

Leander_ACS61011_Project

March 19, 2024

0.1 Multiclass Automated Speech Recognition using a Baseline and an Advanced Model

0.1.1 Prerequisites

- Download the speech image transformed data from GitHub and unzip it in the current directory:

```
[43]: # get the data from github and unzip
!wget https://raw.githubusercontent.com/andrsn/data/main/speechImageData.zip
!unzip -q /content/speechImageData.zip
!mv speechImageData\ -\ Copy speechImageData
```

--2024-03-19 08:58:45--

https://raw.githubusercontent.com/andrsn/data/main/speechImageData.zip

Resolving raw.githubusercontent.com (raw.githubusercontent.com)...

185.199.109.133, 185.199.111.133, 185.199.110.133, ...

Connecting to raw.githubusercontent.com

(raw.githubusercontent.com)|185.199.109.133|:443... connected.

HTTP request sent, awaiting response... 200 OK

Length: 9872924 (9.4M) [application/zip]

Saving to: 'speechImageData.zip.1'

speechImageData.zip 100%[=====>] 9.42M --.-KB/s in 0.05s

2024-03-19 08:58:45 (177 MB/s) - 'speechImageData.zip.1' saved [9872924/9872924]

- Install all the necessary libraries for our notebook

```
[2]: !pip install scikeras pydub
```

Collecting scikeras

Downloading scikeras-0.12.0-py3-none-any.whl (27 kB)

Collecting pydub

Downloading pydub-0.25.1-py2.py3-none-any.whl (32 kB)

Requirement already satisfied: packaging>=0.21 in

/usr/local/lib/python3.10/dist-packages (from scikeras) (24.0)

Requirement already satisfied: scikit-learn>=1.0.0 in

/usr/local/lib/python3.10/dist-packages (from scikeras) (1.2.2)

Requirement already satisfied: numpy>=1.17.3 in /usr/local/lib/python3.10/dist-packages (from scikit-learn>=1.0.0->scikeras) (1.25.2)
Requirement already satisfied: scipy>=1.3.2 in /usr/local/lib/python3.10/dist-packages (from scikit-learn>=1.0.0->scikeras) (1.11.4)
Requirement already satisfied: joblib>=1.1.1 in /usr/local/lib/python3.10/dist-packages (from scikit-learn>=1.0.0->scikeras) (1.3.2)
Requirement already satisfied: threadpoolctl>=2.0.0 in /usr/local/lib/python3.10/dist-packages (from scikit-learn>=1.0.0->scikeras) (3.3.0)
Installing collected packages: pydub, scikeras
Successfully installed pydub-0.25.1 scikeras-0.12.0

0.1.2 1. Import Libraries and define constants

We will start by importing the necessary libraries and defining the constants that will be used throughout the notebook.

```
[44]: import random
import shutil
import librosa
import soundfile as sf
import numpy as np
import seaborn as sns
import tensorflow as tf
import matplotlib.pyplot as plt

from keras import optimizers, regularizers
from keras.models import Sequential
from keras.layers import Dense, Dropout, BatchNormalization, Input, Conv2D,
    MaxPooling2D, Flatten
from keras.applications import MobileNetV2
from keras.applications.mobilenet_v2 import preprocess_input

from pydub import AudioSegment
from sklearn.metrics import confusion_matrix
from sklearn.model_selection import RandomizedSearchCV
from scikeras.wrappers import KerasClassifier
from hyperopt import fmin, tpe, hp, STATUS_OK, Trials, space_eval

NUM_CLASSES = 12
BATCH_SIZE = 128
IMG_SIZE = (98, 50)
TIMEPOOL_SIZE = 12
```

0.1.3 2. Data Preprocessing

- Create usable keras dataset components from the extracted files.

- In total, there are 12 classes of different spoken words and the spectrograms, which form the input image data are of size 98x50 pixels.

```
[45]: # Load the data

train_ds = tf.keras.utils.image_dataset_from_directory(
    directory='/content/speechImageData/TrainData',
    labels='inferred',
    color_mode="grayscale",
    label_mode='categorical',
    batch_size=BATCH_SIZE,
    image_size=IMG_SIZE
)

val_ds = tf.keras.utils.image_dataset_from_directory(
    directory='/content/speechImageData/ValData',
    labels='inferred',
    color_mode="grayscale",
    label_mode='categorical',
    batch_size=BATCH_SIZE,
    image_size=IMG_SIZE
)

# Extract the training input images and output class labels
x_train = []
y_train = []
for images, labels in train_ds.take(-1):
    x_train.append(images.numpy())
    y_train.append(labels.numpy())

x_train = np.concatenate(x_train, axis=0)
y_train = np.concatenate(y_train, axis=0)

print(y_train)

# Extract the validation input images and output class labels
x_val = []
y_val = []
for images, labels in val_ds.take(-1):
    x_val.append(images.numpy())
    y_val.append(labels.numpy())

x_val = np.concatenate(x_val, axis=0)
y_val = np.concatenate(y_val, axis=0)

print(y_val)
```

Found 2023 files belonging to 12 classes.

Found 1181 files belonging to 12 classes.

```
[[0. 0. 1. ... 0. 0. 0.]
 [0. 0. 0. ... 0. 0. 1.]
 [0. 0. 0. ... 0. 0. 0.]
 ...
 [0. 0. 0. ... 0. 0. 0.]
 [1. 0. 0. ... 0. 0. 0.]
 [0. 1. 0. ... 0. 0. 0.]]
[[0. 0. 0. ... 0. 0. 0.]
 [0. 1. 0. ... 0. 0. 0.]
 [1. 0. 0. ... 0. 0. 0.]
 ...
 [0. 0. 0. ... 1. 0. 0.]
 [0. 1. 0. ... 0. 0. 0.]
 [0. 0. 0. ... 0. 0. 0.]]
```

0.1.4 3. Model Design

We now attempt to approach the problem with five tasks:

Task 1: Baseline Model

Model features: The following are its features:

- The baseline model is a simple Convolutional Neural Network (CNN) with one input layer, four hidden layers, one fully connected layer and an output layer.
- The input layer consists of the following:
 - A Conv2D layer with 32 filters, a kernel size of 3x3, and a ReLU activation function.
 - A BatchNormalization layer.
 - A MaxPooling2D layer with a pool size of 2x2.
- The four hidden layers are replicated from the input layer.
- A time pooling layer is added to the model to combat the start time of the audio.
- The fully connected layer consists of 1024 units and a ReLU activation function.
- The output layer consists of 12 units and a softmax activation function.

Additional model hyperparameters:

- The model uses the Adam optimizer with a learning rate of 0.001.
- The L2 regularization parameter is set to 0.001.
- While training, an early stopping callback is used to stop the training process if the validation accuracy does not decrease for 5 epochs.

```
[5]: # define t1 model
def t1_model(num_layers, num_filters, passthrough=False):
    # number of convolutional filters
    input_num_filters = 32
```

```

fully_connected_num_filters = 1024

# define model
model = Sequential()

# input layer
model.add(Input(shape=(IMG_SIZE[0], IMG_SIZE[1], 1)))
model.add(Conv2D(input_num_filters, kernel_size=(3, 3), padding='same',
↪activation='relu'))
model.add(BatchNormalization())

# hidden layers
for i in range(num_layers):
    if passthrough:
        model.add(Conv2D(num_filters[i], kernel_size=(3, 3),
↪padding='same', activation='relu'))
    else:
        model.add(Conv2D(num_filters, kernel_size=(3, 3), padding='same',
↪activation='relu'))
        model.add(BatchNormalization())
        model.add(MaxPooling2D(pool_size=(2, 2), strides=(2, 2),
↪padding='same'))

# Time based pooling
model.add(MaxPooling2D(pool_size=(TIMEPOOL_SIZE, 1),
↪strides=(TIMEPOOL_SIZE, 1), padding='same'))

# fully connected layer
model.add(Flatten())
model.add(Dense(fully_connected_num_filters,
↪kernel_regularizer=regularizers.l2(0.01), activation='relu'))
model.add(Dropout(0.2))

# output layer
model.add(Dense(NUM_CLASSES, activation='softmax'))

# set adam optimizer
opt = optimizers.Adam(learning_rate=0.001)
model.compile(loss="categorical_crossentropy", optimizer=opt,
↪metrics=["accuracy"])

return model

hidden_num_layers = [2, 3, 4, 5]
hidden_num_filters = [128, 128, 128, 128]

```

```

task1_model = t1_model(len(hidden_num_layers), hidden_num_filters,
    ↳passthrough=True)
task1_model.summary()

early_stopping = tf.keras.callbacks.EarlyStopping(monitor='val_accuracy',
    ↳patience=5)

```

Model: "sequential"

Layer (type)	Output Shape	Param #
conv2d (Conv2D)	(None, 98, 50, 32)	320
batch_normalization (Batch Normalization)	(None, 98, 50, 32)	128
conv2d_1 (Conv2D)	(None, 98, 50, 128)	36992
batch_normalization_1 (Batch Normalization)	(None, 98, 50, 128)	512
max_pooling2d (MaxPooling2D)	(None, 49, 25, 128)	0
conv2d_2 (Conv2D)	(None, 49, 25, 128)	147584
batch_normalization_2 (Batch Normalization)	(None, 49, 25, 128)	512
max_pooling2d_1 (MaxPooling2D)	(None, 25, 13, 128)	0
conv2d_3 (Conv2D)	(None, 25, 13, 128)	147584
batch_normalization_3 (Batch Normalization)	(None, 25, 13, 128)	512
max_pooling2d_2 (MaxPooling2D)	(None, 13, 7, 128)	0
conv2d_4 (Conv2D)	(None, 13, 7, 128)	147584
batch_normalization_4 (Batch Normalization)	(None, 13, 7, 128)	512
max_pooling2d_3 (MaxPooling2D)	(None, 7, 4, 128)	0

max_pooling2d_4 (MaxPoolin g2D)	(None, 1, 4, 128)	0
flatten (Flatten)	(None, 512)	0
dense (Dense)	(None, 1024)	525312
dropout (Dropout)	(None, 1024)	0
dense_1 (Dense)	(None, 12)	12300

```
=====
Total params: 1019852 (3.89 MB)
Trainable params: 1018764 (3.89 MB)
Non-trainable params: 1088 (4.25 KB)
-----
```

T1.A - Model Training This section trains the deep convolutional network using the Adam algorithm.

```
[6]: history = task1_model.fit(x_train, y_train, batch_size=BATCH_SIZE, epochs=15,
    ↪validation_data=(x_val, y_val), callbacks=[early_stopping])
```

```
Epoch 1/15
16/16 [=====] - 17s 369ms/step - loss: 10.7208 -
accuracy: 0.2474 - val_loss: 14.2474 - val_accuracy: 0.0863
Epoch 2/15
16/16 [=====] - 2s 128ms/step - loss: 7.5581 -
accuracy: 0.3433 - val_loss: 11.3006 - val_accuracy: 0.1204
Epoch 3/15
16/16 [=====] - 2s 128ms/step - loss: 6.4265 -
accuracy: 0.4693 - val_loss: 8.7848 - val_accuracy: 0.1588
Epoch 4/15
16/16 [=====] - 2s 131ms/step - loss: 5.5289 -
accuracy: 0.5722 - val_loss: 7.1032 - val_accuracy: 0.1742
Epoch 5/15
16/16 [=====] - 2s 135ms/step - loss: 4.6883 -
accuracy: 0.6972 - val_loss: 5.4696 - val_accuracy: 0.3348
Epoch 6/15
16/16 [=====] - 2s 132ms/step - loss: 3.9862 -
accuracy: 0.7841 - val_loss: 4.8391 - val_accuracy: 0.4056
Epoch 7/15
16/16 [=====] - 2s 132ms/step - loss: 3.4144 -
accuracy: 0.8641 - val_loss: 4.8459 - val_accuracy: 0.3305
Epoch 8/15
16/16 [=====] - 2s 129ms/step - loss: 2.9752 -
accuracy: 0.9005 - val_loss: 4.1311 - val_accuracy: 0.5030
```

Epoch 9/15
 16/16 [=====] - 2s 129ms/step - loss: 2.6376 - accuracy: 0.9245 - val_loss: 4.0338 - val_accuracy: 0.4355
 Epoch 10/15
 16/16 [=====] - 2s 131ms/step - loss: 2.3295 - accuracy: 0.9380 - val_loss: 3.5626 - val_accuracy: 0.5209
 Epoch 11/15
 16/16 [=====] - 2s 132ms/step - loss: 2.0557 - accuracy: 0.9595 - val_loss: 3.3018 - val_accuracy: 0.5354
 Epoch 12/15
 16/16 [=====] - 2s 142ms/step - loss: 1.8363 - accuracy: 0.9650 - val_loss: 2.8098 - val_accuracy: 0.5952
 Epoch 13/15
 16/16 [=====] - 2s 142ms/step - loss: 1.6353 - accuracy: 0.9760 - val_loss: 2.8411 - val_accuracy: 0.5517
 Epoch 14/15
 16/16 [=====] - 2s 130ms/step - loss: 1.4460 - accuracy: 0.9840 - val_loss: 2.4654 - val_accuracy: 0.6362
 Epoch 15/15
 16/16 [=====] - 2s 133ms/step - loss: 1.2841 - accuracy: 0.9925 - val_loss: 2.3897 - val_accuracy: 0.6243

T1.B - Plot Training History and Confusion Matrix Here, we plot the training history and confusion matrix of the baseline model.

```
[7]: # summarize history for accuracy
plt.plot(history.history['accuracy'])
plt.plot(history.history['val_accuracy'])
plt.title('T1 - model accuracy')
plt.ylabel('accuracy')
plt.xlabel('epoch')
plt.legend(['train', 'val'], loc='upper left')
plt.show()

# summarize history for loss
plt.plot(history.history['loss'])
plt.plot(history.history['val_loss'])
plt.title('T1 - model loss')
plt.ylabel('loss')
plt.xlabel('epoch')
plt.legend(['train', 'val'], loc='upper left')
plt.show()

# Print accuracy
score = task1_model.evaluate(x_val, y_val, verbose=0)
print('T1 - validation accuracy:', score[1])

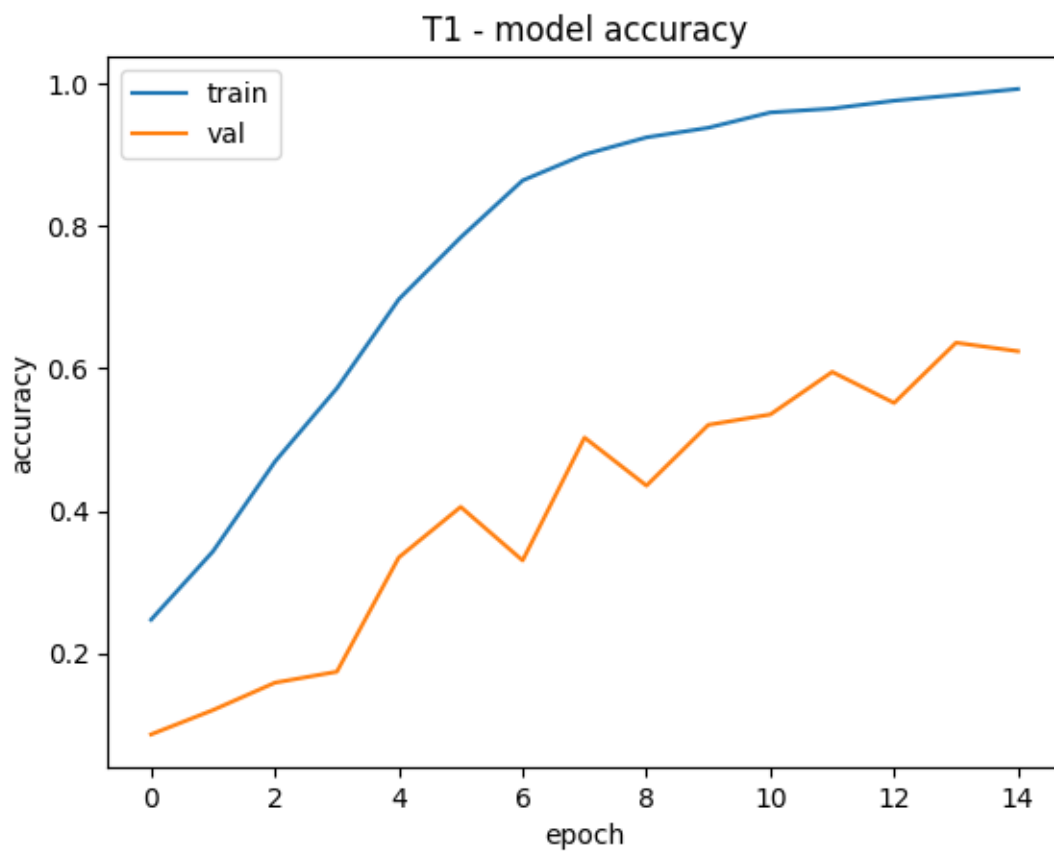
# Print confusion matrix
```

