0.3611  
Epoch 8/20  
108/108 [=====] - 0s 155us/step - loss: 66.0808 - acc: 0.3611  
Epoch 9/20  
108/108 [=====] - 0s 173us/step - loss: 62.6788 - acc: 0.3704  
Epoch 10/20  
108/108 [=====] - 0s 165us/step - loss: 59.4295 - acc: 0.5463  
Epoch 11/20  
108/108 [=====] - 0s 161us/step - loss: 56.3345 - acc: 0.6574



Epoch 12/20  
108/108 [=====] - 0s 156us/step - loss: 53.3887 - acc: 0.6667  
Epoch 13/20  
108/108 [=====] - 0s 195us/step - loss: 50.5835 - acc: 0.6667  
Epoch 14/20  
108/108 [=====] - 0s 169us/step - loss: 47.9172 - acc: 0.6667  
Epoch 15/20  
108/108 [=====] - 0s 168us/step - loss: 45.3834 - acc: 0.6667  
Epoch 16/20  
108/108 [=====] - 0s 167us/step - loss: 42.9772 - acc: 0.6667  
Epoch 17/20  
108/108 [=====] - 0s 184us/step - loss: 40.6931 - acc: 0.6667  
Epoch 18/20  
108/108 [=====] - 0s 157us/step - loss: 38.5277 - acc: 0.6667  
Epoch 19/20  
108/108 [=====] - 0s 195us/step - loss: 36.4721 - acc: 0.6667  
Epoch 20/20  
108/108 [=====] - 0s 188us/step - loss: 34.5223 - acc: 0.6667  
27/27 [=====] - 4s 142ms/step  
108/108 [=====] - 0s 145us/step  
Epoch 1/20  
108/108 [=====] - 9s 81ms/step - loss: 93.6527 - acc: 0.3519  
Epoch 2/20  
108/108 [=====] - 0s 147us/step - loss: 89.6506 - acc: 0.3519  
Epoch 3/20  
108/108 [=====] - 0s 148us/step - loss: 85.4216 - acc: 0.3611  
Epoch 4/20  
108/108 [=====] - 0s 147us/step - loss: 81.2597 - acc: 0.6574  
Epoch 5/20  
108/108 [=====] - 0s 153us/step - loss: 77.2218 - acc: 0.7685  
Epoch 6/20  
108/108 [=====] - 0s 153us/step - loss: 73.3301 - acc: 0.8889  
Epoch 7/20  
108/108 [=====] - 0s 154us/step - loss: 69.5933 - acc: 0.7037  
Epoch 8/20  
108/108 [=====] - 0s 167us/step - loss: 66.0123 - acc: 0.6667  
Epoch 9/20  
108/108 [=====] - 0s 154us/step - loss: 62.5897 - acc: 0.6759  
Epoch 10/20  
108/108 [=====] - 0s 151us/step - loss: 59.3277 - acc: 0.7407  
Epoch 11/20  
108/108 [=====] - 0s 150us/step - loss: 56.2230 - acc: 0.8519  
Epoch 12/20  
108/108 [=====] - 0s 150us/step - loss: 53.2662 - acc: 0.7685  
Epoch 13/20  
108/108 [=====] - 0s 162us/step - loss: 50.4498 - acc: 0.7870  
Epoch 14/20  
108/108 [=====] - 0s 145us/step - loss: 47.7703 - acc: 0.8519

Epoch 15/20  
108/108 [=====] - 0s 153us/step - loss: 45.2251 - acc: 0.7963  
Epoch 16/20  
108/108 [=====] - 0s 153us/step - loss: 42.8084 - acc: 0.7778  
Epoch 17/20  
108/108 [=====] - 0s 152us/step - loss: 40.5147 - acc: 0.8148  
Epoch 18/20  
108/108 [=====] - 0s 152us/step - loss: 38.3407 - acc: 0.9074  
Epoch 19/20  
108/108 [=====] - 0s 152us/step - loss: 36.2777 - acc: 0.7500  
Epoch 20/20  
108/108 [=====] - 0s 147us/step - loss: 34.3201 - acc: 0.6852  
27/27 [=====] - 4s 140ms/step  
108/108 [=====] - 0s 129us/step  
Epoch 1/20  
108/108 [=====] - 9s 80ms/step - loss: 2.1260 - acc: 0.5000  
Epoch 2/20  
108/108 [=====] - 0s 231us/step - loss: 1.9625 - acc: 0.6852  
Epoch 3/20  
108/108 [=====] - 0s 231us/step - loss: 1.8296 - acc: 0.6852  
Epoch 4/20  
108/108 [=====] - 0s 247us/step - loss: 1.7148 - acc: 0.6852  
Epoch 5/20  
108/108 [=====] - 0s 202us/step - loss: 1.6114 - acc: 0.6852  
Epoch 6/20  
108/108 [=====] - 0s 194us/step - loss: 1.5315 - acc: 0.8611  
Epoch 7/20  
108/108 [=====] - 0s 187us/step - loss: 1.4416 - acc: 0.8889  
Epoch 8/20  
108/108 [=====] - 0s 191us/step - loss: 1.3747 - acc: 0.6852  
Epoch 9/20  
108/108 [=====] - 0s 222us/step - loss: 1.3085 - acc: 0.6852  
Epoch 10/20  
108/108 [=====] - 0s 251us/step - loss: 1.2371 - acc: 0.7685  
Epoch 11/20  
108/108 [=====] - 0s 252us/step - loss: 1.1773 - acc: 0.8889  
Epoch 12/20  
108/108 [=====] - 0s 241us/step - loss: 1.1324 - acc: 0.9815  
Epoch 13/20  
108/108 [=====] - 0s 246us/step - loss: 1.0786 - acc: 0.9722  
Epoch 14/20  
108/108 [=====] - 0s 227us/step - loss: 1.0428 - acc: 0.8611  
Epoch 15/20  
108/108 [=====] - 0s 270us/step - loss: 1.0136 - acc: 0.8148  
Epoch 16/20  
108/108 [=====] - 0s 224us/step - loss: 0.9698 - acc: 0.8611  
Epoch 17/20  
108/108 [=====] - 0s 180us/step - loss: 0.9314 - acc: 0.8889

Epoch 18/20  
108/108 [=====] - 0s 162us/step - loss: 0.8941 - acc: 0.9630  
Epoch 19/20  
108/108 [=====] - 0s 195us/step - loss: 0.8714 - acc: 0.9722  
Epoch 20/20  
108/108 [=====] - 0s 158us/step - loss: 0.8363 - acc: 0.9815  
27/27 [=====] - 4s 144ms/step  
108/108 [=====] - 0s 135us/step  
Epoch 1/20  
108/108 [=====] - 9s 82ms/step - loss: 2.1886 - acc: 0.4722  
Epoch 2/20  
108/108 [=====] - 0s 164us/step - loss: 2.0340 - acc: 0.7130  
Epoch 3/20  
108/108 [=====] - 0s 166us/step - loss: 1.9009 - acc: 0.6852  
Epoch 4/20  
108/108 [=====] - 0s 173us/step - loss: 1.7902 - acc: 0.6852  
Epoch 5/20  
108/108 [=====] - 0s 159us/step - loss: 1.6908 - acc: 0.6852  
Epoch 6/20  
108/108 [=====] - 0s 159us/step - loss: 1.5942 - acc: 0.6852  
Epoch 7/20  
108/108 [=====] - 0s 161us/step - loss: 1.5059 - acc: 0.7222  
Epoch 8/20  
108/108 [=====] - 0s 188us/step - loss: 1.4162 - acc: 0.8148  
Epoch 9/20  
108/108 [=====] - 0s 160us/step - loss: 1.3403 - acc: 0.7130  
Epoch 10/20  
108/108 [=====] - 0s 155us/step - loss: 1.2696 - acc: 0.8056  
Epoch 11/20  
108/108 [=====] - 0s 149us/step - loss: 1.2065 - acc: 0.9259  
Epoch 12/20  
108/108 [=====] - 0s 156us/step - loss: 1.1554 - acc: 0.9444  
Epoch 13/20  
108/108 [=====] - 0s 165us/step - loss: 1.1016 - acc: 0.9537  
Epoch 14/20  
108/108 [=====] - 0s 159us/step - loss: 1.0553 - acc: 0.9630  
Epoch 15/20  
108/108 [=====] - 0s 160us/step - loss: 1.0073 - acc: 0.8981  
Epoch 16/20  
108/108 [=====] - 0s 154us/step - loss: 0.9691 - acc: 0.8611  
Epoch 17/20  
108/108 [=====] - 0s 162us/step - loss: 0.9326 - acc: 0.8611  
Epoch 18/20  
108/108 [=====] - 0s 163us/step - loss: 0.8964 - acc: 0.9352  
Epoch 19/20  
108/108 [=====] - 0s 155us/step - loss: 0.8646 - acc: 0.9630  
Epoch 20/20  
108/108 [=====] - 0s 161us/step - loss: 0.8325 - acc: 0.9630

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27/27 [=====] - 4s 144ms/step
108/108 [=====] - 0s 252us/step
Epoch 1/20
108/108 [=====] - 9s 82ms/step - loss: 2.4363 - acc: 0.3333
Epoch 2/20
108/108 [=====] - 0s 214us/step - loss: 2.0566 - acc: 0.4352
Epoch 3/20
108/108 [=====] - 0s 191us/step - loss: 2.0390 - acc: 0.3796
Epoch 4/20
108/108 [=====] - 0s 169us/step - loss: 1.9083 - acc: 0.5000
Epoch 5/20
108/108 [=====] - 0s 167us/step - loss: 1.7406 - acc: 0.5093
Epoch 6/20
108/108 [=====] - 0s 233us/step - loss: 1.6357 - acc: 0.8519
Epoch 7/20
108/108 [=====] - 0s 200us/step - loss: 1.5688 - acc: 0.9352
Epoch 8/20
108/108 [=====] - 0s 161us/step - loss: 1.4794 - acc: 0.8704
Epoch 9/20
108/108 [=====] - 0s 204us/step - loss: 1.4034 - acc: 0.8056
Epoch 10/20
108/108 [=====] - 0s 234us/step - loss: 1.3400 - acc: 0.9167
Epoch 11/20
108/108 [=====] - 0s 231us/step - loss: 1.2865 - acc: 0.9352
Epoch 12/20
108/108 [=====] - 0s 202us/step - loss: 1.2334 - acc: 0.9444
Epoch 13/20
108/108 [=====] - 0s 234us/step - loss: 1.1784 - acc: 0.9630
Epoch 14/20
108/108 [=====] - 0s 212us/step - loss: 1.1354 - acc: 0.9444
Epoch 15/20
108/108 [=====] - 0s 174us/step - loss: 1.0941 - acc: 0.9722
Epoch 16/20
108/108 [=====] - 0s 200us/step - loss: 1.0592 - acc: 0.9537
Epoch 17/20
108/108 [=====] - 0s 192us/step - loss: 1.0223 - acc: 0.9444
Epoch 18/20
108/108 [=====] - 0s 174us/step - loss: 0.9865 - acc: 0.9722
Epoch 19/20
108/108 [=====] - 0s 208us/step - loss: 0.9643 - acc: 0.8981
Epoch 20/20
108/108 [=====] - 0s 203us/step - loss: 0.9260 - acc: 0.9444
27/27 [=====] - 4s 144ms/step
108/108 [=====] - 0s 161us/step
Epoch 1/20
108/108 [=====] - 9s 82ms/step - loss: 2.1045 - acc: 0.6481
Epoch 2/20
108/108 [=====] - 0s 193us/step - loss: 1.9471 - acc: 0.6667

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Epoch 3/20  
108/108 [=====] - 0s 162us/step - loss: 1.8210 - acc: 0.6667  
Epoch 4/20  
108/108 [=====] - 0s 173us/step - loss: 1.6862 - acc: 0.6667  
Epoch 5/20  
108/108 [=====] - 0s 162us/step - loss: 1.5843 - acc: 0.8148  
Epoch 6/20  
108/108 [=====] - 0s 188us/step - loss: 1.4968 - acc: 0.7315  
Epoch 7/20  
108/108 [=====] - 0s 165us/step - loss: 1.4384 - acc: 0.6667  
Epoch 8/20  
108/108 [=====] - 0s 188us/step - loss: 1.3796 - acc: 0.6667  
Epoch 9/20  
108/108 [=====] - 0s 187us/step - loss: 1.3002 - acc: 0.6667  
Epoch 10/20  
108/108 [=====] - 0s 191us/step - loss: 1.2372 - acc: 0.7130  
Epoch 11/20  
108/108 [=====] - 0s 196us/step - loss: 1.1816 - acc: 0.8148  
Epoch 12/20  
108/108 [=====] - 0s 192us/step - loss: 1.1320 - acc: 0.8796  
Epoch 13/20  
108/108 [=====] - 0s 188us/step - loss: 1.0893 - acc: 0.9537  
Epoch 14/20  
108/108 [=====] - 0s 236us/step - loss: 1.0464 - acc: 0.9722  
Epoch 15/20  
108/108 [=====] - 0s 247us/step - loss: 1.0052 - acc: 0.8889  
Epoch 16/20  
108/108 [=====] - 0s 234us/step - loss: 0.9684 - acc: 0.8333  
Epoch 17/20  
108/108 [=====] - 0s 205us/step - loss: 0.9323 - acc: 0.9537  
Epoch 18/20  
108/108 [=====] - 0s 201us/step - loss: 0.8955 - acc: 0.9630  
Epoch 19/20  
108/108 [=====] - 0s 226us/step - loss: 0.8736 - acc: 0.8704  
Epoch 20/20  
108/108 [=====] - 0s 184us/step - loss: 0.8579 - acc: 0.8148  
27/27 [=====] - 4s 147ms/step  
108/108 [=====] - 0s 132us/step  
Epoch 1/20  
108/108 [=====] - 9s 85ms/step - loss: 2.1999 - acc: 0.3148  
Epoch 2/20  
108/108 [=====] - 0s 160us/step - loss: 2.0116 - acc: 0.6852  
Epoch 3/20  
108/108 [=====] - 0s 159us/step - loss: 1.8680 - acc: 0.6852  
Epoch 4/20  
108/108 [=====] - 0s 189us/step - loss: 1.7129 - acc: 0.7870  
Epoch 5/20  
108/108 [=====] - 0s 175us/step - loss: 1.5897 - acc: 0.7870

Epoch 6/20  
 108/108 [=====] - 0s 218us/step - loss: 1.4863 - acc: 0.8981  
 Epoch 7/20  
 108/108 [=====] - 0s 175us/step - loss: 1.4094 - acc: 0.8889  
 Epoch 8/20  
 108/108 [=====] - 0s 166us/step - loss: 1.3430 - acc: 0.7963  
 Epoch 9/20  
 108/108 [=====] - 0s 175us/step - loss: 1.2639 - acc: 0.9444  
 Epoch 10/20  
 108/108 [=====] - 0s 164us/step - loss: 1.2084 - acc: 0.8241  
 Epoch 11/20  
 108/108 [=====] - 0s 155us/step - loss: 1.1601 - acc: 0.7685  
 Epoch 12/20  
 108/108 [=====] - 0s 159us/step - loss: 1.0962 - acc: 0.9352  
 Epoch 13/20  
 108/108 [=====] - 0s 162us/step - loss: 1.0757 - acc: 0.8333  
 Epoch 14/20  
 108/108 [=====] - 0s 193us/step - loss: 1.0320 - acc: 0.8796  
 Epoch 15/20  
 108/108 [=====] - 0s 159us/step - loss: 0.9865 - acc: 0.9444  
 Epoch 16/20  
 108/108 [=====] - 0s 168us/step - loss: 0.9520 - acc: 0.8611  
 Epoch 17/20  
 108/108 [=====] - 0s 163us/step - loss: 0.9141 - acc: 0.9352  
 Epoch 18/20  
 108/108 [=====] - 0s 173us/step - loss: 0.8782 - acc: 0.9537  
 Epoch 19/20  
 108/108 [=====] - 0s 171us/step - loss: 0.8489 - acc: 0.9537  
 Epoch 20/20  
 108/108 [=====] - 0s 159us/step - loss: 0.8217 - acc: 0.9630  
 27/27 [=====] - 4s 147ms/step  
 108/108 [=====] - 0s 196us/step  
 Epoch 1/20  
 108/108 [=====] - 9s 83ms/step - loss: 12.1779 - acc: 0.3148  
 Epoch 2/20  
 108/108 [=====] - 0s 164us/step - loss: 11.4543 - acc: 0.1944  
 Epoch 3/20  
 108/108 [=====] - 0s 174us/step - loss: 10.7924 - acc: 0.3426  
 Epoch 4/20  
 108/108 [=====] - 0s 166us/step - loss: 10.1786 - acc: 0.3426  
 Epoch 5/20  
 108/108 [=====] - 0s 223us/step - loss: 9.5739 - acc: 0.6481  
 Epoch 6/20  
 108/108 [=====] - 0s 169us/step - loss: 8.9994 - acc: 0.6852  
 Epoch 7/20  
 108/108 [=====] - 0s 199us/step - loss: 8.4650 - acc: 0.6852  
 Epoch 8/20  
 108/108 [=====] - 0s 163us/step - loss: 7.9667 - acc: 0.9630

Epoch 9/20  
108/108 [=====] - 0s 201us/step - loss: 7.4973 - acc: 0.9352  
Epoch 10/20  
108/108 [=====] - 0s 207us/step - loss: 7.0473 - acc: 0.8241  
Epoch 11/20  
108/108 [=====] - 0s 209us/step - loss: 6.6324 - acc: 0.6852  
Epoch 12/20  
108/108 [=====] - 0s 182us/step - loss: 6.2424 - acc: 0.6852  
Epoch 13/20  
108/108 [=====] - 0s 219us/step - loss: 5.8744 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 218us/step - loss: 5.5277 - acc: 0.6852  
Epoch 15/20  
108/108 [=====] - 0s 208us/step - loss: 5.2041 - acc: 0.8241  
Epoch 16/20  
108/108 [=====] - 0s 163us/step - loss: 4.9070 - acc: 0.9630  
Epoch 17/20  
108/108 [=====] - 0s 233us/step - loss: 4.6217 - acc: 0.9722  
Epoch 18/20  
108/108 [=====] - 0s 235us/step - loss: 4.3510 - acc: 0.8796  
Epoch 19/20  
108/108 [=====] - 0s 167us/step - loss: 4.1043 - acc: 0.6944  
Epoch 20/20  
108/108 [=====] - 0s 190us/step - loss: 3.8751 - acc: 0.6852  
27/27 [=====] - 4s 147ms/step  
108/108 [=====] - 0s 166us/step  
Epoch 1/20  
108/108 [=====] - 9s 83ms/step - loss: 11.9945 - acc: 0.6667  
Epoch 2/20  
108/108 [=====] - 0s 167us/step - loss: 11.2940 - acc: 0.6204  
Epoch 3/20  
108/108 [=====] - 0s 163us/step - loss: 10.6616 - acc: 0.6574  
Epoch 4/20  
108/108 [=====] - 0s 184us/step - loss: 10.0611 - acc: 0.6296  
Epoch 5/20  
108/108 [=====] - 0s 235us/step - loss: 9.4585 - acc: 0.6852  
Epoch 6/20  
108/108 [=====] - 0s 202us/step - loss: 8.9046 - acc: 0.6759  
Epoch 7/20  
108/108 [=====] - 0s 205us/step - loss: 8.3838 - acc: 0.6667  
Epoch 8/20  
108/108 [=====] - 0s 185us/step - loss: 7.8782 - acc: 0.9259  
Epoch 9/20  
108/108 [=====] - 0s 169us/step - loss: 7.4065 - acc: 0.6852  
Epoch 10/20  
108/108 [=====] - 0s 189us/step - loss: 6.9649 - acc: 0.6852  
Epoch 11/20  
108/108 [=====] - 0s 167us/step - loss: 6.5448 - acc: 0.6852

Epoch 12/20  
108/108 [=====] - 0s 203us/step - loss: 6.1533 - acc: 0.8148  
Epoch 13/20  
108/108 [=====] - 0s 220us/step - loss: 5.7905 - acc: 0.9537  
Epoch 14/20  
108/108 [=====] - 0s 167us/step - loss: 5.4495 - acc: 0.9722  
Epoch 15/20  
108/108 [=====] - 0s 185us/step - loss: 5.1290 - acc: 0.8704  
Epoch 16/20  
108/108 [=====] - 0s 166us/step - loss: 4.8274 - acc: 0.8611  
Epoch 17/20  
108/108 [=====] - 0s 193us/step - loss: 4.5499 - acc: 0.9259  
Epoch 18/20  
108/108 [=====] - 0s 173us/step - loss: 4.2887 - acc: 0.9352  
Epoch 19/20  
108/108 [=====] - 0s 261us/step - loss: 4.0413 - acc: 0.8981  
Epoch 20/20  
108/108 [=====] - 0s 220us/step - loss: 3.8102 - acc: 0.8611  
27/27 [=====] - 4s 157ms/step  
108/108 [=====] - 0s 189us/step  
Epoch 1/20  
108/108 [=====] - 9s 84ms/step - loss: 12.1930 - acc: 0.3704  
Epoch 2/20  
108/108 [=====] - 0s 174us/step - loss: 11.4432 - acc: 0.3333  
Epoch 3/20  
108/108 [=====] - 0s 196us/step - loss: 10.8720 - acc: 0.4630  
Epoch 4/20  
108/108 [=====] - 0s 200us/step - loss: 10.2760 - acc: 0.6296  
Epoch 5/20  
108/108 [=====] - 0s 280us/step - loss: 9.6731 - acc: 0.6667  
Epoch 6/20  
108/108 [=====] - 0s 257us/step - loss: 9.1153 - acc: 0.7778  
Epoch 7/20  
108/108 [=====] - 0s 259us/step - loss: 8.6276 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 207us/step - loss: 8.1488 - acc: 0.6759  
Epoch 9/20  
108/108 [=====] - 0s 168us/step - loss: 7.6719 - acc: 0.7315  
Epoch 10/20  
108/108 [=====] - 0s 179us/step - loss: 7.2257 - acc: 0.8981  
Epoch 11/20  
108/108 [=====] - 0s 182us/step - loss: 6.8141 - acc: 0.6667  
Epoch 12/20  
108/108 [=====] - 0s 166us/step - loss: 6.4248 - acc: 0.7315  
Epoch 13/20  
108/108 [=====] - 0s 206us/step - loss: 6.0616 - acc: 0.9352  
Epoch 14/20  
108/108 [=====] - 0s 301us/step - loss: 5.7185 - acc: 0.9722



Epoch 15/20  
108/108 [=====] - 0s 248us/step - loss: 5.3928 - acc: 0.9630  
Epoch 16/20  
108/108 [=====] - 0s 240us/step - loss: 5.0906 - acc: 0.9722  
Epoch 17/20  
108/108 [=====] - 0s 186us/step - loss: 4.8064 - acc: 0.9630  
Epoch 18/20  
108/108 [=====] - 0s 161us/step - loss: 4.5427 - acc: 0.8981  
Epoch 19/20  
108/108 [=====] - 0s 166us/step - loss: 4.2961 - acc: 0.8796  
Epoch 20/20  
108/108 [=====] - 0s 235us/step - loss: 4.0661 - acc: 0.8519  
27/27 [=====] - 4s 150ms/step  
108/108 [=====] - 0s 130us/step  
Epoch 1/20  
108/108 [=====] - 9s 85ms/step - loss: 11.8802 - acc: 0.6296  
Epoch 2/20  
108/108 [=====] - 0s 182us/step - loss: 11.2316 - acc: 0.6667  
Epoch 3/20  
108/108 [=====] - 0s 164us/step - loss: 10.5911 - acc: 0.6667  
Epoch 4/20  
108/108 [=====] - 0s 163us/step - loss: 9.9635 - acc: 0.7315  
Epoch 5/20  
108/108 [=====] - 0s 189us/step - loss: 9.4099 - acc: 0.8981  
Epoch 6/20  
108/108 [=====] - 0s 179us/step - loss: 8.8584 - acc: 0.9630  
Epoch 7/20  
108/108 [=====] - 0s 171us/step - loss: 8.3427 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 177us/step - loss: 7.8820 - acc: 0.6667  
Epoch 9/20  
108/108 [=====] - 0s 232us/step - loss: 7.4538 - acc: 0.6667  
Epoch 10/20  
108/108 [=====] - 0s 176us/step - loss: 6.9964 - acc: 0.6667  
Epoch 11/20  
108/108 [=====] - 0s 160us/step - loss: 6.5797 - acc: 0.8148  
Epoch 12/20  
108/108 [=====] - 0s 197us/step - loss: 6.2037 - acc: 0.9630  
Epoch 13/20  
108/108 [=====] - 0s 226us/step - loss: 5.8429 - acc: 0.8056  
Epoch 14/20  
108/108 [=====] - 0s 177us/step - loss: 5.5213 - acc: 0.6759  
Epoch 15/20  
108/108 [=====] - 0s 182us/step - loss: 5.2156 - acc: 0.6667  
Epoch 16/20  
108/108 [=====] - 0s 169us/step - loss: 4.9077 - acc: 0.7315  
Epoch 17/20  
108/108 [=====] - 0s 164us/step - loss: 4.6352 - acc: 0.9630