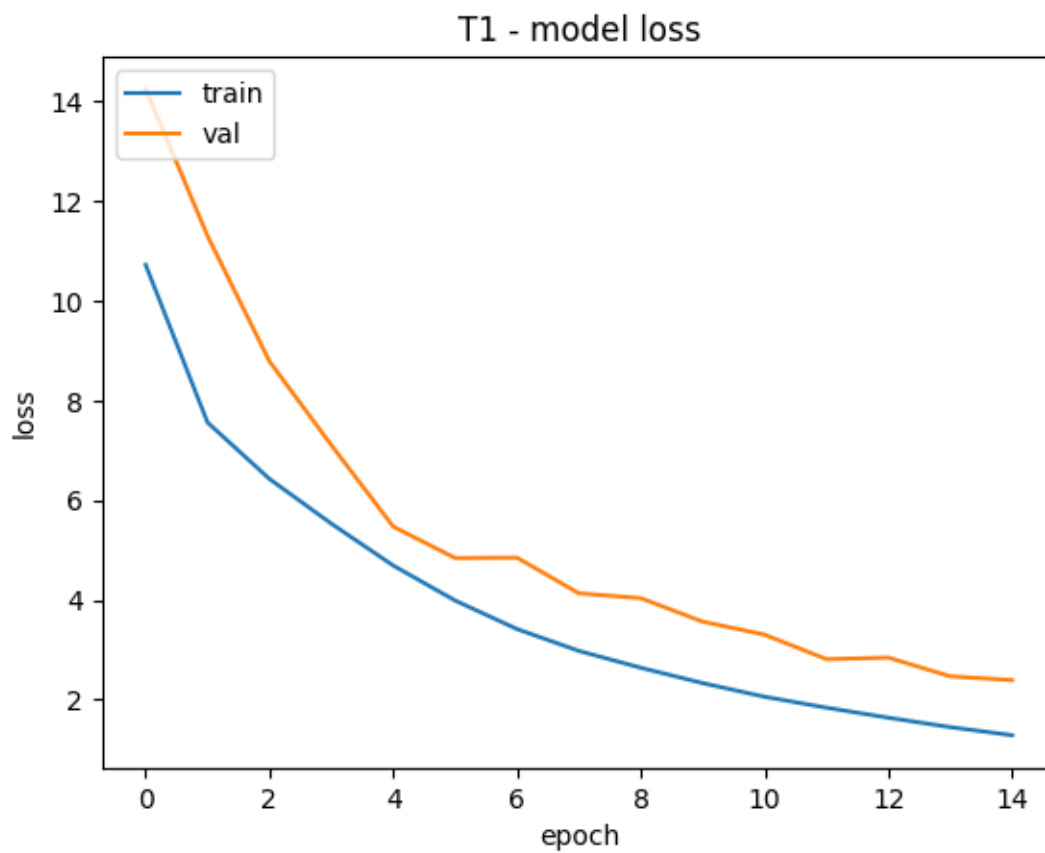


```

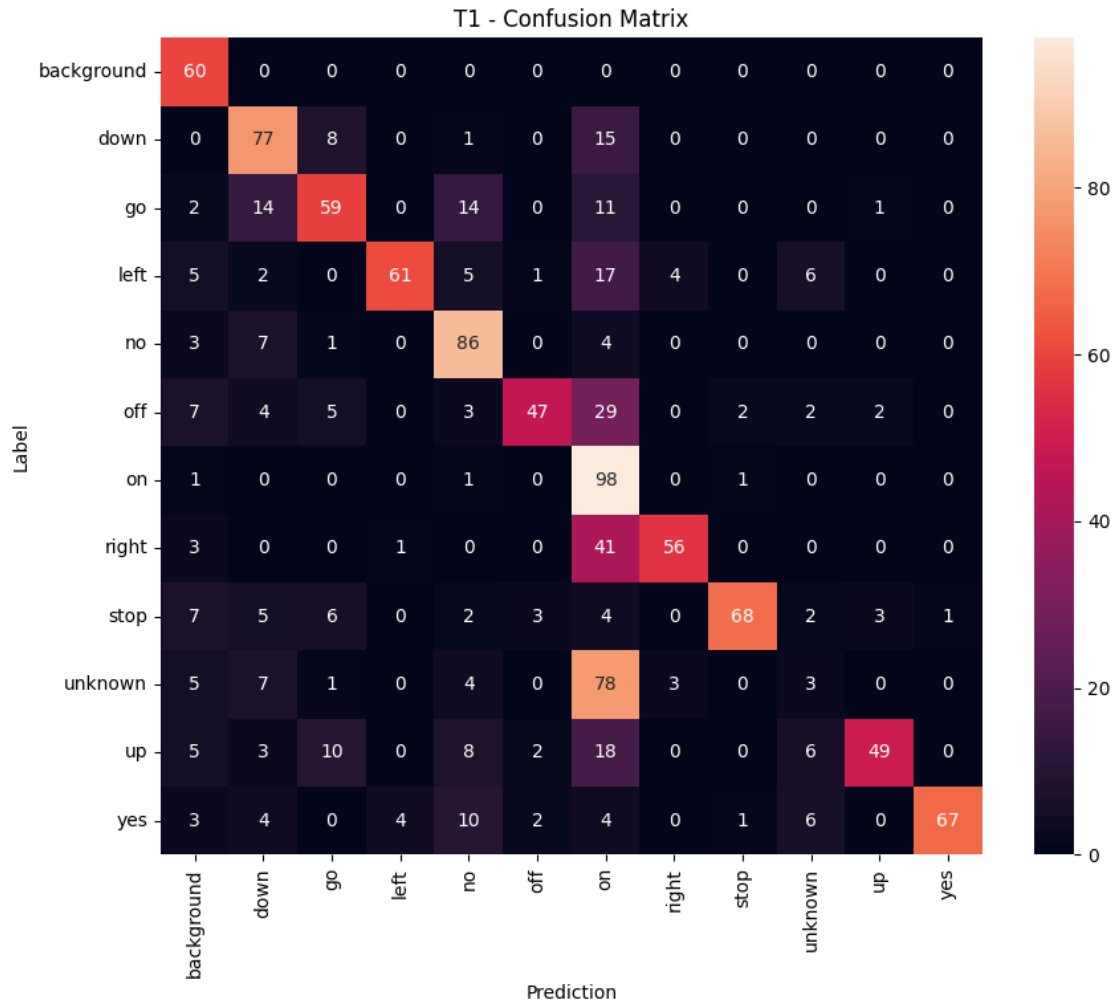
y_pred = task1_model.predict(x_val)
y_pred = np.argmax(y_pred, axis=1)
y_true = np.argmax(y_val, axis=1)
class_labels = list(val_ds.class_names)
confusion_mtx = confusion_matrix(y_true, y_pred)
plt.figure(figsize=(10, 8))
sns.heatmap(confusion_mtx, xticklabels=class_labels, yticklabels=class_labels,
            annot=True, fmt='d')
plt.xlabel('Prediction')
plt.ylabel('Label')
plt.title('T1 - Confusion Matrix')
plt.show()

```





T1 - validation accuracy: 0.6242527961730957
37/37 [=====] - 0s 8ms/step



As we can see, the model is not performing well on the validation set, especially for the class ‘unknown’. But that is expected as the class is a blanket of words not detected by any other classes. Overall, this baseline model achieves a validation accuracy of around 0.6.

We now proceed to the next task.

Task 2: Random Search for Hyperparameter Tuning We now use random search to find the best hyperparameters for the baseline model. Random search is better than grid search because it is faster and more efficient. Here, we use the RandomSearchCV class from the scikit-learn library to find the best hyperparameters for the baseline model.

```
[8]: # define the random search parameters
param_grid = {
    'num_layers': hidden_num_layers,
    'num_filters': hidden_num_filters,
}
```

```

# Create a KerasClassifier
task2_model = KerasClassifier(model=t1_model, epochs=40, batch_size=BATCH_SIZE,
    ↳ verbose=1, num_layers=hidden_num_layers, num_filters=hidden_num_filters)

# Create a RandomizedSearchCV
random_search = RandomizedSearchCV(estimator=task2_model,
    ↳ param_distributions=param_grid, n_iter=2, cv=3, verbose=2)

# Fit the RandomizedSearchCV
random_result = random_search.fit(x_train, y_train, validation_data=(x_val,
    ↳ y_val), callbacks=[early_stopping], verbose=1)

# Summarize results
print("Best: %f using %s" % (random_result.best_score_, random_result.
    ↳ best_params_))

```

Fitting 3 folds for each of 2 candidates, totalling 6 fits

Epoch 1/40

11/11 [=====] - 8s 393ms/step - loss: 11.3078 -
accuracy: 0.2264 - val_loss: 13.8767 - val_accuracy: 0.0931

Epoch 2/40

11/11 [=====] - 2s 141ms/step - loss: 8.2811 -
accuracy: 0.2879 - val_loss: 11.5925 - val_accuracy: 0.1178

Epoch 3/40

11/11 [=====] - 1s 135ms/step - loss: 7.3522 -
accuracy: 0.3598 - val_loss: 9.1822 - val_accuracy: 0.1776

Epoch 4/40

11/11 [=====] - 1s 135ms/step - loss: 6.5350 -
accuracy: 0.4558 - val_loss: 8.1694 - val_accuracy: 0.1067

Epoch 5/40

11/11 [=====] - 1s 137ms/step - loss: 5.7682 -
accuracy: 0.5840 - val_loss: 7.3425 - val_accuracy: 0.1119

Epoch 6/40

11/11 [=====] - 1s 136ms/step - loss: 5.0496 -
accuracy: 0.6769 - val_loss: 6.1923 - val_accuracy: 0.1827

Epoch 7/40

11/11 [=====] - 1s 136ms/step - loss: 4.4414 -
accuracy: 0.7774 - val_loss: 6.1963 - val_accuracy: 0.1324

Epoch 8/40

11/11 [=====] - 1s 136ms/step - loss: 3.8705 -
accuracy: 0.8658 - val_loss: 5.4464 - val_accuracy: 0.1887

Epoch 9/40

11/11 [=====] - 2s 142ms/step - loss: 3.4794 -
accuracy: 0.8808 - val_loss: 4.8642 - val_accuracy: 0.3501

Epoch 10/40

11/11 [=====] - 1s 139ms/step - loss: 3.1433 -

```

accuracy: 0.9130 - val_loss: 4.4623 - val_accuracy: 0.4330
Epoch 11/40
11/11 [=====] - 1s 136ms/step - loss: 2.8647 -
accuracy: 0.9295 - val_loss: 4.4548 - val_accuracy: 0.3322
Epoch 12/40
11/11 [=====] - 1s 137ms/step - loss: 2.6221 -
accuracy: 0.9498 - val_loss: 3.8134 - val_accuracy: 0.5431
Epoch 13/40
11/11 [=====] - 1s 137ms/step - loss: 2.3965 -
accuracy: 0.9580 - val_loss: 3.9290 - val_accuracy: 0.4236
Epoch 14/40
11/11 [=====] - 2s 141ms/step - loss: 2.1844 -
accuracy: 0.9670 - val_loss: 3.4745 - val_accuracy: 0.5107
Epoch 15/40
11/11 [=====] - 1s 136ms/step - loss: 1.9961 -
accuracy: 0.9745 - val_loss: 3.4132 - val_accuracy: 0.4833
Epoch 16/40
11/11 [=====] - 1s 137ms/step - loss: 1.8210 -
accuracy: 0.9880 - val_loss: 3.3338 - val_accuracy: 0.4646
Epoch 17/40
11/11 [=====] - 2s 143ms/step - loss: 1.6692 -
accuracy: 0.9910 - val_loss: 2.8684 - val_accuracy: 0.5935
Epoch 18/40
11/11 [=====] - 2s 143ms/step - loss: 1.5341 -
accuracy: 0.9963 - val_loss: 2.7534 - val_accuracy: 0.5969
Epoch 19/40
11/11 [=====] - 2s 142ms/step - loss: 1.3970 -
accuracy: 0.9985 - val_loss: 2.6736 - val_accuracy: 0.5858
Epoch 20/40
11/11 [=====] - 2s 142ms/step - loss: 1.2815 -
accuracy: 0.9993 - val_loss: 2.5792 - val_accuracy: 0.5816
Epoch 21/40
11/11 [=====] - 2s 141ms/step - loss: 1.1756 -
accuracy: 0.9985 - val_loss: 2.3766 - val_accuracy: 0.6243
Epoch 22/40
11/11 [=====] - 1s 138ms/step - loss: 1.0810 -
accuracy: 0.9985 - val_loss: 2.5306 - val_accuracy: 0.5722
Epoch 23/40
11/11 [=====] - 2s 141ms/step - loss: 0.9958 -
accuracy: 0.9993 - val_loss: 2.1540 - val_accuracy: 0.6345
Epoch 24/40
11/11 [=====] - 1s 138ms/step - loss: 0.9106 -
accuracy: 1.0000 - val_loss: 2.0190 - val_accuracy: 0.6550
Epoch 25/40
11/11 [=====] - 2s 141ms/step - loss: 0.8371 -
accuracy: 1.0000 - val_loss: 1.9569 - val_accuracy: 0.6524
Epoch 26/40
11/11 [=====] - 2s 140ms/step - loss: 0.7703 -

```

```

accuracy: 1.0000 - val_loss: 1.8787 - val_accuracy: 0.6670
Epoch 27/40
11/11 [=====] - 2s 141ms/step - loss: 0.7072 -
accuracy: 1.0000 - val_loss: 1.8113 - val_accuracy: 0.6635
Epoch 28/40
11/11 [=====] - 2s 142ms/step - loss: 0.6504 -
accuracy: 1.0000 - val_loss: 1.7217 - val_accuracy: 0.6832
Epoch 29/40
11/11 [=====] - 1s 139ms/step - loss: 0.5978 -
accuracy: 1.0000 - val_loss: 1.6801 - val_accuracy: 0.6892
Epoch 30/40
11/11 [=====] - 2s 142ms/step - loss: 0.5497 -
accuracy: 1.0000 - val_loss: 1.6554 - val_accuracy: 0.6874
Epoch 31/40
11/11 [=====] - 2s 139ms/step - loss: 0.5058 -
accuracy: 1.0000 - val_loss: 1.5761 - val_accuracy: 0.6892
Epoch 32/40
11/11 [=====] - 1s 139ms/step - loss: 0.4650 -
accuracy: 1.0000 - val_loss: 1.5520 - val_accuracy: 0.6943
Epoch 33/40
11/11 [=====] - 2s 142ms/step - loss: 0.4274 -
accuracy: 1.0000 - val_loss: 1.4838 - val_accuracy: 0.6994
Epoch 34/40
11/11 [=====] - 2s 141ms/step - loss: 0.3943 -
accuracy: 0.9993 - val_loss: 1.5233 - val_accuracy: 0.6772
Epoch 35/40
11/11 [=====] - 2s 139ms/step - loss: 0.3667 -
accuracy: 0.9993 - val_loss: 1.5073 - val_accuracy: 0.6951
Epoch 36/40
11/11 [=====] - 2s 142ms/step - loss: 0.3379 -
accuracy: 1.0000 - val_loss: 1.4462 - val_accuracy: 0.6781
Epoch 37/40
11/11 [=====] - 2s 143ms/step - loss: 0.3106 -
accuracy: 1.0000 - val_loss: 1.5108 - val_accuracy: 0.6832
Epoch 38/40
11/11 [=====] - 2s 143ms/step - loss: 0.2850 -
accuracy: 1.0000 - val_loss: 1.3635 - val_accuracy: 0.6823
Epoch 39/40
11/11 [=====] - 2s 140ms/step - loss: 0.2611 -
accuracy: 1.0000 - val_loss: 1.3346 - val_accuracy: 0.6849
Epoch 40/40
11/11 [=====] - 2s 143ms/step - loss: 0.2397 -
accuracy: 1.0000 - val_loss: 1.3071 - val_accuracy: 0.6943
6/6 [=====] - 1s 129ms/step
[CV] END ...num_filters=128, num_layers=4; total time= 1.4min
Epoch 1/40
11/11 [=====] - 5s 181ms/step - loss: 10.9177 -
accuracy: 0.2226 - val_loss: 25.4376 - val_accuracy: 0.1221

```

Epoch 2/40
11/11 [=====] - 2s 142ms/step - loss: 7.8666 -
accuracy: 0.3471 - val_loss: 32.4891 - val_accuracy: 0.0999
Epoch 3/40
11/11 [=====] - 1s 138ms/step - loss: 6.8530 -
accuracy: 0.4865 - val_loss: 24.1249 - val_accuracy: 0.0956
Epoch 4/40
11/11 [=====] - 2s 142ms/step - loss: 5.9920 -
accuracy: 0.5982 - val_loss: 21.2051 - val_accuracy: 0.1008
Epoch 5/40
11/11 [=====] - 2s 139ms/step - loss: 5.2734 -
accuracy: 0.6844 - val_loss: 14.9276 - val_accuracy: 0.1067
Epoch 6/40
11/11 [=====] - 2s 142ms/step - loss: 4.6735 -
accuracy: 0.7669 - val_loss: 11.2893 - val_accuracy: 0.1076
Epoch 7/40
11/11 [=====] - 2s 139ms/step - loss: 4.1269 -
accuracy: 0.8141 - val_loss: 9.7536 - val_accuracy: 0.1076
Epoch 8/40
11/11 [=====] - 2s 143ms/step - loss: 3.7297 -
accuracy: 0.8538 - val_loss: 7.1853 - val_accuracy: 0.1324
Epoch 9/40
11/11 [=====] - 2s 146ms/step - loss: 3.3274 -
accuracy: 0.8823 - val_loss: 5.6822 - val_accuracy: 0.1862
Epoch 10/40
11/11 [=====] - 2s 140ms/step - loss: 3.0098 -
accuracy: 0.9273 - val_loss: 4.2388 - val_accuracy: 0.4406
Epoch 11/40
11/11 [=====] - 2s 143ms/step - loss: 2.7194 -
accuracy: 0.9430 - val_loss: 3.9191 - val_accuracy: 0.5158
Epoch 12/40
11/11 [=====] - 2s 144ms/step - loss: 2.4661 -
accuracy: 0.9633 - val_loss: 3.8045 - val_accuracy: 0.4483
Epoch 13/40
11/11 [=====] - 2s 140ms/step - loss: 2.2534 -
accuracy: 0.9723 - val_loss: 3.3968 - val_accuracy: 0.5722
Epoch 14/40
11/11 [=====] - 2s 141ms/step - loss: 2.0650 -
accuracy: 0.9738 - val_loss: 3.2807 - val_accuracy: 0.5525
Epoch 15/40
11/11 [=====] - 2s 144ms/step - loss: 1.8867 -
accuracy: 0.9858 - val_loss: 3.1062 - val_accuracy: 0.5739
Epoch 16/40
11/11 [=====] - 2s 146ms/step - loss: 1.7277 -
accuracy: 0.9910 - val_loss: 2.8455 - val_accuracy: 0.6225
Epoch 17/40
11/11 [=====] - 2s 148ms/step - loss: 1.5939 -
accuracy: 0.9888 - val_loss: 2.8030 - val_accuracy: 0.6183

Epoch 18/40
11/11 [=====] - 2s 145ms/step - loss: 1.4651 - accuracy: 0.9903 - val_loss: 2.6260 - val_accuracy: 0.6063

Epoch 19/40
11/11 [=====] - 2s 142ms/step - loss: 1.3492 - accuracy: 0.9948 - val_loss: 2.4277 - val_accuracy: 0.6465

Epoch 20/40
11/11 [=====] - 2s 143ms/step - loss: 1.2457 - accuracy: 0.9955 - val_loss: 2.5712 - val_accuracy: 0.5414

Epoch 21/40
11/11 [=====] - 2s 142ms/step - loss: 1.1449 - accuracy: 0.9948 - val_loss: 2.5747 - val_accuracy: 0.5064

Epoch 22/40
11/11 [=====] - 2s 142ms/step - loss: 1.0443 - accuracy: 0.9993 - val_loss: 2.3225 - val_accuracy: 0.5909

Epoch 23/40
11/11 [=====] - 2s 141ms/step - loss: 0.9595 - accuracy: 1.0000 - val_loss: 2.2104 - val_accuracy: 0.6490

Epoch 24/40
11/11 [=====] - 2s 144ms/step - loss: 0.8832 - accuracy: 0.9993 - val_loss: 1.9860 - val_accuracy: 0.6670

Epoch 25/40
11/11 [=====] - 2s 143ms/step - loss: 0.8099 - accuracy: 1.0000 - val_loss: 1.9189 - val_accuracy: 0.6661

Epoch 26/40
11/11 [=====] - 2s 141ms/step - loss: 0.7422 - accuracy: 1.0000 - val_loss: 1.9123 - val_accuracy: 0.6541

Epoch 27/40
11/11 [=====] - 2s 144ms/step - loss: 0.6822 - accuracy: 1.0000 - val_loss: 1.9176 - val_accuracy: 0.6388

Epoch 28/40
11/11 [=====] - 2s 145ms/step - loss: 0.6289 - accuracy: 0.9993 - val_loss: 1.6978 - val_accuracy: 0.7062

Epoch 29/40
11/11 [=====] - 2s 144ms/step - loss: 0.5783 - accuracy: 1.0000 - val_loss: 1.7061 - val_accuracy: 0.7062

Epoch 30/40
11/11 [=====] - 2s 142ms/step - loss: 0.5313 - accuracy: 1.0000 - val_loss: 1.5055 - val_accuracy: 0.7225

Epoch 31/40
11/11 [=====] - 2s 144ms/step - loss: 0.4878 - accuracy: 1.0000 - val_loss: 1.4667 - val_accuracy: 0.7216

Epoch 32/40
11/11 [=====] - 2s 147ms/step - loss: 0.4474 - accuracy: 1.0000 - val_loss: 1.4737 - val_accuracy: 0.7054

Epoch 33/40
11/11 [=====] - 2s 143ms/step - loss: 0.4110 - accuracy: 1.0000 - val_loss: 1.4606 - val_accuracy: 0.7114

Epoch 34/40
11/11 [=====] - 2s 142ms/step - loss: 0.3771 - accuracy: 1.0000 - val_loss: 1.3770 - val_accuracy: 0.7276
Epoch 35/40
11/11 [=====] - 2s 142ms/step - loss: 0.3463 - accuracy: 1.0000 - val_loss: 1.3526 - val_accuracy: 0.7284
Epoch 36/40
11/11 [=====] - 2s 145ms/step - loss: 0.3178 - accuracy: 1.0000 - val_loss: 1.3202 - val_accuracy: 0.7293
Epoch 37/40
11/11 [=====] - 2s 142ms/step - loss: 0.2923 - accuracy: 1.0000 - val_loss: 1.3188 - val_accuracy: 0.7259
Epoch 38/40
11/11 [=====] - 2s 144ms/step - loss: 0.2682 - accuracy: 1.0000 - val_loss: 1.2920 - val_accuracy: 0.7225
Epoch 39/40
11/11 [=====] - 2s 145ms/step - loss: 0.2463 - accuracy: 1.0000 - val_loss: 1.2630 - val_accuracy: 0.7361
Epoch 40/40
11/11 [=====] - 2s 145ms/step - loss: 0.2260 - accuracy: 1.0000 - val_loss: 1.2392 - val_accuracy: 0.7455
6/6 [=====] - 0s 37ms/step
[CV] END ...num_filters=128, num_layers=4; total time= 1.4min
Epoch 1/40
11/11 [=====] - 5s 174ms/step - loss: 11.1266 - accuracy: 0.2376 - val_loss: 32.8397 - val_accuracy: 0.0854
Epoch 2/40
11/11 [=====] - 2s 139ms/step - loss: 8.0780 - accuracy: 0.3126 - val_loss: 20.6583 - val_accuracy: 0.1289
Epoch 3/40
11/11 [=====] - 2s 139ms/step - loss: 7.1699 - accuracy: 0.4093 - val_loss: 19.3227 - val_accuracy: 0.1281
Epoch 4/40
11/11 [=====] - 2s 139ms/step - loss: 6.3581 - accuracy: 0.5030 - val_loss: 13.2528 - val_accuracy: 0.1452
Epoch 5/40
11/11 [=====] - 2s 143ms/step - loss: 5.6633 - accuracy: 0.5930 - val_loss: 12.8476 - val_accuracy: 0.1076
Epoch 6/40
11/11 [=====] - 2s 143ms/step - loss: 4.9952 - accuracy: 0.6777 - val_loss: 11.3853 - val_accuracy: 0.1059
Epoch 7/40
11/11 [=====] - 2s 140ms/step - loss: 4.4195 - accuracy: 0.7586 - val_loss: 9.2108 - val_accuracy: 0.1093
Epoch 8/40
11/11 [=====] - 2s 148ms/step - loss: 3.9552 - accuracy: 0.8073 - val_loss: 7.0090 - val_accuracy: 0.1127
Epoch 9/40

11/11 [=====] - 2s 144ms/step - loss: 3.5260 - accuracy: 0.8568 - val_loss: 5.5443 - val_accuracy: 0.1785
Epoch 10/40
11/11 [=====] - 2s 144ms/step - loss: 3.1527 - accuracy: 0.9063 - val_loss: 4.5565 - val_accuracy: 0.3604
Epoch 11/40
11/11 [=====] - 2s 143ms/step - loss: 2.8604 - accuracy: 0.9235 - val_loss: 4.2615 - val_accuracy: 0.4031
Epoch 12/40
11/11 [=====] - 2s 144ms/step - loss: 2.5994 - accuracy: 0.9483 - val_loss: 4.0213 - val_accuracy: 0.4355
Epoch 13/40
11/11 [=====] - 2s 141ms/step - loss: 2.3779 - accuracy: 0.9588 - val_loss: 3.5896 - val_accuracy: 0.5406
Epoch 14/40
11/11 [=====] - 2s 144ms/step - loss: 2.1680 - accuracy: 0.9700 - val_loss: 3.5604 - val_accuracy: 0.4996
Epoch 15/40
11/11 [=====] - 2s 146ms/step - loss: 1.9847 - accuracy: 0.9768 - val_loss: 3.2232 - val_accuracy: 0.5491
Epoch 16/40
11/11 [=====] - 2s 141ms/step - loss: 1.8268 - accuracy: 0.9888 - val_loss: 2.9803 - val_accuracy: 0.5816
Epoch 17/40
11/11 [=====] - 2s 141ms/step - loss: 1.6743 - accuracy: 0.9895 - val_loss: 3.1183 - val_accuracy: 0.4611
Epoch 18/40
11/11 [=====] - 2s 141ms/step - loss: 1.5540 - accuracy: 0.9903 - val_loss: 2.8769 - val_accuracy: 0.5115
Epoch 19/40
11/11 [=====] - 2s 145ms/step - loss: 1.4268 - accuracy: 0.9910 - val_loss: 2.8432 - val_accuracy: 0.5354
Epoch 20/40
11/11 [=====] - 2s 144ms/step - loss: 1.3058 - accuracy: 0.9963 - val_loss: 2.8132 - val_accuracy: 0.4851
Epoch 21/40
11/11 [=====] - 2s 144ms/step - loss: 1.1961 - accuracy: 0.9970 - val_loss: 2.6385 - val_accuracy: 0.5107
Epoch 22/40
11/11 [=====] - 2s 141ms/step - loss: 1.1007 - accuracy: 0.9985 - val_loss: 2.3351 - val_accuracy: 0.5961
Epoch 23/40
11/11 [=====] - 2s 146ms/step - loss: 1.0102 - accuracy: 0.9993 - val_loss: 2.2147 - val_accuracy: 0.6097
Epoch 24/40
11/11 [=====] - 2s 146ms/step - loss: 0.9270 - accuracy: 0.9993 - val_loss: 1.9705 - val_accuracy: 0.6695
Epoch 25/40

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11/11 [=====] - 2s 145ms/step - loss: 0.8530 -
accuracy: 0.9993 - val_loss: 1.8940 - val_accuracy: 0.6772
Epoch 26/40
11/11 [=====] - 2s 142ms/step - loss: 0.7835 -
accuracy: 0.9993 - val_loss: 1.8901 - val_accuracy: 0.6422
Epoch 27/40
11/11 [=====] - 2s 145ms/step - loss: 0.7195 -
accuracy: 0.9993 - val_loss: 1.8182 - val_accuracy: 0.6576
Epoch 28/40
11/11 [=====] - 2s 143ms/step - loss: 0.6595 -
accuracy: 1.0000 - val_loss: 1.6874 - val_accuracy: 0.6857
Epoch 29/40
11/11 [=====] - 2s 146ms/step - loss: 0.6054 -
accuracy: 1.0000 - val_loss: 1.6397 - val_accuracy: 0.6840
Epoch 30/40
11/11 [=====] - 2s 145ms/step - loss: 0.5560 -
accuracy: 1.0000 - val_loss: 1.5512 - val_accuracy: 0.6977
Epoch 31/40
11/11 [=====] - 2s 149ms/step - loss: 0.5105 -
accuracy: 1.0000 - val_loss: 1.4495 - val_accuracy: 0.7199
Epoch 32/40
11/11 [=====] - 2s 143ms/step - loss: 0.4689 -
accuracy: 1.0000 - val_loss: 1.4352 - val_accuracy: 0.7105
Epoch 33/40
11/11 [=====] - 2s 143ms/step - loss: 0.4310 -
accuracy: 1.0000 - val_loss: 1.3737 - val_accuracy: 0.7199
Epoch 34/40
11/11 [=====] - 2s 143ms/step - loss: 0.3958 -
accuracy: 1.0000 - val_loss: 1.3875 - val_accuracy: 0.7062
Epoch 35/40
11/11 [=====] - 2s 144ms/step - loss: 0.3633 -
accuracy: 1.0000 - val_loss: 1.3131 - val_accuracy: 0.7182
Epoch 36/40
11/11 [=====] - 2s 143ms/step - loss: 0.3339 -
accuracy: 1.0000 - val_loss: 1.3124 - val_accuracy: 0.7131
Epoch 37/40
11/11 [=====] - 2s 146ms/step - loss: 0.3063 -
accuracy: 1.0000 - val_loss: 1.2455 - val_accuracy: 0.7250
Epoch 38/40
11/11 [=====] - 2s 147ms/step - loss: 0.2811 -
accuracy: 1.0000 - val_loss: 1.2425 - val_accuracy: 0.7156
Epoch 39/40
11/11 [=====] - 2s 146ms/step - loss: 0.2580 -
accuracy: 1.0000 - val_loss: 1.1800 - val_accuracy: 0.7242
Epoch 40/40
11/11 [=====] - 2s 146ms/step - loss: 0.2368 -
accuracy: 1.0000 - val_loss: 1.2018 - val_accuracy: 0.7250
6/6 [=====] - 0s 37ms/step

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[CV] END ...num_filters=128, num_layers=4; total time= 1.4min
Epoch 1/40
11/11 [=====] - 4s 156ms/step - loss: 38.3277 -
accuracy: 0.2159 - val_loss: 144.2063 - val_accuracy: 0.1153
Epoch 2/40
11/11 [=====] - 1s 130ms/step - loss: 20.6041 -
accuracy: 0.2639 - val_loss: 45.9289 - val_accuracy: 0.1512
Epoch 3/40
11/11 [=====] - 1s 129ms/step - loss: 17.0014 -
accuracy: 0.3006 - val_loss: 24.7214 - val_accuracy: 0.1529
Epoch 4/40
11/11 [=====] - 1s 135ms/step - loss: 15.3385 -
accuracy: 0.3568 - val_loss: 17.7981 - val_accuracy: 0.1887
Epoch 5/40
11/11 [=====] - 1s 136ms/step - loss: 13.9562 -
accuracy: 0.4063 - val_loss: 16.0583 - val_accuracy: 0.1930
Epoch 6/40
11/11 [=====] - 1s 136ms/step - loss: 12.7793 -
accuracy: 0.4183 - val_loss: 14.1732 - val_accuracy: 0.1879
Epoch 7/40
11/11 [=====] - 1s 131ms/step - loss: 11.6717 -
accuracy: 0.4610 - val_loss: 12.8334 - val_accuracy: 0.2169
Epoch 8/40
11/11 [=====] - 1s 138ms/step - loss: 10.6979 -
accuracy: 0.4700 - val_loss: 11.5747 - val_accuracy: 0.2118
Epoch 9/40
11/11 [=====] - 1s 136ms/step - loss: 9.8363 -
accuracy: 0.4715 - val_loss: 10.7535 - val_accuracy: 0.2400
Epoch 10/40
11/11 [=====] - 1s 130ms/step - loss: 9.0581 -
accuracy: 0.5150 - val_loss: 9.6990 - val_accuracy: 0.2477
Epoch 11/40
11/11 [=====] - 1s 131ms/step - loss: 8.3701 -
accuracy: 0.5217 - val_loss: 9.0288 - val_accuracy: 0.2579
Epoch 12/40
11/11 [=====] - 1s 131ms/step - loss: 7.6833 -
accuracy: 0.5607 - val_loss: 8.4303 - val_accuracy: 0.2775
Epoch 13/40
11/11 [=====] - 1s 130ms/step - loss: 7.0717 -
accuracy: 0.5660 - val_loss: 7.7082 - val_accuracy: 0.2946
Epoch 14/40
11/11 [=====] - 1s 136ms/step - loss: 6.5163 -
accuracy: 0.5937 - val_loss: 7.2469 - val_accuracy: 0.2921
Epoch 15/40
11/11 [=====] - 1s 137ms/step - loss: 6.0389 -
accuracy: 0.5982 - val_loss: 6.7174 - val_accuracy: 0.3023
Epoch 16/40
11/11 [=====] - 1s 134ms/step - loss: 5.5461 -

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accuracy: 0.6454 - val_loss: 6.4784 - val_accuracy: 0.2886
Epoch 17/40
11/11 [=====] - 1s 139ms/step - loss: 5.1529 -
accuracy: 0.6522 - val_loss: 6.2586 - val_accuracy: 0.3194
Epoch 18/40
11/11 [=====] - 1s 132ms/step - loss: 4.7525 -
accuracy: 0.6949 - val_loss: 5.7913 - val_accuracy: 0.2946
Epoch 19/40
11/11 [=====] - 1s 136ms/step - loss: 4.2890 -
accuracy: 0.7421 - val_loss: 5.4281 - val_accuracy: 0.3202
Epoch 20/40
11/11 [=====] - 1s 136ms/step - loss: 3.9925 -
accuracy: 0.7429 - val_loss: 5.1881 - val_accuracy: 0.3100
Epoch 21/40
11/11 [=====] - 1s 137ms/step - loss: 3.6883 -
accuracy: 0.7646 - val_loss: 4.8687 - val_accuracy: 0.3553
Epoch 22/40
11/11 [=====] - 1s 138ms/step - loss: 3.3846 -
accuracy: 0.7954 - val_loss: 4.4096 - val_accuracy: 0.3945
Epoch 23/40
11/11 [=====] - 1s 131ms/step - loss: 3.0858 -
accuracy: 0.8193 - val_loss: 4.3398 - val_accuracy: 0.3766
Epoch 24/40
11/11 [=====] - 1s 138ms/step - loss: 2.8224 -
accuracy: 0.8433 - val_loss: 4.0212 - val_accuracy: 0.4048
Epoch 25/40
11/11 [=====] - 1s 138ms/step - loss: 2.6131 -
accuracy: 0.8553 - val_loss: 3.9478 - val_accuracy: 0.4022
Epoch 26/40
11/11 [=====] - 1s 137ms/step - loss: 2.3980 -
accuracy: 0.8583 - val_loss: 3.7463 - val_accuracy: 0.4099
Epoch 27/40
11/11 [=====] - 1s 132ms/step - loss: 2.2164 -
accuracy: 0.8966 - val_loss: 3.5105 - val_accuracy: 0.4193
Epoch 28/40
11/11 [=====] - 1s 137ms/step - loss: 2.0171 -
accuracy: 0.9048 - val_loss: 3.4258 - val_accuracy: 0.4039
Epoch 29/40
11/11 [=====] - 1s 137ms/step - loss: 1.8569 -
accuracy: 0.9160 - val_loss: 3.2944 - val_accuracy: 0.4236
Epoch 30/40
11/11 [=====] - 1s 132ms/step - loss: 1.7117 -
accuracy: 0.9280 - val_loss: 3.3306 - val_accuracy: 0.3655
Epoch 31/40
11/11 [=====] - 1s 138ms/step - loss: 1.5650 -
accuracy: 0.9453 - val_loss: 3.1694 - val_accuracy: 0.3971
Epoch 32/40
11/11 [=====] - 1s 135ms/step - loss: 1.4507 -

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accuracy: 0.9550 - val_loss: 3.0431 - val_accuracy: 0.4184
Epoch 33/40
11/11 [=====] - 1s 137ms/step - loss: 1.3559 -
accuracy: 0.9528 - val_loss: 3.0111 - val_accuracy: 0.3757
Epoch 34/40
11/11 [=====] - 1s 132ms/step - loss: 1.2349 -
accuracy: 0.9678 - val_loss: 2.9146 - val_accuracy: 0.4133
Epoch 35/40
11/11 [=====] - 1s 137ms/step - loss: 1.1815 -
accuracy: 0.9520 - val_loss: 2.6262 - val_accuracy: 0.4509
Epoch 36/40
11/11 [=====] - 1s 133ms/step - loss: 1.0847 -
accuracy: 0.9685 - val_loss: 2.6297 - val_accuracy: 0.4458
Epoch 37/40
11/11 [=====] - 1s 133ms/step - loss: 1.0155 -
accuracy: 0.9745 - val_loss: 2.7664 - val_accuracy: 0.4150
Epoch 38/40
11/11 [=====] - 1s 133ms/step - loss: 0.9362 -
accuracy: 0.9783 - val_loss: 2.5347 - val_accuracy: 0.4330
Epoch 39/40
11/11 [=====] - 2s 139ms/step - loss: 0.8705 -
accuracy: 0.9805 - val_loss: 2.5638 - val_accuracy: 0.4210
Epoch 40/40
11/11 [=====] - 1s 136ms/step - loss: 0.8154 -
accuracy: 0.9813 - val_loss: 2.4638 - val_accuracy: 0.4227
6/6 [=====] - 0s 26ms/step
[CV] END ...num_filters=128, num_layers=2; total time= 1.0min
Epoch 1/40
11/11 [=====] - 4s 157ms/step - loss: 41.1181 -
accuracy: 0.1837 - val_loss: 62.3380 - val_accuracy: 0.1230
Epoch 2/40
11/11 [=====] - 1s 137ms/step - loss: 19.2888 -
accuracy: 0.2721 - val_loss: 34.0311 - val_accuracy: 0.1238
Epoch 3/40
11/11 [=====] - 1s 138ms/step - loss: 16.7934 -
accuracy: 0.2826 - val_loss: 22.0282 - val_accuracy: 0.1418
Epoch 4/40
11/11 [=====] - 1s 132ms/step - loss: 15.1746 -
accuracy: 0.3433 - val_loss: 17.6936 - val_accuracy: 0.1605
Epoch 5/40
11/11 [=====] - 1s 133ms/step - loss: 13.7963 -
accuracy: 0.3966 - val_loss: 15.5702 - val_accuracy: 0.1751
Epoch 6/40
11/11 [=====] - 1s 138ms/step - loss: 12.6055 -
accuracy: 0.4108 - val_loss: 14.0672 - val_accuracy: 0.1939
Epoch 7/40
11/11 [=====] - 2s 142ms/step - loss: 11.5562 -
accuracy: 0.4295 - val_loss: 12.3845 - val_accuracy: 0.1964