Epoch 18/20  
108/108 [=====] - 0s 201us/step - loss: 4.3858 - acc: 0.9167  
Epoch 19/20  
108/108 [=====] - 0s 210us/step - loss: 4.1370 - acc: 0.9722  
Epoch 20/20  
108/108 [=====] - 0s 206us/step - loss: 3.9052 - acc: 0.8796  
27/27 [=====] - 4s 162ms/step  
108/108 [=====] - 0s 188us/step  
Epoch 1/20  
108/108 [=====] - 9s 86ms/step - loss: 12.0134 - acc: 0.0463  
Epoch 2/20  
108/108 [=====] - 0s 167us/step - loss: 11.3626 - acc: 0.3889  
Epoch 3/20  
108/108 [=====] - 0s 208us/step - loss: 10.7115 - acc: 0.4259  
Epoch 4/20  
108/108 [=====] - 0s 241us/step - loss: 10.0932 - acc: 0.7222  
Epoch 5/20  
108/108 [=====] - 0s 199us/step - loss: 9.5147 - acc: 0.7222  
Epoch 6/20  
108/108 [=====] - 0s 173us/step - loss: 8.9623 - acc: 0.6759  
Epoch 7/20  
108/108 [=====] - 0s 176us/step - loss: 8.4410 - acc: 0.6667  
Epoch 8/20  
108/108 [=====] - 0s 169us/step - loss: 7.9362 - acc: 0.7037  
Epoch 9/20  
108/108 [=====] - 0s 193us/step - loss: 7.4900 - acc: 0.7222  
Epoch 10/20  
108/108 [=====] - 0s 181us/step - loss: 7.0850 - acc: 0.6852  
Epoch 11/20  
108/108 [=====] - 0s 164us/step - loss: 6.6721 - acc: 0.6852  
Epoch 12/20  
108/108 [=====] - 0s 170us/step - loss: 6.2644 - acc: 0.8241  
Epoch 13/20  
108/108 [=====] - 0s 163us/step - loss: 5.9050 - acc: 0.7500  
Epoch 14/20  
108/108 [=====] - 0s 160us/step - loss: 5.5965 - acc: 0.6667  
Epoch 15/20  
108/108 [=====] - 0s 187us/step - loss: 5.2745 - acc: 0.6667  
Epoch 16/20  
108/108 [=====] - 0s 165us/step - loss: 4.9584 - acc: 0.7963  
Epoch 17/20  
108/108 [=====] - 0s 160us/step - loss: 4.7001 - acc: 0.7222  
Epoch 18/20  
108/108 [=====] - 0s 198us/step - loss: 4.4456 - acc: 0.7130  
Epoch 19/20  
108/108 [=====] - 0s 188us/step - loss: 4.1835 - acc: 0.9259  
Epoch 20/20  
108/108 [=====] - 0s 158us/step - loss: 3.9570 - acc: 0.7963

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27/27 [=====] - 4s 155ms/step
108/108 [=====] - 0s 190us/step
Epoch 1/20
108/108 [=====] - 10s 89ms/step - loss: 110.0316 - acc: 0.3426
Epoch 2/20
108/108 [=====] - 0s 185us/step - loss: 104.0049 - acc: 0.3426
Epoch 3/20
108/108 [=====] - 0s 168us/step - loss: 97.6959 - acc: 0.3426
Epoch 4/20
108/108 [=====] - 0s 158us/step - loss: 91.5629 - acc: 0.3519
Epoch 5/20
108/108 [=====] - 0s 160us/step - loss: 85.6845 - acc: 0.7037
Epoch 6/20
108/108 [=====] - 0s 160us/step - loss: 80.0870 - acc: 0.9537
Epoch 7/20
108/108 [=====] - 0s 164us/step - loss: 74.7848 - acc: 0.9537
Epoch 8/20
108/108 [=====] - 0s 162us/step - loss: 69.7754 - acc: 0.9722
Epoch 9/20
108/108 [=====] - 0s 197us/step - loss: 65.0572 - acc: 0.8241
Epoch 10/20
108/108 [=====] - 0s 261us/step - loss: 60.6228 - acc: 0.6852
Epoch 11/20
108/108 [=====] - 0s 197us/step - loss: 56.4659 - acc: 0.6852
Epoch 12/20
108/108 [=====] - 0s 179us/step - loss: 52.5773 - acc: 0.6852
Epoch 13/20
108/108 [=====] - 0s 197us/step - loss: 48.9395 - acc: 0.6852
Epoch 14/20
108/108 [=====] - 0s 168us/step - loss: 45.5370 - acc: 0.6852
Epoch 15/20
108/108 [=====] - 0s 171us/step - loss: 42.3565 - acc: 0.6852
Epoch 16/20
108/108 [=====] - 0s 164us/step - loss: 39.3866 - acc: 0.6852
Epoch 17/20
108/108 [=====] - 0s 165us/step - loss: 36.6175 - acc: 0.6852
Epoch 18/20
108/108 [=====] - 0s 180us/step - loss: 34.0417 - acc: 0.6852
Epoch 19/20
108/108 [=====] - 0s 172us/step - loss: 31.6447 - acc: 0.7870
Epoch 20/20
108/108 [=====] - 0s 154us/step - loss: 29.4122 - acc: 0.9444
27/27 [=====] - 4s 157ms/step
108/108 [=====] - 0s 203us/step
Epoch 1/20
108/108 [=====] - 9s 86ms/step - loss: 110.2148 - acc: 0.3519
Epoch 2/20
108/108 [=====] - 0s 251us/step - loss: 104.2231 - acc: 0.5278

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Epoch 3/20  
108/108 [=====] - 0s 207us/step - loss: 97.9399 - acc: 0.3333  
Epoch 4/20  
108/108 [=====] - 0s 284us/step - loss: 91.8113 - acc: 0.3333  
Epoch 5/20  
108/108 [=====] - 0s 221us/step - loss: 85.9287 - acc: 0.3333  
Epoch 6/20  
108/108 [=====] - 0s 194us/step - loss: 80.3220 - acc: 0.3704  
Epoch 7/20  
108/108 [=====] - 0s 203us/step - loss: 75.0054 - acc: 0.6667  
Epoch 8/20  
108/108 [=====] - 0s 211us/step - loss: 69.9862 - acc: 0.8519  
Epoch 9/20  
108/108 [=====] - 0s 177us/step - loss: 65.2591 - acc: 0.9259  
Epoch 10/20  
108/108 [=====] - 0s 178us/step - loss: 60.8188 - acc: 0.7130  
Epoch 11/20  
108/108 [=====] - 0s 158us/step - loss: 56.6546 - acc: 0.6852  
Epoch 12/20  
108/108 [=====] - 0s 194us/step - loss: 52.7558 - acc: 0.6852  
Epoch 13/20  
108/108 [=====] - 0s 176us/step - loss: 49.1099 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 163us/step - loss: 45.6976 - acc: 0.6852  
Epoch 15/20  
108/108 [=====] - 0s 168us/step - loss: 42.5086 - acc: 0.6852  
Epoch 16/20  
108/108 [=====] - 0s 175us/step - loss: 39.5352 - acc: 0.6944  
Epoch 17/20  
108/108 [=====] - 0s 215us/step - loss: 36.7705 - acc: 0.9167  
Epoch 18/20  
108/108 [=====] - 0s 208us/step - loss: 34.1915 - acc: 0.7778  
Epoch 19/20  
108/108 [=====] - 0s 162us/step - loss: 31.7868 - acc: 0.6759  
Epoch 20/20  
108/108 [=====] - 0s 165us/step - loss: 29.5455 - acc: 0.7037  
27/27 [=====] - 4s 155ms/step  
108/108 [=====] - 0s 168us/step  
Epoch 1/20  
108/108 [=====] - 9s 85ms/step - loss: 110.5631 - acc: 0.3148  
Epoch 2/20  
108/108 [=====] - 0s 162us/step - loss: 104.5590 - acc: 0.3241  
Epoch 3/20  
108/108 [=====] - 0s 163us/step - loss: 98.2763 - acc: 0.6667  
Epoch 4/20  
108/108 [=====] - 0s 161us/step - loss: 92.1591 - acc: 0.6667  
Epoch 5/20  
108/108 [=====] - 0s 158us/step - loss: 86.2831 - acc: 0.6852

Epoch 6/20  
108/108 [=====] - 0s 156us/step - loss: 80.6804 - acc: 0.6852  
Epoch 7/20  
108/108 [=====] - 0s 154us/step - loss: 75.3649 - acc: 0.7593  
Epoch 8/20  
108/108 [=====] - 0s 159us/step - loss: 70.3463 - acc: 0.9815  
Epoch 9/20  
108/108 [=====] - 0s 163us/step - loss: 65.6248 - acc: 0.8056  
Epoch 10/20  
108/108 [=====] - 0s 156us/step - loss: 61.1869 - acc: 0.6296  
Epoch 11/20  
108/108 [=====] - 0s 183us/step - loss: 57.0162 - acc: 0.6759  
Epoch 12/20  
108/108 [=====] - 0s 162us/step - loss: 53.1087 - acc: 0.8704  
Epoch 13/20  
108/108 [=====] - 0s 158us/step - loss: 49.4542 - acc: 0.9074  
Epoch 14/20  
108/108 [=====] - 0s 227us/step - loss: 46.0369 - acc: 0.7685  
Epoch 15/20  
108/108 [=====] - 0s 184us/step - loss: 42.8429 - acc: 0.9167  
Epoch 16/20  
108/108 [=====] - 0s 164us/step - loss: 39.8629 - acc: 0.9722  
Epoch 17/20  
108/108 [=====] - 0s 162us/step - loss: 37.0840 - acc: 0.8889  
Epoch 18/20  
108/108 [=====] - 0s 157us/step - loss: 34.4924 - acc: 0.9352  
Epoch 19/20  
108/108 [=====] - 0s 171us/step - loss: 32.0793 - acc: 0.9815  
Epoch 20/20  
108/108 [=====] - 0s 160us/step - loss: 29.8323 - acc: 0.9815  
27/27 [=====] - 4s 157ms/step  
108/108 [=====] - 0s 190us/step  
Epoch 1/20  
108/108 [=====] - 11s 100ms/step - loss: 109.2381 - acc: 0.3611  
Epoch 2/20  
108/108 [=====] - 0s 205us/step - loss: 103.2845 - acc: 0.3611  
Epoch 3/20  
108/108 [=====] - 0s 224us/step - loss: 97.0250 - acc: 0.3611  
Epoch 4/20  
108/108 [=====] - 0s 200us/step - loss: 90.9130 - acc: 0.4815  
Epoch 5/20  
108/108 [=====] - 0s 162us/step - loss: 85.0465 - acc: 0.3426  
Epoch 6/20  
108/108 [=====] - 0s 229us/step - loss: 79.4592 - acc: 0.3333  
Epoch 7/20  
108/108 [=====] - 0s 188us/step - loss: 74.1635 - acc: 0.6574  
Epoch 8/20  
108/108 [=====] - 0s 237us/step - loss: 69.1652 - acc: 0.7130

Epoch 9/20  
108/108 [=====] - 0s 193us/step - loss: 64.4619 - acc: 0.6667  
Epoch 10/20  
108/108 [=====] - 0s 214us/step - loss: 60.0490 - acc: 0.6667  
Epoch 11/20  
108/108 [=====] - 0s 277us/step - loss: 55.9096 - acc: 0.6667  
Epoch 12/20  
108/108 [=====] - 0s 307us/step - loss: 52.0314 - acc: 0.6667  
Epoch 13/20  
108/108 [=====] - 0s 230us/step - loss: 48.3994 - acc: 0.6667  
Epoch 14/20  
108/108 [=====] - 0s 202us/step - loss: 45.0072 - acc: 0.6667  
Epoch 15/20  
108/108 [=====] - 0s 198us/step - loss: 41.8446 - acc: 0.6667  
Epoch 16/20  
108/108 [=====] - 0s 255us/step - loss: 38.8931 - acc: 0.7130  
Epoch 17/20  
108/108 [=====] - 0s 267us/step - loss: 36.1426 - acc: 0.7315  
Epoch 18/20  
108/108 [=====] - 0s 187us/step - loss: 33.5799 - acc: 0.7222  
Epoch 19/20  
108/108 [=====] - 0s 154us/step - loss: 31.1940 - acc: 0.6759  
Epoch 20/20  
108/108 [=====] - 0s 196us/step - loss: 28.9777 - acc: 0.6667  
27/27 [=====] - 4s 154ms/step  
108/108 [=====] - 0s 177us/step  
Epoch 1/20  
108/108 [=====] - 10s 91ms/step - loss: 108.3929 - acc: 0.6852  
Epoch 2/20  
108/108 [=====] - 0s 188us/step - loss: 102.4671 - acc: 0.6852  
Epoch 3/20  
108/108 [=====] - 0s 161us/step - loss: 96.2325 - acc: 0.6852  
Epoch 4/20  
108/108 [=====] - 0s 163us/step - loss: 90.1411 - acc: 0.6852  
Epoch 5/20  
108/108 [=====] - 0s 163us/step - loss: 84.2967 - acc: 0.6852  
Epoch 6/20  
108/108 [=====] - 0s 196us/step - loss: 78.7350 - acc: 0.6852  
Epoch 7/20  
108/108 [=====] - 0s 249us/step - loss: 73.4683 - acc: 0.7130  
Epoch 8/20  
108/108 [=====] - 0s 166us/step - loss: 68.4965 - acc: 0.8796  
Epoch 9/20  
108/108 [=====] - 0s 187us/step - loss: 63.8147 - acc: 0.9352  
Epoch 10/20  
108/108 [=====] - 0s 159us/step - loss: 59.4146 - acc: 0.9630  
Epoch 11/20  
108/108 [=====] - 0s 165us/step - loss: 55.2899 - acc: 0.9352

Epoch 12/20  
108/108 [=====] - 0s 171us/step - loss: 51.4266 - acc: 0.8241  
Epoch 13/20  
108/108 [=====] - 0s 168us/step - loss: 47.8157 - acc: 0.8426  
Epoch 14/20  
108/108 [=====] - 0s 164us/step - loss: 44.4445 - acc: 0.9444  
Epoch 15/20  
108/108 [=====] - 0s 197us/step - loss: 41.2973 - acc: 0.9630  
Epoch 16/20  
108/108 [=====] - 0s 169us/step - loss: 38.3630 - acc: 0.9444  
Epoch 17/20  
108/108 [=====] - 0s 161us/step - loss: 35.6278 - acc: 0.9352  
Epoch 18/20  
108/108 [=====] - 0s 162us/step - loss: 33.0810 - acc: 0.8889  
Epoch 19/20  
108/108 [=====] - 0s 164us/step - loss: 30.7106 - acc: 0.7593  
Epoch 20/20  
108/108 [=====] - 0s 170us/step - loss: 28.5062 - acc: 0.6852  
27/27 [=====] - 4s 158ms/step  
108/108 [=====] - 0s 135us/step  
Epoch 1/20  
108/108 [=====] - 9s 86ms/step - loss: 2.4067 - acc: 0.3426  
Epoch 2/20  
108/108 [=====] - 0s 171us/step - loss: 2.0166 - acc: 0.3611  
Epoch 3/20  
108/108 [=====] - 0s 157us/step - loss: 1.8174 - acc: 0.6852  
Epoch 4/20  
108/108 [=====] - 0s 165us/step - loss: 1.7391 - acc: 0.6389  
Epoch 5/20  
108/108 [=====] - 0s 154us/step - loss: 1.6813 - acc: 0.6204  
Epoch 6/20  
108/108 [=====] - 0s 158us/step - loss: 1.6114 - acc: 0.6759  
Epoch 7/20  
108/108 [=====] - 0s 160us/step - loss: 1.5232 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 158us/step - loss: 1.4340 - acc: 0.6852  
Epoch 9/20  
108/108 [=====] - 0s 158us/step - loss: 1.3692 - acc: 0.6852  
Epoch 10/20  
108/108 [=====] - 0s 158us/step - loss: 1.3134 - acc: 0.6852  
Epoch 11/20  
108/108 [=====] - 0s 156us/step - loss: 1.2623 - acc: 0.6944  
Epoch 12/20  
108/108 [=====] - 0s 156us/step - loss: 1.2148 - acc: 0.7685  
Epoch 13/20  
108/108 [=====] - 0s 160us/step - loss: 1.1649 - acc: 0.7500  
Epoch 14/20  
108/108 [=====] - 0s 151us/step - loss: 1.1240 - acc: 0.6944

Epoch 15/20  
108/108 [=====] - 0s 150us/step - loss: 1.0868 - acc: 0.7130  
Epoch 16/20  
108/108 [=====] - 0s 150us/step - loss: 1.0518 - acc: 0.7593  
Epoch 17/20  
108/108 [=====] - 0s 154us/step - loss: 1.0198 - acc: 0.8241  
Epoch 18/20  
108/108 [=====] - 0s 151us/step - loss: 0.9904 - acc: 0.8426  
Epoch 19/20  
108/108 [=====] - 0s 156us/step - loss: 0.9586 - acc: 0.8981  
Epoch 20/20  
108/108 [=====] - 0s 158us/step - loss: 0.9410 - acc: 0.9537  
27/27 [=====] - 4s 154ms/step  
108/108 [=====] - 0s 132us/step  
Epoch 1/20  
108/108 [=====] - 10s 89ms/step - loss: 2.0782 - acc: 0.3148  
Epoch 2/20  
108/108 [=====] - 0s 197us/step - loss: 1.8426 - acc: 0.4259  
Epoch 3/20  
108/108 [=====] - 0s 168us/step - loss: 1.7493 - acc: 0.6852  
Epoch 4/20  
108/108 [=====] - 0s 166us/step - loss: 1.6535 - acc: 0.6852  
Epoch 5/20  
108/108 [=====] - 0s 212us/step - loss: 1.5491 - acc: 0.6852  
Epoch 6/20  
108/108 [=====] - 0s 185us/step - loss: 1.4626 - acc: 0.6944  
Epoch 7/20  
108/108 [=====] - 0s 155us/step - loss: 1.3991 - acc: 0.8611  
Epoch 8/20  
108/108 [=====] - 0s 159us/step - loss: 1.3410 - acc: 0.9444  
Epoch 9/20  
108/108 [=====] - 0s 215us/step - loss: 1.2803 - acc: 0.9167  
Epoch 10/20  
108/108 [=====] - 0s 219us/step - loss: 1.2278 - acc: 0.7222  
Epoch 11/20  
108/108 [=====] - 0s 218us/step - loss: 1.1812 - acc: 0.7037  
Epoch 12/20  
108/108 [=====] - 0s 234us/step - loss: 1.1387 - acc: 0.6944  
Epoch 13/20  
108/108 [=====] - 0s 213us/step - loss: 1.1015 - acc: 0.6944  
Epoch 14/20  
108/108 [=====] - 0s 243us/step - loss: 1.0621 - acc: 0.7407  
Epoch 15/20  
108/108 [=====] - 0s 235us/step - loss: 1.0319 - acc: 0.9444  
Epoch 16/20  
108/108 [=====] - 0s 220us/step - loss: 1.0117 - acc: 0.8889  
Epoch 17/20  
108/108 [=====] - 0s 171us/step - loss: 0.9752 - acc: 0.9630



Epoch 18/20  
108/108 [=====] - 0s 190us/step - loss: 0.9470 - acc: 0.7963  
Epoch 19/20  
108/108 [=====] - 0s 240us/step - loss: 0.9298 - acc: 0.7130  
Epoch 20/20  
108/108 [=====] - 0s 194us/step - loss: 0.9006 - acc: 0.7870  
27/27 [=====] - 5s 186ms/step  
108/108 [=====] - 0s 156us/step  
Epoch 1/20  
108/108 [=====] - 11s 103ms/step - loss: 2.0359 - acc: 0.3426  
Epoch 2/20  
108/108 [=====] - 0s 200us/step - loss: 1.8246 - acc: 0.6389  
Epoch 3/20  
108/108 [=====] - 0s 187us/step - loss: 1.7082 - acc: 0.8426  
Epoch 4/20  
108/108 [=====] - 0s 179us/step - loss: 1.6381 - acc: 0.5556  
Epoch 5/20  
108/108 [=====] - 0s 200us/step - loss: 1.5536 - acc: 0.7593  
Epoch 6/20  
108/108 [=====] - 0s 202us/step - loss: 1.4628 - acc: 0.9352  
Epoch 7/20  
108/108 [=====] - 0s 168us/step - loss: 1.3942 - acc: 0.9074  
Epoch 8/20  
108/108 [=====] - 0s 170us/step - loss: 1.3402 - acc: 0.8519  
Epoch 9/20  
108/108 [=====] - 0s 167us/step - loss: 1.2871 - acc: 0.9167  
Epoch 10/20  
108/108 [=====] - 0s 170us/step - loss: 1.2321 - acc: 0.9815  
Epoch 11/20  
108/108 [=====] - 0s 168us/step - loss: 1.1869 - acc: 0.9630  
Epoch 12/20  
108/108 [=====] - 0s 190us/step - loss: 1.1456 - acc: 0.9352  
Epoch 13/20  
108/108 [=====] - 0s 167us/step - loss: 1.1049 - acc: 0.9444  
Epoch 14/20  
108/108 [=====] - 0s 172us/step - loss: 1.0624 - acc: 0.9722  
Epoch 15/20  
108/108 [=====] - 0s 173us/step - loss: 1.0279 - acc: 0.9352  
Epoch 16/20  
108/108 [=====] - 0s 174us/step - loss: 0.9928 - acc: 0.9444  
Epoch 17/20  
108/108 [=====] - 0s 182us/step - loss: 0.9714 - acc: 0.9444  
Epoch 18/20  
108/108 [=====] - 0s 190us/step - loss: 0.9412 - acc: 0.9537  
Epoch 19/20  
108/108 [=====] - 0s 164us/step - loss: 0.9072 - acc: 0.9815  
Epoch 20/20  
108/108 [=====] - 0s 172us/step - loss: 0.8839 - acc: 0.9907

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27/27 [=====] - 4s 162ms/step
108/108 [=====] - 0s 130us/step
Epoch 1/20
108/108 [=====] - 10s 88ms/step - loss: 2.0354 - acc: 0.3333
Epoch 2/20
108/108 [=====] - 0s 169us/step - loss: 1.8520 - acc: 0.5185
Epoch 3/20
108/108 [=====] - 0s 191us/step - loss: 1.7916 - acc: 0.6667
Epoch 4/20
108/108 [=====] - 0s 165us/step - loss: 1.6909 - acc: 0.6667
Epoch 5/20
108/108 [=====] - 0s 165us/step - loss: 1.6035 - acc: 0.7130
Epoch 6/20
108/108 [=====] - 0s 161us/step - loss: 1.5324 - acc: 0.9630
Epoch 7/20
108/108 [=====] - 0s 159us/step - loss: 1.4558 - acc: 0.7963
Epoch 8/20
108/108 [=====] - 0s 176us/step - loss: 1.3925 - acc: 0.6667
Epoch 9/20
108/108 [=====] - 0s 176us/step - loss: 1.3384 - acc: 0.6667
Epoch 10/20
108/108 [=====] - 0s 169us/step - loss: 1.2831 - acc: 0.6852
Epoch 11/20
108/108 [=====] - 0s 169us/step - loss: 1.2366 - acc: 0.7778
Epoch 12/20
108/108 [=====] - 0s 175us/step - loss: 1.1887 - acc: 0.8426
Epoch 13/20
108/108 [=====] - 0s 167us/step - loss: 1.1490 - acc: 0.8056
Epoch 14/20
108/108 [=====] - 0s 203us/step - loss: 1.1161 - acc: 0.7407
Epoch 15/20
108/108 [=====] - 0s 161us/step - loss: 1.0844 - acc: 0.7222
Epoch 16/20
108/108 [=====] - 0s 160us/step - loss: 1.0432 - acc: 0.8519
Epoch 17/20
108/108 [=====] - 0s 189us/step - loss: 1.0043 - acc: 0.9444
Epoch 18/20
108/108 [=====] - 0s 164us/step - loss: 0.9776 - acc: 0.9537
Epoch 19/20
108/108 [=====] - 0s 167us/step - loss: 0.9499 - acc: 0.9630
Epoch 20/20
108/108 [=====] - 0s 168us/step - loss: 0.9215 - acc: 0.9722
27/27 [=====] - 4s 163ms/step
108/108 [=====] - 0s 137us/step
Epoch 1/20
108/108 [=====] - 10s 88ms/step - loss: 2.1492 - acc: 0.3333
Epoch 2/20
108/108 [=====] - 0s 172us/step - loss: 1.9663 - acc: 0.5000