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Epoch 8/40
11/11 [=====] - 1s 132ms/step - loss: 10.5780 -
accuracy: 0.4513 - val_loss: 11.2333 - val_accuracy: 0.2109

Epoch 9/40
11/11 [=====] - 1s 138ms/step - loss: 9.7017 -
accuracy: 0.4828 - val_loss: 10.7125 - val_accuracy: 0.2058

Epoch 10/40
11/11 [=====] - 1s 133ms/step - loss: 8.9317 -
accuracy: 0.5052 - val_loss: 9.7285 - val_accuracy: 0.2280

Epoch 11/40
11/11 [=====] - 1s 132ms/step - loss: 8.3037 -
accuracy: 0.4993 - val_loss: 9.1299 - val_accuracy: 0.2272

Epoch 12/40
11/11 [=====] - 1s 132ms/step - loss: 7.6634 -
accuracy: 0.5150 - val_loss: 8.2954 - val_accuracy: 0.2425

Epoch 13/40
11/11 [=====] - 1s 138ms/step - loss: 7.0522 -
accuracy: 0.5435 - val_loss: 7.9627 - val_accuracy: 0.2374

Epoch 14/40
11/11 [=====] - 1s 138ms/step - loss: 6.5097 -
accuracy: 0.5645 - val_loss: 7.2452 - val_accuracy: 0.2878

Epoch 15/40
11/11 [=====] - 2s 142ms/step - loss: 6.0221 -
accuracy: 0.6019 - val_loss: 6.7965 - val_accuracy: 0.3040

Epoch 16/40
11/11 [=====] - 1s 134ms/step - loss: 5.5398 -
accuracy: 0.6364 - val_loss: 6.3979 - val_accuracy: 0.3057

Epoch 17/40
11/11 [=====] - 1s 138ms/step - loss: 5.2019 -
accuracy: 0.6297 - val_loss: 6.0695 - val_accuracy: 0.3049

Epoch 18/40
11/11 [=====] - 1s 133ms/step - loss: 4.7873 -
accuracy: 0.6582 - val_loss: 5.7635 - val_accuracy: 0.3040

Epoch 19/40
11/11 [=====] - 1s 133ms/step - loss: 4.3976 -
accuracy: 0.6829 - val_loss: 5.4927 - val_accuracy: 0.3117

Epoch 20/40
11/11 [=====] - 1s 132ms/step - loss: 4.0531 -
accuracy: 0.7069 - val_loss: 5.4290 - val_accuracy: 0.2921

Epoch 21/40
11/11 [=====] - 1s 133ms/step - loss: 3.7224 -
accuracy: 0.7609 - val_loss: 5.1855 - val_accuracy: 0.3049

Epoch 22/40
11/11 [=====] - 1s 132ms/step - loss: 3.5064 -
accuracy: 0.7534 - val_loss: 4.9377 - val_accuracy: 0.3228

Epoch 23/40
11/11 [=====] - 2s 141ms/step - loss: 3.2459 -
accuracy: 0.7871 - val_loss: 4.6678 - val_accuracy: 0.3348

Epoch 24/40
11/11 [=====] - 2s 140ms/step - loss: 3.0093 -
accuracy: 0.7999 - val_loss: 4.3308 - val_accuracy: 0.3493

Epoch 25/40
11/11 [=====] - 1s 133ms/step - loss: 2.8039 -
accuracy: 0.8133 - val_loss: 4.2266 - val_accuracy: 0.3612

Epoch 26/40
11/11 [=====] - 1s 138ms/step - loss: 2.6148 -
accuracy: 0.8096 - val_loss: 4.1021 - val_accuracy: 0.3442

Epoch 27/40
11/11 [=====] - 1s 139ms/step - loss: 2.3558 -
accuracy: 0.8651 - val_loss: 4.1683 - val_accuracy: 0.3219

Epoch 28/40
11/11 [=====] - 1s 133ms/step - loss: 2.2122 -
accuracy: 0.8583 - val_loss: 3.7881 - val_accuracy: 0.3672

Epoch 29/40
11/11 [=====] - 1s 133ms/step - loss: 2.0500 -
accuracy: 0.8741 - val_loss: 3.9174 - val_accuracy: 0.3177

Epoch 30/40
11/11 [=====] - 1s 133ms/step - loss: 1.8991 -
accuracy: 0.8861 - val_loss: 3.7989 - val_accuracy: 0.3271

Epoch 31/40
11/11 [=====] - 1s 137ms/step - loss: 1.7660 -
accuracy: 0.9010 - val_loss: 3.7108 - val_accuracy: 0.3296

Epoch 32/40
11/11 [=====] - 1s 135ms/step - loss: 1.6437 -
accuracy: 0.9078 - val_loss: 3.5375 - val_accuracy: 0.3424

Epoch 33/40
11/11 [=====] - 1s 138ms/step - loss: 1.5391 -
accuracy: 0.9183 - val_loss: 3.5819 - val_accuracy: 0.3040

Epoch 34/40
11/11 [=====] - 1s 134ms/step - loss: 1.4548 -
accuracy: 0.9138 - val_loss: 3.3956 - val_accuracy: 0.3544

Epoch 35/40
11/11 [=====] - 1s 138ms/step - loss: 1.3470 -
accuracy: 0.9288 - val_loss: 3.3046 - val_accuracy: 0.3450

Epoch 36/40
11/11 [=====] - 1s 134ms/step - loss: 1.2524 -
accuracy: 0.9363 - val_loss: 3.0731 - val_accuracy: 0.3655

Epoch 37/40
11/11 [=====] - 1s 134ms/step - loss: 1.1869 -
accuracy: 0.9280 - val_loss: 3.1597 - val_accuracy: 0.3450

Epoch 38/40
11/11 [=====] - 1s 134ms/step - loss: 1.0922 -
accuracy: 0.9460 - val_loss: 3.0413 - val_accuracy: 0.3476

Epoch 39/40
11/11 [=====] - 2s 140ms/step - loss: 1.0241 -
accuracy: 0.9453 - val_loss: 2.7230 - val_accuracy: 0.4330

Epoch 40/40
11/11 [=====] - 2s 141ms/step - loss: 0.9504 - accuracy: 0.9565 - val_loss: 2.8738 - val_accuracy: 0.3903
6/6 [=====] - 0s 25ms/step
[CV] END ...num_filters=128, num_layers=2; total time= 1.0min
Epoch 1/40
11/11 [=====] - 4s 158ms/step - loss: 39.4508 - accuracy: 0.2016 - val_loss: 241.7034 - val_accuracy: 0.1050
Epoch 2/40
11/11 [=====] - 1s 139ms/step - loss: 21.3111 - accuracy: 0.2399 - val_loss: 81.2366 - val_accuracy: 0.1161
Epoch 3/40
11/11 [=====] - 1s 134ms/step - loss: 16.9313 - accuracy: 0.3163 - val_loss: 32.8363 - val_accuracy: 0.1623
Epoch 4/40
11/11 [=====] - 1s 133ms/step - loss: 15.1019 - accuracy: 0.3501 - val_loss: 21.4714 - val_accuracy: 0.1443
Epoch 5/40
11/11 [=====] - 2s 140ms/step - loss: 13.7266 - accuracy: 0.3951 - val_loss: 16.9548 - val_accuracy: 0.1879
Epoch 6/40
11/11 [=====] - 2s 142ms/step - loss: 12.5059 - accuracy: 0.4033 - val_loss: 14.7623 - val_accuracy: 0.1947
Epoch 7/40
11/11 [=====] - 1s 139ms/step - loss: 11.4497 - accuracy: 0.4370 - val_loss: 13.0904 - val_accuracy: 0.1956
Epoch 8/40
11/11 [=====] - 1s 139ms/step - loss: 10.5111 - accuracy: 0.4408 - val_loss: 11.5762 - val_accuracy: 0.2408
Epoch 9/40
11/11 [=====] - 1s 139ms/step - loss: 9.6600 - accuracy: 0.4723 - val_loss: 10.7658 - val_accuracy: 0.2400
Epoch 10/40
11/11 [=====] - 1s 139ms/step - loss: 8.9205 - accuracy: 0.4708 - val_loss: 9.8572 - val_accuracy: 0.2383
Epoch 11/40
11/11 [=====] - 2s 140ms/step - loss: 8.2424 - accuracy: 0.4933 - val_loss: 9.3581 - val_accuracy: 0.2143
Epoch 12/40
11/11 [=====] - 1s 133ms/step - loss: 7.6660 - accuracy: 0.5120 - val_loss: 8.4432 - val_accuracy: 0.2511
Epoch 13/40
11/11 [=====] - 2s 142ms/step - loss: 7.0928 - accuracy: 0.5097 - val_loss: 7.9257 - val_accuracy: 0.2716
Epoch 14/40
11/11 [=====] - 1s 137ms/step - loss: 6.5786 - accuracy: 0.5345 - val_loss: 7.3791 - val_accuracy: 0.2827
Epoch 15/40

11/11 [=====] - 1s 138ms/step - loss: 6.1244 -
accuracy: 0.5390 - val_loss: 6.9679 - val_accuracy: 0.2895
Epoch 16/40
11/11 [=====] - 1s 139ms/step - loss: 5.6575 -
accuracy: 0.5795 - val_loss: 6.6862 - val_accuracy: 0.2656
Epoch 17/40
11/11 [=====] - 1s 139ms/step - loss: 5.2699 -
accuracy: 0.5930 - val_loss: 6.1836 - val_accuracy: 0.2844
Epoch 18/40
11/11 [=====] - 1s 139ms/step - loss: 4.8615 -
accuracy: 0.6319 - val_loss: 5.9577 - val_accuracy: 0.2699
Epoch 19/40
11/11 [=====] - 1s 134ms/step - loss: 4.5148 -
accuracy: 0.6514 - val_loss: 5.6340 - val_accuracy: 0.2792
Epoch 20/40
11/11 [=====] - 1s 134ms/step - loss: 4.1408 -
accuracy: 0.6882 - val_loss: 5.7783 - val_accuracy: 0.2383
Epoch 21/40
11/11 [=====] - 1s 137ms/step - loss: 3.8416 -
accuracy: 0.7001 - val_loss: 5.1679 - val_accuracy: 0.2724
Epoch 22/40
11/11 [=====] - 1s 138ms/step - loss: 3.6008 -
accuracy: 0.7151 - val_loss: 5.1495 - val_accuracy: 0.2630
Epoch 23/40
11/11 [=====] - 1s 134ms/step - loss: 3.2842 -
accuracy: 0.7699 - val_loss: 4.9527 - val_accuracy: 0.2442
Epoch 24/40
11/11 [=====] - 1s 134ms/step - loss: 3.0192 -
accuracy: 0.7909 - val_loss: 4.7208 - val_accuracy: 0.2673
Epoch 25/40
11/11 [=====] - 1s 135ms/step - loss: 2.7399 -
accuracy: 0.8448 - val_loss: 4.8564 - val_accuracy: 0.2417
Epoch 26/40
11/11 [=====] - 1s 134ms/step - loss: 2.5270 -
accuracy: 0.8568 - val_loss: 4.7041 - val_accuracy: 0.2485
Epoch 27/40
11/11 [=====] - 1s 138ms/step - loss: 2.3220 -
accuracy: 0.8943 - val_loss: 4.4139 - val_accuracy: 0.2716
Epoch 28/40
11/11 [=====] - 2s 140ms/step - loss: 2.1525 -
accuracy: 0.9033 - val_loss: 4.2696 - val_accuracy: 0.2844
Epoch 29/40
11/11 [=====] - 2s 141ms/step - loss: 1.9955 -
accuracy: 0.9018 - val_loss: 4.1188 - val_accuracy: 0.2699
Epoch 30/40
11/11 [=====] - 2s 143ms/step - loss: 1.8566 -
accuracy: 0.9183 - val_loss: 3.9333 - val_accuracy: 0.2562
Epoch 31/40

```

11/11 [=====] - 2s 140ms/step - loss: 1.7212 -
accuracy: 0.9235 - val_loss: 3.9512 - val_accuracy: 0.2605
Epoch 32/40
11/11 [=====] - 1s 135ms/step - loss: 1.6006 -
accuracy: 0.9295 - val_loss: 3.7759 - val_accuracy: 0.2647
Epoch 33/40
11/11 [=====] - 1s 134ms/step - loss: 1.4823 -
accuracy: 0.9378 - val_loss: 3.7879 - val_accuracy: 0.2699
Epoch 34/40
11/11 [=====] - 1s 134ms/step - loss: 1.3919 -
accuracy: 0.9438 - val_loss: 3.6823 - val_accuracy: 0.2707
Epoch 35/40
11/11 [=====] - 1s 138ms/step - loss: 1.3214 -
accuracy: 0.9340 - val_loss: 3.2742 - val_accuracy: 0.3202
Epoch 36/40
11/11 [=====] - 1s 135ms/step - loss: 1.2485 -
accuracy: 0.9460 - val_loss: 3.2655 - val_accuracy: 0.3433
Epoch 37/40
11/11 [=====] - 2s 141ms/step - loss: 1.1583 -
accuracy: 0.9423 - val_loss: 3.2585 - val_accuracy: 0.3143
Epoch 38/40
11/11 [=====] - 1s 138ms/step - loss: 1.0948 -
accuracy: 0.9565 - val_loss: 3.5053 - val_accuracy: 0.2921
Epoch 39/40
11/11 [=====] - 1s 134ms/step - loss: 1.0165 -
accuracy: 0.9603 - val_loss: 3.5056 - val_accuracy: 0.2792
Epoch 40/40
11/11 [=====] - 1s 135ms/step - loss: 0.9496 -
accuracy: 0.9693 - val_loss: 3.0227 - val_accuracy: 0.3595
6/6 [=====] - 0s 35ms/step
[CV] END ...num_filters=128, num_layers=2; total time= 1.4min
Epoch 1/40
16/16 [=====] - 5s 158ms/step - loss: 10.4863 -
accuracy: 0.2384 - val_loss: 27.2533 - val_accuracy: 0.0871
Epoch 2/40
16/16 [=====] - 2s 138ms/step - loss: 7.6654 -
accuracy: 0.3303 - val_loss: 11.6465 - val_accuracy: 0.1033
Epoch 3/40
16/16 [=====] - 2s 139ms/step - loss: 6.4423 -
accuracy: 0.4863 - val_loss: 8.6276 - val_accuracy: 0.1443
Epoch 4/40
16/16 [=====] - 2s 136ms/step - loss: 5.4152 -
accuracy: 0.6297 - val_loss: 7.6298 - val_accuracy: 0.1076
Epoch 5/40
16/16 [=====] - 2s 137ms/step - loss: 4.5353 -
accuracy: 0.7356 - val_loss: 5.8419 - val_accuracy: 0.1648
Epoch 6/40
16/16 [=====] - 2s 136ms/step - loss: 3.8844 -

```

accuracy: 0.8191 - val_loss: 4.6807 - val_accuracy: 0.4449
 Epoch 7/40
 16/16 [=====] - 2s 138ms/step - loss: 3.3197 -
 accuracy: 0.8756 - val_loss: 4.4571 - val_accuracy: 0.4031
 Epoch 8/40
 16/16 [=====] - 2s 141ms/step - loss: 2.8830 -
 accuracy: 0.9135 - val_loss: 4.0164 - val_accuracy: 0.4791
 Epoch 9/40
 16/16 [=====] - 2s 140ms/step - loss: 2.5104 -
 accuracy: 0.9425 - val_loss: 3.6529 - val_accuracy: 0.4774
 Epoch 10/40
 16/16 [=====] - 2s 137ms/step - loss: 2.1942 -
 accuracy: 0.9620 - val_loss: 3.2199 - val_accuracy: 0.5884
 Epoch 11/40
 16/16 [=====] - 2s 138ms/step - loss: 1.9359 -
 accuracy: 0.9740 - val_loss: 3.0913 - val_accuracy: 0.5585
 Epoch 12/40
 16/16 [=====] - 2s 139ms/step - loss: 1.7291 -
 accuracy: 0.9725 - val_loss: 2.7496 - val_accuracy: 0.6157
 Epoch 13/40
 16/16 [=====] - 2s 139ms/step - loss: 1.5259 -
 accuracy: 0.9845 - val_loss: 2.4136 - val_accuracy: 0.6610
 Epoch 14/40
 16/16 [=====] - 2s 139ms/step - loss: 1.3625 -
 accuracy: 0.9840 - val_loss: 2.2252 - val_accuracy: 0.6823
 Epoch 15/40
 16/16 [=====] - 2s 138ms/step - loss: 1.2085 -
 accuracy: 0.9885 - val_loss: 2.1646 - val_accuracy: 0.6627
 Epoch 16/40
 16/16 [=====] - 2s 137ms/step - loss: 1.0792 -
 accuracy: 0.9890 - val_loss: 1.9213 - val_accuracy: 0.6789
 Epoch 17/40
 16/16 [=====] - 2s 139ms/step - loss: 0.9529 -
 accuracy: 0.9925 - val_loss: 2.1592 - val_accuracy: 0.6020
 Epoch 18/40
 16/16 [=====] - 2s 138ms/step - loss: 0.8397 -
 accuracy: 0.9970 - val_loss: 1.6989 - val_accuracy: 0.7259
 Epoch 19/40
 16/16 [=====] - 2s 142ms/step - loss: 0.7393 -
 accuracy: 0.9990 - val_loss: 1.6790 - val_accuracy: 0.6994
 Epoch 20/40
 16/16 [=====] - 2s 139ms/step - loss: 0.6556 -
 accuracy: 0.9985 - val_loss: 1.4915 - val_accuracy: 0.7259
 Epoch 21/40
 16/16 [=====] - 2s 138ms/step - loss: 0.5799 -
 accuracy: 0.9995 - val_loss: 1.4173 - val_accuracy: 0.7267
 Epoch 22/40
 16/16 [=====] - 2s 140ms/step - loss: 0.5159 -

accuracy: 0.9985 - val_loss: 1.5078 - val_accuracy: 0.6934
 Epoch 23/40
 16/16 [=====] - 2s 139ms/step - loss: 0.4540 -
 accuracy: 1.0000 - val_loss: 1.2565 - val_accuracy: 0.7506
 Epoch 24/40
 16/16 [=====] - 2s 142ms/step - loss: 0.4042 -
 accuracy: 0.9995 - val_loss: 1.2706 - val_accuracy: 0.7387
 Epoch 25/40
 16/16 [=====] - 2s 140ms/step - loss: 0.3724 -
 accuracy: 0.9950 - val_loss: 1.2062 - val_accuracy: 0.7361
 Epoch 26/40
 16/16 [=====] - 2s 140ms/step - loss: 0.3383 -
 accuracy: 0.9970 - val_loss: 1.2706 - val_accuracy: 0.7199
 Epoch 27/40
 16/16 [=====] - 2s 139ms/step - loss: 0.3177 -
 accuracy: 0.9940 - val_loss: 1.3983 - val_accuracy: 0.6874
 Epoch 28/40
 16/16 [=====] - 2s 141ms/step - loss: 0.2998 -
 accuracy: 0.9925 - val_loss: 1.3316 - val_accuracy: 0.6934
 Epoch 29/40
 16/16 [=====] - 2s 140ms/step - loss: 0.3084 -
 accuracy: 0.9810 - val_loss: 1.3649 - val_accuracy: 0.7079
 Epoch 30/40
 16/16 [=====] - 2s 140ms/step - loss: 0.3141 -
 accuracy: 0.9705 - val_loss: 1.5190 - val_accuracy: 0.6627
 Epoch 31/40
 16/16 [=====] - 2s 139ms/step - loss: 0.3307 -
 accuracy: 0.9605 - val_loss: 1.5947 - val_accuracy: 0.6567
 Epoch 32/40
 16/16 [=====] - 2s 141ms/step - loss: 0.3424 -
 accuracy: 0.9590 - val_loss: 1.9958 - val_accuracy: 0.6191
 Epoch 33/40
 16/16 [=====] - 2s 141ms/step - loss: 0.3655 -
 accuracy: 0.9545 - val_loss: 2.5672 - val_accuracy: 0.4979
 Epoch 34/40
 16/16 [=====] - 2s 141ms/step - loss: 0.3135 -
 accuracy: 0.9650 - val_loss: 1.7657 - val_accuracy: 0.6260
 Epoch 35/40
 16/16 [=====] - 2s 142ms/step - loss: 0.2615 -
 accuracy: 0.9820 - val_loss: 1.8249 - val_accuracy: 0.6755
 Epoch 36/40
 16/16 [=====] - 2s 140ms/step - loss: 0.2374 -
 accuracy: 0.9860 - val_loss: 1.5537 - val_accuracy: 0.6781
 Epoch 37/40
 16/16 [=====] - 2s 139ms/step - loss: 0.2114 -
 accuracy: 0.9890 - val_loss: 1.6634 - val_accuracy: 0.6550
 Epoch 38/40
 16/16 [=====] - 2s 141ms/step - loss: 0.1766 -

```

accuracy: 0.9915 - val_loss: 1.4961 - val_accuracy: 0.7301
Epoch 39/40
16/16 [=====] - 2s 139ms/step - loss: 0.1419 -
accuracy: 0.9990 - val_loss: 1.3936 - val_accuracy: 0.7173
Epoch 40/40
16/16 [=====] - 2s 141ms/step - loss: 0.1210 -
accuracy: 1.0000 - val_loss: 1.2234 - val_accuracy: 0.7199
Best: 0.845077 using {'num_layers': 4, 'num_filters': 128}

```

As seen during the cross validation split of the Randomized Search for the best fit, the accuracy of the model has improved to 0.84. The best values for the hyperparameters are: * num_layers: 4 * num_filters: 128

We now redefine the model with these hyperparameters.

```

[9]: hidden_num_filters = [128, 128, 128, 128]
    hidden_num_layers = [2, 3, 4, 5]

    task2_model = t1_model(len(hidden_num_layers), hidden_num_filters,
        ↳passthrough=True)
    task2_model.summary()

```

Model: "sequential_8"

Layer (type)	Output Shape	Param #
conv2d_34 (Conv2D)	(None, 98, 50, 32)	320
batch_normalization_34 (Batch Normalization)	(None, 98, 50, 32)	128
conv2d_35 (Conv2D)	(None, 98, 50, 128)	36992
batch_normalization_35 (Batch Normalization)	(None, 98, 50, 128)	512
max_pooling2d_34 (MaxPooling2D)	(None, 49, 25, 128)	0
conv2d_36 (Conv2D)	(None, 49, 25, 128)	147584
batch_normalization_36 (Batch Normalization)	(None, 49, 25, 128)	512
max_pooling2d_35 (MaxPooling2D)	(None, 25, 13, 128)	0
conv2d_37 (Conv2D)	(None, 25, 13, 128)	147584

batch_normalization_37 (Batch Normalization)	(None, 25, 13, 128)	512
max_pooling2d_36 (MaxPooling2D)	(None, 13, 7, 128)	0
conv2d_38 (Conv2D)	(None, 13, 7, 128)	147584
batch_normalization_38 (Batch Normalization)	(None, 13, 7, 128)	512
max_pooling2d_37 (MaxPooling2D)	(None, 7, 4, 128)	0
max_pooling2d_38 (MaxPooling2D)	(None, 1, 4, 128)	0
flatten_8 (Flatten)	(None, 512)	0
dense_16 (Dense)	(None, 1024)	525312
dropout_8 (Dropout)	(None, 1024)	0
dense_17 (Dense)	(None, 12)	12300

```

=====
Total params: 1019852 (3.89 MB)
Trainable params: 1018764 (3.89 MB)
Non-trainable params: 1088 (4.25 KB)
-----

```

Task 3: Model Averaging Scheme Here, we randomly sample three subsets of the training data and train the T2 model on each of them. We then proceed with a series of voting schemes to determine the final prediction.

```

[10]: # define number of samples
train_samples = 2001

# create data index
data_index = list(range(1, train_samples))

subsets = 3

# keep track of history
shuffle_history = []

for i in range(subsets):

```

```

# create random index using sampling with replacement
idx = random.choices(data_index, k=train_samples)

# define first shuffle
x_train_shuffle = np.zeros([train_samples, IMG_SIZE[0], IMG_SIZE[1], 1])
y_train_shuffle = np.zeros([train_samples, NUM_CLASSES])

# resample the data
for j in range(train_samples):
    x_train_shuffle[j] = x_train[idx[j], :, :, :]
    y_train_shuffle[j] = y_train[idx[j], :]

# train the model
shuffle_history.append(task2_model.fit(x_train_shuffle, y_train_shuffle,
    ↪batch_size=BATCH_SIZE, epochs=40, validation_data=(x_val, y_val),
    ↪callbacks=[early_stopping]))

# Take the majority class prediction and use the mode for all the three models
    ↪to determine final prediction
# Create a matrix of predictions
y_pred = np.zeros([len(y_val), subsets])
# iterate through the models
for i in range(subsets):
    # save the predictions
    y_pred[:, i] = np.argmax(shuffle_history[i].model.predict(x_val), axis=1)

# convert to integer
y_pred = np.array(y_pred, dtype=int)
# take the mode
y_pred = np.squeeze(np.apply_along_axis(lambda x: np.bincount(x).argmax(),
    ↪axis=1, arr=y_pred))

# Print accuracy
score = task2_model.evaluate(x_val, y_val, verbose=0)
print('T3 - validation accuracy:', score[1])

```

```

Epoch 1/40
16/16 [=====] - 5s 160ms/step - loss: 10.5197 -
accuracy: 0.2214 - val_loss: 18.5219 - val_accuracy: 0.1016
Epoch 2/40
16/16 [=====] - 2s 153ms/step - loss: 7.5967 -
accuracy: 0.3593 - val_loss: 20.7082 - val_accuracy: 0.0897
Epoch 3/40
16/16 [=====] - 2s 143ms/step - loss: 6.4641 -
accuracy: 0.4873 - val_loss: 16.3425 - val_accuracy: 0.1332
Epoch 4/40

```


16/16 [=====] - 2s 137ms/step - loss: 5.4825 -
accuracy: 0.6142 - val_loss: 12.7257 - val_accuracy: 0.1059
Epoch 5/40
16/16 [=====] - 2s 130ms/step - loss: 4.5665 -
accuracy: 0.7331 - val_loss: 8.8176 - val_accuracy: 0.1127
Epoch 6/40
16/16 [=====] - 2s 133ms/step - loss: 3.8732 -
accuracy: 0.8216 - val_loss: 6.2845 - val_accuracy: 0.1196
Epoch 7/40
16/16 [=====] - 2s 131ms/step - loss: 3.3322 -
accuracy: 0.8776 - val_loss: 5.4244 - val_accuracy: 0.1768
Epoch 8/40
16/16 [=====] - 2s 134ms/step - loss: 2.8720 -
accuracy: 0.9220 - val_loss: 4.4875 - val_accuracy: 0.3279
Epoch 9/40
16/16 [=====] - 2s 133ms/step - loss: 2.4648 -
accuracy: 0.9575 - val_loss: 4.4722 - val_accuracy: 0.2570
Epoch 10/40
16/16 [=====] - 2s 133ms/step - loss: 2.1880 -
accuracy: 0.9645 - val_loss: 3.8638 - val_accuracy: 0.3595
Epoch 11/40
16/16 [=====] - 2s 131ms/step - loss: 1.9207 -
accuracy: 0.9735 - val_loss: 3.7465 - val_accuracy: 0.3595
Epoch 12/40
16/16 [=====] - 2s 131ms/step - loss: 1.6984 -
accuracy: 0.9840 - val_loss: 3.1284 - val_accuracy: 0.4927
Epoch 13/40
16/16 [=====] - 2s 135ms/step - loss: 1.4974 -
accuracy: 0.9900 - val_loss: 4.2781 - val_accuracy: 0.2605
Epoch 14/40
16/16 [=====] - 2s 133ms/step - loss: 1.3218 -
accuracy: 0.9900 - val_loss: 3.3047 - val_accuracy: 0.4304
Epoch 15/40
16/16 [=====] - 2s 131ms/step - loss: 1.1689 -
accuracy: 0.9950 - val_loss: 3.0466 - val_accuracy: 0.3903
Epoch 16/40
16/16 [=====] - 2s 132ms/step - loss: 1.0328 -
accuracy: 0.9960 - val_loss: 3.0104 - val_accuracy: 0.4150
Epoch 17/40
16/16 [=====] - 2s 134ms/step - loss: 0.9111 -
accuracy: 0.9985 - val_loss: 2.4636 - val_accuracy: 0.4774
Epoch 1/40
16/16 [=====] - 2s 137ms/step - loss: 1.0839 -
accuracy: 0.9160 - val_loss: 2.3834 - val_accuracy: 0.5278
Epoch 2/40
16/16 [=====] - 2s 134ms/step - loss: 0.9004 -
accuracy: 0.9465 - val_loss: 2.0721 - val_accuracy: 0.5918
Epoch 3/40

16/16 [=====] - 2s 132ms/step - loss: 0.7856 - accuracy: 0.9590 - val_loss: 2.3790 - val_accuracy: 0.5705
Epoch 4/40
16/16 [=====] - 2s 135ms/step - loss: 0.6729 - accuracy: 0.9805 - val_loss: 1.9279 - val_accuracy: 0.6567
Epoch 5/40
16/16 [=====] - 2s 133ms/step - loss: 0.5827 - accuracy: 0.9880 - val_loss: 1.8948 - val_accuracy: 0.6832
Epoch 6/40
16/16 [=====] - 2s 138ms/step - loss: 0.5056 - accuracy: 0.9960 - val_loss: 1.8606 - val_accuracy: 0.7037
Epoch 7/40
16/16 [=====] - 2s 133ms/step - loss: 0.4508 - accuracy: 0.9950 - val_loss: 1.7802 - val_accuracy: 0.6892
Epoch 8/40
16/16 [=====] - 2s 133ms/step - loss: 0.3940 - accuracy: 0.9990 - val_loss: 1.7808 - val_accuracy: 0.6994
Epoch 9/40
16/16 [=====] - 2s 135ms/step - loss: 0.3490 - accuracy: 0.9990 - val_loss: 1.6781 - val_accuracy: 0.6874
Epoch 10/40
16/16 [=====] - 2s 133ms/step - loss: 0.3067 - accuracy: 1.0000 - val_loss: 1.5526 - val_accuracy: 0.6951
Epoch 11/40
16/16 [=====] - 2s 137ms/step - loss: 0.2697 - accuracy: 1.0000 - val_loss: 1.4867 - val_accuracy: 0.7037
Epoch 1/40
16/16 [=====] - 2s 140ms/step - loss: 0.3848 - accuracy: 0.9570 - val_loss: 1.5943 - val_accuracy: 0.6055
Epoch 2/40
16/16 [=====] - 2s 134ms/step - loss: 0.3479 - accuracy: 0.9670 - val_loss: 1.5060 - val_accuracy: 0.6951
Epoch 3/40
16/16 [=====] - 2s 136ms/step - loss: 0.2879 - accuracy: 0.9850 - val_loss: 1.5928 - val_accuracy: 0.6020
Epoch 4/40
16/16 [=====] - 2s 132ms/step - loss: 0.2566 - accuracy: 0.9915 - val_loss: 1.4400 - val_accuracy: 0.7045
Epoch 5/40
16/16 [=====] - 2s 132ms/step - loss: 0.2326 - accuracy: 0.9890 - val_loss: 1.7171 - val_accuracy: 0.6507
Epoch 6/40
16/16 [=====] - 2s 135ms/step - loss: 0.1958 - accuracy: 0.9960 - val_loss: 1.4202 - val_accuracy: 0.7139
Epoch 7/40
16/16 [=====] - 2s 133ms/step - loss: 0.1648 - accuracy: 0.9995 - val_loss: 1.4839 - val_accuracy: 0.7045
Epoch 8/40

```

16/16 [=====] - 2s 135ms/step - loss: 0.1437 -
accuracy: 0.9995 - val_loss: 1.2630 - val_accuracy: 0.7071
Epoch 9/40
16/16 [=====] - 2s 135ms/step - loss: 0.1284 -
accuracy: 0.9990 - val_loss: 1.2872 - val_accuracy: 0.7182
Epoch 10/40
16/16 [=====] - 2s 135ms/step - loss: 0.1115 -
accuracy: 0.9995 - val_loss: 1.2885 - val_accuracy: 0.7242
Epoch 11/40
16/16 [=====] - 2s 134ms/step - loss: 0.0994 -
accuracy: 0.9995 - val_loss: 1.1652 - val_accuracy: 0.7370
Epoch 12/40
16/16 [=====] - 2s 134ms/step - loss: 0.0875 -
accuracy: 0.9995 - val_loss: 1.1433 - val_accuracy: 0.7387
Epoch 13/40
16/16 [=====] - 2s 136ms/step - loss: 0.0755 -
accuracy: 0.9995 - val_loss: 1.1431 - val_accuracy: 0.7395
Epoch 14/40
16/16 [=====] - 2s 139ms/step - loss: 0.0687 -
accuracy: 0.9995 - val_loss: 1.0792 - val_accuracy: 0.7515
Epoch 15/40
16/16 [=====] - 2s 136ms/step - loss: 0.0598 -
accuracy: 0.9995 - val_loss: 1.1098 - val_accuracy: 0.7404
Epoch 16/40
16/16 [=====] - 2s 143ms/step - loss: 0.0534 -
accuracy: 0.9995 - val_loss: 1.0631 - val_accuracy: 0.7455
Epoch 17/40
16/16 [=====] - 2s 143ms/step - loss: 0.0478 -
accuracy: 1.0000 - val_loss: 1.1018 - val_accuracy: 0.7421
Epoch 18/40
16/16 [=====] - 2s 137ms/step - loss: 0.0429 -
accuracy: 1.0000 - val_loss: 1.0780 - val_accuracy: 0.7387
Epoch 19/40
16/16 [=====] - 2s 138ms/step - loss: 0.0387 -
accuracy: 1.0000 - val_loss: 1.0424 - val_accuracy: 0.7421
37/37 [=====] - 0s 10ms/step
37/37 [=====] - 0s 8ms/step
37/37 [=====] - 0s 8ms/step
T3 - validation accuracy: 0.7421007752418518

```

After resampling for three times, the accuracy drops to about 0.75.

This is maybe an indication that resampling with replacement reduces the overall accuracy of the model due to a drop in the amount of data available for training.

0.1.5 Task 4: Hyperparameter Tuning using Bayesian Optimization

We now use Bayesian optimization to find the best hyperparameters for the advanced model.

Bayesian optimization is a probabilistic model-based optimization algorithm that is used to find the best hyperparameters for a model.

```
[12]: # Define the search space for hyperparameters
space = {'num_layers': hp.choice('num_layers', [1, 2, 3, 4, 5]),
        'num_filters': hp.choice('num_filters', [8, 16, 32, 64, 128]),}

# Define the objective function
def t4_model(params):
    # number of convolutional filters
    input_num_filters = 32
    fully_connected_num_filters = 1024

    # define model
    model = Sequential()

    # input layer
    model.add(Input(shape=(IMG_SIZE[0], IMG_SIZE[1], 1)))
    model.add(Conv2D(input_num_filters, kernel_size=(3, 3), padding='same',
    ↪activation='relu'))
    model.add(BatchNormalization())
    model.add(MaxPooling2D(pool_size=(2, 2), strides=(2, 2), padding='same'))

    # hidden layers
    for _ in range(params['num_layers']):
        model.add(Conv2D(params['num_filters'], kernel_size=(3, 3),
    ↪padding='same', activation='relu'))
        model.add(BatchNormalization())
        model.add(MaxPooling2D(pool_size=(2, 2), strides=(2, 2),
    ↪padding='same'))

    # Time based pooling
    model.add(MaxPooling2D(pool_size=(TIMEPOOL_SIZE, 1),
    ↪strides=(TIMEPOOL_SIZE, 1), padding='same'))

    # fully connected layer
    model.add(Flatten())
    model.add(Dense(fully_connected_num_filters,
    ↪kernel_regularizer=regularizers.l2(0.01), activation='relu'))
    model.add(Dropout(0.2))

    # output layer
    model.add(Dense(NUM_CLASSES, activation='softmax'))

    # set adam optimizer
    opt = optimizers.Adam(learning_rate=0.001)
```

```

    model.compile(loss="categorical_crossentropy", optimizer=opt,
↳metrics=["accuracy"])

    # train the model
    model.fit(x_train, y_train, batch_size=int(BATCH_SIZE/6), epochs=30,
↳validation_data=(x_val, y_val), callbacks=[early_stopping])

    # evaluate the model
    _, accuracy = model.evaluate(x_val, y_val, verbose=0)

    return {'loss': -accuracy, 'status': STATUS_OK}

# Run the hyperparameter search
best = fmin(fn=t4_model, space=space, algo=tpe.suggest, max_evals=20)

# Print the best hyperparameters of number of layers and number of filters
print(space_eval(space, best))

```

Streaming output truncated to the last 5000 lines.

```

62/96 [=====>...] - ETA: 0s - loss: 0.4662 - accuracy:
0.9201
66/96 [=====>...] - ETA: 0s - loss: 0.4668 - accuracy:
0.9214
70/96 [=====>...] - ETA: 0s - loss: 0.4728 - accuracy:
0.9197
74/96 [=====>...] - ETA: 0s - loss: 0.4719 - accuracy:
0.9196
78/96 [=====>...] - ETA: 0s - loss: 0.4745 - accuracy:
0.9182
82/96 [=====>...] - ETA: 0s - loss: 0.4721 - accuracy:
0.9199
86/96 [=====>...] - ETA: 0s - loss: 0.4757 - accuracy:
0.9208
90/96 [=====>..] - ETA: 0s - loss: 0.4769 - accuracy:
0.9206
94/96 [=====>.] - ETA: 0s - loss: 0.4783 - accuracy:
0.9184
96/96 [=====] - 2s 18ms/step - loss: 0.4758 - accuracy:
0.9195 - val_loss: 1.5420 - val_accuracy: 0.6396