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Epoch 3/20  
108/108 [=====] - 0s 170us/step - loss: 1.8386 - acc: 0.6667  
Epoch 4/20  
108/108 [=====] - 0s 160us/step - loss: 1.7306 - acc: 0.6667  
Epoch 5/20  
108/108 [=====] - 0s 186us/step - loss: 1.6336 - acc: 0.6759  
Epoch 6/20  
108/108 [=====] - 0s 218us/step - loss: 1.5468 - acc: 0.6667  
Epoch 7/20  
108/108 [=====] - 0s 199us/step - loss: 1.4735 - acc: 0.6667  
Epoch 8/20  
108/108 [=====] - 0s 172us/step - loss: 1.3970 - acc: 0.6852  
Epoch 9/20  
108/108 [=====] - 0s 166us/step - loss: 1.3358 - acc: 0.6852  
Epoch 10/20  
108/108 [=====] - 0s 163us/step - loss: 1.2717 - acc: 0.7500  
Epoch 11/20  
108/108 [=====] - 0s 163us/step - loss: 1.2215 - acc: 0.9167  
Epoch 12/20  
108/108 [=====] - 0s 192us/step - loss: 1.1835 - acc: 0.8241  
Epoch 13/20  
108/108 [=====] - 0s 178us/step - loss: 1.1488 - acc: 0.7778  
Epoch 14/20  
108/108 [=====] - 0s 164us/step - loss: 1.1027 - acc: 0.7963  
Epoch 15/20  
108/108 [=====] - 0s 180us/step - loss: 1.0544 - acc: 0.8981  
Epoch 16/20  
108/108 [=====] - 0s 197us/step - loss: 1.0203 - acc: 0.8241  
Epoch 17/20  
108/108 [=====] - 0s 175us/step - loss: 0.9873 - acc: 0.8333  
Epoch 18/20  
108/108 [=====] - 0s 174us/step - loss: 0.9588 - acc: 0.8889  
Epoch 19/20  
108/108 [=====] - 0s 176us/step - loss: 0.9382 - acc: 0.8796  
Epoch 20/20  
108/108 [=====] - 0s 245us/step - loss: 0.9073 - acc: 0.9352  
27/27 [=====] - 4s 157ms/step  
108/108 [=====] - 0s 184us/step  
Epoch 1/20  
108/108 [=====] - 10s 93ms/step - loss: 10.4318 - acc: 0.1759  
Epoch 2/20  
108/108 [=====] - 0s 225us/step - loss: 9.9658 - acc: 0.4259  
Epoch 3/20  
108/108 [=====] - 0s 181us/step - loss: 9.5576 - acc: 0.3148  
Epoch 4/20  
108/108 [=====] - 0s 172us/step - loss: 9.1221 - acc: 0.4630  
Epoch 5/20  
108/108 [=====] - 0s 161us/step - loss: 8.6847 - acc: 0.7685

Epoch 6/20  
108/108 [=====] - 0s 164us/step - loss: 8.2825 - acc: 0.6852  
Epoch 7/20  
108/108 [=====] - 0s 179us/step - loss: 7.9131 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 167us/step - loss: 7.5704 - acc: 0.6852  
Epoch 9/20  
108/108 [=====] - 0s 164us/step - loss: 7.2253 - acc: 0.6852  
Epoch 10/20  
108/108 [=====] - 0s 177us/step - loss: 6.8869 - acc: 0.7037  
Epoch 11/20  
108/108 [=====] - 0s 223us/step - loss: 6.5950 - acc: 0.9444  
Epoch 12/20  
108/108 [=====] - 0s 190us/step - loss: 6.3092 - acc: 0.8426  
Epoch 13/20  
108/108 [=====] - 0s 167us/step - loss: 6.0203 - acc: 0.9352  
Epoch 14/20  
108/108 [=====] - 0s 179us/step - loss: 5.7431 - acc: 0.9630  
Epoch 15/20  
108/108 [=====] - 0s 160us/step - loss: 5.4849 - acc: 0.8241  
Epoch 16/20  
108/108 [=====] - 0s 208us/step - loss: 5.2412 - acc: 0.7037  
Epoch 17/20  
108/108 [=====] - 0s 163us/step - loss: 5.0115 - acc: 0.7130  
Epoch 18/20  
108/108 [=====] - 0s 167us/step - loss: 4.7930 - acc: 0.7407  
Epoch 19/20  
108/108 [=====] - 0s 211us/step - loss: 4.5850 - acc: 0.8519  
Epoch 20/20  
108/108 [=====] - 0s 248us/step - loss: 4.3887 - acc: 0.9722  
27/27 [=====] - 4s 162ms/step  
108/108 [=====] - 0s 184us/step  
Epoch 1/20  
108/108 [=====] - 10s 91ms/step - loss: 10.5026 - acc: 0.3333  
Epoch 2/20  
108/108 [=====] - 0s 200us/step - loss: 9.9038 - acc: 0.3333  
Epoch 3/20  
108/108 [=====] - 0s 242us/step - loss: 9.4570 - acc: 0.5926  
Epoch 4/20  
108/108 [=====] - 0s 199us/step - loss: 9.1023 - acc: 0.6574  
Epoch 5/20  
108/108 [=====] - 0s 165us/step - loss: 8.7284 - acc: 0.6667  
Epoch 6/20  
108/108 [=====] - 0s 168us/step - loss: 8.3430 - acc: 0.6667  
Epoch 7/20  
108/108 [=====] - 0s 198us/step - loss: 7.9576 - acc: 0.6944  
Epoch 8/20  
108/108 [=====] - 0s 219us/step - loss: 7.5908 - acc: 0.8889

Epoch 9/20  
108/108 [=====] - 0s 164us/step - loss: 7.2543 - acc: 0.6944  
Epoch 10/20  
108/108 [=====] - 0s 189us/step - loss: 6.9341 - acc: 0.6852  
Epoch 11/20  
108/108 [=====] - 0s 203us/step - loss: 6.6327 - acc: 0.6944  
Epoch 12/20  
108/108 [=====] - 0s 216us/step - loss: 6.3448 - acc: 0.6944  
Epoch 13/20  
108/108 [=====] - 0s 241us/step - loss: 6.0743 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 220us/step - loss: 5.8087 - acc: 0.6944  
Epoch 15/20  
108/108 [=====] - 0s 242us/step - loss: 5.5549 - acc: 0.8426  
Epoch 16/20  
108/108 [=====] - 0s 200us/step - loss: 5.3212 - acc: 0.9444  
Epoch 17/20  
108/108 [=====] - 0s 201us/step - loss: 5.0946 - acc: 0.9630  
Epoch 18/20  
108/108 [=====] - 0s 177us/step - loss: 4.8757 - acc: 0.9444  
Epoch 19/20  
108/108 [=====] - 0s 187us/step - loss: 4.6657 - acc: 0.8981  
Epoch 20/20  
108/108 [=====] - 0s 164us/step - loss: 4.4692 - acc: 0.9352  
27/27 [=====] - 4s 163ms/step  
108/108 [=====] - 0s 142us/step  
Epoch 1/20  
108/108 [=====] - 10s 91ms/step - loss: 10.3316 - acc: 0.3148  
Epoch 2/20  
108/108 [=====] - 0s 156us/step - loss: 9.8236 - acc: 0.3148  
Epoch 3/20  
108/108 [=====] - 0s 164us/step - loss: 9.3796 - acc: 0.8889  
Epoch 4/20  
108/108 [=====] - 0s 162us/step - loss: 8.9683 - acc: 0.8148  
Epoch 5/20  
108/108 [=====] - 0s 184us/step - loss: 8.5666 - acc: 0.8426  
Epoch 6/20  
108/108 [=====] - 0s 164us/step - loss: 8.1724 - acc: 0.8796  
Epoch 7/20  
108/108 [=====] - 0s 157us/step - loss: 7.8056 - acc: 0.6481  
Epoch 8/20  
108/108 [=====] - 0s 181us/step - loss: 7.4440 - acc: 0.6389  
Epoch 9/20  
108/108 [=====] - 0s 203us/step - loss: 7.0995 - acc: 0.7315  
Epoch 10/20  
108/108 [=====] - 0s 194us/step - loss: 6.7710 - acc: 0.8981  
Epoch 11/20  
108/108 [=====] - 0s 160us/step - loss: 6.4586 - acc: 0.9722

Epoch 12/20  
108/108 [=====] - 0s 232us/step - loss: 6.1632 - acc: 0.9444  
Epoch 13/20  
108/108 [=====] - 0s 260us/step - loss: 5.8813 - acc: 0.9537  
Epoch 14/20  
108/108 [=====] - 0s 202us/step - loss: 5.6134 - acc: 0.9537  
Epoch 15/20  
108/108 [=====] - 0s 181us/step - loss: 5.3596 - acc: 0.8981  
Epoch 16/20  
108/108 [=====] - 0s 212us/step - loss: 5.1181 - acc: 0.9259  
Epoch 17/20  
108/108 [=====] - 0s 176us/step - loss: 4.8863 - acc: 0.9537  
Epoch 18/20  
108/108 [=====] - 0s 166us/step - loss: 4.6800 - acc: 0.7685  
Epoch 19/20  
108/108 [=====] - 0s 163us/step - loss: 4.4664 - acc: 0.8889  
Epoch 20/20  
108/108 [=====] - 0s 174us/step - loss: 4.2651 - acc: 0.9352  
27/27 [=====] - 4s 163ms/step  
108/108 [=====] - 0s 148us/step  
Epoch 1/20  
108/108 [=====] - 10s 89ms/step - loss: 10.6094 - acc: 0.3333  
Epoch 2/20  
108/108 [=====] - 0s 181us/step - loss: 9.9791 - acc: 0.3333  
Epoch 3/20  
108/108 [=====] - 0s 159us/step - loss: 9.5263 - acc: 0.4537  
Epoch 4/20  
108/108 [=====] - 0s 166us/step - loss: 9.1352 - acc: 0.6667  
Epoch 5/20  
108/108 [=====] - 0s 196us/step - loss: 8.7502 - acc: 0.6667  
Epoch 6/20  
108/108 [=====] - 0s 158us/step - loss: 8.3662 - acc: 0.6667  
Epoch 7/20  
108/108 [=====] - 0s 166us/step - loss: 7.9932 - acc: 0.6759  
Epoch 8/20  
108/108 [=====] - 0s 183us/step - loss: 7.6429 - acc: 0.8426  
Epoch 9/20  
108/108 [=====] - 0s 195us/step - loss: 7.3008 - acc: 0.8519  
Epoch 10/20  
108/108 [=====] - 0s 177us/step - loss: 6.9803 - acc: 0.7037  
Epoch 11/20  
108/108 [=====] - 0s 164us/step - loss: 6.6783 - acc: 0.6667  
Epoch 12/20  
108/108 [=====] - 0s 192us/step - loss: 6.3945 - acc: 0.6667  
Epoch 13/20  
108/108 [=====] - 0s 238us/step - loss: 6.1165 - acc: 0.6667  
Epoch 14/20  
108/108 [=====] - 0s 259us/step - loss: 5.8432 - acc: 0.6852

Epoch 15/20  
108/108 [=====] - 0s 220us/step - loss: 5.5858 - acc: 0.7685  
Epoch 16/20  
108/108 [=====] - 0s 206us/step - loss: 5.3562 - acc: 0.9722  
Epoch 17/20  
108/108 [=====] - 0s 186us/step - loss: 5.1351 - acc: 0.8611  
Epoch 18/20  
108/108 [=====] - 0s 168us/step - loss: 4.9106 - acc: 0.9444  
Epoch 19/20  
108/108 [=====] - 0s 167us/step - loss: 4.6908 - acc: 0.9074  
Epoch 20/20  
108/108 [=====] - 0s 199us/step - loss: 4.5010 - acc: 0.7222  
27/27 [=====] - 4s 165ms/step  
108/108 [=====] - 0s 177us/step  
Epoch 1/20  
108/108 [=====] - 10s 93ms/step - loss: 10.2249 - acc: 0.5185  
Epoch 2/20  
108/108 [=====] - 0s 255us/step - loss: 9.7798 - acc: 0.6667  
Epoch 3/20  
108/108 [=====] - 0s 255us/step - loss: 9.3506 - acc: 0.6759  
Epoch 4/20  
108/108 [=====] - 0s 182us/step - loss: 8.9346 - acc: 0.7593  
Epoch 5/20  
108/108 [=====] - 0s 208us/step - loss: 8.5449 - acc: 0.6852  
Epoch 6/20  
108/108 [=====] - 0s 195us/step - loss: 8.1658 - acc: 0.6852  
Epoch 7/20  
108/108 [=====] - 0s 190us/step - loss: 7.7874 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 177us/step - loss: 7.4207 - acc: 0.9259  
Epoch 9/20  
108/108 [=====] - 0s 162us/step - loss: 7.0891 - acc: 0.6667  
Epoch 10/20  
108/108 [=====] - 0s 179us/step - loss: 6.7686 - acc: 0.6667  
Epoch 11/20  
108/108 [=====] - 0s 195us/step - loss: 6.4563 - acc: 0.6667  
Epoch 12/20  
108/108 [=====] - 0s 181us/step - loss: 6.1623 - acc: 0.6667  
Epoch 13/20  
108/108 [=====] - 0s 214us/step - loss: 5.8835 - acc: 0.7130  
Epoch 14/20  
108/108 [=====] - 0s 301us/step - loss: 5.6185 - acc: 0.6852  
Epoch 15/20  
108/108 [=====] - 0s 281us/step - loss: 5.3644 - acc: 0.7037  
Epoch 16/20  
108/108 [=====] - 0s 232us/step - loss: 5.1379 - acc: 0.8796  
Epoch 17/20  
108/108 [=====] - 0s 225us/step - loss: 4.9131 - acc: 0.7593

Epoch 18/20  
108/108 [=====] - 0s 166us/step - loss: 4.6922 - acc: 0.9259  
Epoch 19/20  
108/108 [=====] - 0s 224us/step - loss: 4.4903 - acc: 0.9444  
Epoch 20/20  
108/108 [=====] - 0s 224us/step - loss: 4.2953 - acc: 0.9537  
27/27 [=====] - 4s 159ms/step  
108/108 [=====] - 0s 171us/step  
Epoch 1/20  
108/108 [=====] - 10s 92ms/step - loss: 94.0701 - acc: 0.3426  
Epoch 2/20  
108/108 [=====] - 0s 175us/step - loss: 89.8707 - acc: 0.3426  
Epoch 3/20  
108/108 [=====] - 0s 172us/step - loss: 85.5064 - acc: 0.3611  
Epoch 4/20  
108/108 [=====] - 0s 160us/step - loss: 81.2569 - acc: 0.6852  
Epoch 5/20  
108/108 [=====] - 0s 189us/step - loss: 77.1804 - acc: 0.6852  
Epoch 6/20  
108/108 [=====] - 0s 197us/step - loss: 73.2504 - acc: 0.6667  
Epoch 7/20  
108/108 [=====] - 0s 198us/step - loss: 69.4693 - acc: 0.6296  
Epoch 8/20  
108/108 [=====] - 0s 171us/step - loss: 65.8469 - acc: 0.6481  
Epoch 9/20  
108/108 [=====] - 0s 253us/step - loss: 62.3779 - acc: 0.6574  
Epoch 10/20  
108/108 [=====] - 0s 293us/step - loss: 59.0689 - acc: 0.6574  
Epoch 11/20  
108/108 [=====] - 0s 280us/step - loss: 55.9155 - acc: 0.6852  
Epoch 12/20  
108/108 [=====] - 0s 252us/step - loss: 52.9169 - acc: 0.6852  
Epoch 13/20  
108/108 [=====] - 0s 165us/step - loss: 50.0641 - acc: 0.6944  
Epoch 14/20  
108/108 [=====] - 0s 161us/step - loss: 47.3511 - acc: 0.6852  
Epoch 15/20  
108/108 [=====] - 0s 161us/step - loss: 44.7758 - acc: 0.6852  
Epoch 16/20  
108/108 [=====] - 0s 243us/step - loss: 42.3277 - acc: 0.6852  
Epoch 17/20  
108/108 [=====] - 0s 197us/step - loss: 40.0065 - acc: 0.6852  
Epoch 18/20  
108/108 [=====] - 0s 205us/step - loss: 37.8042 - acc: 0.6852  
Epoch 19/20  
108/108 [=====] - 0s 193us/step - loss: 35.7164 - acc: 0.6852  
Epoch 20/20  
108/108 [=====] - 0s 184us/step - loss: 33.7383 - acc: 0.6852



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27/27 [=====] - 4s 163ms/step
108/108 [=====] - 0s 179us/step
Epoch 1/20
108/108 [=====] - 10s 92ms/step - loss: 94.5016 - acc: 0.3148
Epoch 2/20
108/108 [=====] - 0s 162us/step - loss: 90.2928 - acc: 0.3148
Epoch 3/20
108/108 [=====] - 0s 178us/step - loss: 85.8840 - acc: 0.3148
Epoch 4/20
108/108 [=====] - 0s 163us/step - loss: 81.5879 - acc: 0.3148
Epoch 5/20
108/108 [=====] - 0s 204us/step - loss: 77.4518 - acc: 0.3148
Epoch 6/20
108/108 [=====] - 0s 311us/step - loss: 73.4887 - acc: 0.3241
Epoch 7/20
108/108 [=====] - 0s 196us/step - loss: 69.6827 - acc: 0.3333
Epoch 8/20
108/108 [=====] - 0s 168us/step - loss: 66.0333 - acc: 0.3519
Epoch 9/20
108/108 [=====] - 0s 258us/step - loss: 62.5436 - acc: 0.4444
Epoch 10/20
108/108 [=====] - 0s 300us/step - loss: 59.2242 - acc: 0.6481
Epoch 11/20
108/108 [=====] - 0s 269us/step - loss: 56.0634 - acc: 0.7407
Epoch 12/20
108/108 [=====] - 0s 186us/step - loss: 53.0554 - acc: 0.6574
Epoch 13/20
108/108 [=====] - 0s 253us/step - loss: 50.1936 - acc: 0.7407
Epoch 14/20
108/108 [=====] - 0s 272us/step - loss: 47.4769 - acc: 0.7500
Epoch 15/20
108/108 [=====] - 0s 245us/step - loss: 44.8976 - acc: 0.6759
Epoch 16/20
108/108 [=====] - 0s 169us/step - loss: 42.4490 - acc: 0.6852
Epoch 17/20
108/108 [=====] - 0s 180us/step - loss: 40.1232 - acc: 0.6852
Epoch 18/20
108/108 [=====] - 0s 265us/step - loss: 37.9176 - acc: 0.6852
Epoch 19/20
108/108 [=====] - 0s 223us/step - loss: 35.8268 - acc: 0.6852
Epoch 20/20
108/108 [=====] - 0s 196us/step - loss: 33.8454 - acc: 0.6852
27/27 [=====] - 4s 162ms/step
108/108 [=====] - 0s 187us/step
Epoch 1/20
108/108 [=====] - 10s 94ms/step - loss: 92.9093 - acc: 0.3611
Epoch 2/20
108/108 [=====] - 0s 212us/step - loss: 88.9098 - acc: 0.3889

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Epoch 3/20  
108/108 [=====] - 0s 184us/step - loss: 84.6547 - acc: 0.4907  
Epoch 4/20  
108/108 [=====] - 0s 161us/step - loss: 80.4528 - acc: 0.3704  
Epoch 5/20  
108/108 [=====] - 0s 170us/step - loss: 76.3676 - acc: 0.3148  
Epoch 6/20  
108/108 [=====] - 0s 206us/step - loss: 72.4313 - acc: 0.3148  
Epoch 7/20  
108/108 [=====] - 0s 184us/step - loss: 68.6512 - acc: 0.3148  
Epoch 8/20  
108/108 [=====] - 0s 171us/step - loss: 65.0326 - acc: 0.3148  
Epoch 9/20  
108/108 [=====] - 0s 169us/step - loss: 61.5775 - acc: 0.3148  
Epoch 10/20  
108/108 [=====] - 0s 182us/step - loss: 58.2838 - acc: 0.3148  
Epoch 11/20  
108/108 [=====] - 0s 166us/step - loss: 55.1477 - acc: 0.3241  
Epoch 12/20  
108/108 [=====] - 0s 168us/step - loss: 52.1632 - acc: 0.4352  
Epoch 13/20  
108/108 [=====] - 0s 156us/step - loss: 49.3276 - acc: 0.6574  
Epoch 14/20  
108/108 [=====] - 0s 198us/step - loss: 46.6352 - acc: 0.4630  
Epoch 15/20  
108/108 [=====] - 0s 162us/step - loss: 44.0797 - acc: 0.4722  
Epoch 16/20  
108/108 [=====] - 0s 179us/step - loss: 41.6545 - acc: 0.8519  
Epoch 17/20  
108/108 [=====] - 0s 168us/step - loss: 39.3539 - acc: 0.8981  
Epoch 18/20  
108/108 [=====] - 0s 170us/step - loss: 37.1725 - acc: 0.8704  
Epoch 19/20  
108/108 [=====] - 0s 173us/step - loss: 35.1043 - acc: 0.8981  
Epoch 20/20  
108/108 [=====] - 0s 167us/step - loss: 33.1467 - acc: 0.9074  
27/27 [=====] - 5s 167ms/step  
108/108 [=====] - 0s 190us/step  
Epoch 1/20  
108/108 [=====] - 11s 98ms/step - loss: 95.5692 - acc: 0.3056  
Epoch 2/20  
108/108 [=====] - 0s 196us/step - loss: 91.4042 - acc: 0.3519  
Epoch 3/20  
108/108 [=====] - 0s 169us/step - loss: 87.0334 - acc: 0.6667  
Epoch 4/20  
108/108 [=====] - 0s 210us/step - loss: 82.7434 - acc: 0.6667  
Epoch 5/20  
108/108 [=====] - 0s 160us/step - loss: 78.5905 - acc: 0.6667

Epoch 6/20  
108/108 [=====] - 0s 160us/step - loss: 74.5857 - acc: 0.6667  
Epoch 7/20  
108/108 [=====] - 0s 163us/step - loss: 70.7462 - acc: 0.6667  
Epoch 8/20  
108/108 [=====] - 0s 161us/step - loss: 67.0685 - acc: 0.6667  
Epoch 9/20  
108/108 [=====] - 0s 158us/step - loss: 63.5535 - acc: 0.6759  
Epoch 10/20  
108/108 [=====] - 0s 168us/step - loss: 60.1977 - acc: 0.6667  
Epoch 11/20  
108/108 [=====] - 0s 199us/step - loss: 56.9964 - acc: 0.6667  
Epoch 12/20  
108/108 [=====] - 0s 271us/step - loss: 53.9511 - acc: 0.6667  
Epoch 13/20  
108/108 [=====] - 0s 190us/step - loss: 51.0584 - acc: 0.6667  
Epoch 14/20  
108/108 [=====] - 0s 273us/step - loss: 48.3090 - acc: 0.6667  
Epoch 15/20  
108/108 [=====] - 0s 176us/step - loss: 45.6942 - acc: 0.6667  
Epoch 16/20  
108/108 [=====] - 0s 163us/step - loss: 43.2120 - acc: 0.6667  
Epoch 17/20  
108/108 [=====] - 0s 158us/step - loss: 40.8563 - acc: 0.6667  
Epoch 18/20  
108/108 [=====] - 0s 160us/step - loss: 38.6200 - acc: 0.6667  
Epoch 19/20  
108/108 [=====] - 0s 158us/step - loss: 36.5016 - acc: 0.6667  
Epoch 20/20  
108/108 [=====] - 0s 155us/step - loss: 34.4891 - acc: 0.6667  
27/27 [=====] - 4s 166ms/step  
108/108 [=====] - 0s 145us/step  
Epoch 1/20  
108/108 [=====] - 10s 92ms/step - loss: 92.7504 - acc: 0.3148  
Epoch 2/20  
108/108 [=====] - 0s 216us/step - loss: 88.7470 - acc: 0.3333  
Epoch 3/20  
108/108 [=====] - 0s 252us/step - loss: 84.4989 - acc: 0.3333  
Epoch 4/20  
108/108 [=====] - 0s 189us/step - loss: 80.3026 - acc: 0.3426  
Epoch 5/20  
108/108 [=====] - 0s 168us/step - loss: 76.2275 - acc: 0.4074  
Epoch 6/20  
108/108 [=====] - 0s 159us/step - loss: 72.2992 - acc: 0.4907  
Epoch 7/20  
108/108 [=====] - 0s 171us/step - loss: 68.5320 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 159us/step - loss: 64.9268 - acc: 0.6944

Epoch 9/20  
108/108 [=====] - 0s 161us/step - loss: 61.4855 - acc: 0.7037  
Epoch 10/20  
108/108 [=====] - 0s 167us/step - loss: 58.2052 - acc: 0.6852  
Epoch 11/20  
108/108 [=====] - 0s 181us/step - loss: 55.0825 - acc: 0.6852  
Epoch 12/20  
108/108 [=====] - 0s 194us/step - loss: 52.1125 - acc: 0.6852  
Epoch 13/20  
108/108 [=====] - 0s 199us/step - loss: 49.2866 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 210us/step - loss: 46.6082 - acc: 0.7685  
Epoch 15/20  
108/108 [=====] - 0s 247us/step - loss: 44.0612 - acc: 0.7407  
Epoch 16/20  
108/108 [=====] - 0s 179us/step - loss: 41.6462 - acc: 0.7130  
Epoch 17/20  
108/108 [=====] - 0s 162us/step - loss: 39.3591 - acc: 0.8611  
Epoch 18/20  
108/108 [=====] - 0s 163us/step - loss: 37.1900 - acc: 0.9074  
Epoch 19/20  
108/108 [=====] - 0s 162us/step - loss: 35.1331 - acc: 0.8148  
Epoch 20/20  
108/108 [=====] - 0s 173us/step - loss: 33.1852 - acc: 0.7778  
27/27 [=====] - 5s 170ms/step  
108/108 [=====] - 0s 177us/step  
Epoch 1/20  
108/108 [=====] - 10s 94ms/step - loss: 2.4994 - acc: 0.3611  
Epoch 2/20  
108/108 [=====] - 0s 177us/step - loss: 2.2535 - acc: 0.6852  
Epoch 3/20  
108/108 [=====] - 0s 186us/step - loss: 2.0986 - acc: 0.6852  
Epoch 4/20  
108/108 [=====] - 0s 250us/step - loss: 1.9423 - acc: 0.7037  
Epoch 5/20  
108/108 [=====] - 0s 207us/step - loss: 1.8192 - acc: 0.9537  
Epoch 6/20  
108/108 [=====] - 0s 223us/step - loss: 1.7193 - acc: 0.9444  
Epoch 7/20  
108/108 [=====] - 0s 241us/step - loss: 1.6211 - acc: 0.9630  
Epoch 8/20  
108/108 [=====] - 0s 216us/step - loss: 1.5386 - acc: 0.8519  
Epoch 9/20  
108/108 [=====] - 0s 254us/step - loss: 1.4688 - acc: 0.7963  
Epoch 10/20  
108/108 [=====] - 0s 285us/step - loss: 1.4052 - acc: 0.7685  
Epoch 11/20  
108/108 [=====] - 0s 281us/step - loss: 1.3428 - acc: 0.8981