```

Epoch 11/30

```

1/96 [...] - ETA: 2s - loss: 0.8127 - accuracy:
0.9048
5/96 [>...] - ETA: 1s - loss: 0.6106 - accuracy:
0.9048
9/96 [=>...] - ETA: 1s - loss: 0.4971 - accuracy:

```

0.9259
 12/96 [==>...] - ETA: 1s - loss: 0.4539 - accuracy:
 0.9365
 15/96 [===>...] - ETA: 1s - loss: 0.4452 - accuracy:
 0.9333
 18/96 [====>...] - ETA: 1s - loss: 0.4234 - accuracy:
 0.9418
 22/96 [=====>...] - ETA: 1s - loss: 0.4206 - accuracy:
 0.9416
 26/96 [=====>...] - ETA: 1s - loss: 0.4238 - accuracy:
 0.9322
 30/96 [=====>...] - ETA: 1s - loss: 0.4250 - accuracy:
 0.9317
 34/96 [=====>...] - ETA: 0s - loss: 0.4076 - accuracy:
 0.9370
 37/96 [=====>...] - ETA: 0s - loss: 0.3982 - accuracy:
 0.9421
 41/96 [=====>...] - ETA: 0s - loss: 0.4130 - accuracy:
 0.9350
 44/96 [=====>...] - ETA: 0s - loss: 0.4135 - accuracy:
 0.9340
 47/96 [=====>...] - ETA: 0s - loss: 0.4186 - accuracy:
 0.9321
 50/96 [=====>...] - ETA: 0s - loss: 0.4154 - accuracy:
 0.9324
 53/96 [=====>...] - ETA: 0s - loss: 0.4146 - accuracy:
 0.9326
 56/96 [=====>...] - ETA: 0s - loss: 0.4198 - accuracy:
 0.9337
 60/96 [=====>...] - ETA: 0s - loss: 0.4232 - accuracy:
 0.9302
 65/96 [=====>...] - ETA: 0s - loss: 0.4177 - accuracy:
 0.9326
 70/96 [=====>...] - ETA: 0s - loss: 0.4176 - accuracy:
 0.9333
 74/96 [=====>...] - ETA: 0s - loss: 0.4175 - accuracy:
 0.9331
 78/96 [=====>...] - ETA: 0s - loss: 0.4215 - accuracy:
 0.9316
 82/96 [=====>...] - ETA: 0s - loss: 0.4160 - accuracy:
 0.9332
 87/96 [=====>...] - ETA: 0s - loss: 0.4221 - accuracy:
 0.9316
 92/96 [=====>...] - ETA: 0s - loss: 0.4190 - accuracy:
 0.9312
 96/96 [=====] - ETA: 0s - loss: 0.4272 - accuracy:
 0.9290
 96/96 [=====] - 2s 18ms/step - loss: 0.4272 - accuracy:

0.9290 - val_loss: 1.6089 - val_accuracy: 0.6302

Epoch 12/30

1/96 [...] - ETA: 2s - loss: 0.4408 - accuracy:
0.8571
5/96 [>...] - ETA: 1s - loss: 0.5202 - accuracy:
0.8952
10/96 [==>...] - ETA: 1s - loss: 0.5544 - accuracy:
0.8905
15/96 [===>...] - ETA: 0s - loss: 0.4798 - accuracy:
0.9079
20/96 [=====>...] - ETA: 0s - loss: 0.4714 - accuracy:
0.9071
25/96 [=====>...] - ETA: 0s - loss: 0.4783 - accuracy:
0.9067
30/96 [======>...] - ETA: 0s - loss: 0.4506 - accuracy:
0.9190
34/96 [======>...] - ETA: 0s - loss: 0.4520 - accuracy:
0.9160
39/96 [======>...] - ETA: 0s - loss: 0.4353 - accuracy:
0.9194
44/96 [======>...] - ETA: 0s - loss: 0.4501 - accuracy:
0.9123
49/96 [======>...] - ETA: 0s - loss: 0.4443 - accuracy:
0.9155
55/96 [======>...] - ETA: 0s - loss: 0.4353 - accuracy:
0.9186
59/96 [======>...] - ETA: 0s - loss: 0.4323 - accuracy:
0.9193
64/96 [======>...] - ETA: 0s - loss: 0.4394 - accuracy:
0.9152
69/96 [======>...] - ETA: 0s - loss: 0.4475 - accuracy:
0.9130
74/96 [======>...] - ETA: 0s - loss: 0.4440 - accuracy:
0.9112
78/96 [======>...] - ETA: 0s - loss: 0.4432 - accuracy:
0.9115
83/96 [======>...] - ETA: 0s - loss: 0.4477 - accuracy:
0.9094
88/96 [======>...] - ETA: 0s - loss: 0.4502 - accuracy:
0.9091
92/96 [======>..] - ETA: 0s - loss: 0.4491 - accuracy:
0.9089
96/96 [=====] - 1s 15ms/step - loss: 0.4518 - accuracy:
0.9085 - val_loss: 1.8827 - val_accuracy: 0.5901

Epoch 13/30

```

1/96 [...] - ETA: 2s - loss: 0.3056 - accuracy:
0.9524
6/96 [>...] - ETA: 1s - loss: 0.3472 - accuracy:
0.9444
11/96 [==>...] - ETA: 0s - loss: 0.3773 - accuracy:
0.9307
15/96 [===>...] - ETA: 0s - loss: 0.4244 - accuracy:
0.9143
20/96 [=====>...] - ETA: 0s - loss: 0.4352 - accuracy:
0.9119
25/96 [=====>...] - ETA: 0s - loss: 0.4341 - accuracy:
0.9124
30/96 [======>...] - ETA: 0s - loss: 0.4283 - accuracy:
0.9111
35/96 [======>...] - ETA: 0s - loss: 0.4101 - accuracy:
0.9184
41/96 [======>...] - ETA: 0s - loss: 0.4163 - accuracy:
0.9164
46/96 [======>...] - ETA: 0s - loss: 0.4047 - accuracy:
0.9193
51/96 [======>...] - ETA: 0s - loss: 0.3974 - accuracy:
0.9216
56/96 [======>...] - ETA: 0s - loss: 0.3978 - accuracy:
0.9226
61/96 [======>...] - ETA: 0s - loss: 0.3961 - accuracy:
0.9227
65/96 [======>...] - ETA: 0s - loss: 0.3880 - accuracy:
0.9260
70/96 [======>...] - ETA: 0s - loss: 0.3884 - accuracy:
0.9272
74/96 [======>...] - ETA: 0s - loss: 0.3854 - accuracy:
0.9292
79/96 [======>...] - ETA: 0s - loss: 0.3825 - accuracy:
0.9307
84/96 [======>...] - ETA: 0s - loss: 0.3804 - accuracy:
0.9325
88/96 [======>...] - ETA: 0s - loss: 0.3810 - accuracy:
0.9324
93/96 [======>.] - ETA: 0s - loss: 0.3802 - accuracy:
0.9314
96/96 [=====] - 1s 14ms/step - loss: 0.3828 - accuracy:
0.9310 - val_loss: 1.6588 - val_accuracy: 0.6678

```

Epoch 14/30

```

1/96 [...] - ETA: 1s - loss: 0.2894 - accuracy:
0.9524

```


5/96 [>...] - ETA: 1s - loss: 0.3169 - accuracy:
 0.9524
 9/96 [=>...] - ETA: 1s - loss: 0.3287 - accuracy:
 0.9524
 13/96 [===>...] - ETA: 1s - loss: 0.3246 - accuracy:
 0.9524
 18/96 [====>...] - ETA: 0s - loss: 0.3456 - accuracy:
 0.9418
 23/96 [=====>...] - ETA: 0s - loss: 0.3625 - accuracy:
 0.9379
 27/96 [=====>...] - ETA: 0s - loss: 0.3608 - accuracy:
 0.9347
 31/96 [=====>...] - ETA: 0s - loss: 0.3708 - accuracy:
 0.9278
 36/96 [=====>...] - ETA: 0s - loss: 0.3691 - accuracy:
 0.9299
 41/96 [=====>...] - ETA: 0s - loss: 0.3683 - accuracy:
 0.9292
 46/96 [=====>...] - ETA: 0s - loss: 0.3751 - accuracy:
 0.9296
 51/96 [=====>...] - ETA: 0s - loss: 0.3722 - accuracy:
 0.9309
 56/96 [=====>...] - ETA: 0s - loss: 0.3832 - accuracy:
 0.9303
 61/96 [=====>...] - ETA: 0s - loss: 0.3887 - accuracy:
 0.9282
 66/96 [=====>...] - ETA: 0s - loss: 0.3843 - accuracy:
 0.9286
 71/96 [=====>...] - ETA: 0s - loss: 0.3845 - accuracy:
 0.9289
 76/96 [=====>...] - ETA: 0s - loss: 0.3850 - accuracy:
 0.9292
 81/96 [=====>...] - ETA: 0s - loss: 0.3825 - accuracy:
 0.9295
 87/96 [=====>...] - ETA: 0s - loss: 0.3845 - accuracy:
 0.9283
 91/96 [=====>..] - ETA: 0s - loss: 0.3834 - accuracy:
 0.9288
 96/96 [=====] - ETA: 0s - loss: 0.3815 - accuracy:
 0.9290
 96/96 [=====] - 1s 14ms/step - loss: 0.3815 - accuracy:
 0.9290 - val_loss: 1.6870 - val_accuracy: 0.6729

Epoch 15/30

1/96 [...] - ETA: 1s - loss: 0.2642 - accuracy:
 0.9524
 6/96 [>...] - ETA: 1s - loss: 0.4299 - accuracy:

```

0.9048
11/96 [==>...] - ETA: 0s - loss: 0.3742 - accuracy:
0.9351
16/96 [====>...] - ETA: 0s - loss: 0.3433 - accuracy:
0.9435
21/96 [=====>...] - ETA: 0s - loss: 0.3569 - accuracy:
0.9410
26/96 [=====>...] - ETA: 0s - loss: 0.3424 - accuracy:
0.9432
31/96 [=====>...] - ETA: 0s - loss: 0.3393 - accuracy:
0.9462
36/96 [=====>...] - ETA: 0s - loss: 0.3586 - accuracy:
0.9392
41/96 [=====>...] - ETA: 0s - loss: 0.3542 - accuracy:
0.9408
45/96 [=====>...] - ETA: 0s - loss: 0.3522 - accuracy:
0.9397
50/96 [=====>...] - ETA: 0s - loss: 0.3494 - accuracy:
0.9410
56/96 [=====>...] - ETA: 0s - loss: 0.3522 - accuracy:
0.9379
60/96 [=====>...] - ETA: 0s - loss: 0.3526 - accuracy:
0.9381
65/96 [=====>...] - ETA: 0s - loss: 0.3531 - accuracy:
0.9385
71/96 [=====>...] - ETA: 0s - loss: 0.3599 - accuracy:
0.9363
76/96 [=====>...] - ETA: 0s - loss: 0.3568 - accuracy:
0.9380
81/96 [=====>...] - ETA: 0s - loss: 0.3614 - accuracy:
0.9347
85/96 [=====>...] - ETA: 0s - loss: 0.3602 - accuracy:
0.9361
89/96 [=====>...] - ETA: 0s - loss: 0.3585 - accuracy:
0.9347
94/96 [=====>.] - ETA: 0s - loss: 0.3554 - accuracy:
0.9357
96/96 [=====] - 1s 15ms/step - loss: 0.3531 - accuracy:
0.9365 - val_loss: 1.7403 - val_accuracy: 0.6721

```

Epoch 16/30

```

1/96 [...] - ETA: 2s - loss: 0.2323 - accuracy:
1.0000
6/96 [>...] - ETA: 0s - loss: 0.2924 - accuracy:
0.9444
10/96 [==>...] - ETA: 0s - loss: 0.2651 - accuracy:
0.9571

```

15/96 [==>...] - ETA: 0s - loss: 0.2817 - accuracy:
 0.9556
 20/96 [====>...] - ETA: 0s - loss: 0.3100 - accuracy:
 0.9476
 25/96 [=====>...] - ETA: 0s - loss: 0.3052 - accuracy:
 0.9524
 30/96 [=====>...] - ETA: 0s - loss: 0.3091 - accuracy:
 0.9492
 35/96 [=====>...] - ETA: 0s - loss: 0.3029 - accuracy:
 0.9510
 40/96 [=====>...] - ETA: 0s - loss: 0.2987 - accuracy:
 0.9536
 45/96 [=====>...] - ETA: 0s - loss: 0.2960 - accuracy:
 0.9556
 51/96 [=====>...] - ETA: 0s - loss: 0.3029 - accuracy:
 0.9514
 55/96 [=====>...] - ETA: 0s - loss: 0.3020 - accuracy:
 0.9524
 61/96 [=====>...] - ETA: 0s - loss: 0.3014 - accuracy:
 0.9524
 66/96 [=====>...] - ETA: 0s - loss: 0.3021 - accuracy:
 0.9502
 72/96 [=====>...] - ETA: 0s - loss: 0.3029 - accuracy:
 0.9491
 77/96 [=====>...] - ETA: 0s - loss: 0.3019 - accuracy:
 0.9493
 83/96 [=====>...] - ETA: 0s - loss: 0.3028 - accuracy:
 0.9489
 89/96 [=====>...] - ETA: 0s - loss: 0.3025 - accuracy:
 0.9486
 95/96 [=====>.] - ETA: 0s - loss: 0.3078 - accuracy:
 0.9469
 96/96 [=====] - 1s 14ms/step - loss: 0.3079 - accuracy:
 0.9470 - val_loss: 2.2128 - val_accuracy: 0.5773

Epoch 17/30

1/96 [...] - ETA: 1s - loss: 0.2128 - accuracy:
 0.9524
 6/96 [>...] - ETA: 1s - loss: 0.2713 - accuracy:
 0.9683
 11/96 [==>...] - ETA: 0s - loss: 0.3032 - accuracy:
 0.9437
 17/96 [====>...] - ETA: 0s - loss: 0.3113 - accuracy:
 0.9384
 21/96 [=====>...] - ETA: 0s - loss: 0.3096 - accuracy:
 0.9365
 25/96 [=====>...] - ETA: 0s - loss: 0.3109 - accuracy:

0.9352
30/96 [=====>...] - ETA: 0s - loss: 0.3253 - accuracy:
0.9286
36/96 [=====>...] - ETA: 0s - loss: 0.3112 - accuracy:
0.9365
41/96 [=====>...] - ETA: 0s - loss: 0.3180 - accuracy:
0.9373
46/96 [=====>...] - ETA: 0s - loss: 0.3208 - accuracy:
0.9379
52/96 [=====>...] - ETA: 0s - loss: 0.3186 - accuracy:
0.9396
57/96 [=====>...] - ETA: 0s - loss: 0.3143 - accuracy:
0.9415
62/96 [=====>...] - ETA: 0s - loss: 0.3152 - accuracy:
0.9416
67/96 [=====>...] - ETA: 0s - loss: 0.3093 - accuracy:
0.9439
72/96 [=====>...] - ETA: 0s - loss: 0.3132 - accuracy:
0.9411
76/96 [=====>...] - ETA: 0s - loss: 0.3091 - accuracy:
0.9430
81/96 [=====>...] - ETA: 0s - loss: 0.3054 - accuracy:
0.9436
86/96 [=====>...] - ETA: 0s - loss: 0.3086 - accuracy:
0.9435
91/96 [=====>...] - ETA: 0s - loss: 0.3058 - accuracy:
0.9451
96/96 [=====] - ETA: 0s - loss: 0.3059 - accuracy:
0.9450
96/96 [=====] - 1s 15ms/step - loss: 0.3059 - accuracy:
0.9450 - val_loss: 2.1110 - val_accuracy: 0.6336

Epoch 18/30

1/96 [...] - ETA: 2s - loss: 0.1986 - accuracy:
1.0000
6/96 [>...] - ETA: 0s - loss: 0.2325 - accuracy:
0.9762
12/96 [==>...] - ETA: 0s - loss: 0.2500 - accuracy:
0.9722
17/96 [====>...] - ETA: 0s - loss: 0.2406 - accuracy:
0.9804
23/96 [=====>...] - ETA: 0s - loss: 0.2435 - accuracy:
0.9731
28/96 [=====>...] - ETA: 0s - loss: 0.2432 - accuracy:
0.9728
33/96 [=====>...] - ETA: 0s - loss: 0.2363 - accuracy:
0.9755

```

39/96 [=====>...] - ETA: 0s - loss: 0.2420 - accuracy:
0.9744
44/96 [=====>...] - ETA: 0s - loss: 0.2518 - accuracy:
0.9729
49/96 [=====>...] - ETA: 0s - loss: 0.2554 - accuracy:
0.9699
54/96 [=====>...] - ETA: 0s - loss: 0.2614 - accuracy:
0.9656
59/96 [=====>...] - ETA: 0s - loss: 0.2644 - accuracy:
0.9653
64/96 [=====>...] - ETA: 0s - loss: 0.2718 - accuracy:
0.9635
69/96 [=====>...] - ETA: 0s - loss: 0.2741 - accuracy:
0.9620
73/96 [=====>...] - ETA: 0s - loss: 0.2737 - accuracy:
0.9609
77/96 [=====>...] - ETA: 0s - loss: 0.2711 - accuracy:
0.9604
81/96 [=====>...] - ETA: 0s - loss: 0.2730 - accuracy:
0.9583
85/96 [=====>...] - ETA: 0s - loss: 0.2702 - accuracy:
0.9591
89/96 [=====>...] - ETA: 0s - loss: 0.2697 - accuracy:
0.9588
92/96 [=====>..] - ETA: 0s - loss: 0.2674 - accuracy:
0.9596
96/96 [=====] - ETA: 0s - loss: 0.2680 - accuracy:
0.9590
96/96 [=====] - 1s 15ms/step - loss: 0.2680 - accuracy:
0.9590 - val_loss: 1.8945 - val_accuracy: 0.6294

```

Epoch 19/30

```

1/96 [...] - ETA: 2s - loss: 0.2276 - accuracy:
1.0000
5/96 [>...] - ETA: 1s - loss: 0.2789 - accuracy:
0.9429
9/96 [=>...] - ETA: 1s - loss: 0.2307 - accuracy:
0.9683
13/96 [==>...] - ETA: 1s - loss: 0.2489 - accuracy:
0.9707
17/96 [====>...] - ETA: 1s - loss: 0.2474 - accuracy:
0.9720
21/96 [=====>...] - ETA: 1s - loss: 0.2385 - accuracy:
0.9728
25/96 [=====>...] - ETA: 0s - loss: 0.2670 - accuracy:
0.9638
29/96 [=====>...] - ETA: 0s - loss: 0.2700 - accuracy:

```

0.9606
33/96 [=====>...] - ETA: 0s - loss: 0.2809 - accuracy:
0.9553
37/96 [=====>...] - ETA: 0s - loss: 0.2796 - accuracy:
0.9550
40/96 [=====>...] - ETA: 0s - loss: 0.2770 - accuracy:
0.9548
44/96 [=====>...] - ETA: 0s - loss: 0.2736 - accuracy:
0.9556
48/96 [=====>...] - ETA: 0s - loss: 0.2759 - accuracy:
0.9554
52/96 [=====>...] - ETA: 0s - loss: 0.2758 - accuracy:
0.9551
56/96 [=====>...] - ETA: 0s - loss: 0.2748 - accuracy:
0.9532
60/96 [=====>...] - ETA: 0s - loss: 0.2757 - accuracy:
0.9524
64/96 [=====>...] - ETA: 0s - loss: 0.2860 - accuracy:
0.9487
68/96 [=====>...] - ETA: 0s - loss: 0.2900 - accuracy:
0.9482
72/96 [=====>...] - ETA: 0s - loss: 0.2864 - accuracy:
0.9497
76/96 [=====>...] - ETA: 0s - loss: 0.2838 - accuracy:
0.9511
80/96 [=====>...] - ETA: 0s - loss: 0.2823 - accuracy:
0.9518
85/96 [=====>...] - ETA: 0s - loss: 0.2785 - accuracy:
0.9529
89/96 [=====>...] - ETA: 0s - loss: 0.2759 - accuracy:
0.9540
93/96 [=====>.] - ETA: 0s - loss: 0.2758 - accuracy:
0.9534
96/96 [=====] - 2s 18ms/step - loss: 0.2746 - accuracy:
0.9535 - val_loss: 1.6111 - val_accuracy: 0.6832

Epoch 20/30

1/96 [...] - ETA: 1s - loss: 0.1394 - accuracy:
1.0000
4/96 [>...] - ETA: 1s - loss: 0.1666 - accuracy:
1.0000
9/96 [=>...] - ETA: 1s - loss: 0.2128 - accuracy:
0.9788
13/96 [===>...] - ETA: 1s - loss: 0.1956 - accuracy:
0.9853
18/96 [====>...] - ETA: 1s - loss: 0.1971 - accuracy:
0.9841

22/96 [====>...] - ETA: 0s - loss: 0.1947 - accuracy:
 0.9827
 26/96 [=====>...] - ETA: 0s - loss: 0.1971 - accuracy:
 0.9835
 30/96 [=====>...] - ETA: 0s - loss: 0.2008 - accuracy:
 0.9810
 34/96 [=====>...] - ETA: 0s - loss: 0.1960 - accuracy:
 0.9832
 38/96 [=====>...] - ETA: 0s - loss: 0.2032 - accuracy:
 0.9774
 42/96 [=====>...] - ETA: 0s - loss: 0.1986 - accuracy:
 0.9796
 46/96 [=====>...] - ETA: 0s - loss: 0.2025 - accuracy:
 0.9762
 50/96 [=====>...] - ETA: 0s - loss: 0.2110 - accuracy:
 0.9743
 53/96 [=====>...] - ETA: 0s - loss: 0.2141 - accuracy:
 0.9712
 57/96 [=====>...] - ETA: 0s - loss: 0.2168 - accuracy:
 0.9708
 61/96 [=====>...] - ETA: 0s - loss: 0.2190 - accuracy:
 0.9696
 65/96 [=====>...] - ETA: 0s - loss: 0.2238 - accuracy:
 0.9685
 69/96 [=====>...] - ETA: 0s - loss: 0.2275 - accuracy:
 0.9669
 73/96 [=====>...] - ETA: 0s - loss: 0.2280 - accuracy:
 0.9654
 78/96 [=====>...] - ETA: 0s - loss: 0.2289 - accuracy:
 0.9646
 83/96 [=====>...] - ETA: 0s - loss: 0.2381 - accuracy:
 0.9627
 88/96 [=====>...] - ETA: 0s - loss: 0.2344 - accuracy:
 0.9648
 92/96 [=====>...] - ETA: 0s - loss: 0.2347 - accuracy:
 0.9648
 96/96 [=====>...] - 2s 16ms/step - loss: 0.2396 - accuracy:
 0.9640 - val_loss: 1.9677 - val_accuracy: 0.6294

Epoch 21/30

1/96 [...] - ETA: 1s - loss: 0.1517 - accuracy:
 1.0000
 6/96 [>...] - ETA: 1s - loss: 0.2234 - accuracy:
 0.9762
 11/96 [==>...] - ETA: 1s - loss: 0.2277 - accuracy:
 0.9740
 15/96 [===>...] - ETA: 0s - loss: 0.2512 - accuracy:

```

0.9683
19/96 [====>...] - ETA: 0s - loss: 0.2596 - accuracy:
0.9624
24/96 [=====>...] - ETA: 0s - loss: 0.2556 - accuracy:
0.9583
28/96 [=====>...] - ETA: 0s - loss: 0.2436 - accuracy:
0.9609
32/96 [=====>...] - ETA: 0s - loss: 0.2457 - accuracy:
0.9598
37/96 [=====>...] - ETA: 0s - loss: 0.2403 - accuracy:
0.9614
41/96 [=====>...] - ETA: 0s - loss: 0.2408 - accuracy:
0.9628
45/96 [=====>...] - ETA: 0s - loss: 0.2351 - accuracy:
0.9640
50/96 [=====>...] - ETA: 0s - loss: 0.2342 - accuracy:
0.9638
54/96 [=====>...] - ETA: 0s - loss: 0.2342 - accuracy:
0.9630
59/96 [=====>...] - ETA: 0s - loss: 0.2299 - accuracy:
0.9637
63/96 [=====>...] - ETA: 0s - loss: 0.2380 - accuracy:
0.9607
68/96 [=====>...] - ETA: 0s - loss: 0.2363 - accuracy:
0.9622
73/96 [=====>...] - ETA: 0s - loss: 0.2364 - accuracy:
0.9622
77/96 [=====>...] - ETA: 0s - loss: 0.2339 - accuracy:
0.9635
82/96 [=====>...] - ETA: 0s - loss: 0.2306 - accuracy:
0.9646
87/96 [=====>...] - ETA: 0s - loss: 0.2287 - accuracy:
0.9644
92/96 [=====>...] - ETA: 0s - loss: 0.2359 - accuracy:
0.9627
96/96 [=====>...] - 2s 16ms/step - loss: 0.2337 - accuracy:
0.9635 - val_loss: 1.9454 - val_accuracy: 0.6892

```

Epoch 22/30

```

1/96 [...] - ETA: 2s - loss: 0.1685 - accuracy:
1.0000
6/96 [>...] - ETA: 1s - loss: 0.1914 - accuracy:
0.9603
11/96 [==>...] - ETA: 0s - loss: 0.1728 - accuracy:
0.9784
16/96 [====>...] - ETA: 0s - loss: 0.1709 - accuracy:
0.9821

```


21/96 [====>...] - ETA: 0s - loss: 0.1729 - accuracy:
0.9819
26/96 [=====>...] - ETA: 0s - loss: 0.1765 - accuracy:
0.9780
31/96 [=====>...] - ETA: 0s - loss: 0.1763 - accuracy:
0.9785
36/96 [=====>...] - ETA: 0s - loss: 0.1718 - accuracy:
0.9815
41/96 [=====>...] - ETA: 0s - loss: 0.1700 - accuracy:
0.9826
45/96 [=====>...] - ETA: 0s - loss: 0.1705 - accuracy:
0.9831
50/96 [=====>...] - ETA: 0s - loss: 0.1684 - accuracy:
0.9838
55/96 [=====>...] - ETA: 0s - loss: 0.1671 - accuracy:
0.9844
59/96 [=====>...] - ETA: 0s - loss: 0.1667 - accuracy:
0.9839
64/96 [=====>...] - ETA: 0s - loss: 0.1671 - accuracy:
0.9844
68/96 [=====>...] - ETA: 0s - loss: 0.1689 - accuracy:
0.9839
72/96 [=====>...] - ETA: 0s - loss: 0.1721 - accuracy:
0.9841
77/96 [=====>...] - ETA: 0s - loss: 0.1693 - accuracy:
0.9852
82/96 [=====>...] - ETA: 0s - loss: 0.1687 - accuracy:
0.9855
86/96 [=====>...] - ETA: 0s - loss: 0.1690 - accuracy:
0.9856
91/96 [=====>...] - ETA: 0s - loss: 0.1687 - accuracy:
0.9853
96/96 [=====>...] - 1s 14ms/step - loss: 0.1685 - accuracy:
0.9855 - val_loss: 1.7679 - val_accuracy: 0.6328

Epoch 23/30

1/96 [...] - ETA: 2s - loss: 0.1479 - accuracy:
1.0000
6/96 [>...] - ETA: 0s - loss: 0.1288 - accuracy:
0.9921
11/96 [==>...] - ETA: 0s - loss: 0.1621 - accuracy:
0.9913
16/96 [====>...] - ETA: 0s - loss: 0.1520 - accuracy:
0.9911
20/96 [====>...] - ETA: 0s - loss: 0.1524 - accuracy:
0.9881
25/96 [=====>...] - ETA: 0s - loss: 0.1499 - accuracy:

```

0.9886
29/96 [=====>...] - ETA: 0s - loss: 0.1483 - accuracy:
0.9885
34/96 [=====>...] - ETA: 0s - loss: 0.1517 - accuracy:
0.9860
39/96 [=====>...] - ETA: 0s - loss: 0.1485 - accuracy:
0.9866
44/96 [=====>...] - ETA: 0s - loss: 0.1540 - accuracy:
0.9848
49/96 [=====>...] - ETA: 0s - loss: 0.1530 - accuracy:
0.9845
55/96 [=====>...] - ETA: 0s - loss: 0.1542 - accuracy:
0.9844
60/96 [=====>...] - ETA: 0s - loss: 0.1542 - accuracy:
0.9833
65/96 [=====>...] - ETA: 0s - loss: 0.1536 - accuracy:
0.9832
70/96 [=====>...] - ETA: 0s - loss: 0.1530 - accuracy:
0.9837
75/96 [=====>...] - ETA: 0s - loss: 0.1568 - accuracy:
0.9829
81/96 [=====>...] - ETA: 0s - loss: 0.1565 - accuracy:
0.9830
86/96 [=====>...] - ETA: 0s - loss: 0.1555 - accuracy:
0.9834
91/96 [=====>..] - ETA: 0s - loss: 0.1584 - accuracy:
0.9827
96/96 [=====] - ETA: 0s - loss: 0.1575 - accuracy:
0.9835
96/96 [=====] - 1s 14ms/step - loss: 0.1575 - accuracy:
0.9835 - val_loss: 1.8603 - val_accuracy: 0.6405

```

Epoch 24/30

```

1/96 [...] - ETA: 1s - loss: 0.1958 - accuracy:
0.9048
6/96 [>...] - ETA: 0s - loss: 0.2168 - accuracy:
0.9762
12/96 [==>...] - ETA: 0s - loss: 0.2285 - accuracy:
0.9524
17/96 [====>...] - ETA: 0s - loss: 0.2197 - accuracy:
0.9524
22/96 [=====>...] - ETA: 0s - loss: 0.2403 - accuracy:
0.9481
26/96 [=====>...] - ETA: 0s - loss: 0.2463 - accuracy:
0.9524
31/96 [=====>...] - ETA: 0s - loss: 0.2534 - accuracy:
0.9524

```

36/96 [=====>...] - ETA: 0s - loss: 0.2529 - accuracy:
 0.9550
 41/96 [=====>...] - ETA: 0s - loss: 0.2437 - accuracy:
 0.9593
 45/96 [=====>...] - ETA: 0s - loss: 0.2518 - accuracy:
 0.9556
 51/96 [=====>...] - ETA: 0s - loss: 0.2467 - accuracy:
 0.9570
 57/96 [=====>...] - ETA: 0s - loss: 0.2400 - accuracy:
 0.9591
 62/96 [=====>...] - ETA: 0s - loss: 0.2358 - accuracy:
 0.9616
 66/96 [=====>...] - ETA: 0s - loss: 0.2354 - accuracy:
 0.9603
 71/96 [=====>...] - ETA: 0s - loss: 0.2325 - accuracy:
 0.9604
 76/96 [=====>...] - ETA: 0s - loss: 0.2335 - accuracy:
 0.9612
 81/96 [=====>...] - ETA: 0s - loss: 0.2314 - accuracy:
 0.9612
 85/96 [=====>...] - ETA: 0s - loss: 0.2311 - accuracy:
 0.9613
 90/96 [=====>..] - ETA: 0s - loss: 0.2372 - accuracy:
 0.9593
 95/96 [=====>.] - ETA: 0s - loss: 0.2400 - accuracy:
 0.9584
 96/96 [=====] - 1s 14ms/step - loss: 0.2403 - accuracy:
 0.9580 - val_loss: 1.9113 - val_accuracy: 0.6089

Epoch 25/30

1/96 [...] - ETA: 2s - loss: 0.1604 - accuracy:
 0.9524
 6/96 [>...] - ETA: 0s - loss: 0.2523 - accuracy:
 0.9444
 11/96 [==>...] - ETA: 0s - loss: 0.2400 - accuracy:
 0.9524
 16/96 [====>...] - ETA: 0s - loss: 0.2370 - accuracy:
 0.9583
 21/96 [=====>...] - ETA: 0s - loss: 0.2547 - accuracy:
 0.9524
 26/96 [=====>...] - ETA: 0s - loss: 0.2421 - accuracy:
 0.9579
 30/96 [=====>...] - ETA: 0s - loss: 0.2497 - accuracy:
 0.9556
 36/96 [=====>...] - ETA: 0s - loss: 0.2653 - accuracy:
 0.9471
 41/96 [=====>...] - ETA: 0s - loss: 0.2696 - accuracy:

0.9454
 47/96 [=====>...] - ETA: 0s - loss: 0.2652 - accuracy:
 0.9463
 52/96 [=====>...] - ETA: 0s - loss: 0.2643 - accuracy:
 0.9451
 58/96 [=====>...] - ETA: 0s - loss: 0.2727 - accuracy:
 0.9417
 63/96 [=====>...] - ETA: 0s - loss: 0.2750 - accuracy:
 0.9418
 68/96 [=====>...] - ETA: 0s - loss: 0.2725 - accuracy:
 0.9433
 73/96 [=====>...] - ETA: 0s - loss: 0.2681 - accuracy:
 0.9446
 78/96 [=====>...] - ETA: 0s - loss: 0.2677 - accuracy:
 0.9457
 83/96 [=====>...] - ETA: 0s - loss: 0.2720 - accuracy:
 0.9449
 88/96 [=====>...] - ETA: 0s - loss: 0.2771 - accuracy:
 0.9426
 92/96 [=====>..] - ETA: 0s - loss: 0.2798 - accuracy:
 0.9420
 96/96 [=====] - 1s 14ms/step - loss: 0.2822 - accuracy:
 0.9405 - val_loss: 2.3600 - val_accuracy: 0.6405

Epoch 26/30

1/96 [...] - ETA: 2s - loss: 0.3020 - accuracy:
 0.9524
 5/96 [>...] - ETA: 1s - loss: 0.3410 - accuracy:
 0.9429
 10/96 [==>...] - ETA: 1s - loss: 0.2727 - accuracy:
 0.9524
 15/96 [===>...] - ETA: 0s - loss: 0.2728 - accuracy:
 0.9556
 20/96 [=====>...] - ETA: 0s - loss: 0.2682 - accuracy:
 0.9548
 25/96 [=====>...] - ETA: 0s - loss: 0.2781 - accuracy:
 0.9562
 30/96 [=====>...] - ETA: 0s - loss: 0.2923 - accuracy:
 0.9524
 35/96 [=====>...] - ETA: 0s - loss: 0.2912 - accuracy:
 0.9483
 40/96 [=====>...] - ETA: 0s - loss: 0.3045 - accuracy:
 0.9452
 46/96 [=====>...] - ETA: 0s - loss: 0.3106 - accuracy:
 0.9400
 50/96 [=====>...] - ETA: 0s - loss: 0.3118 - accuracy:
 0.9390

55/96 [=====>...] - ETA: 0s - loss: 0.3042 - accuracy:
 0.9420
 59/96 [=====>...] - ETA: 0s - loss: 0.3095 - accuracy:
 0.9403
 64/96 [=====>...] - ETA: 0s - loss: 0.3016 - accuracy:
 0.9449
 69/96 [=====>...] - ETA: 0s - loss: 0.3019 - accuracy:
 0.9448
 74/96 [=====>...] - ETA: 0s - loss: 0.3014 - accuracy:
 0.9453
 79/96 [=====>...] - ETA: 0s - loss: 0.2980 - accuracy:
 0.9476
 83/96 [=====>...] - ETA: 0s - loss: 0.2973 - accuracy:
 0.9472
 87/96 [=====>...] - ETA: 0s - loss: 0.2955 - accuracy:
 0.9480
 92/96 [=====>..] - ETA: 0s - loss: 0.2955 - accuracy:
 0.9477
 96/96 [=====] - 1s 14ms/step - loss: 0.2974 - accuracy:
 0.9465 - val_loss: 2.0110 - val_accuracy: 0.5918

Epoch 1/30

1/96 [...] - ETA: 6:03 - loss: 10.5251 - accuracy:
 0.0952
 6/96 [>...] - ETA: 0s - loss: 11.7066 - accuracy:
 0.2381
 11/96 [==>...] - ETA: 0s - loss: 10.8317 - accuracy:
 0.2381
 17/96 [====>...] - ETA: 0s - loss: 10.0666 - accuracy:
 0.2493
 22/96 [=====>...] - ETA: 0s - loss: 9.7091 - accuracy:
 0.2554
 28/96 [=====>...] - ETA: 0s - loss: 9.3193 - accuracy:
 0.2517
 34/96 [=====>...] - ETA: 0s - loss: 8.9919 - accuracy:
 0.2577
 39/96 [=====>...] - ETA: 0s - loss: 8.7854 - accuracy:
 0.2625
 45/96 [=====>...] - ETA: 0s - loss: 8.5759 - accuracy:
 0.2635
 50/96 [=====>...] - ETA: 0s - loss: 8.3925 - accuracy:
 0.2724
 55/96 [=====>...] - ETA: 0s - loss: 8.2499 - accuracy:
 0.2753
 61/96 [=====>...] - ETA: 0s - loss: 8.0694 - accuracy:
 0.2865
 66/96 [=====>...] - ETA: 0s - loss: 7.9405 - accuracy:

0.2929
71/96 [=====>...] - ETA: 0s - loss: 7.8230 - accuracy:
0.2978
75/96 [=====>...] - ETA: 0s - loss: 7.7359 - accuracy:
0.2990
80/96 [=====>...] - ETA: 0s - loss: 7.6318 - accuracy:
0.3042
84/96 [=====>...] - ETA: 0s - loss: 7.5421 - accuracy:
0.3095
90/96 [=====>..] - ETA: 0s - loss: 7.4296 - accuracy:
0.3138
95/96 [=====>.] - ETA: 0s - loss: 7.3300 - accuracy:
0.3193
96/96 [=====] - 5s 17ms/step - loss: 7.3259 - accuracy:
0.3193 - val_loss: 7.3942 - val_accuracy: 0.1469