Epoch 12/20  
108/108 [=====] - 0s 263us/step - loss: 1.2847 - acc: 0.9537  
Epoch 13/20  
108/108 [=====] - 0s 210us/step - loss: 1.2344 - acc: 0.9444  
Epoch 14/20  
108/108 [=====] - 0s 215us/step - loss: 1.1875 - acc: 0.9537  
Epoch 15/20  
108/108 [=====] - 0s 248us/step - loss: 1.1432 - acc: 0.9537  
Epoch 16/20  
108/108 [=====] - 0s 248us/step - loss: 1.1036 - acc: 0.9444  
Epoch 17/20  
108/108 [=====] - 0s 219us/step - loss: 1.0647 - acc: 0.9444  
Epoch 18/20  
108/108 [=====] - 0s 177us/step - loss: 1.0291 - acc: 0.9444  
Epoch 19/20  
108/108 [=====] - 0s 167us/step - loss: 0.9905 - acc: 0.9630  
Epoch 20/20  
108/108 [=====] - 0s 170us/step - loss: 0.9596 - acc: 0.9815  
27/27 [=====] - 5s 176ms/step  
108/108 [=====] - 0s 180us/step  
Epoch 1/20  
108/108 [=====] - 10s 96ms/step - loss: 2.7170 - acc: 0.3519  
Epoch 2/20  
108/108 [=====] - 0s 241us/step - loss: 2.4319 - acc: 0.3611  
Epoch 3/20  
108/108 [=====] - 0s 191us/step - loss: 2.2711 - acc: 0.3333  
Epoch 4/20  
108/108 [=====] - 0s 208us/step - loss: 2.1565 - acc: 0.4537  
Epoch 5/20  
108/108 [=====] - 0s 210us/step - loss: 2.0382 - acc: 0.6852  
Epoch 6/20  
108/108 [=====] - 0s 227us/step - loss: 1.9297 - acc: 0.7685  
Epoch 7/20  
108/108 [=====] - 0s 239us/step - loss: 1.8381 - acc: 0.7315  
Epoch 8/20  
108/108 [=====] - 0s 243us/step - loss: 1.7470 - acc: 0.7870  
Epoch 9/20  
108/108 [=====] - 0s 318us/step - loss: 1.6602 - acc: 0.7315  
Epoch 10/20  
108/108 [=====] - 0s 232us/step - loss: 1.5848 - acc: 0.8889  
Epoch 11/20  
108/108 [=====] - 0s 200us/step - loss: 1.5059 - acc: 0.8148  
Epoch 12/20  
108/108 [=====] - 0s 169us/step - loss: 1.4455 - acc: 0.6852  
Epoch 13/20  
108/108 [=====] - 0s 161us/step - loss: 1.4053 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 171us/step - loss: 1.3363 - acc: 0.6852

Epoch 15/20  
108/108 [=====] - 0s 173us/step - loss: 1.2805 - acc: 0.8889  
Epoch 16/20  
108/108 [=====] - 0s 167us/step - loss: 1.2471 - acc: 0.7037  
Epoch 17/20  
108/108 [=====] - 0s 165us/step - loss: 1.1908 - acc: 0.8981  
Epoch 18/20  
108/108 [=====] - 0s 167us/step - loss: 1.1472 - acc: 0.7130  
Epoch 19/20  
108/108 [=====] - 0s 162us/step - loss: 1.1181 - acc: 0.7037  
Epoch 20/20  
108/108 [=====] - 0s 162us/step - loss: 1.0804 - acc: 0.7037  
27/27 [=====] - 5s 172ms/step  
108/108 [=====] - 0s 190us/step  
Epoch 1/20  
108/108 [=====] - 11s 102ms/step - loss: 2.4390 - acc: 0.3704  
Epoch 2/20  
108/108 [=====] - 0s 177us/step - loss: 2.2242 - acc: 0.3426  
Epoch 3/20  
108/108 [=====] - 0s 189us/step - loss: 2.0790 - acc: 0.6296  
Epoch 4/20  
108/108 [=====] - 0s 212us/step - loss: 1.9307 - acc: 0.8056  
Epoch 5/20  
108/108 [=====] - 0s 174us/step - loss: 1.8699 - acc: 0.6852  
Epoch 6/20  
108/108 [=====] - 0s 202us/step - loss: 1.7540 - acc: 0.6852  
Epoch 7/20  
108/108 [=====] - 0s 177us/step - loss: 1.6401 - acc: 0.8889  
Epoch 8/20  
108/108 [=====] - 0s 175us/step - loss: 1.5878 - acc: 0.6296  
Epoch 9/20  
108/108 [=====] - 0s 170us/step - loss: 1.5167 - acc: 0.6296  
Epoch 10/20  
108/108 [=====] - 0s 178us/step - loss: 1.4325 - acc: 0.8426  
Epoch 11/20  
108/108 [=====] - 0s 189us/step - loss: 1.3677 - acc: 0.9352  
Epoch 12/20  
108/108 [=====] - 0s 211us/step - loss: 1.3190 - acc: 0.8519  
Epoch 13/20  
108/108 [=====] - 0s 173us/step - loss: 1.2674 - acc: 0.8611  
Epoch 14/20  
108/108 [=====] - 0s 173us/step - loss: 1.2130 - acc: 0.9444  
Epoch 15/20  
108/108 [=====] - 0s 184us/step - loss: 1.1602 - acc: 0.9815  
Epoch 16/20  
108/108 [=====] - 0s 228us/step - loss: 1.1171 - acc: 0.9815  
Epoch 17/20  
108/108 [=====] - 0s 208us/step - loss: 1.0770 - acc: 0.9815

Epoch 18/20  
108/108 [=====] - 0s 218us/step - loss: 1.0414 - acc: 0.9444  
Epoch 19/20  
108/108 [=====] - 0s 174us/step - loss: 1.0054 - acc: 0.9537  
Epoch 20/20  
108/108 [=====] - 0s 174us/step - loss: 0.9680 - acc: 0.9907  
27/27 [=====] - 6s 209ms/step  
108/108 [=====] - 0s 184us/step  
Epoch 1/20  
108/108 [=====] - 12s 108ms/step - loss: 2.5771 - acc: 0.3611  
Epoch 2/20  
108/108 [=====] - 0s 226us/step - loss: 2.3109 - acc: 0.3796  
Epoch 3/20  
108/108 [=====] - 0s 230us/step - loss: 2.1894 - acc: 0.4352  
Epoch 4/20  
108/108 [=====] - 0s 248us/step - loss: 2.0390 - acc: 0.6944  
Epoch 5/20  
108/108 [=====] - 0s 237us/step - loss: 1.9097 - acc: 0.7222  
Epoch 6/20  
108/108 [=====] - 0s 170us/step - loss: 1.8053 - acc: 0.6667  
Epoch 7/20  
108/108 [=====] - 0s 173us/step - loss: 1.7038 - acc: 0.6667  
Epoch 8/20  
108/108 [=====] - 0s 163us/step - loss: 1.6032 - acc: 0.7870  
Epoch 9/20  
108/108 [=====] - 0s 205us/step - loss: 1.5240 - acc: 0.7685  
Epoch 10/20  
108/108 [=====] - 0s 198us/step - loss: 1.4492 - acc: 0.7778  
Epoch 11/20  
108/108 [=====] - 0s 267us/step - loss: 1.3773 - acc: 0.8611  
Epoch 12/20  
108/108 [=====] - 0s 297us/step - loss: 1.3186 - acc: 0.9815  
Epoch 13/20  
108/108 [=====] - 0s 302us/step - loss: 1.2673 - acc: 0.9722  
Epoch 14/20  
108/108 [=====] - 0s 301us/step - loss: 1.2034 - acc: 0.9630  
Epoch 15/20  
108/108 [=====] - 0s 326us/step - loss: 1.1550 - acc: 0.9444  
Epoch 16/20  
108/108 [=====] - 0s 269us/step - loss: 1.1096 - acc: 0.9537  
Epoch 17/20  
108/108 [=====] - 0s 297us/step - loss: 1.0713 - acc: 0.9630  
Epoch 18/20  
108/108 [=====] - 0s 283us/step - loss: 1.0413 - acc: 0.9444  
Epoch 19/20  
108/108 [=====] - 0s 217us/step - loss: 0.9928 - acc: 0.9630  
Epoch 20/20  
108/108 [=====] - 0s 328us/step - loss: 0.9648 - acc: 0.9444

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27/27 [=====] - 5s 176ms/step
108/108 [=====] - 0s 152us/step
Epoch 1/20
108/108 [=====] - 11s 98ms/step - loss: 3.0380 - acc: 0.3519
Epoch 2/20
108/108 [=====] - 0s 167us/step - loss: 2.4486 - acc: 0.3519
Epoch 3/20
108/108 [=====] - 0s 209us/step - loss: 2.1845 - acc: 0.6852
Epoch 4/20
108/108 [=====] - 0s 179us/step - loss: 2.0715 - acc: 0.6574
Epoch 5/20
108/108 [=====] - 0s 210us/step - loss: 1.9764 - acc: 0.6667
Epoch 6/20
108/108 [=====] - 0s 201us/step - loss: 1.8602 - acc: 0.6667
Epoch 7/20
108/108 [=====] - 0s 198us/step - loss: 1.7412 - acc: 0.7963
Epoch 8/20
108/108 [=====] - 0s 200us/step - loss: 1.6587 - acc: 0.7222
Epoch 9/20
108/108 [=====] - 0s 184us/step - loss: 1.5811 - acc: 0.8519
Epoch 10/20
108/108 [=====] - 0s 279us/step - loss: 1.5112 - acc: 0.6852
Epoch 11/20
108/108 [=====] - 0s 207us/step - loss: 1.4564 - acc: 0.6667
Epoch 12/20
108/108 [=====] - 0s 170us/step - loss: 1.4057 - acc: 0.6667
Epoch 13/20
108/108 [=====] - 0s 164us/step - loss: 1.3332 - acc: 0.6852
Epoch 14/20
108/108 [=====] - 0s 173us/step - loss: 1.2741 - acc: 0.9537
Epoch 15/20
108/108 [=====] - 0s 171us/step - loss: 1.2290 - acc: 0.9074
Epoch 16/20
108/108 [=====] - 0s 199us/step - loss: 1.1837 - acc: 0.9259
Epoch 17/20
108/108 [=====] - 0s 223us/step - loss: 1.1446 - acc: 0.9722
Epoch 18/20
108/108 [=====] - 0s 182us/step - loss: 1.1072 - acc: 0.9722
Epoch 19/20
108/108 [=====] - 0s 171us/step - loss: 1.0723 - acc: 0.9630
Epoch 20/20
108/108 [=====] - 0s 208us/step - loss: 1.0386 - acc: 0.9537
27/27 [=====] - 5s 176ms/step
108/108 [=====] - 0s 221us/step
Epoch 1/20
108/108 [=====] - 11s 100ms/step - loss: 14.6423 - acc: 0.0185
Epoch 2/20
108/108 [=====] - 0s 191us/step - loss: 13.8958 - acc: 0.3426

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Epoch 3/20  
108/108 [=====] - 0s 175us/step - loss: 13.1629 - acc: 0.3796  
Epoch 4/20  
108/108 [=====] - 0s 187us/step - loss: 12.4863 - acc: 0.6759  
Epoch 5/20  
108/108 [=====] - 0s 176us/step - loss: 11.8333 - acc: 0.6852  
Epoch 6/20  
108/108 [=====] - 0s 169us/step - loss: 11.2064 - acc: 0.6852  
Epoch 7/20  
108/108 [=====] - 0s 183us/step - loss: 10.6115 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 171us/step - loss: 10.0485 - acc: 0.6852  
Epoch 9/20  
108/108 [=====] - 0s 173us/step - loss: 9.5120 - acc: 0.8333  
Epoch 10/20  
108/108 [=====] - 0s 181us/step - loss: 8.9948 - acc: 0.6852  
Epoch 11/20  
108/108 [=====] - 0s 168us/step - loss: 8.5091 - acc: 0.6852  
Epoch 12/20  
108/108 [=====] - 0s 194us/step - loss: 8.0452 - acc: 0.6852  
Epoch 13/20  
108/108 [=====] - 0s 192us/step - loss: 7.6149 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 190us/step - loss: 7.2045 - acc: 0.6944  
Epoch 15/20  
108/108 [=====] - 0s 198us/step - loss: 6.8199 - acc: 0.9444  
Epoch 16/20  
108/108 [=====] - 0s 172us/step - loss: 6.4501 - acc: 0.9167  
Epoch 17/20  
108/108 [=====] - 0s 205us/step - loss: 6.0976 - acc: 0.8796  
Epoch 18/20  
108/108 [=====] - 0s 177us/step - loss: 5.7663 - acc: 0.6852  
Epoch 19/20  
108/108 [=====] - 0s 174us/step - loss: 5.4623 - acc: 0.6852  
Epoch 20/20  
108/108 [=====] - 0s 210us/step - loss: 5.1721 - acc: 0.6852  
27/27 [=====] - 5s 175ms/step  
108/108 [=====] - 0s 138us/step  
Epoch 1/20  
108/108 [=====] - 10s 97ms/step - loss: 14.6560 - acc: 0.1944  
Epoch 2/20  
108/108 [=====] - 0s 269us/step - loss: 13.9534 - acc: 0.1759  
Epoch 3/20  
108/108 [=====] - 0s 234us/step - loss: 13.2961 - acc: 0.2593  
Epoch 4/20  
108/108 [=====] - 0s 256us/step - loss: 12.6367 - acc: 0.1944  
Epoch 5/20  
108/108 [=====] - 0s 194us/step - loss: 11.9718 - acc: 0.3981

Epoch 6/20  
 108/108 [=====] - 0s 177us/step - loss: 11.3443 - acc: 0.6667  
 Epoch 7/20  
 108/108 [=====] - 0s 171us/step - loss: 10.7465 - acc: 0.5741  
 Epoch 8/20  
 108/108 [=====] - 0s 206us/step - loss: 10.1859 - acc: 0.6296  
 Epoch 9/20  
 108/108 [=====] - 0s 166us/step - loss: 9.6416 - acc: 0.6852  
 Epoch 10/20  
 108/108 [=====] - 0s 254us/step - loss: 9.1346 - acc: 0.6852  
 Epoch 11/20  
 108/108 [=====] - 0s 175us/step - loss: 8.6494 - acc: 0.6852  
 Epoch 12/20  
 108/108 [=====] - 0s 177us/step - loss: 8.1888 - acc: 0.6852  
 Epoch 13/20  
 108/108 [=====] - 0s 175us/step - loss: 7.7540 - acc: 0.6852  
 Epoch 14/20  
 108/108 [=====] - 0s 226us/step - loss: 7.3420 - acc: 0.6852  
 Epoch 15/20  
 108/108 [=====] - 0s 265us/step - loss: 6.9643 - acc: 0.6852  
 Epoch 16/20  
 108/108 [=====] - 0s 190us/step - loss: 6.5964 - acc: 0.6852  
 Epoch 17/20  
 108/108 [=====] - 0s 215us/step - loss: 6.2470 - acc: 0.6852  
 Epoch 18/20  
 108/108 [=====] - 0s 210us/step - loss: 5.9195 - acc: 0.6852  
 Epoch 19/20  
 108/108 [=====] - 0s 214us/step - loss: 5.6078 - acc: 0.6852  
 Epoch 20/20  
 108/108 [=====] - 0s 202us/step - loss: 5.3214 - acc: 0.8889  
 27/27 [=====] - 5s 175ms/step  
 108/108 [=====] - 0s 158us/step  
 Epoch 1/20  
 108/108 [=====] - 11s 98ms/step - loss: 14.5359 - acc: 0.6667  
 Epoch 2/20  
 108/108 [=====] - 0s 208us/step - loss: 13.8219 - acc: 0.6574  
 Epoch 3/20  
 108/108 [=====] - 0s 242us/step - loss: 13.1030 - acc: 0.8333  
 Epoch 4/20  
 108/108 [=====] - 0s 172us/step - loss: 12.4101 - acc: 0.7593  
 Epoch 5/20  
 108/108 [=====] - 0s 226us/step - loss: 11.7454 - acc: 0.6852  
 Epoch 6/20  
 108/108 [=====] - 0s 224us/step - loss: 11.1237 - acc: 0.7870  
 Epoch 7/20  
 108/108 [=====] - 0s 239us/step - loss: 10.5326 - acc: 0.6389  
 Epoch 8/20  
 108/108 [=====] - 0s 230us/step - loss: 9.9565 - acc: 0.7778

Epoch 9/20  
108/108 [=====] - 0s 201us/step - loss: 9.4197 - acc: 0.9167  
Epoch 10/20  
108/108 [=====] - 0s 198us/step - loss: 8.9080 - acc: 0.8333  
Epoch 11/20  
108/108 [=====] - 0s 234us/step - loss: 8.4203 - acc: 0.9167  
Epoch 12/20  
108/108 [=====] - 0s 209us/step - loss: 7.9693 - acc: 0.8889  
Epoch 13/20  
108/108 [=====] - 0s 187us/step - loss: 7.5360 - acc: 0.8426  
Epoch 14/20  
108/108 [=====] - 0s 201us/step - loss: 7.1246 - acc: 0.8981  
Epoch 15/20  
108/108 [=====] - 0s 204us/step - loss: 6.7646 - acc: 0.6852  
Epoch 16/20  
108/108 [=====] - 0s 191us/step - loss: 6.3860 - acc: 0.7778  
Epoch 17/20  
108/108 [=====] - 0s 171us/step - loss: 6.0390 - acc: 0.8333  
Epoch 18/20  
108/108 [=====] - 0s 177us/step - loss: 5.7143 - acc: 0.8611  
Epoch 19/20  
108/108 [=====] - 0s 232us/step - loss: 5.4107 - acc: 0.9167  
Epoch 20/20  
108/108 [=====] - 0s 167us/step - loss: 5.1420 - acc: 0.7222  
27/27 [=====] - 5s 190ms/step  
108/108 [=====] - 0s 194us/step  
Epoch 1/20  
108/108 [=====] - 11s 100ms/step - loss: 14.2773 - acc: 0.3611  
Epoch 2/20  
108/108 [=====] - 0s 178us/step - loss: 13.5554 - acc: 0.5463  
Epoch 3/20  
108/108 [=====] - 0s 196us/step - loss: 12.8897 - acc: 0.9352  
Epoch 4/20  
108/108 [=====] - 0s 172us/step - loss: 12.2320 - acc: 0.6667  
Epoch 5/20  
108/108 [=====] - 0s 191us/step - loss: 11.5838 - acc: 0.6667  
Epoch 6/20  
108/108 [=====] - 0s 177us/step - loss: 10.9683 - acc: 0.6667  
Epoch 7/20  
108/108 [=====] - 0s 176us/step - loss: 10.3883 - acc: 0.7407  
Epoch 8/20  
108/108 [=====] - 0s 169us/step - loss: 9.8362 - acc: 0.8148  
Epoch 9/20  
108/108 [=====] - 0s 172us/step - loss: 9.3093 - acc: 0.9537  
Epoch 10/20  
108/108 [=====] - 0s 238us/step - loss: 8.8106 - acc: 0.9259  
Epoch 11/20  
108/108 [=====] - 0s 189us/step - loss: 8.3275 - acc: 0.9259

Epoch 12/20  
108/108 [=====] - 0s 202us/step - loss: 7.8847 - acc: 0.9630  
Epoch 13/20  
108/108 [=====] - 0s 165us/step - loss: 7.4607 - acc: 0.9537  
Epoch 14/20  
108/108 [=====] - 0s 220us/step - loss: 7.0561 - acc: 0.8426  
Epoch 15/20  
108/108 [=====] - 0s 188us/step - loss: 6.6804 - acc: 0.7963  
Epoch 16/20  
108/108 [=====] - 0s 188us/step - loss: 6.3219 - acc: 0.8056  
Epoch 17/20  
108/108 [=====] - 0s 242us/step - loss: 5.9850 - acc: 0.7963  
Epoch 18/20  
108/108 [=====] - 0s 196us/step - loss: 5.6642 - acc: 0.8889  
Epoch 19/20  
108/108 [=====] - 0s 216us/step - loss: 5.3758 - acc: 0.9630  
Epoch 20/20  
108/108 [=====] - 0s 181us/step - loss: 5.0869 - acc: 0.9167  
27/27 [=====] - 5s 180ms/step  
108/108 [=====] - 0s 192us/step  
Epoch 1/20  
108/108 [=====] - 11s 100ms/step - loss: 14.4919 - acc: 0.6574  
Epoch 2/20  
108/108 [=====] - 0s 171us/step - loss: 13.7752 - acc: 0.7315  
Epoch 3/20  
108/108 [=====] - 0s 166us/step - loss: 13.0805 - acc: 0.6667  
Epoch 4/20  
108/108 [=====] - 0s 197us/step - loss: 12.3909 - acc: 0.6667  
Epoch 5/20  
108/108 [=====] - 0s 171us/step - loss: 11.7306 - acc: 0.8611  
Epoch 6/20  
108/108 [=====] - 0s 184us/step - loss: 11.0954 - acc: 0.8796  
Epoch 7/20  
108/108 [=====] - 0s 172us/step - loss: 10.4848 - acc: 0.8704  
Epoch 8/20  
108/108 [=====] - 0s 163us/step - loss: 9.9049 - acc: 0.8148  
Epoch 9/20  
108/108 [=====] - 0s 161us/step - loss: 9.3576 - acc: 0.7130  
Epoch 10/20  
108/108 [=====] - 0s 169us/step - loss: 8.8347 - acc: 0.7593  
Epoch 11/20  
108/108 [=====] - 0s 165us/step - loss: 8.3406 - acc: 0.7963  
Epoch 12/20  
108/108 [=====] - 0s 169us/step - loss: 7.8778 - acc: 0.7870  
Epoch 13/20  
108/108 [=====] - 0s 166us/step - loss: 7.4382 - acc: 0.9167  
Epoch 14/20  
108/108 [=====] - 0s 168us/step - loss: 7.0234 - acc: 0.9537

Epoch 15/20  
108/108 [=====] - 0s 165us/step - loss: 6.6281 - acc: 0.8981  
Epoch 16/20  
108/108 [=====] - 0s 206us/step - loss: 6.2661 - acc: 0.7222  
Epoch 17/20  
108/108 [=====] - 0s 189us/step - loss: 5.9223 - acc: 0.6852  
Epoch 18/20  
108/108 [=====] - 0s 172us/step - loss: 5.5912 - acc: 0.6944  
Epoch 19/20  
108/108 [=====] - 0s 166us/step - loss: 5.2766 - acc: 0.8889  
Epoch 20/20  
108/108 [=====] - 0s 189us/step - loss: 4.9938 - acc: 0.8981  
27/27 [=====] - 5s 177ms/step  
108/108 [=====] - 0s 192us/step  
Epoch 1/20  
108/108 [=====] - 11s 100ms/step - loss: 134.9407 - acc: 0.3426  
Epoch 2/20  
108/108 [=====] - 0s 215us/step - loss: 128.1360 - acc: 0.3426  
Epoch 3/20  
108/108 [=====] - 0s 218us/step - loss: 121.0065 - acc: 0.3426  
Epoch 4/20  
108/108 [=====] - 0s 199us/step - loss: 114.0374 - acc: 0.5278  
Epoch 5/20  
108/108 [=====] - 0s 243us/step - loss: 107.3327 - acc: 0.6852  
Epoch 6/20  
108/108 [=====] - 0s 231us/step - loss: 100.9098 - acc: 0.6759  
Epoch 7/20  
108/108 [=====] - 0s 170us/step - loss: 94.7865 - acc: 0.6759  
Epoch 8/20  
108/108 [=====] - 0s 197us/step - loss: 88.9673 - acc: 0.6852  
Epoch 9/20  
108/108 [=====] - 0s 207us/step - loss: 83.4517 - acc: 0.6852  
Epoch 10/20  
108/108 [=====] - 0s 168us/step - loss: 78.2349 - acc: 0.6852  
Epoch 11/20  
108/108 [=====] - 0s 271us/step - loss: 73.3082 - acc: 0.6852  
Epoch 12/20  
108/108 [=====] - 0s 204us/step - loss: 68.6649 - acc: 0.6852  
Epoch 13/20  
108/108 [=====] - 0s 206us/step - loss: 64.2889 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 191us/step - loss: 60.1696 - acc: 0.6852  
Epoch 15/20  
108/108 [=====] - 0s 257us/step - loss: 56.2931 - acc: 0.6852  
Epoch 16/20  
108/108 [=====] - 0s 174us/step - loss: 52.6497 - acc: 0.6852  
Epoch 17/20  
108/108 [=====] - 0s 167us/step - loss: 49.2271 - acc: 0.6852

Epoch 18/20  
108/108 [=====] - 0s 205us/step - loss: 46.0130 - acc: 0.6852  
Epoch 19/20  
108/108 [=====] - 0s 189us/step - loss: 42.9968 - acc: 0.6852  
Epoch 20/20  
108/108 [=====] - 0s 219us/step - loss: 40.1671 - acc: 0.6852  
27/27 [=====] - 5s 192ms/step  
108/108 [=====] - 0s 157us/step  
Epoch 1/20  
108/108 [=====] - 11s 98ms/step - loss: 135.9770 - acc: 0.6759  
Epoch 2/20  
108/108 [=====] - 0s 218us/step - loss: 129.2562 - acc: 0.6852  
Epoch 3/20  
108/108 [=====] - 0s 191us/step - loss: 122.1431 - acc: 0.6852  
Epoch 4/20  
108/108 [=====] - 0s 172us/step - loss: 115.1505 - acc: 0.6852  
Epoch 5/20  
108/108 [=====] - 0s 206us/step - loss: 108.4002 - acc: 0.6852  
Epoch 6/20  
108/108 [=====] - 0s 189us/step - loss: 101.9304 - acc: 0.8426  
Epoch 7/20  
108/108 [=====] - 0s 180us/step - loss: 95.7617 - acc: 0.9259  
Epoch 8/20  
108/108 [=====] - 0s 217us/step - loss: 89.8986 - acc: 0.8704  
Epoch 9/20  
108/108 [=====] - 0s 188us/step - loss: 84.3370 - acc: 0.6852  
Epoch 10/20  
108/108 [=====] - 0s 200us/step - loss: 79.0742 - acc: 0.6852  
Epoch 11/20  
108/108 [=====] - 0s 168us/step - loss: 74.1107 - acc: 0.6852  
Epoch 12/20  
108/108 [=====] - 0s 215us/step - loss: 69.4322 - acc: 0.6852  
Epoch 13/20  
108/108 [=====] - 0s 190us/step - loss: 65.0218 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 195us/step - loss: 60.8590 - acc: 0.6852  
Epoch 15/20  
108/108 [=====] - 0s 262us/step - loss: 56.9358 - acc: 0.6852  
Epoch 16/20  
108/108 [=====] - 0s 256us/step - loss: 53.2523 - acc: 0.6852  
Epoch 17/20  
108/108 [=====] - 0s 194us/step - loss: 49.7905 - acc: 0.6852  
Epoch 18/20  
108/108 [=====] - 0s 174us/step - loss: 46.5388 - acc: 0.6852  
Epoch 19/20  
108/108 [=====] - 0s 180us/step - loss: 43.4858 - acc: 0.6852  
Epoch 20/20  
108/108 [=====] - 0s 203us/step - loss: 40.6239 - acc: 0.6852

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27/27 [=====] - 5s 179ms/step
108/108 [=====] - 0s 199us/step
Epoch 1/20
108/108 [=====] - 11s 98ms/step - loss: 134.9161 - acc: 0.3148
Epoch 2/20
108/108 [=====] - 0s 229us/step - loss: 128.1999 - acc: 0.3148
Epoch 3/20
108/108 [=====] - 0s 216us/step - loss: 121.1264 - acc: 0.5463
Epoch 4/20
108/108 [=====] - 0s 230us/step - loss: 114.1903 - acc: 0.5741
Epoch 5/20
108/108 [=====] - 0s 194us/step - loss: 107.4945 - acc: 0.3981
Epoch 6/20
108/108 [=====] - 0s 197us/step - loss: 101.0797 - acc: 0.4537
Epoch 7/20
108/108 [=====] - 0s 314us/step - loss: 94.9635 - acc: 0.6296
Epoch 8/20
108/108 [=====] - 0s 319us/step - loss: 89.1568 - acc: 0.6852
Epoch 9/20
108/108 [=====] - 0s 196us/step - loss: 83.6548 - acc: 0.7222
Epoch 10/20
108/108 [=====] - 0s 175us/step - loss: 78.4506 - acc: 0.9352
Epoch 11/20
108/108 [=====] - 0s 257us/step - loss: 73.5340 - acc: 0.9074
Epoch 12/20
108/108 [=====] - 0s 178us/step - loss: 68.8989 - acc: 0.7037
Epoch 13/20
108/108 [=====] - 0s 171us/step - loss: 64.5335 - acc: 0.6389
Epoch 14/20
108/108 [=====] - 0s 222us/step - loss: 60.4234 - acc: 0.6389
Epoch 15/20
108/108 [=====] - 0s 178us/step - loss: 56.5560 - acc: 0.6944
Epoch 16/20
108/108 [=====] - 0s 199us/step - loss: 52.9176 - acc: 0.9074
Epoch 17/20
108/108 [=====] - 0s 165us/step - loss: 49.5001 - acc: 0.9630
Epoch 18/20
108/108 [=====] - 0s 239us/step - loss: 46.2911 - acc: 0.8889
Epoch 19/20
108/108 [=====] - 0s 264us/step - loss: 43.2767 - acc: 0.8704
Epoch 20/20
108/108 [=====] - 0s 289us/step - loss: 40.4478 - acc: 0.9074
27/27 [=====] - 5s 184ms/step
108/108 [=====] - 0s 152us/step
Epoch 1/20
108/108 [=====] - 11s 102ms/step - loss: 135.7860 - acc: 0.3611
Epoch 2/20
108/108 [=====] - 0s 179us/step - loss: 129.0664 - acc: 0.3611

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Epoch 3/20  
108/108 [=====] - 0s 193us/step - loss: 121.9630 - acc: 0.3611  
Epoch 4/20  
108/108 [=====] - 0s 224us/step - loss: 114.9882 - acc: 0.3611  
Epoch 5/20  
108/108 [=====] - 0s 233us/step - loss: 108.2574 - acc: 0.4537  
Epoch 6/20  
108/108 [=====] - 0s 176us/step - loss: 101.8079 - acc: 0.6481  
Epoch 7/20  
108/108 [=====] - 0s 223us/step - loss: 95.6578 - acc: 0.5000  
Epoch 8/20  
108/108 [=====] - 0s 173us/step - loss: 89.8110 - acc: 0.6204  
Epoch 9/20  
108/108 [=====] - 0s 172us/step - loss: 84.2779 - acc: 0.5648  
Epoch 10/20  
108/108 [=====] - 0s 185us/step - loss: 79.0459 - acc: 0.4444  
Epoch 11/20  
108/108 [=====] - 0s 265us/step - loss: 74.1026 - acc: 0.4074  
Epoch 12/20  
108/108 [=====] - 0s 184us/step - loss: 69.4317 - acc: 0.4907  
Epoch 13/20  
108/108 [=====] - 0s 233us/step - loss: 65.0204 - acc: 0.6481  
Epoch 14/20  
108/108 [=====] - 0s 199us/step - loss: 60.8704 - acc: 0.6667  
Epoch 15/20  
108/108 [=====] - 0s 194us/step - loss: 56.9648 - acc: 0.6667  
Epoch 16/20  
108/108 [=====] - 0s 181us/step - loss: 53.2902 - acc: 0.6667  
Epoch 17/20  
108/108 [=====] - 0s 217us/step - loss: 49.8402 - acc: 0.6667  
Epoch 18/20  
108/108 [=====] - 0s 201us/step - loss: 46.5990 - acc: 0.6667  
Epoch 19/20  
108/108 [=====] - 0s 217us/step - loss: 43.5550 - acc: 0.6667  
Epoch 20/20  
108/108 [=====] - 0s 264us/step - loss: 40.6983 - acc: 0.6667  
27/27 [=====] - 5s 183ms/step  
108/108 [=====] - 0s 149us/step  
Epoch 1/20  
108/108 [=====] - 11s 102ms/step - loss: 136.1811 - acc: 0.3148  
Epoch 2/20  
108/108 [=====] - 0s 300us/step - loss: 129.3825 - acc: 0.3148  
Epoch 3/20  
108/108 [=====] - 0s 245us/step - loss: 122.2740 - acc: 0.3148  
Epoch 4/20  
108/108 [=====] - 0s 230us/step - loss: 115.3068 - acc: 0.5000  
Epoch 5/20  
108/108 [=====] - 0s 195us/step - loss: 108.5764 - acc: 0.3519



Epoch 6/20  
108/108 [=====] - 0s 253us/step - loss: 102.1155 - acc: 0.4630  
Epoch 7/20  
108/108 [=====] - 0s 327us/step - loss: 95.9516 - acc: 0.6759  
Epoch 8/20  
108/108 [=====] - 0s 345us/step - loss: 90.0920 - acc: 0.8056  
Epoch 9/20  
108/108 [=====] - 0s 318us/step - loss: 84.5368 - acc: 0.6759  
Epoch 10/20  
108/108 [=====] - 0s 259us/step - loss: 79.2807 - acc: 0.6667  
Epoch 11/20  
108/108 [=====] - 0s 245us/step - loss: 74.3134 - acc: 0.6667  
Epoch 12/20  
108/108 [=====] - 0s 249us/step - loss: 69.6277 - acc: 0.6667  
Epoch 13/20  
108/108 [=====] - 0s 197us/step - loss: 65.2110 - acc: 0.6667  
Epoch 14/20  
108/108 [=====] - 0s 278us/step - loss: 61.0513 - acc: 0.6667  
Epoch 15/20  
108/108 [=====] - 0s 245us/step - loss: 57.1353 - acc: 0.6667  
Epoch 16/20  
108/108 [=====] - 0s 211us/step - loss: 53.4536 - acc: 0.6667  
Epoch 17/20  
108/108 [=====] - 0s 167us/step - loss: 49.9959 - acc: 0.6667  
Epoch 18/20  
108/108 [=====] - 0s 223us/step - loss: 46.7454 - acc: 0.6852  
Epoch 19/20  
108/108 [=====] - 0s 196us/step - loss: 43.6926 - acc: 0.7037  
Epoch 20/20  
108/108 [=====] - 0s 168us/step - loss: 40.8280 - acc: 0.7037  
27/27 [=====] - 5s 183ms/step  
108/108 [=====] - 0s 139us/step  
Epoch 1/20  
108/108 [=====] - 11s 102ms/step - loss: 2.8532 - acc: 0.3333  
Epoch 2/20  
108/108 [=====] - 0s 193us/step - loss: 2.6566 - acc: 0.3519  
Epoch 3/20  
108/108 [=====] - 0s 170us/step - loss: 2.4523 - acc: 0.6759  
Epoch 4/20  
108/108 [=====] - 0s 185us/step - loss: 2.3016 - acc: 0.8056  
Epoch 5/20  
108/108 [=====] - 0s 173us/step - loss: 2.1616 - acc: 0.7870  
Epoch 6/20  
108/108 [=====] - 0s 168us/step - loss: 2.0134 - acc: 0.6852  
Epoch 7/20  
108/108 [=====] - 0s 274us/step - loss: 1.9070 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 247us/step - loss: 1.7932 - acc: 0.6852

Epoch 9/20  
108/108 [=====] - 0s 201us/step - loss: 1.7008 - acc: 0.9537  
Epoch 10/20  
108/108 [=====] - 0s 217us/step - loss: 1.6126 - acc: 0.9815  
Epoch 11/20  
108/108 [=====] - 0s 172us/step - loss: 1.5262 - acc: 0.9074  
Epoch 12/20  
108/108 [=====] - 0s 173us/step - loss: 1.4540 - acc: 0.8704  
Epoch 13/20  
108/108 [=====] - 0s 164us/step - loss: 1.3875 - acc: 0.8796  
Epoch 14/20  
108/108 [=====] - 0s 194us/step - loss: 1.3241 - acc: 0.9722  
Epoch 15/20  
108/108 [=====] - 0s 204us/step - loss: 1.2662 - acc: 0.9815  
Epoch 16/20  
108/108 [=====] - 0s 187us/step - loss: 1.2187 - acc: 0.8889  
Epoch 17/20  
108/108 [=====] - 0s 174us/step - loss: 1.1629 - acc: 0.9259  
Epoch 18/20  
108/108 [=====] - 0s 199us/step - loss: 1.1137 - acc: 0.9815  
Epoch 19/20  
108/108 [=====] - 0s 183us/step - loss: 1.0755 - acc: 0.9074  
Epoch 20/20  
108/108 [=====] - 0s 204us/step - loss: 1.0323 - acc: 0.9167  
27/27 [=====] - 5s 188ms/step  
108/108 [=====] - 0s 183us/step  
Epoch 1/20  
108/108 [=====] - 12s 111ms/step - loss: 2.8835 - acc: 0.3333  
Epoch 2/20  
108/108 [=====] - 0s 191us/step - loss: 2.5656 - acc: 0.6852  
Epoch 3/20  
108/108 [=====] - 0s 260us/step - loss: 2.3668 - acc: 0.6852  
Epoch 4/20  
108/108 [=====] - 0s 281us/step - loss: 2.1939 - acc: 0.6852  
Epoch 5/20  
108/108 [=====] - 0s 300us/step - loss: 2.0385 - acc: 0.6944  
Epoch 6/20  
108/108 [=====] - 0s 230us/step - loss: 1.9094 - acc: 0.8889  
Epoch 7/20  
108/108 [=====] - 0s 270us/step - loss: 1.8143 - acc: 0.9074  
Epoch 8/20  
108/108 [=====] - 0s 352us/step - loss: 1.7224 - acc: 0.8796  
Epoch 9/20  
108/108 [=====] - 0s 292us/step - loss: 1.6161 - acc: 0.9722  
Epoch 10/20  
108/108 [=====] - 0s 229us/step - loss: 1.5305 - acc: 0.9630  
Epoch 11/20  
108/108 [=====] - 0s 186us/step - loss: 1.4572 - acc: 0.9630

Epoch 12/20  
108/108 [=====] - 0s 219us/step - loss: 1.3866 - acc: 0.9537  
Epoch 13/20  
108/108 [=====] - 0s 246us/step - loss: 1.3226 - acc: 0.9259  
Epoch 14/20  
108/108 [=====] - 0s 194us/step - loss: 1.2742 - acc: 0.8704  
Epoch 15/20  
108/108 [=====] - 0s 228us/step - loss: 1.2096 - acc: 0.9537  
Epoch 16/20  
108/108 [=====] - 0s 197us/step - loss: 1.1539 - acc: 0.9815  
Epoch 17/20  
108/108 [=====] - 0s 229us/step - loss: 1.1095 - acc: 0.9259  
Epoch 18/20  
108/108 [=====] - 0s 220us/step - loss: 1.0599 - acc: 0.9352  
Epoch 19/20  
108/108 [=====] - 0s 265us/step - loss: 1.0135 - acc: 0.9722  
Epoch 20/20  
108/108 [=====] - 0s 172us/step - loss: 0.9696 - acc: 0.9722  
27/27 [=====] - 5s 186ms/step  
108/108 [=====] - 0s 194us/step  
Epoch 1/20  
108/108 [=====] - 12s 107ms/step - loss: 3.0397 - acc: 0.4907  
Epoch 2/20  
108/108 [=====] - 0s 230us/step - loss: 2.6462 - acc: 0.6389  
Epoch 3/20  
108/108 [=====] - 0s 217us/step - loss: 2.4808 - acc: 0.8333  
Epoch 4/20  
108/108 [=====] - 0s 209us/step - loss: 2.3226 - acc: 0.7037  
Epoch 5/20  
108/108 [=====] - 0s 173us/step - loss: 2.1876 - acc: 0.6852  
Epoch 6/20  
108/108 [=====] - 0s 174us/step - loss: 2.0563 - acc: 0.8148  
Epoch 7/20  
108/108 [=====] - 0s 177us/step - loss: 1.9383 - acc: 0.6389  
Epoch 8/20  
108/108 [=====] - 0s 170us/step - loss: 1.8193 - acc: 0.8056  
Epoch 9/20  
108/108 [=====] - 0s 169us/step - loss: 1.7245 - acc: 0.8889  
Epoch 10/20  
108/108 [=====] - 0s 190us/step - loss: 1.6457 - acc: 0.7963  
Epoch 11/20  
108/108 [=====] - 0s 222us/step - loss: 1.5526 - acc: 0.9444  
Epoch 12/20  
108/108 [=====] - 0s 202us/step - loss: 1.4783 - acc: 0.8704  
Epoch 13/20  
108/108 [=====] - 0s 172us/step - loss: 1.4168 - acc: 0.8056  
Epoch 14/20  
108/108 [=====] - 0s 178us/step - loss: 1.3395 - acc: 0.9537

Epoch 15/20  
108/108 [=====] - 0s 205us/step - loss: 1.2879 - acc: 0.9352  
Epoch 16/20  
108/108 [=====] - 0s 184us/step - loss: 1.2268 - acc: 0.9630  
Epoch 17/20  
108/108 [=====] - 0s 170us/step - loss: 1.1737 - acc: 0.9537  
Epoch 18/20  
108/108 [=====] - 0s 172us/step - loss: 1.1229 - acc: 0.9722  
Epoch 19/20  
108/108 [=====] - 0s 183us/step - loss: 1.0814 - acc: 0.9815  
Epoch 20/20  
108/108 [=====] - 0s 221us/step - loss: 1.0421 - acc: 0.9815  
27/27 [=====] - 5s 196ms/step  
108/108 [=====] - 0s 188us/step  
Epoch 1/20  
108/108 [=====] - 11s 103ms/step - loss: 3.0273 - acc: 0.3148  
Epoch 2/20  
108/108 [=====] - 0s 196us/step - loss: 2.6863 - acc: 0.4907  
Epoch 3/20  
108/108 [=====] - 0s 193us/step - loss: 2.5652 - acc: 0.3611  
Epoch 4/20  
108/108 [=====] - 0s 205us/step - loss: 2.4086 - acc: 0.4074  
Epoch 5/20  
108/108 [=====] - 0s 206us/step - loss: 2.2335 - acc: 0.6759  
Epoch 6/20  
108/108 [=====] - 0s 199us/step - loss: 2.1056 - acc: 0.8519  
Epoch 7/20  
108/108 [=====] - 0s 240us/step - loss: 1.9941 - acc: 0.7407  
Epoch 8/20  
108/108 [=====] - 0s 269us/step - loss: 1.8710 - acc: 0.8241  
Epoch 9/20  
108/108 [=====] - 0s 289us/step - loss: 1.7697 - acc: 0.7685  
Epoch 10/20  
108/108 [=====] - 0s 257us/step - loss: 1.6633 - acc: 0.9444  
Epoch 11/20  
108/108 [=====] - 0s 252us/step - loss: 1.5727 - acc: 0.6667  
Epoch 12/20  
108/108 [=====] - 0s 267us/step - loss: 1.4993 - acc: 0.6667  
Epoch 13/20  
108/108 [=====] - 0s 170us/step - loss: 1.4216 - acc: 0.7130  
Epoch 14/20  
108/108 [=====] - 0s 219us/step - loss: 1.3471 - acc: 0.8426  
Epoch 15/20  
108/108 [=====] - 0s 220us/step - loss: 1.2829 - acc: 0.8796  
Epoch 16/20  
108/108 [=====] - 0s 205us/step - loss: 1.2287 - acc: 0.8519  
Epoch 17/20  
108/108 [=====] - 0s 260us/step - loss: 1.1711 - acc: 0.9537

Epoch 18/20  
108/108 [=====] - 0s 295us/step - loss: 1.1236 - acc: 0.9630  
Epoch 19/20  
108/108 [=====] - 0s 213us/step - loss: 1.0734 - acc: 0.9722  
Epoch 20/20  
108/108 [=====] - 0s 276us/step - loss: 1.0291 - acc: 0.9722  
27/27 [=====] - 5s 198ms/step  
108/108 [=====] - 0s 214us/step  
Epoch 1/20  
108/108 [=====] - 12s 116ms/step - loss: 2.9436 - acc: 0.3426  
Epoch 2/20  
108/108 [=====] - 0s 292us/step - loss: 2.6768 - acc: 0.4167  
Epoch 3/20  
108/108 [=====] - 0s 244us/step - loss: 2.4711 - acc: 0.7130  
Epoch 4/20  
108/108 [=====] - 0s 215us/step - loss: 2.2995 - acc: 0.9074  
Epoch 5/20  
108/108 [=====] - 0s 209us/step - loss: 2.1614 - acc: 0.6759  
Epoch 6/20  
108/108 [=====] - 0s 174us/step - loss: 2.0088 - acc: 0.7037  
Epoch 7/20  
108/108 [=====] - 0s 173us/step - loss: 1.8868 - acc: 0.8796  
Epoch 8/20  
108/108 [=====] - 0s 172us/step - loss: 1.7818 - acc: 0.8519  
Epoch 9/20  
108/108 [=====] - 0s 175us/step - loss: 1.6754 - acc: 0.8704  
Epoch 10/20  
108/108 [=====] - 0s 180us/step - loss: 1.6081 - acc: 0.7037  
Epoch 11/20  
108/108 [=====] - 0s 181us/step - loss: 1.5205 - acc: 0.7500  
Epoch 12/20  
108/108 [=====] - 0s 219us/step - loss: 1.4594 - acc: 0.8611  
Epoch 13/20  
108/108 [=====] - 0s 239us/step - loss: 1.4090 - acc: 0.7500  
Epoch 14/20  
108/108 [=====] - 0s 175us/step - loss: 1.3227 - acc: 0.9167  
Epoch 15/20  
108/108 [=====] - 0s 178us/step - loss: 1.2690 - acc: 0.8333  
Epoch 16/20  
108/108 [=====] - 0s 191us/step - loss: 1.2093 - acc: 0.9630  
Epoch 17/20  
108/108 [=====] - 0s 242us/step - loss: 1.1802 - acc: 0.8519  
Epoch 18/20  
108/108 [=====] - 0s 208us/step - loss: 1.1231 - acc: 0.8796  
Epoch 19/20  
108/108 [=====] - 0s 204us/step - loss: 1.0825 - acc: 0.8611  
Epoch 20/20  
108/108 [=====] - 0s 179us/step - loss: 1.0716 - acc: 0.8056

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27/27 [=====] - 5s 186ms/step
108/108 [=====] - 0s 216us/step
Epoch 1/20
108/108 [=====] - 11s 104ms/step - loss: 19.0864 - acc: 0.3241
Epoch 2/20
108/108 [=====] - 0s 219us/step - loss: 17.8114 - acc: 0.5926
Epoch 3/20
108/108 [=====] - 0s 204us/step - loss: 16.6704 - acc: 0.3981
Epoch 4/20
108/108 [=====] - 0s 210us/step - loss: 15.5935 - acc: 0.6111
Epoch 5/20
108/108 [=====] - 0s 176us/step - loss: 14.5577 - acc: 0.6852
Epoch 6/20
108/108 [=====] - 0s 216us/step - loss: 13.5722 - acc: 0.6852
Epoch 7/20
108/108 [=====] - 0s 236us/step - loss: 12.6563 - acc: 0.6852
Epoch 8/20
108/108 [=====] - 0s 227us/step - loss: 11.7880 - acc: 0.6852
Epoch 9/20
108/108 [=====] - 0s 255us/step - loss: 10.9725 - acc: 0.6852
Epoch 10/20
108/108 [=====] - 0s 219us/step - loss: 10.2116 - acc: 0.6852
Epoch 11/20
108/108 [=====] - 0s 219us/step - loss: 9.4994 - acc: 0.6852
Epoch 12/20
108/108 [=====] - 0s 192us/step - loss: 8.8361 - acc: 0.6852
Epoch 13/20
108/108 [=====] - 0s 217us/step - loss: 8.2171 - acc: 0.7870
Epoch 14/20
108/108 [=====] - 0s 194us/step - loss: 7.6439 - acc: 0.7870
Epoch 15/20
108/108 [=====] - 0s 182us/step - loss: 7.1073 - acc: 0.7130
Epoch 16/20
108/108 [=====] - 0s 177us/step - loss: 6.6109 - acc: 0.6852
Epoch 17/20
108/108 [=====] - 0s 207us/step - loss: 6.1500 - acc: 0.6852
Epoch 18/20
108/108 [=====] - 0s 179us/step - loss: 5.7194 - acc: 0.7963
Epoch 19/20
108/108 [=====] - 0s 193us/step - loss: 5.3230 - acc: 0.9259
Epoch 20/20
108/108 [=====] - 0s 202us/step - loss: 4.9550 - acc: 0.8796
27/27 [=====] - 5s 195ms/step
108/108 [=====] - 0s 170us/step
Epoch 1/20
108/108 [=====] - 11s 104ms/step - loss: 18.9376 - acc: 0.3519
Epoch 2/20
108/108 [=====] - 0s 253us/step - loss: 17.7366 - acc: 0.5000

```

Epoch 3/20  
108/108 [=====] - 0s 282us/step - loss: 16.6480 - acc: 0.3333  
Epoch 4/20  
108/108 [=====] - 0s 254us/step - loss: 15.5765 - acc: 0.6111  
Epoch 5/20  
108/108 [=====] - 0s 237us/step - loss: 14.5254 - acc: 0.6944  
Epoch 6/20  
108/108 [=====] - 0s 226us/step - loss: 13.5302 - acc: 0.6944  
Epoch 7/20  
108/108 [=====] - 0s 228us/step - loss: 12.6109 - acc: 0.7222  
Epoch 8/20  
108/108 [=====] - 0s 249us/step - loss: 11.7522 - acc: 0.8889  
Epoch 9/20  
108/108 [=====] - 0s 297us/step - loss: 10.9424 - acc: 0.9259  
Epoch 10/20  
108/108 [=====] - 0s 274us/step - loss: 10.1771 - acc: 0.9444  
Epoch 11/20  
108/108 [=====] - 0s 272us/step - loss: 9.4617 - acc: 0.9167  
Epoch 12/20  
108/108 [=====] - 0s 217us/step - loss: 8.7948 - acc: 0.7593  
Epoch 13/20  
108/108 [=====] - 0s 183us/step - loss: 8.1737 - acc: 0.7315  
Epoch 14/20  
108/108 [=====] - 0s 205us/step - loss: 7.5965 - acc: 0.7963  
Epoch 15/20  
108/108 [=====] - 0s 178us/step - loss: 7.0604 - acc: 0.7778  
Epoch 16/20  
108/108 [=====] - 0s 190us/step - loss: 6.5617 - acc: 0.8519  
Epoch 17/20  
108/108 [=====] - 0s 180us/step - loss: 6.1068 - acc: 0.9722  
Epoch 18/20  
108/108 [=====] - 0s 183us/step - loss: 5.6878 - acc: 0.8796  
Epoch 19/20  
108/108 [=====] - 0s 179us/step - loss: 5.2768 - acc: 0.9722  
Epoch 20/20  
108/108 [=====] - 0s 172us/step - loss: 4.9261 - acc: 0.7222  
27/27 [=====] - 6s 222ms/step  
108/108 [=====] - 0s 198us/step  
Epoch 1/20  
108/108 [=====] - 11s 105ms/step - loss: 18.8862 - acc: 0.1389  
Epoch 2/20  
108/108 [=====] - 0s 289us/step - loss: 17.6999 - acc: 0.3889  
Epoch 3/20  
108/108 [=====] - 0s 238us/step - loss: 16.6258 - acc: 0.3148  
Epoch 4/20  
108/108 [=====] - 0s 198us/step - loss: 15.5423 - acc: 0.3519  
Epoch 5/20  
108/108 [=====] - 0s 193us/step - loss: 14.4955 - acc: 0.8241

Epoch 6/20  
 108/108 [=====] - 0s 215us/step - loss: 13.5365 - acc: 0.6852  
 Epoch 7/20  
 108/108 [=====] - 0s 175us/step - loss: 12.6442 - acc: 0.6852  
 Epoch 8/20  
 108/108 [=====] - 0s 206us/step - loss: 11.7704 - acc: 0.7315  
 Epoch 9/20  
 108/108 [=====] - 0s 184us/step - loss: 10.9516 - acc: 0.8241  
 Epoch 10/20  
 108/108 [=====] - 0s 170us/step - loss: 10.2068 - acc: 0.9259  
 Epoch 11/20  
 108/108 [=====] - 0s 173us/step - loss: 9.5126 - acc: 0.8611  
 Epoch 12/20  
 108/108 [=====] - 0s 213us/step - loss: 8.8569 - acc: 0.7130  
 Epoch 13/20  
 108/108 [=====] - 0s 201us/step - loss: 8.2438 - acc: 0.7870  
 Epoch 14/20  
 108/108 [=====] - 0s 189us/step - loss: 7.6681 - acc: 0.9630  
 Epoch 15/20  
 108/108 [=====] - 0s 176us/step - loss: 7.1502 - acc: 0.7130  
 Epoch 16/20  
 108/108 [=====] - 0s 192us/step - loss: 6.6596 - acc: 0.6944  
 Epoch 17/20  
 108/108 [=====] - 0s 187us/step - loss: 6.1939 - acc: 0.9815  
 Epoch 18/20  
 108/108 [=====] - 0s 179us/step - loss: 5.7811 - acc: 0.8148  
 Epoch 19/20  
 108/108 [=====] - 0s 175us/step - loss: 5.3800 - acc: 0.9259  
 Epoch 20/20  
 108/108 [=====] - 0s 176us/step - loss: 5.0250 - acc: 0.8148  
 27/27 [=====] - 5s 193ms/step  
 108/108 [=====] - 0s 208us/step  
 Epoch 1/20  
 108/108 [=====] - 13s 118ms/step - loss: 18.6983 - acc: 0.5185  
 Epoch 2/20  
 108/108 [=====] - 0s 177us/step - loss: 17.6062 - acc: 0.3889  
 Epoch 3/20  
 108/108 [=====] - 0s 171us/step - loss: 16.4998 - acc: 0.6667  
 Epoch 4/20  
 108/108 [=====] - 0s 180us/step - loss: 15.4328 - acc: 0.6759  
 Epoch 5/20  
 108/108 [=====] - 0s 166us/step - loss: 14.4162 - acc: 0.6759  
 Epoch 6/20  
 108/108 [=====] - 0s 188us/step - loss: 13.4659 - acc: 0.6667  
 Epoch 7/20  
 108/108 [=====] - 0s 174us/step - loss: 12.5713 - acc: 0.6667  
 Epoch 8/20  
 108/108 [=====] - 0s 175us/step - loss: 11.7144 - acc: 0.6667



Epoch 9/20  
108/108 [=====] - 0s 184us/step - loss: 10.9110 - acc: 0.7593  
Epoch 10/20  
108/108 [=====] - 0s 208us/step - loss: 10.1779 - acc: 0.8981  
Epoch 11/20  
108/108 [=====] - 0s 212us/step - loss: 9.4709 - acc: 0.9352  
Epoch 12/20  
108/108 [=====] - 0s 249us/step - loss: 8.8109 - acc: 0.7315  
Epoch 13/20  
108/108 [=====] - 0s 258us/step - loss: 8.2033 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 187us/step - loss: 7.6346 - acc: 0.7130  
Epoch 15/20  
108/108 [=====] - 0s 184us/step - loss: 7.1046 - acc: 0.8241  
Epoch 16/20  
108/108 [=====] - 0s 187us/step - loss: 6.6151 - acc: 0.7500  
Epoch 17/20  
108/108 [=====] - 0s 351us/step - loss: 6.1613 - acc: 0.8519  
Epoch 18/20  
108/108 [=====] - 0s 205us/step - loss: 5.7370 - acc: 0.9259  
Epoch 19/20  
108/108 [=====] - 0s 210us/step - loss: 5.3442 - acc: 0.8796  
Epoch 20/20  
108/108 [=====] - 0s 172us/step - loss: 4.9765 - acc: 0.7685  
27/27 [=====] - 6s 206ms/step  
108/108 [=====] - 0s 160us/step  
Epoch 1/20  
108/108 [=====] - 11s 106ms/step - loss: 18.5809 - acc: 0.6296  
Epoch 2/20  
108/108 [=====] - 0s 221us/step - loss: 17.4845 - acc: 0.6759  
Epoch 3/20  
108/108 [=====] - 0s 296us/step - loss: 16.3707 - acc: 0.6852  
Epoch 4/20  
108/108 [=====] - 0s 275us/step - loss: 15.2916 - acc: 0.7685  
Epoch 5/20  
108/108 [=====] - 0s 305us/step - loss: 14.2737 - acc: 0.6667  
Epoch 6/20  
108/108 [=====] - 0s 349us/step - loss: 13.3254 - acc: 0.6667  
Epoch 7/20  
108/108 [=====] - 0s 237us/step - loss: 12.4092 - acc: 0.6667  
Epoch 8/20  
108/108 [=====] - 0s 266us/step - loss: 11.5357 - acc: 0.6852  
Epoch 9/20  
108/108 [=====] - 0s 238us/step - loss: 10.7297 - acc: 0.9167  
Epoch 10/20  
108/108 [=====] - 0s 222us/step - loss: 9.9778 - acc: 0.9630  
Epoch 11/20  
108/108 [=====] - 0s 225us/step - loss: 9.2716 - acc: 0.9074

Epoch 12/20  
108/108 [=====] - 0s 177us/step - loss: 8.6136 - acc: 0.8611  
Epoch 13/20  
108/108 [=====] - 0s 268us/step - loss: 8.0004 - acc: 0.8981  
Epoch 14/20  
108/108 [=====] - 0s 205us/step - loss: 7.4340 - acc: 0.9630  
Epoch 15/20  
108/108 [=====] - 0s 226us/step - loss: 6.9059 - acc: 0.9815  
Epoch 16/20  
108/108 [=====] - 0s 191us/step - loss: 6.4129 - acc: 0.9537  
Epoch 17/20  
108/108 [=====] - 0s 210us/step - loss: 5.9625 - acc: 0.7870  
Epoch 18/20  
108/108 [=====] - 0s 184us/step - loss: 5.5473 - acc: 0.7037  
Epoch 19/20  
108/108 [=====] - 0s 212us/step - loss: 5.1497 - acc: 0.7870  
Epoch 20/20  
108/108 [=====] - 0s 188us/step - loss: 4.7854 - acc: 0.9259  
27/27 [=====] - 6s 217ms/step  
108/108 [=====] - 0s 194us/step  
Epoch 1/20  
108/108 [=====] - 12s 108ms/step - loss: 178.4322 - acc: 0.3426  
Epoch 2/20  
108/108 [=====] - 0s 193us/step - loss: 167.5883 - acc: 0.3426  
Epoch 3/20  
108/108 [=====] - 0s 194us/step - loss: 156.2574 - acc: 0.5741  
Epoch 4/20  
108/108 [=====] - 0s 234us/step - loss: 145.2683 - acc: 0.6852  
Epoch 5/20  
108/108 [=====] - 0s 258us/step - loss: 134.7797 - acc: 0.6852  
Epoch 6/20  
108/108 [=====] - 0s 270us/step - loss: 124.8522 - acc: 0.6852  
Epoch 7/20  
108/108 [=====] - 0s 270us/step - loss: 115.5081 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 191us/step - loss: 106.7451 - acc: 0.6852  
Epoch 9/20  
108/108 [=====] - 0s 187us/step - loss: 98.5534 - acc: 0.6852  
Epoch 10/20  
108/108 [=====] - 0s 178us/step - loss: 90.9107 - acc: 0.6852  
Epoch 11/20  
108/108 [=====] - 0s 172us/step - loss: 83.7945 - acc: 0.6852  
Epoch 12/20  
108/108 [=====] - 0s 211us/step - loss: 77.1798 - acc: 0.6852  
Epoch 13/20  
108/108 [=====] - 0s 196us/step - loss: 71.0407 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 178us/step - loss: 65.3520 - acc: 0.6852

Epoch 15/20  
108/108 [=====] - 0s 168us/step - loss: 60.0858 - acc: 0.7037  
Epoch 16/20  
108/108 [=====] - 0s 174us/step - loss: 55.2148 - acc: 0.7963  
Epoch 17/20  
108/108 [=====] - 0s 179us/step - loss: 50.7110 - acc: 0.8056  
Epoch 18/20  
108/108 [=====] - 0s 173us/step - loss: 46.5533 - acc: 0.7315  
Epoch 19/20  
108/108 [=====] - 0s 236us/step - loss: 42.7176 - acc: 0.7222  
Epoch 20/20  
108/108 [=====] - 0s 233us/step - loss: 39.1825 - acc: 0.8148  
27/27 [=====] - 5s 191ms/step  
108/108 [=====] - 0s 165us/step  
Epoch 1/20  
108/108 [=====] - 12s 108ms/step - loss: 179.8897 - acc: 0.2963  
Epoch 2/20  
108/108 [=====] - 0s 178us/step - loss: 169.0687 - acc: 0.2870  
Epoch 3/20  
108/108 [=====] - 0s 169us/step - loss: 157.7234 - acc: 0.3333  
Epoch 4/20  
108/108 [=====] - 0s 223us/step - loss: 146.6942 - acc: 0.3333  
Epoch 5/20  
108/108 [=====] - 0s 210us/step - loss: 136.1565 - acc: 0.3333  
Epoch 6/20  
108/108 [=====] - 0s 255us/step - loss: 126.1713 - acc: 0.4074  
Epoch 7/20  
108/108 [=====] - 0s 221us/step - loss: 116.7714 - acc: 0.6667  
Epoch 8/20  
108/108 [=====] - 0s 175us/step - loss: 107.9485 - acc: 0.7407  
Epoch 9/20  
108/108 [=====] - 0s 178us/step - loss: 99.6831 - acc: 0.6852  
Epoch 10/20  
108/108 [=====] - 0s 221us/step - loss: 91.9711 - acc: 0.6852  
Epoch 11/20  
108/108 [=====] - 0s 221us/step - loss: 84.7876 - acc: 0.6852  
Epoch 12/20  
108/108 [=====] - 0s 198us/step - loss: 78.1147 - acc: 0.6852  
Epoch 13/20  
108/108 [=====] - 0s 213us/step - loss: 71.9178 - acc: 0.6852  
Epoch 14/20  
108/108 [=====] - 0s 182us/step - loss: 66.1638 - acc: 0.6852  
Epoch 15/20  
108/108 [=====] - 0s 170us/step - loss: 60.8369 - acc: 0.7037  
Epoch 16/20  
108/108 [=====] - 0s 227us/step - loss: 55.9130 - acc: 0.6944  
Epoch 17/20  
108/108 [=====] - 0s 182us/step - loss: 51.3589 - acc: 0.7037

Epoch 18/20  
108/108 [=====] - 0s 200us/step - loss: 47.1509 - acc: 0.6944  
Epoch 19/20  
108/108 [=====] - 0s 194us/step - loss: 43.2690 - acc: 0.6852  
Epoch 20/20  
108/108 [=====] - 0s 177us/step - loss: 39.6897 - acc: 0.6852  
27/27 [=====] - 5s 195ms/step  
108/108 [=====] - 0s 151us/step  
Epoch 1/20  
108/108 [=====] - 12s 109ms/step - loss: 177.2909 - acc: 0.3704  
Epoch 2/20  
108/108 [=====] - 0s 210us/step - loss: 166.5396 - acc: 0.3704  
Epoch 3/20  
108/108 [=====] - 0s 207us/step - loss: 155.2696 - acc: 0.3704  
Epoch 4/20  
108/108 [=====] - 0s 180us/step - loss: 144.3163 - acc: 0.3704  
Epoch 5/20  
108/108 [=====] - 0s 237us/step - loss: 133.8530 - acc: 0.4815  
Epoch 6/20  
108/108 [=====] - 0s 275us/step - loss: 123.9498 - acc: 0.6759  
Epoch 7/20  
108/108 [=====] - 0s 185us/step - loss: 114.6232 - acc: 0.6852  
Epoch 8/20  
108/108 [=====] - 0s 178us/step - loss: 105.8795 - acc: 0.8056  
Epoch 9/20  
108/108 [=====] - 0s 180us/step - loss: 97.7098 - acc: 0.8796  
Epoch 10/20  
108/108 [=====] - 0s 190us/step - loss: 90.0912 - acc: 0.8426  
Epoch 11/20  
108/108 [=====] - 0s 173us/step - loss: 82.9999 - acc: 0.6759  
Epoch 12/20  
108/108 [=====] - 0s 175us/step - loss: 76.4095 - acc: 0.7130  
Epoch 13/20  
108/108 [=====] - 0s 175us/step - loss: 70.2936 - acc: 0.8611  
Epoch 14/20  
108/108 [=====] - 0s 178us/step - loss: 64.6286 - acc: 0.9167  
Epoch 15/20  
108/108 [=====] - 0s 197us/step - loss: 59.3840 - acc: 0.9722  
Epoch 16/20  
108/108 [=====] - 0s 239us/step - loss: 54.5359 - acc: 0.8426  
Epoch 17/20  
108/108 [=====] - 0s 329us/step - loss: 50.0578 - acc: 0.7685  
Epoch 18/20  
108/108 [=====] - 0s 331us/step - loss: 45.9264 - acc: 0.6944  
Epoch 19/20  
108/108 [=====] - 0s 282us/step - loss: 42.1167 - acc: 0.6574  
Epoch 20/20  
108/108 [=====] - 0s 391us/step - loss: 38.6053 - acc: 0.6481

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27/27 [=====] - 5s 193ms/step
108/108 [=====] - 0s 187us/step
Epoch 1/20
108/108 [=====] - 12s 107ms/step - loss: 176.5188 - acc: 0.4722
Epoch 2/20
108/108 [=====] - 0s 225us/step - loss: 165.8116 - acc: 0.3426
Epoch 3/20
108/108 [=====] - 0s 274us/step - loss: 154.5889 - acc: 0.3611
Epoch 4/20
108/108 [=====] - 0s 299us/step - loss: 143.6665 - acc: 0.3611
Epoch 5/20
108/108 [=====] - 0s 218us/step - loss: 133.2381 - acc: 0.5556
Epoch 6/20
108/108 [=====] - 0s 179us/step - loss: 123.3678 - acc: 0.6667
Epoch 7/20
108/108 [=====] - 0s 179us/step - loss: 114.0777 - acc: 0.6667
Epoch 8/20
108/108 [=====] - 0s 261us/step - loss: 105.3673 - acc: 0.6667
Epoch 9/20
108/108 [=====] - 0s 189us/step - loss: 97.2279 - acc: 0.6667
Epoch 10/20
108/108 [=====] - 0s 208us/step - loss: 89.6382 - acc: 0.6667
Epoch 11/20
108/108 [=====] - 0s 197us/step - loss: 82.5766 - acc: 0.6667
Epoch 12/20
108/108 [=====] - 0s 185us/step - loss: 76.0124 - acc: 0.6667
Epoch 13/20
108/108 [=====] - 0s 231us/step - loss: 69.9303 - acc: 0.8426
Epoch 14/20
108/108 [=====] - 0s 263us/step - loss: 64.2957 - acc: 0.8889
Epoch 15/20
108/108 [=====] - 0s 191us/step - loss: 59.0766 - acc: 0.8704
Epoch 16/20
108/108 [=====] - 0s 266us/step - loss: 54.2570 - acc: 0.6944
Epoch 17/20
108/108 [=====] - 0s 333us/step - loss: 49.8031 - acc: 0.6667
Epoch 18/20
108/108 [=====] - 0s 238us/step - loss: 45.6940 - acc: 0.7222
Epoch 19/20
108/108 [=====] - 0s 222us/step - loss: 41.9044 - acc: 0.7593
Epoch 20/20
108/108 [=====] - 0s 326us/step - loss: 38.4124 - acc: 0.6667
27/27 [=====] - 5s 193ms/step
108/108 [=====] - 0s 156us/step
Epoch 1/20
108/108 [=====] - 11s 106ms/step - loss: 178.0075 - acc: 0.3333
Epoch 2/20
108/108 [=====] - 0s 280us/step - loss: 167.2355 - acc: 0.3704

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Epoch 3/20  
108/108 [=====] - 0s 278us/step - loss: 155.9580 - acc: 0.6296  
Epoch 4/20  
108/108 [=====] - 0s 312us/step - loss: 144.9847 - acc: 0.6574  
Epoch 5/20  
108/108 [=====] - 0s 292us/step - loss: 134.5084 - acc: 0.6389  
Epoch 6/20  
108/108 [=====] - 0s 197us/step - loss: 124.5909 - acc: 0.6944  
Epoch 7/20  
108/108 [=====] - 0s 192us/step - loss: 115.2513 - acc: 0.7963  
Epoch 8/20  
108/108 [=====] - 0s 254us/step - loss: 106.4926 - acc: 0.9537  
Epoch 9/20  
108/108 [=====] - 0s 305us/step - loss: 98.3107 - acc: 0.7222  
Epoch 10/20  
108/108 [=====] - 0s 276us/step - loss: 90.6692 - acc: 0.6944  
Epoch 11/20  
108/108 [=====] - 0s 198us/step - loss: 83.5555 - acc: 0.9352  
Epoch 12/20  
108/108 [=====] - 0s 183us/step - loss: 76.9436 - acc: 0.7500  
Epoch 13/20  
108/108 [=====] - 0s 178us/step - loss: 70.8084 - acc: 0.6667  
Epoch 14/20  
108/108 [=====] - 0s 221us/step - loss: 65.1248 - acc: 0.6667  
Epoch 15/20  
108/108 [=====] - 0s 287us/step - loss: 59.8603 - acc: 0.6667  
Epoch 16/20  
108/108 [=====] - 0s 302us/step - loss: 54.9918 - acc: 0.6667  
Epoch 17/20  
108/108 [=====] - 0s 272us/step - loss: 50.4939 - acc: 0.6667  
Epoch 18/20  
108/108 [=====] - 0s 326us/step - loss: 46.3427 - acc: 0.6667  
Epoch 19/20  
108/108 [=====] - 0s 280us/step - loss: 42.5172 - acc: 0.6667  
Epoch 20/20  
108/108 [=====] - 0s 277us/step - loss: 38.9897 - acc: 0.6667  
27/27 [=====] - 6s 213ms/step  
108/108 [=====] - 0s 181us/step  
Epoch 1/20  
135/135 [=====] - 12s 92ms/step - loss: 2.7870 - acc: 0.5111  
Epoch 2/20  
135/135 [=====] - 0s 319us/step - loss: 2.5595 - acc: 0.6667  
Epoch 3/20  
135/135 [=====] - 0s 330us/step - loss: 2.3925 - acc: 0.7407  
Epoch 4/20  
135/135 [=====] - 0s 224us/step - loss: 2.2179 - acc: 0.9037  
Epoch 5/20  
135/135 [=====] - 0s 220us/step - loss: 2.0760 - acc: 0.6741

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Epoch 6/20
135/135 [=====] - 0s 181us/step - loss: 1.9461 - acc: 0.7185
Epoch 7/20
135/135 [=====] - 0s 146us/step - loss: 1.8210 - acc: 0.9333
Epoch 8/20
135/135 [=====] - 0s 245us/step - loss: 1.7086 - acc: 0.9556
Epoch 9/20
135/135 [=====] - 0s 266us/step - loss: 1.6124 - acc: 0.8593
Epoch 10/20
135/135 [=====] - 0s 266us/step - loss: 1.5231 - acc: 0.8963
Epoch 11/20
135/135 [=====] - 0s 241us/step - loss: 1.4366 - acc: 0.9556
Epoch 12/20
135/135 [=====] - 0s 251us/step - loss: 1.3699 - acc: 0.9407
Epoch 13/20
135/135 [=====] - 0s 174us/step - loss: 1.2912 - acc: 0.9556
Epoch 14/20
135/135 [=====] - 0s 142us/step - loss: 1.2328 - acc: 0.9185
Epoch 15/20
135/135 [=====] - 0s 141us/step - loss: 1.1653 - acc: 0.9630
Epoch 16/20
135/135 [=====] - 0s 164us/step - loss: 1.1110 - acc: 0.9778
Epoch 17/20
135/135 [=====] - 0s 245us/step - loss: 1.0664 - acc: 0.9407
Epoch 18/20
135/135 [=====] - 0s 267us/step - loss: 1.0104 - acc: 0.9481
Epoch 19/20
135/135 [=====] - 0s 228us/step - loss: 0.9620 - acc: 0.9852
Epoch 20/20
135/135 [=====] - 0s 188us/step - loss: 0.9194 - acc: 0.9704

```

```

Out[7]: GridSearchCV(cv=5, error_score='raise',
                    estimator=<keras.wrappers.scikit_learn.KerasClassifier object at 0x7f462814e400>,
                    fit_params=None, iid=True, n_jobs=1,
                    param_grid={'epochs': [10, 20], 'batch_size': [50], 'regularize': [0.01, 0.1, 1]},
                    pre_dispatch='2*n_jobs', refit=True, return_train_score='warn',
                    scoring=None, verbose=0)

```

**Best model Parameters as per the grid serach:**

```

In [8]: grid.best_params_

```

```

Out[8]: {'batch_size': 50,
         'epochs': 20,
         'hidden_size_L1': 128,
         'hidden_size_L2': 256,
         'regularize': 0.01}

```

### Best Model performance on validation set:

```
In [9]: print("best validation score is {}".format(grid.best_score_))
```

best validation score is 0.9481481552124024

### Model performance on Test data:

```
In [15]: pred = grid.best_estimator_.predict(X_test)
         test_accu = np.sum(pred == np.argmax(y_test, axis=1))/pred.shape[0]
         print("Test score is {}".format(test_accu))
```

Test score is 1.0

## 2 Task 2 [30 Points]

- Train a multilayer perceptron on the MNIST dataset using the traditional train/test split as given by `mnist.load_data` in keras.
- Use a separate 10000 samples (from the training set) for model selection and to compute learning curves (accuracy vs epochs, not vs `n_samples`).
- Compare a “vanilla” model with a model using drop-out. Visualize learning curves for all models. As an estimate, you should expect each model to take less than 30 minutes to train on a CPU.

```
In [3]: sess = tf.Session(config=tf.ConfigProto(log_device_placement=True))
```

### Preparing data:

```
In [4]: (X_train, y_train), (X_test, y_test) = mnist.load_data()
         X_train = X_train.reshape(60000, 784)
         X_test = X_test.reshape(10000, 784)
         X_train = X_train.astype('float32')
         X_test = X_test.astype('float32')
         X_train /= 255
         X_test /= 255
         num_classes = 10

         y_train = keras.utils.to_categorical(y_train, num_classes)
         y_test = keras.utils.to_categorical(y_test, num_classes)
```

### Separating a random sample of 10000 as validation set:

```
In [5]: idx = np.arange(X_train.shape[0])
         np.random.seed(seed=0)
         np.random.shuffle(idx)
         train_idx = idx[:50000]
         val_idx = idx[-10000:]
```



```

X_train_new = X_train[train_idx,:]
y_train_new = y_train[train_idx,:]
X_val = X_train[val_idx,:]
y_val = y_train[val_idx,:]

```

## 2.1 Vanilla Model:

```

In [6]: hidden_size_L1 = 50
        hidden_size_L2 = 100
        hidden_size_L3 = 200
        # hidden_size_L4 = 100
        hidden_size_L4 = 32
        hidden_size_L5 = 32

```

```

mnist_model = Sequential([
    Dense(hidden_size_L1, input_shape=(X_train.shape[1],)),
    Activation('relu'),
    Dense(hidden_size_L2),
    Activation('relu'),
    Dense(hidden_size_L3),
    Activation('relu'),
    Dense(hidden_size_L4),
    Activation('relu'),
    #     Dense(hidden_size_L5),
    #     Activation('relu'),
    Dense(10),
    Activation('softmax')
])

```

```

mnist_model.compile("adam", "categorical_crossentropy", metrics=["accuracy"])

```

```

In [7]: mnist_model_obj = mnist_model.fit(X_train_new,
                                           y_train_new,
                                           batch_size=128,
                                           verbose=1, epochs=30,
                                           validation_data=(X_val, y_val))

```

Train on 50000 samples, validate on 10000 samples

Epoch 1/30

50000/50000 [=====] - 3s 59us/step - loss: 0.4198 - acc: 0.8751 - val\_loss: 0.1637

Epoch 2/30

50000/50000 [=====] - 2s 42us/step - loss: 0.1637 - acc: 0.9507 - val\_loss: 0.1222

Epoch 3/30

50000/50000 [=====] - 2s 43us/step - loss: 0.1222 - acc: 0.9624 - val\_loss: 0.0989

Epoch 4/30

50000/50000 [=====] - 2s 44us/step - loss: 0.0989 - acc: 0.9708 - val\_loss: 0.0989

Epoch 5/30

50000/50000 [=====] - 2s 44us/step - loss: 0.0818 - acc: 0.9746 - val\_1  
 Epoch 6/30  
 50000/50000 [=====] - 2s 44us/step - loss: 0.0707 - acc: 0.9783 - val\_1  
 Epoch 7/30  
 50000/50000 [=====] - 2s 44us/step - loss: 0.0608 - acc: 0.9808 - val\_1  
 Epoch 8/30  
 50000/50000 [=====] - 2s 43us/step - loss: 0.0546 - acc: 0.9823 - val\_1  
 Epoch 9/30  
 50000/50000 [=====] - 2s 44us/step - loss: 0.0485 - acc: 0.9838 - val\_1  
 Epoch 10/30  
 50000/50000 [=====] - 2s 43us/step - loss: 0.0401 - acc: 0.9869 - val\_1  
 Epoch 11/30  
 50000/50000 [=====] - 2s 43us/step - loss: 0.0369 - acc: 0.9875 - val\_1  
 Epoch 12/30  
 50000/50000 [=====] - 2s 43us/step - loss: 0.0313 - acc: 0.9903 - val\_1  
 Epoch 13/30  
 50000/50000 [=====] - 2s 43us/step - loss: 0.0328 - acc: 0.9889 - val\_1  
 Epoch 14/30  
 50000/50000 [=====] - 2s 43us/step - loss: 0.0271 - acc: 0.9911 - val\_1  
 Epoch 15/30  
 50000/50000 [=====] - 2s 42us/step - loss: 0.0259 - acc: 0.9915 - val\_1  
 Epoch 16/30  
 50000/50000 [=====] - 2s 43us/step - loss: 0.0246 - acc: 0.9919 - val\_1  
 Epoch 17/30  
 50000/50000 [=====] - 2s 41us/step - loss: 0.0210 - acc: 0.9929 - val\_1  
 Epoch 18/30  
 50000/50000 [=====] - 2s 41us/step - loss: 0.0185 - acc: 0.9937 - val\_1  
 Epoch 19/30  
 50000/50000 [=====] - 2s 43us/step - loss: 0.0171 - acc: 0.9944 - val\_1  
 Epoch 20/30  
 50000/50000 [=====] - 2s 43us/step - loss: 0.0196 - acc: 0.9933 - val\_1  
 Epoch 21/30  
 50000/50000 [=====] - 2s 46us/step - loss: 0.0145 - acc: 0.9952 - val\_1  
 Epoch 22/30  
 50000/50000 [=====] - 2s 44us/step - loss: 0.0182 - acc: 0.9938 - val\_1  
 Epoch 23/30  
 50000/50000 [=====] - 2s 43us/step - loss: 0.0153 - acc: 0.9950 - val\_1  
 Epoch 24/30  
 50000/50000 [=====] - 2s 42us/step - loss: 0.0138 - acc: 0.9954 - val\_1  
 Epoch 25/30  
 50000/50000 [=====] - 2s 42us/step - loss: 0.0089 - acc: 0.9967 - val\_1  
 Epoch 26/30  
 50000/50000 [=====] - 2s 43us/step - loss: 0.0185 - acc: 0.9935 - val\_1  
 Epoch 27/30  
 50000/50000 [=====] - 2s 43us/step - loss: 0.0094 - acc: 0.9968 - val\_1  
 Epoch 28/30  
 50000/50000 [=====] - 2s 44us/step - loss: 0.0157 - acc: 0.9955 - val\_1  
 Epoch 29/30

```
50000/50000 [=====] - 2s 43us/step - loss: 0.0104 - acc: 0.9965 - val_1
Epoch 30/30
50000/50000 [=====] - 2s 43us/step - loss: 0.0109 - acc: 0.9964 - val_1
```

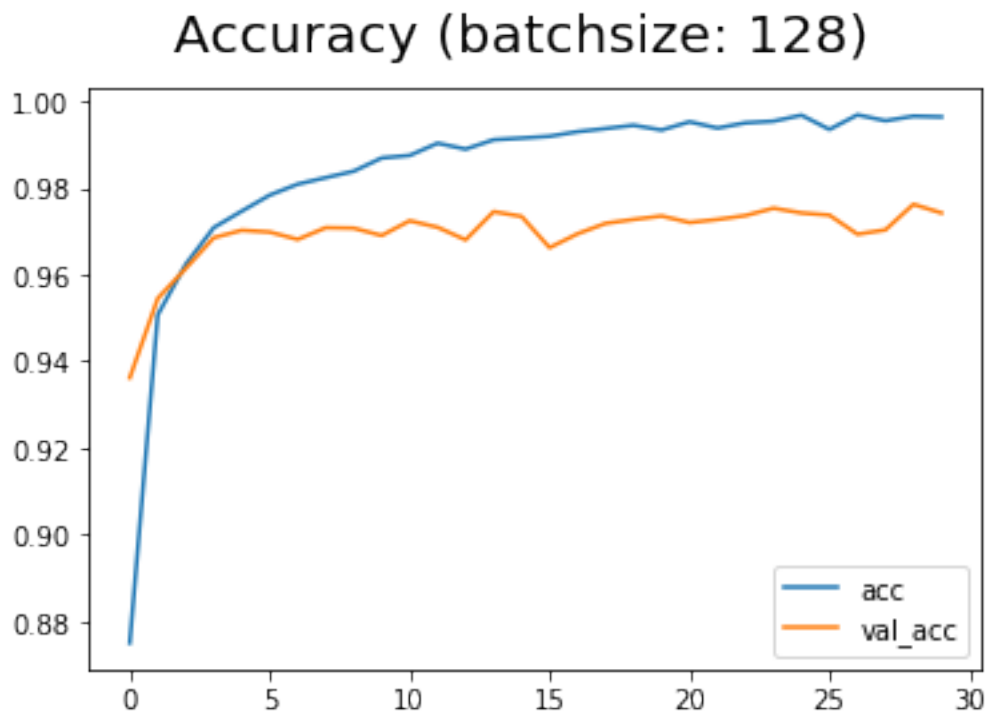
```
In [8]: print("Vanilla Model Test Accuracy: \n")
        mnist_model.evaluate(X_test, y_test)
```

Vanilla Model Test Accuracy:

```
10000/10000 [=====] - 0s 45us/step
```

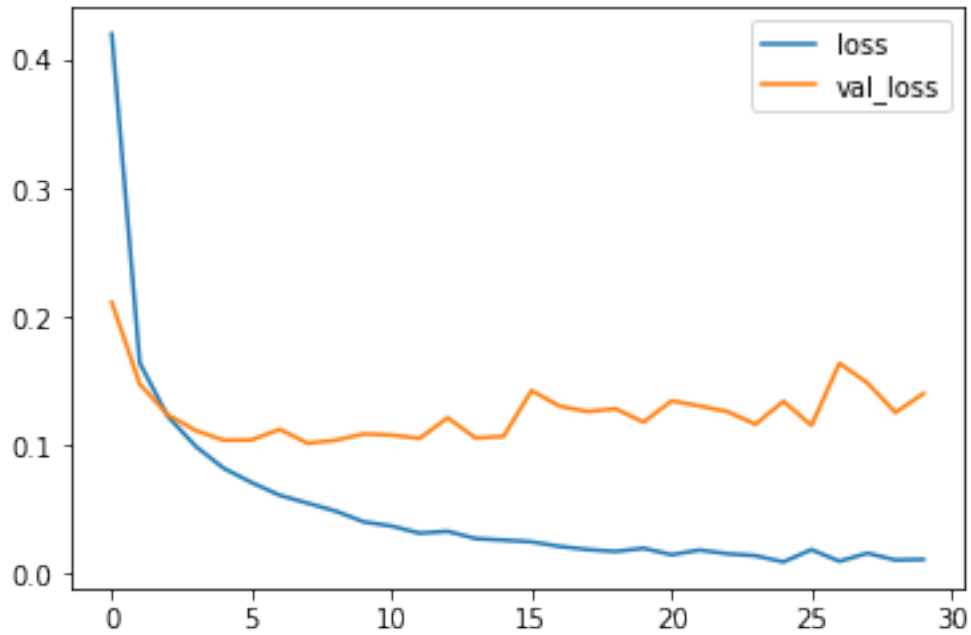
```
Out[8]: [0.1565230111772601, 0.9713]
```

```
In [9]: pd.DataFrame(mnist_model_obj.history)[['acc', 'val_acc']].plot()
        plt.suptitle("Accuracy (batchsize: 128)", fontsize = 20)
        plt.show()
```



```
In [10]: #batch-size=128
         pd.DataFrame(mnist_model_obj.history)[['loss', 'val_loss']].plot()
         plt.suptitle("Loss (batchsize: 128)", fontsize = 20)
         plt.show()
```

## Loss (batchsize: 128)



### 2.2 Dropout model:

```
In [11]: dropout_L1 = 0.2
         dropout_L2 = 0.2
         dropout_L3 = 0.2
         dropout_L4 = 0.2
```

```
In [12]: mnist_model_dropout = Sequential([
        Dense(hidden_size_L1, input_shape=(X_train.shape[1],)),
        Activation('relu'),
        Dropout(dropout_L1),
        Dense(hidden_size_L2),
        Activation('relu'),
        Dropout(dropout_L2),
        Dense(hidden_size_L3),
        Activation('relu'),
        Dropout(dropout_L3),
        Dense(hidden_size_L4),
        Activation('relu'),
        Dropout(dropout_L4),
        Dense(10),
        Activation('softmax')
    ])
```

```
mnist_model_dropout.compile("adam", "categorical_crossentropy",
                             metrics=["accuracy"])
```

```
In [13]: mnist_model_dropout_obj = mnist_model_dropout.fit(X_train_new,
                                                            y_train_new,
                                                            batch_size=128,
                                                            verbose=1,
                                                            epochs=30,
                                                            validation_data=(X_val,y_val))
```

Train on 50000 samples, validate on 10000 samples

```
Epoch 1/30
50000/50000 [=====] - 3s 68us/step - loss: 0.6908 - acc: 0.7795 - val_loss: 0.4018
Epoch 2/30
50000/50000 [=====] - 2s 48us/step - loss: 0.3137 - acc: 0.9111 - val_loss: 0.2018
Epoch 3/30
50000/50000 [=====] - 2s 49us/step - loss: 0.2560 - acc: 0.9271 - val_loss: 0.1818
Epoch 4/30
50000/50000 [=====] - 2s 47us/step - loss: 0.2213 - acc: 0.9391 - val_loss: 0.1718
Epoch 5/30
50000/50000 [=====] - 2s 46us/step - loss: 0.2052 - acc: 0.9427 - val_loss: 0.1618
Epoch 6/30
50000/50000 [=====] - 2s 45us/step - loss: 0.1893 - acc: 0.9473 - val_loss: 0.1518
Epoch 7/30
50000/50000 [=====] - 2s 44us/step - loss: 0.1753 - acc: 0.9506 - val_loss: 0.1418
Epoch 8/30
50000/50000 [=====] - 2s 44us/step - loss: 0.1625 - acc: 0.9532 - val_loss: 0.1318
Epoch 9/30
50000/50000 [=====] - 2s 49us/step - loss: 0.1553 - acc: 0.9564 - val_loss: 0.1218
Epoch 10/30
50000/50000 [=====] - 2s 48us/step - loss: 0.1493 - acc: 0.9579 - val_loss: 0.1118
Epoch 11/30
50000/50000 [=====] - 2s 49us/step - loss: 0.1440 - acc: 0.9591 - val_loss: 0.1018
Epoch 12/30
50000/50000 [=====] - 3s 50us/step - loss: 0.1363 - acc: 0.9595 - val_loss: 0.0918
Epoch 13/30
50000/50000 [=====] - 2s 48us/step - loss: 0.1357 - acc: 0.9607 - val_loss: 0.0818
Epoch 14/30
50000/50000 [=====] - 2s 49us/step - loss: 0.1319 - acc: 0.9628 - val_loss: 0.0718
Epoch 15/30
50000/50000 [=====] - 2s 46us/step - loss: 0.1255 - acc: 0.9640 - val_loss: 0.0618
Epoch 16/30
50000/50000 [=====] - 2s 48us/step - loss: 0.1228 - acc: 0.9645 - val_loss: 0.0518
Epoch 17/30
50000/50000 [=====] - 2s 46us/step - loss: 0.1163 - acc: 0.9662 - val_loss: 0.0418
Epoch 18/30
50000/50000 [=====] - 2s 44us/step - loss: 0.1152 - acc: 0.9666 - val_loss: 0.0318
Epoch 19/30
```

```

50000/50000 [=====] - 2s 45us/step - loss: 0.1172 - acc: 0.9670 - val_loss: 0.1172
Epoch 20/30
50000/50000 [=====] - 2s 47us/step - loss: 0.1122 - acc: 0.9677 - val_loss: 0.1122
Epoch 21/30
50000/50000 [=====] - 2s 48us/step - loss: 0.1133 - acc: 0.9681 - val_loss: 0.1133
Epoch 22/30
50000/50000 [=====] - 2s 48us/step - loss: 0.1093 - acc: 0.9688 - val_loss: 0.1093
Epoch 23/30
50000/50000 [=====] - 2s 50us/step - loss: 0.1076 - acc: 0.9694 - val_loss: 0.1076
Epoch 24/30
50000/50000 [=====] - 2s 48us/step - loss: 0.1027 - acc: 0.9700 - val_loss: 0.1027
Epoch 25/30
50000/50000 [=====] - 2s 49us/step - loss: 0.1014 - acc: 0.9704 - val_loss: 0.1014
Epoch 26/30
50000/50000 [=====] - 2s 49us/step - loss: 0.1034 - acc: 0.9710 - val_loss: 0.1034
Epoch 27/30
50000/50000 [=====] - 2s 49us/step - loss: 0.1017 - acc: 0.9711 - val_loss: 0.1017
Epoch 28/30
50000/50000 [=====] - 2s 49us/step - loss: 0.0971 - acc: 0.9714 - val_loss: 0.0971
Epoch 29/30
50000/50000 [=====] - 2s 47us/step - loss: 0.0992 - acc: 0.9704 - val_loss: 0.0992
Epoch 30/30
50000/50000 [=====] - 2s 48us/step - loss: 0.0954 - acc: 0.9722 - val_loss: 0.0954

```

```

In [14]: print("Dropout Model Test Accuracy: \n")
         mnist_model_dropout.evaluate(X_test, y_test)

```

Dropout Model Test Accuracy:

```

10000/10000 [=====] - 0s 49us/step

```

```

Out[14]: [0.10580891984964255, 0.9731]

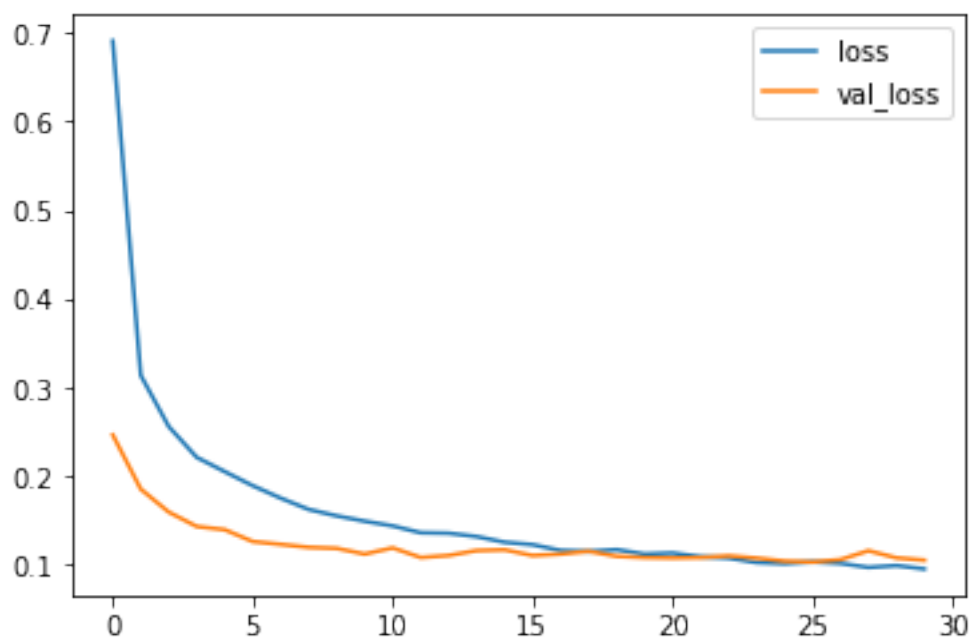
```

```

In [15]: pd.DataFrame(mnist_model_dropout_obj.history)[['loss', 'val_loss']].plot()
         plt.suptitle("Loss (dropout - 0.3,0.4,0.3,0.5)", fontsize = 20)
         plt.show()

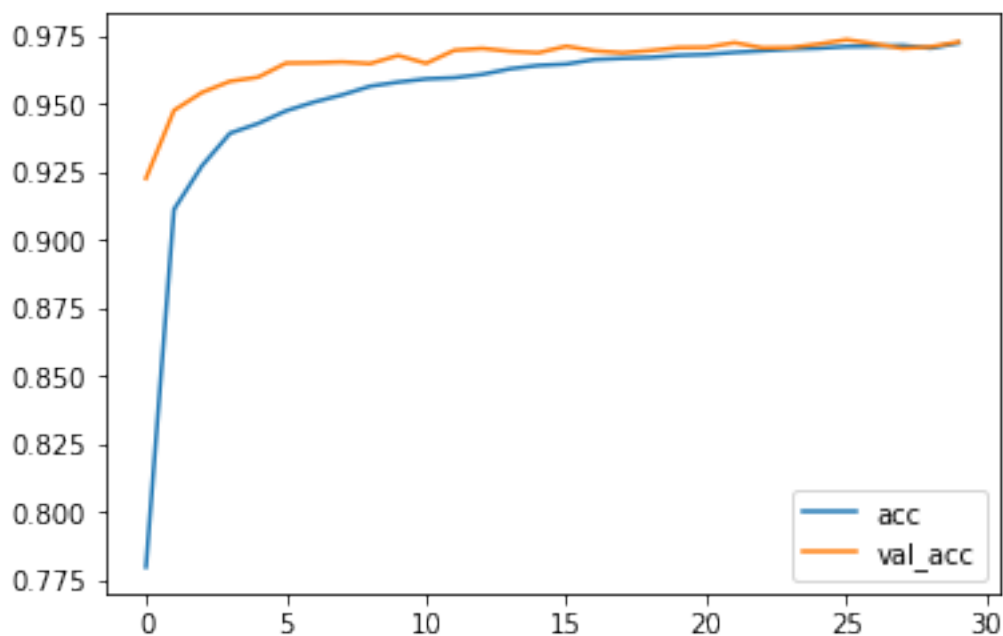
```

## Loss (dropout - 0.3,0.4,0.3,0.5)



```
In [16]: pd.DataFrame(mnist_model_dropout_obj.history)[['acc', 'val_acc']].plot()  
plt.suptitle("Accuracy (dropout - 0.3,0.4,0.3,0.5)", fontsize = 20)  
plt.show()
```

## Accuracy (dropout - 0.3,0.4,0.3,0.5)



## 2.3 Model Comparison:

- The accuracy **without dropout** is : **0.9713**
- The accuracy **with dropout** is : **0.9731**
- We see a clear gap between validation and train accuracy in the plots of the vanilla model which indicates that there is overfitting. Therefore, using dropout could improve generalization accuracy
- We applied dropout to the model and saw that the two curves converged to a nearly equal accuracy which represents that now the model is more generalizable.

## 3 Task 3 [30 Points]

- Train a convolutional neural network on the SVHN dataset in format 2 (single digit classification). You should achieve at least 85% test-set accuracy with a base model.
- Also build a model using batch normalization. Your final accuracy will be included in the grading.
- You can compare against other approaches reported here if you're curious. You shouldn't use the "extra" data. On a CPU, each epoch (pass through the training set) can take up to ~40 minutes.
- **Hint** : Make sure you are doing the reshape for the training set correctly. A direct reshape might give you garbled images. Display an image after reshaping to make sure they are correct.

```
In [3]: sess = tf.Session(config=tf.ConfigProto(log_device_placement=True))
```

### data import:

```
In [4]: test_data = scipy.io.loadmat('test_32x32.mat')
        train_data = scipy.io.loadmat('train_32x32.mat')
```

### data pre-processing:

```
In [32]: X_train = train_data['X'].T
        X_test = test_data['X'].T
        y_train = train_data['y']
        y_test = test_data['y']

        X_train = X_train/255
        X_test = X_test/255
        y_test[y_test == 10] = 0
        y_train[y_train == 10] = 0
        num_classes = 10
```



```
In [33]: input_shape = train_data['X'].shape[:3]

X_train = X_train.reshape(X_train.shape[0], input_shape[0],
                           input_shape[1], input_shape[2])
X_test = X_test.reshape(X_test.shape[0], input_shape[0],
                        input_shape[1], input_shape[2])
y_train = keras.utils.to_categorical(y_train, num_classes)
y_test = keras.utils.to_categorical(y_test, num_classes)
```

### 3.1 Base model (Without Batch Normalization):

#### Model Building:

```
In [34]: conv_l1 = 48
conv_l2 = 64
conv_l3 = 128
conv_l4 = 160
dense_l1 = 1024
dense_l2 = 512
dropout = 0.2

In [35]: model = Sequential()
model.add(Conv2D(conv_l1, kernel_size=(3,3),
                 input_shape = input_shape,
                 activation="relu",padding='same'))
model.add(Dropout(dropout))
model.add(MaxPooling2D(pool_size=(2,2)))
model.add(Conv2D(conv_l2, kernel_size=(3,3),
                 activation="relu",padding='same'))
model.add(Dropout(dropout))
model.add(MaxPooling2D(pool_size=(2,2)))
model.add(Conv2D(conv_l3, kernel_size=(3,3),
                 activation="relu",padding='same'))
model.add(Dropout(dropout))
model.add(MaxPooling2D(pool_size=(2,2)))
# model.add(Conv2D(conv_l4, kernel_size=(3,3),
#                 activation="relu",padding='same'))
# model.add(Dropout(dropout))
# model.add(MaxPooling2D(pool_size=(2,2)))
model.add(Flatten())
model.add(Dense(dense_l1, activation='relu'))
model.add(Dropout(dropout))
model.add(Dense(dense_l2, activation='relu'))
model.add(Dense(num_classes, activation='softmax'))

model.compile("adam", "categorical_crossentropy",
              metrics=["accuracy"])

In [36]: model.summary()
```

Layer (type)	Output Shape	Param #
conv2d_24 (Conv2D)	(None, 32, 32, 48)	1344
dropout_30 (Dropout)	(None, 32, 32, 48)	0
max_pooling2d_24 (MaxPooling)	(None, 16, 16, 48)	0
conv2d_25 (Conv2D)	(None, 16, 16, 64)	27712
dropout_31 (Dropout)	(None, 16, 16, 64)	0
max_pooling2d_25 (MaxPooling)	(None, 8, 8, 64)	0
conv2d_26 (Conv2D)	(None, 8, 8, 128)	73856
dropout_32 (Dropout)	(None, 8, 8, 128)	0
max_pooling2d_26 (MaxPooling)	(None, 4, 4, 128)	0
flatten_7 (Flatten)	(None, 2048)	0
dense_19 (Dense)	(None, 1024)	2098176
dropout_33 (Dropout)	(None, 1024)	0
dense_20 (Dense)	(None, 512)	524800
dense_21 (Dense)	(None, 10)	5130
Total params: 2,731,018		
Trainable params: 2,731,018		
Non-trainable params: 0		

```
In [37]: model_hist = model.fit(X_train,
                                y_train,
                                batch_size=256,
                                epochs=20,
                                verbose=1,
                                validation_split = .1)
```

Train on 65931 samples, validate on 7326 samples

Epoch 1/20

65931/65931 [=====] - 15s 233us/step - loss: 1.8961 - acc: 0.3182 - val

Epoch 2/20

```

65931/65931 [=====] - 14s 208us/step - loss: 1.0179 - acc: 0.6584 - val
Epoch 3/20
65931/65931 [=====] - 14s 208us/step - loss: 0.6874 - acc: 0.7752 - val
Epoch 4/20
65931/65931 [=====] - 14s 209us/step - loss: 0.5728 - acc: 0.8154 - val
Epoch 5/20
65931/65931 [=====] - 14s 208us/step - loss: 0.5185 - acc: 0.8331 - val
Epoch 6/20
65931/65931 [=====] - 14s 207us/step - loss: 0.4789 - acc: 0.8469 - val
Epoch 7/20
65931/65931 [=====] - 14s 207us/step - loss: 0.4528 - acc: 0.8552 - val
Epoch 8/20
65931/65931 [=====] - 14s 207us/step - loss: 0.4273 - acc: 0.8631 - val
Epoch 9/20
65931/65931 [=====] - 14s 207us/step - loss: 0.4063 - acc: 0.8712 - val
Epoch 10/20
65931/65931 [=====] - 13s 204us/step - loss: 0.3874 - acc: 0.8767 - val
Epoch 11/20
65931/65931 [=====] - 14s 206us/step - loss: 0.3731 - acc: 0.8812 - val
Epoch 12/20
65931/65931 [=====] - 14s 207us/step - loss: 0.3515 - acc: 0.8884 - val
Epoch 13/20
65931/65931 [=====] - 14s 207us/step - loss: 0.3432 - acc: 0.8910 - val
Epoch 14/20
65931/65931 [=====] - 14s 207us/step - loss: 0.3374 - acc: 0.8928 - val
Epoch 15/20
65931/65931 [=====] - 14s 207us/step - loss: 0.3137 - acc: 0.9001 - val
Epoch 16/20
65931/65931 [=====] - 14s 207us/step - loss: 0.3024 - acc: 0.9022 - val
Epoch 17/20
65931/65931 [=====] - 14s 207us/step - loss: 0.3010 - acc: 0.9043 - val
Epoch 18/20
65931/65931 [=====] - 14s 208us/step - loss: 0.2879 - acc: 0.9073 - val
Epoch 19/20
65931/65931 [=====] - 14s 208us/step - loss: 0.2736 - acc: 0.9101 - val
Epoch 20/20
65931/65931 [=====] - 14s 210us/step - loss: 0.2666 - acc: 0.9134 - val

```

```

In [38]: print("Base Model Test Accuracy: \n")
         model.evaluate(X_test, y_test)

```

Base Model Test Accuracy:

```

26032/26032 [=====] - 4s 148us/step

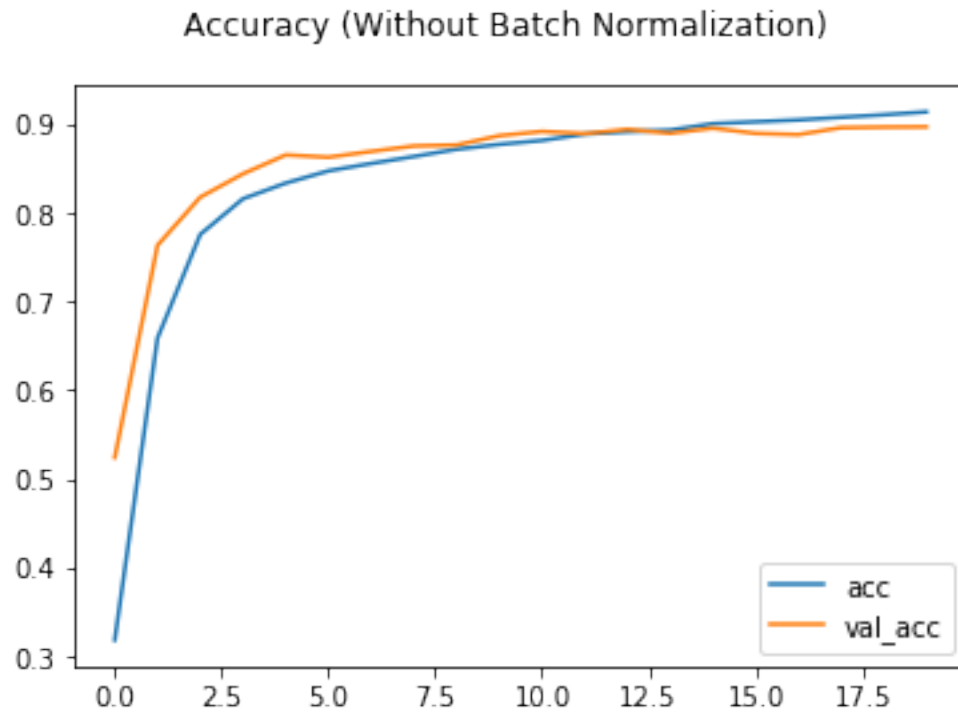
```

```

Out[38]: [0.3323163653173803, 0.90069913952059]

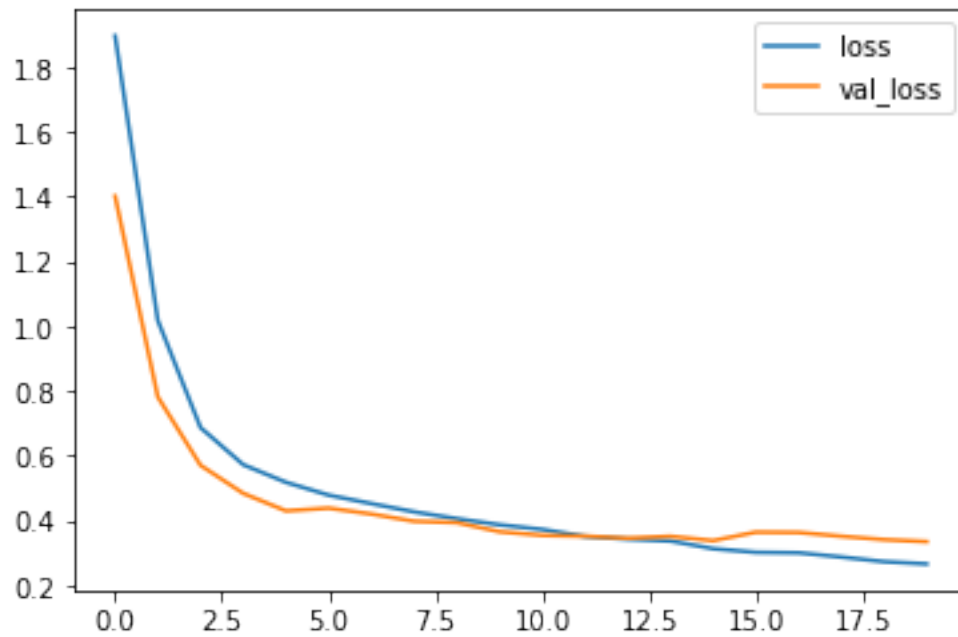
```

```
In [39]: pd.DataFrame(model_hist.history)[['acc', 'val_acc']].plot()  
plt.suptitle("Accuracy (Without Batch Normalization)")  
plt.show()
```



```
In [40]: pd.DataFrame(model_hist.history)[['loss', 'val_loss']].plot()  
plt.suptitle("Loss (Without Batch Normalization)")  
plt.show()
```

Loss (Without Batch Normalization)



### 3.2 Model with Batch Normalization:

```
In [41]: sess = tf.Session(config=tf.ConfigProto(log_device_placement=True))
```

```
In [42]: model_bn = Sequential()
        model_bn.add(Conv2D(conv_l1,
                             kernel_size=(3,3),
                             input_shape = input_shape,
                             activation="relu",padding='same'))
        model_bn.add(BatchNormalization())
        model_bn.add(Dropout(dropout))
        model_bn.add(MaxPooling2D(pool_size=(2,2)))
        model_bn.add(Conv2D(conv_l2, kernel_size=(3,3),
                             activation="relu",padding='same'))
        model_bn.add(BatchNormalization())
        model_bn.add(Dropout(dropout))
        model_bn.add(MaxPooling2D(pool_size=(2,2)))
        model_bn.add(Conv2D(conv_l3, kernel_size=(3,3),
                             activation="relu",padding='same'))
        model_bn.add(BatchNormalization())
        model_bn.add(Dropout(dropout))
        model_bn.add(MaxPooling2D(pool_size=(2,2)))
        # model_bn.add(Conv2D(conv_l4, kernel_size=(3,3),
        #                       activation="relu",padding='same'))
```

```

# model_bn.add(BatchNormalization())
# model_bn.add(Dropout(dropout))
# model_bn.add(MaxPooling2D(pool_size=(2,2)))
model_bn.add(Flatten())
model_bn.add(Dense(dense_l1, activation='relu'))
model_bn.add(Dropout(dropout))
model_bn.add(Dense(dense_l2, activation='relu'))
model_bn.add(Dense(num_classes, activation='softmax'))

model_bn.compile("adam", "categorical_crossentropy",
                 metrics=["accuracy"])

```

In [43]: model\_bn.summary()

Layer (type)	Output Shape	Param #
conv2d_27 (Conv2D)	(None, 32, 32, 48)	1344
batch_normalization_5 (Batch Normalization)	(None, 32, 32, 48)	192
dropout_34 (Dropout)	(None, 32, 32, 48)	0
max_pooling2d_27 (MaxPooling2D)	(None, 16, 16, 48)	0
conv2d_28 (Conv2D)	(None, 16, 16, 64)	27712
batch_normalization_6 (Batch Normalization)	(None, 16, 16, 64)	256
dropout_35 (Dropout)	(None, 16, 16, 64)	0
max_pooling2d_28 (MaxPooling2D)	(None, 8, 8, 64)	0
conv2d_29 (Conv2D)	(None, 8, 8, 128)	73856
batch_normalization_7 (Batch Normalization)	(None, 8, 8, 128)	512
dropout_36 (Dropout)	(None, 8, 8, 128)	0
max_pooling2d_29 (MaxPooling2D)	(None, 4, 4, 128)	0
flatten_8 (Flatten)	(None, 2048)	0
dense_22 (Dense)	(None, 1024)	2098176
dropout_37 (Dropout)	(None, 1024)	0
dense_23 (Dense)	(None, 512)	524800

```

-----
dense_24 (Dense)                (None, 10)                5130
=====
Total params: 2,731,978
Trainable params: 2,731,498
Non-trainable params: 480
-----

```

```

In [44]: model_bn_hist = model_bn.fit(X_train,
                                     y_train,
                                     batch_size=256,
                                     epochs=20,
                                     verbose=1,
                                     validation_split = .1)

```

Train on 65931 samples, validate on 7326 samples

```

Epoch 1/20
65931/65931 [=====] - 19s 292us/step - loss: 1.9703 - acc: 0.3407 - val
Epoch 2/20
65931/65931 [=====] - 17s 252us/step - loss: 0.8205 - acc: 0.7285 - val
Epoch 3/20
65931/65931 [=====] - 17s 251us/step - loss: 0.5850 - acc: 0.8130 - val
Epoch 4/20
65931/65931 [=====] - 17s 253us/step - loss: 0.4988 - acc: 0.8413 - val
Epoch 5/20
65931/65931 [=====] - 17s 252us/step - loss: 0.4485 - acc: 0.8592 - val
Epoch 6/20
65931/65931 [=====] - 17s 253us/step - loss: 0.4117 - acc: 0.8697 - val
Epoch 7/20
65931/65931 [=====] - 17s 253us/step - loss: 0.3828 - acc: 0.8794 - val
Epoch 8/20
65931/65931 [=====] - 17s 252us/step - loss: 0.3563 - acc: 0.8871 - val
Epoch 9/20
65931/65931 [=====] - 17s 252us/step - loss: 0.3397 - acc: 0.8927 - val
Epoch 10/20
65931/65931 [=====] - 17s 250us/step - loss: 0.3148 - acc: 0.9009 - val
Epoch 11/20
65931/65931 [=====] - 17s 251us/step - loss: 0.2983 - acc: 0.9048 - val
Epoch 12/20
65931/65931 [=====] - 17s 252us/step - loss: 0.2799 - acc: 0.9116 - val
Epoch 13/20
65931/65931 [=====] - 17s 252us/step - loss: 0.2598 - acc: 0.9177 - val
Epoch 14/20
65931/65931 [=====] - 17s 252us/step - loss: 0.2506 - acc: 0.9188 - val
Epoch 15/20
65931/65931 [=====] - 17s 251us/step - loss: 0.2317 - acc: 0.9246 - val
Epoch 16/20

```

```

65931/65931 [=====] - 17s 251us/step - loss: 0.2210 - acc: 0.9284 - val
Epoch 17/20
65931/65931 [=====] - 17s 252us/step - loss: 0.2024 - acc: 0.9339 - val
Epoch 18/20
65931/65931 [=====] - 17s 252us/step - loss: 0.1940 - acc: 0.9365 - val
Epoch 19/20
65931/65931 [=====] - 17s 252us/step - loss: 0.1825 - acc: 0.9401 - val
Epoch 20/20
65931/65931 [=====] - 17s 252us/step - loss: 0.1754 - acc: 0.9431 - val

```

```

In [45]: print("Model with Batch Normalization Test Accuracy: \n")
         model_bn.evaluate(X_test, y_test)

```

Model with Batch Normalization Test Accuracy:

```

26032/26032 [=====] - 5s 177us/step

```

```

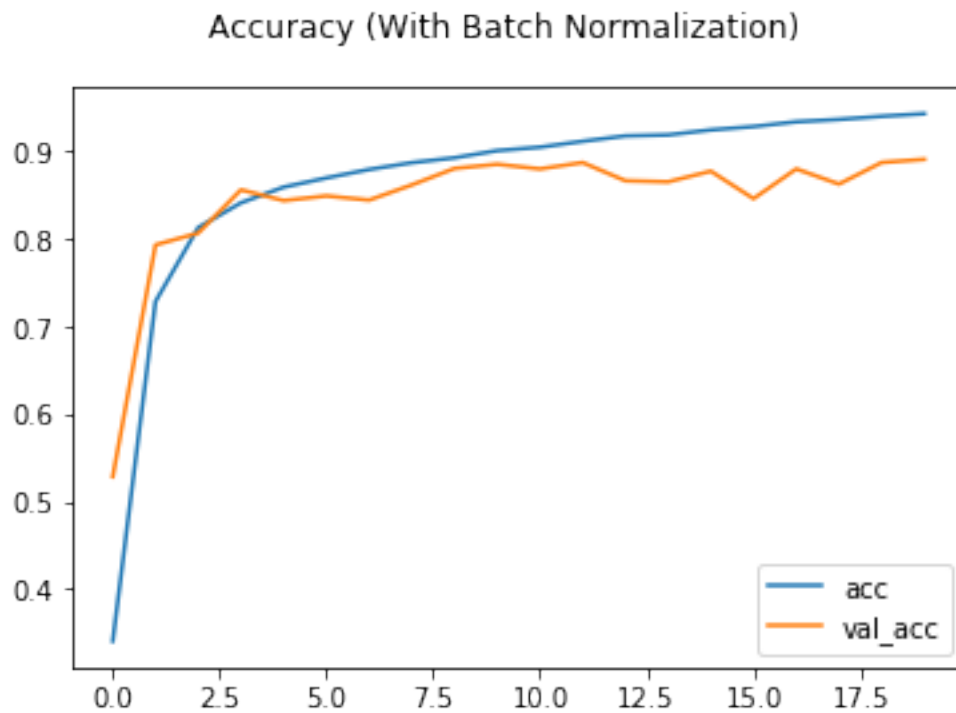
Out[45]: [0.5182511254915534, 0.8936693300553166]

```

```

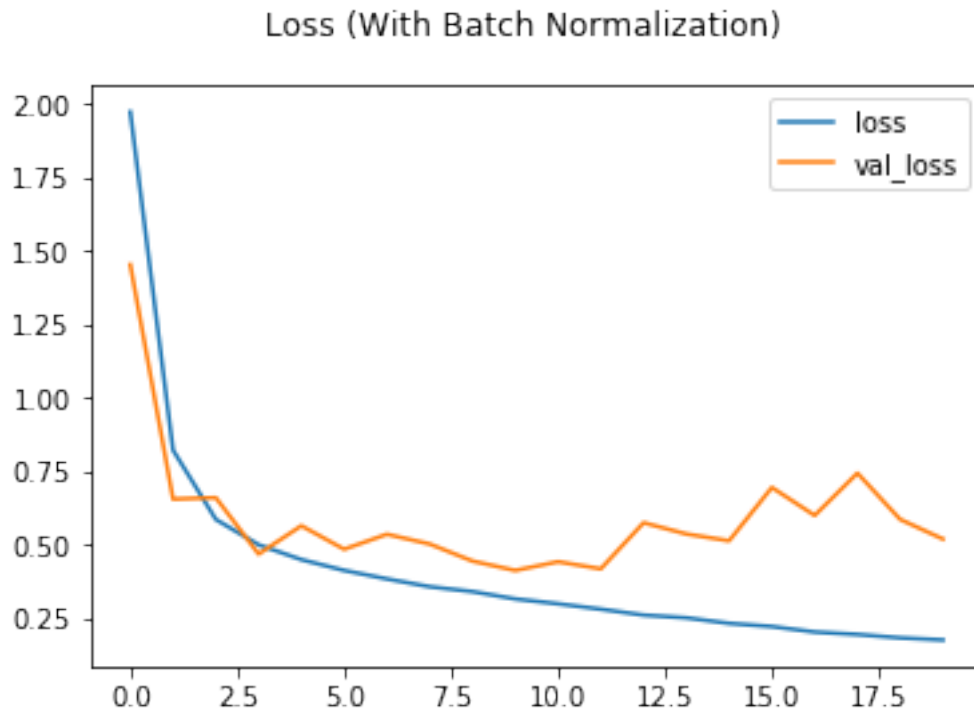
In [46]: pd.DataFrame(model_bn_hist.history)[['acc', 'val_acc']].plot()
         plt.suptitle("Accuracy (With Batch Normalization)")
         plt.show()

```





```
In [47]: pd.DataFrame(model_bn_hist.history)[['loss', 'val_loss']].plot()
plt.suptitle("Loss (With Batch Normalization)")
plt.show()
```



## 4 Task 4 [30 points]

- Load the weights of a pre-trained convolutional neural network included in keras, see <https://keras.io/applications/> , and use it as feature extraction method to train a linear model or MLP (scikit-learn or keras are fine) on the pets dataset ( <http://www.robots.ox.ac.uk/~vgg/data/pets/> ).
- You should achieve at least 70% accuracy. It's recommended you store the extracted features on disk so you don't have to recompute them for model selection.
- We will be working with the 37 class classification task.

```
In [48]: sess = tf.Session(config=tf.ConfigProto(log_device_placement=True))
```

```
In [49]: from keras import applications
from keras.preprocessing import image
from keras.applications.vgg16 import preprocess_input
from keras.preprocessing.image import ImageDataGenerator, array_to_img, img_to_array, load_img

import os
from IPython.display import display
```

```

import PIL
from PIL import Image
from PIL.Image import core as _imaging
from sklearn.linear_model import LogisticRegressionCV
from sklearn.metrics import confusion_matrix

from keras.applications.inception_v3 import preprocess_input
from keras.applications.vgg16 import preprocess_input as preprocess_input_vgg

```

## Data import

```

In [50]: images_dataset_dir = "images"
        ground_truth_dir = "annotations"
        test_file = open('annotations/test.txt')
        test_names_list = test_file.readlines()
        train_file = open('annotations/trainval.txt')
        train_names_list = train_file.readlines()

        test_class_labels = [ name.split()[1] for name in test_names_list]
        test_class_names = [ name.split()[0] for name in test_names_list]
        test_name_label_dict = dict(zip(test_class_names,test_class_labels))

        train_class_labels = [ name.split()[1] for name in train_names_list]
        train_class_names = [ name.split()[0] for name in train_names_list]
        train_name_label_dict = dict(zip(train_class_names,train_class_labels))

```

## Data Preprocessing

- Reading in images into a numpy array
- Separating images to test and train sets based on image names given in trainval.txt file and test.txt file

```

In [51]: test_class_labels = np.array(test_class_labels).astype(int)
        num_classes = np.unique(test_class_labels).shape[0]

        img_rows, img_cols = 150,150

        train_labels = []
        train_data = []
        test_data = []
        test_labels =[]

        for imageName in sorted(os.listdir("images")):
            if (".mat" in imageName):
                print(".mat error for file: ",imageName)
                continue
            img = load_img("images/"+str(imageName),False,
                           target_size=(img_rows,img_cols,3),

```

```

        interpolation='nearest')
x = img_to_array(img)
breed_name = imageName[:-4]

if breed_name in train_class_names:
    train_data.append(x)
    train_labels.append(train_name_label_dict[breed_name])

elif breed_name in test_class_names:
    test_data.append(x)
    test_labels.append(test_name_label_dict[breed_name])
else:
    print("Breed not found. Invalid image:", imageName, breed_name)

.mat error for file: Abyssinian_100.mat
.mat error for file: Abyssinian_101.mat
.mat error for file: Abyssinian_102.mat
Breed not found. Invalid image: Abyssinian_34.jpg Abyssinian_34
Breed not found. Invalid image: Abyssinian_82.jpg Abyssinian_82
Breed not found. Invalid image: Bombay_11.jpg Bombay_11
Breed not found. Invalid image: Bombay_189.jpg Bombay_189
Breed not found. Invalid image: Bombay_190.jpg Bombay_190
Breed not found. Invalid image: Bombay_192.jpg Bombay_192
Breed not found. Invalid image: Bombay_203.jpg Bombay_203
Breed not found. Invalid image: Bombay_206.jpg Bombay_206
Breed not found. Invalid image: Bombay_209.jpg Bombay_209
Breed not found. Invalid image: Bombay_210.jpg Bombay_210
Breed not found. Invalid image: Bombay_217.jpg Bombay_217
Breed not found. Invalid image: Bombay_22.jpg Bombay_22
Breed not found. Invalid image: Bombay_220.jpg Bombay_220
Breed not found. Invalid image: Bombay_32.jpg Bombay_32
Breed not found. Invalid image: Bombay_69.jpg Bombay_69
Breed not found. Invalid image: Bombay_85.jpg Bombay_85
Breed not found. Invalid image: Bombay_92.jpg Bombay_92
Breed not found. Invalid image: Bombay_99.jpg Bombay_99
Breed not found. Invalid image: Egyptian_Mau_129.jpg Egyptian_Mau_129
Breed not found. Invalid image: Egyptian_Mau_139.jpg Egyptian_Mau_139
Breed not found. Invalid image: Egyptian_Mau_145.jpg Egyptian_Mau_145
Breed not found. Invalid image: Egyptian_Mau_167.jpg Egyptian_Mau_167
Breed not found. Invalid image: Egyptian_Mau_177.jpg Egyptian_Mau_177
Breed not found. Invalid image: Egyptian_Mau_183.jpg Egyptian_Mau_183
Breed not found. Invalid image: Egyptian_Mau_191.jpg Egyptian_Mau_191
Breed not found. Invalid image: Egyptian_Mau_202.jpg Egyptian_Mau_202
Breed not found. Invalid image: Egyptian_Mau_41.jpg Egyptian_Mau_41
Breed not found. Invalid image: Egyptian_Mau_71.jpg Egyptian_Mau_71
Breed not found. Invalid image: Siamese_203.jpg Siamese_203
Breed not found. Invalid image: boxer_82.jpg boxer_82
Breed not found. Invalid image: english_cocker_spaniel_162.jpg english_cocker_spaniel_162

```

```
Breed not found. Invalid image: english_cocker_spaniel_163.jpg english_cocker_spaniel_163
Breed not found. Invalid image: english_cocker_spaniel_164.jpg english_cocker_spaniel_164
Breed not found. Invalid image: english_cocker_spaniel_179.jpg english_cocker_spaniel_179
Breed not found. Invalid image: keeshond_59.jpg keeshond_59
Breed not found. Invalid image: newfoundland_152.jpg newfoundland_152
Breed not found. Invalid image: newfoundland_153.jpg newfoundland_153
Breed not found. Invalid image: newfoundland_154.jpg newfoundland_154
Breed not found. Invalid image: newfoundland_155.jpg newfoundland_155
Breed not found. Invalid image: staffordshire_bull_terrier_2.jpg staffordshire_bull_terrier_2
Breed not found. Invalid image: staffordshire_bull_terrier_22.jpg staffordshire_bull_terrier_22
```

```
In [52]: train_labels_np = np.array(train_labels)
         test_labels_np = np.array(test_labels)
         train_data_np = np.array(train_data)
         test_data_np = np.array(test_data)
```

## Model import

```
In [53]: model_inc = applications.inception_v3.InceptionV3(include_top=False,
                                                         weights='imagenet',
                                                         input_tensor=None,
                                                         input_shape=(150,150,3),
                                                         pooling=None, classes=1000)
```

```
In [54]: train_inc = preprocess_input(train_data_np)
         test_inc = preprocess_input(test_data_np)

         feat_train_inc = model_inc.predict(train_inc)
         X_train = feat_train_inc.reshape(feat_train_inc.shape[0], -1)
         y_train = np.array(train_labels_np, copy=True)

         feat_test_inc = model_inc.predict(test_inc)
         X_test = feat_test_inc.reshape(feat_test_inc.shape[0], -1)
         y_test = np.array(test_labels_np, copy = True)
```

## Saving the features data:

```
In [55]: import h5py

         with h5py.File('features-inc3_train.h5', 'w') as hf:
             hf.create_dataset("feat_train_inc", data=feat_train_inc)

         with h5py.File('features-inc3_test.h5', 'w') as hf:
             hf.create_dataset("feat_test_inc", data=feat_test_inc)

In [56]: y_train = y_train.astype(int)
         y_test = y_test.astype(int)
         y_train[y_train == 37] = 0
         y_test[y_test == 37] = 0
```

#### 4.0.1 Running a classifier on the features data:

##### LinearSVC Classifier:

```
In [58]: from sklearn.svm import LinearSVC
         logit = LinearSVC(verbose=1).fit(X_train, y_train)
         print("The train score is {}".format(logit.score(X_train, y_train)))
         print("The test score is {}".format(logit.score(X_test, y_test)))
```

```
[LibLinear]The train score is 1.0
The test score is 0.7972199509403107
```