Epoch 2/30

1/96 [...] - ETA: 1s - loss: 5.4862 - accuracy:
0.2857
7/96 [=>...] - ETA: 0s - loss: 5.3892 - accuracy:
0.4354
12/96 [==>...] - ETA: 0s - loss: 5.3717 - accuracy:
0.4444
17/96 [====>...] - ETA: 0s - loss: 5.2819 - accuracy:
0.4594
22/96 [=====>...] - ETA: 0s - loss: 5.2014 - accuracy:
0.4567
27/96 [=====>...] - ETA: 0s - loss: 5.2383 - accuracy:
0.4444
33/96 [=====>...] - ETA: 0s - loss: 5.2130 - accuracy:
0.4416
38/96 [=====>...] - ETA: 0s - loss: 5.1251 - accuracy:
0.4586
43/96 [=====>...] - ETA: 0s - loss: 5.0681 - accuracy:
0.4618
49/96 [=====>...] - ETA: 0s - loss: 4.9976 - accuracy:
0.4684
54/96 [=====>...] - ETA: 0s - loss: 4.9660 - accuracy:
0.4691
60/96 [=====>...] - ETA: 0s - loss: 4.9197 - accuracy:
0.4651
66/96 [=====>...] - ETA: 0s - loss: 4.8569 - accuracy:
0.4668
72/96 [=====>...] - ETA: 0s - loss: 4.8349 - accuracy:
0.4643
78/96 [=====>...] - ETA: 0s - loss: 4.7839 - accuracy:
0.4664

84/96 [=====>...] - ETA: 0s - loss: 4.7294 - accuracy:
0.4722
90/96 [=====>..] - ETA: 0s - loss: 4.6781 - accuracy:
0.4746
95/96 [=====>.] - ETA: 0s - loss: 4.6293 - accuracy:
0.4792
96/96 [=====] - 1s 13ms/step - loss: 4.6255 - accuracy:
0.4793 - val_loss: 4.2107 - val_accuracy: 0.3997

Epoch 3/30

1/96 [...] - ETA: 1s - loss: 3.9606 - accuracy:
0.5238
6/96 [>...] - ETA: 1s - loss: 3.5386 - accuracy:
0.6587
11/96 [==>...] - ETA: 0s - loss: 3.4719 - accuracy:
0.6926
16/96 [====>...] - ETA: 0s - loss: 3.4340 - accuracy:
0.6756
22/96 [=====>...] - ETA: 0s - loss: 3.4297 - accuracy:
0.6645
28/96 [=====>...] - ETA: 0s - loss: 3.4415 - accuracy:
0.6497
34/96 [=====>...] - ETA: 0s - loss: 3.3891 - accuracy:
0.6471
39/96 [=====>...] - ETA: 0s - loss: 3.3797 - accuracy:
0.6410
45/96 [=====>...] - ETA: 0s - loss: 3.3932 - accuracy:
0.6265
51/96 [=====>...] - ETA: 0s - loss: 3.3811 - accuracy:
0.6209
56/96 [=====>...] - ETA: 0s - loss: 3.3497 - accuracy:
0.6233
62/96 [=====>...] - ETA: 0s - loss: 3.3234 - accuracy:
0.6252
68/96 [=====>...] - ETA: 0s - loss: 3.3025 - accuracy:
0.6239
72/96 [=====>...] - ETA: 0s - loss: 3.2700 - accuracy:
0.6283
78/96 [=====>...] - ETA: 0s - loss: 3.2441 - accuracy:
0.6300
84/96 [=====>...] - ETA: 0s - loss: 3.2129 - accuracy:
0.6298
88/96 [=====>...] - ETA: 0s - loss: 3.1977 - accuracy:
0.6293
94/96 [=====>.] - ETA: 0s - loss: 3.1588 - accuracy:
0.6337
96/96 [=====] - 1s 13ms/step - loss: 3.1567 - accuracy:

0.6337 - val_loss: 3.1264 - val_accuracy: 0.5141

Epoch 4/30

1/96 [...] - ETA: 2s - loss: 2.7605 - accuracy:
0.6190
7/96 [=>...] - ETA: 0s - loss: 2.7136 - accuracy:
0.6395
13/96 [===>...] - ETA: 0s - loss: 2.5918 - accuracy:
0.6667
19/96 [====>...] - ETA: 0s - loss: 2.5114 - accuracy:
0.6717
24/96 [=====>...] - ETA: 0s - loss: 2.5257 - accuracy:
0.6647
30/96 [=====>...] - ETA: 0s - loss: 2.4974 - accuracy:
0.6857
36/96 [=====>...] - ETA: 0s - loss: 2.4646 - accuracy:
0.6918
41/96 [=====>...] - ETA: 0s - loss: 2.4319 - accuracy:
0.6945
46/96 [=====>...] - ETA: 0s - loss: 2.4194 - accuracy:
0.6925
52/96 [=====>...] - ETA: 0s - loss: 2.3930 - accuracy:
0.6969
58/96 [=====>...] - ETA: 0s - loss: 2.3849 - accuracy:
0.6946
63/96 [=====>...] - ETA: 0s - loss: 2.3669 - accuracy:
0.6954
69/96 [=====>...] - ETA: 0s - loss: 2.3445 - accuracy:
0.7012
75/96 [=====>...] - ETA: 0s - loss: 2.3271 - accuracy:
0.7010
79/96 [=====>...] - ETA: 0s - loss: 2.3009 - accuracy:
0.7089
85/96 [=====>...] - ETA: 0s - loss: 2.2863 - accuracy:
0.7126
91/96 [=====>..] - ETA: 0s - loss: 2.2685 - accuracy:
0.7153
96/96 [=====] - ETA: 0s - loss: 2.2479 - accuracy:
0.7171
96/96 [=====] - 1s 13ms/step - loss: 2.2479 - accuracy:
0.7171 - val_loss: 2.7829 - val_accuracy: 0.4492

Epoch 5/30

1/96 [...] - ETA: 2s - loss: 1.9616 - accuracy:
0.6667
7/96 [=>...] - ETA: 0s - loss: 1.9515 - accuracy:

0.7551
13/96 [===>...] - ETA: 0s - loss: 1.8912 - accuracy:
0.7802
18/96 [====>...] - ETA: 0s - loss: 1.8782 - accuracy:
0.7593
24/96 [=====>...] - ETA: 0s - loss: 1.8830 - accuracy:
0.7560
30/96 [=====>...] - ETA: 0s - loss: 1.8864 - accuracy:
0.7524
35/96 [=====>...] - ETA: 0s - loss: 1.8611 - accuracy:
0.7578
40/96 [=====>...] - ETA: 0s - loss: 1.8409 - accuracy:
0.7560
45/96 [=====>...] - ETA: 0s - loss: 1.8603 - accuracy:
0.7439
50/96 [=====>...] - ETA: 0s - loss: 1.8550 - accuracy:
0.7429
55/96 [=====>...] - ETA: 0s - loss: 1.8439 - accuracy:
0.7463
60/96 [=====>...] - ETA: 0s - loss: 1.8279 - accuracy:
0.7492
65/96 [=====>...] - ETA: 0s - loss: 1.8140 - accuracy:
0.7502
70/96 [=====>...] - ETA: 0s - loss: 1.7957 - accuracy:
0.7524
76/96 [=====>...] - ETA: 0s - loss: 1.7925 - accuracy:
0.7500
80/96 [=====>...] - ETA: 0s - loss: 1.7810 - accuracy:
0.7512
85/96 [=====>...] - ETA: 0s - loss: 1.7754 - accuracy:
0.7485
90/96 [=====>..] - ETA: 0s - loss: 1.7614 - accuracy:
0.7487
94/96 [=====>.] - ETA: 0s - loss: 1.7614 - accuracy:
0.7452
96/96 [=====] - 1s 13ms/step - loss: 1.7630 - accuracy:
0.7441 - val_loss: 2.2219 - val_accuracy: 0.5756

Epoch 6/30

1/96 [...] - ETA: 2s - loss: 1.4207 - accuracy:
0.9048
6/96 [>...] - ETA: 0s - loss: 1.5129 - accuracy:
0.7937
11/96 [==>...] - ETA: 0s - loss: 1.5186 - accuracy:
0.7662
15/96 [===>...] - ETA: 0s - loss: 1.4500 - accuracy:
0.7841

21/96 [====>...] - ETA: 0s - loss: 1.3841 - accuracy:
0.8027
27/96 [=====>...] - ETA: 0s - loss: 1.3914 - accuracy:
0.8007
33/96 [=====>...] - ETA: 0s - loss: 1.3975 - accuracy:
0.8023
37/96 [=====>...] - ETA: 0s - loss: 1.3836 - accuracy:
0.8044
42/96 [=====>...] - ETA: 0s - loss: 1.3864 - accuracy:
0.8039
46/96 [=====>...] - ETA: 0s - loss: 1.3712 - accuracy:
0.8033
51/96 [=====>...] - ETA: 0s - loss: 1.3755 - accuracy:
0.8039
57/96 [=====>...] - ETA: 0s - loss: 1.3679 - accuracy:
0.8020
62/96 [=====>...] - ETA: 0s - loss: 1.3829 - accuracy:
0.7926
68/96 [=====>...] - ETA: 0s - loss: 1.3808 - accuracy:
0.7899
74/96 [=====>...] - ETA: 0s - loss: 1.3865 - accuracy:
0.7870
79/96 [=====>...] - ETA: 0s - loss: 1.3771 - accuracy:
0.7890
84/96 [=====>...] - ETA: 0s - loss: 1.3796 - accuracy:
0.7874
89/96 [=====>...] - ETA: 0s - loss: 1.3804 - accuracy:
0.7881
95/96 [=====>.] - ETA: 0s - loss: 1.3879 - accuracy:
0.7840
96/96 [=====] - 1s 14ms/step - loss: 1.3871 - accuracy:
0.7841 - val_loss: 1.8833 - val_accuracy: 0.6234

Epoch 7/30

1/96 [...] - ETA: 1s - loss: 0.9947 - accuracy:
0.9524
6/96 [>...] - ETA: 0s - loss: 1.2842 - accuracy:
0.8016
11/96 [==>...] - ETA: 0s - loss: 1.2372 - accuracy:
0.8095
16/96 [====>...] - ETA: 0s - loss: 1.2277 - accuracy:
0.8244
21/96 [=====>...] - ETA: 0s - loss: 1.2061 - accuracy:
0.8367
26/96 [=====>...] - ETA: 0s - loss: 1.2217 - accuracy:
0.8278
32/96 [=====>...] - ETA: 0s - loss: 1.2007 - accuracy:

```

0.8333
38/96 [=====>...] - ETA: 0s - loss: 1.1868 - accuracy:
0.8358
43/96 [=====>...] - ETA: 0s - loss: 1.1651 - accuracy:
0.8394
49/96 [=====>...] - ETA: 0s - loss: 1.1568 - accuracy:
0.8397
55/96 [=====>...] - ETA: 0s - loss: 1.1615 - accuracy:
0.8372
61/96 [=====>...] - ETA: 0s - loss: 1.1463 - accuracy:
0.8392
67/96 [=====>...] - ETA: 0s - loss: 1.1409 - accuracy:
0.8387
73/96 [=====>...] - ETA: 0s - loss: 1.1383 - accuracy:
0.8343
78/96 [=====>...] - ETA: 0s - loss: 1.1387 - accuracy:
0.8333
84/96 [=====>...] - ETA: 0s - loss: 1.1420 - accuracy:
0.8282
89/96 [=====>...] - ETA: 0s - loss: 1.1457 - accuracy:
0.8256
94/96 [=====>.] - ETA: 0s - loss: 1.1419 - accuracy:
0.8237
96/96 [=====] - 1s 13ms/step - loss: 1.1474 - accuracy:
0.8221 - val_loss: 2.2460 - val_accuracy: 0.5816

```

Epoch 8/30

```

1/96 [...] - ETA: 1s - loss: 0.9762 - accuracy:
0.8571
7/96 [=>...] - ETA: 0s - loss: 1.0258 - accuracy:
0.8503
13/96 [===>...] - ETA: 0s - loss: 1.0699 - accuracy:
0.8388
17/96 [====>...] - ETA: 0s - loss: 1.0858 - accuracy:
0.8319
23/96 [=====>...] - ETA: 0s - loss: 1.0769 - accuracy:
0.8344
29/96 [=====>...] - ETA: 0s - loss: 1.0885 - accuracy:
0.8276
33/96 [=====>...] - ETA: 0s - loss: 1.0822 - accuracy:
0.8268
39/96 [=====>...] - ETA: 0s - loss: 1.0834 - accuracy:
0.8242
45/96 [=====>...] - ETA: 0s - loss: 1.0664 - accuracy:
0.8286
49/96 [=====>...] - ETA: 0s - loss: 1.0728 - accuracy:
0.8280

```

53/96 [=====>...] - ETA: 0s - loss: 1.0651 - accuracy:
0.8293
58/96 [=====>...] - ETA: 0s - loss: 1.0508 - accuracy:
0.8333
63/96 [=====>...] - ETA: 0s - loss: 1.0440 - accuracy:
0.8360
68/96 [=====>...] - ETA: 0s - loss: 1.0399 - accuracy:
0.8361
73/96 [=====>...] - ETA: 0s - loss: 1.0375 - accuracy:
0.8350
78/96 [=====>...] - ETA: 0s - loss: 1.0395 - accuracy:
0.8309
83/96 [=====>...] - ETA: 0s - loss: 1.0316 - accuracy:
0.8319
88/96 [=====>...] - ETA: 0s - loss: 1.0293 - accuracy:
0.8290
92/96 [=====>..] - ETA: 0s - loss: 1.0310 - accuracy:
0.8276
96/96 [=====] - 1s 15ms/step - loss: 1.0337 - accuracy:
0.8276 - val_loss: 2.1770 - val_accuracy: 0.5226

Epoch 9/30

1/96 [...] - ETA: 2s - loss: 0.9165 - accuracy:
0.8095
7/96 [=>...] - ETA: 0s - loss: 0.8572 - accuracy:
0.8503
12/96 [==>...] - ETA: 0s - loss: 0.9102 - accuracy:
0.8413
16/96 [====>...] - ETA: 0s - loss: 0.9236 - accuracy:
0.8393
20/96 [=====>...] - ETA: 0s - loss: 0.9178 - accuracy:
0.8476
25/96 [=====>...] - ETA: 0s - loss: 0.9401 - accuracy:
0.8400
30/96 [=====>...] - ETA: 0s - loss: 0.9194 - accuracy:
0.8444
35/96 [=====>...] - ETA: 0s - loss: 0.9083 - accuracy:
0.8463
39/96 [=====>...] - ETA: 0s - loss: 0.8995 - accuracy:
0.8486
43/96 [=====>...] - ETA: 0s - loss: 0.8949 - accuracy:
0.8483
47/96 [=====>...] - ETA: 0s - loss: 0.9023 - accuracy:
0.8470
51/96 [=====>...] - ETA: 0s - loss: 0.9004 - accuracy:
0.8497
56/96 [=====>...] - ETA: 0s - loss: 0.8843 - accuracy:

0.8563
61/96 [=====>...] - ETA: 0s - loss: 0.8768 - accuracy:
0.8603
65/96 [=====>...] - ETA: 0s - loss: 0.8824 - accuracy:
0.8593
70/96 [=====>...] - ETA: 0s - loss: 0.8806 - accuracy:
0.8592
75/96 [=====>...] - ETA: 0s - loss: 0.8748 - accuracy:
0.8603
80/96 [=====>...] - ETA: 0s - loss: 0.8718 - accuracy:
0.8613
85/96 [=====>...] - ETA: 0s - loss: 0.8691 - accuracy:
0.8639
89/96 [=====>...] - ETA: 0s - loss: 0.8688 - accuracy:
0.8625
93/96 [=====>.] - ETA: 0s - loss: 0.8629 - accuracy:
0.8638
96/96 [=====] - 1s 15ms/step - loss: 0.8617 - accuracy:
0.8631 - val_loss: 1.7263 - val_accuracy: 0.6319

Epoch 10/30

1/96 [...] - ETA: 2s - loss: 0.6489 - accuracy:
0.9048
5/96 [>...] - ETA: 1s - loss: 0.7636 - accuracy:
0.8476
9/96 [=>...] - ETA: 1s - loss: 0.7455 - accuracy:
0.8571
13/96 [===>...] - ETA: 1s - loss: 0.7156 - accuracy:
0.8755
17/96 [====>...] - ETA: 1s - loss: 0.7197 - accuracy:
0.8739
21/96 [=====>...] - ETA: 1s - loss: 0.6991 - accuracy:
0.8844
25/96 [=====>...] - ETA: 1s - loss: 0.7002 - accuracy:
0.8857
30/96 [=====>...] - ETA: 0s - loss: 0.7030 - accuracy:
0.8873
34/96 [=====>...] - ETA: 0s - loss: 0.6980 - accuracy:
0.8908
38/96 [=====>...] - ETA: 0s - loss: 0.6956 - accuracy:
0.8910
42/96 [=====>...] - ETA: 0s - loss: 0.6857 - accuracy:
0.8957
46/96 [=====>...] - ETA: 0s - loss: 0.6908 - accuracy:
0.8923
50/96 [=====>...] - ETA: 0s - loss: 0.6957 - accuracy:
0.8933

54/96 [=====>...] - ETA: 0s - loss: 0.7031 - accuracy:
 0.8933
 58/96 [=====>...] - ETA: 0s - loss: 0.7058 - accuracy:
 0.8941
 62/96 [=====>...] - ETA: 0s - loss: 0.7074 - accuracy:
 0.8948
 67/96 [=====>...] - ETA: 0s - loss: 0.7113 - accuracy:
 0.8941
 71/96 [=====>...] - ETA: 0s - loss: 0.7194 - accuracy:
 0.8900
 75/96 [=====>...] - ETA: 0s - loss: 0.7249 - accuracy:
 0.8895
 79/96 [=====>...] - ETA: 0s - loss: 0.7281 - accuracy:
 0.8897
 84/96 [=====>...] - ETA: 0s - loss: 0.7355 - accuracy:
 0.8878
 90/96 [=====>..] - ETA: 0s - loss: 0.7365 - accuracy:
 0.8852
 95/96 [=====>.] - ETA: 0s - loss: 0.7439 - accuracy:
 0.8837
 96/96 [=====] - 2s 17ms/step - loss: 0.7497 - accuracy:
 0.8821 - val_loss: 1.8616 - val_accuracy: 0.5448

Epoch 11/30

1/96 [...] - ETA: 1s - loss: 0.6504 - accuracy:
 0.9048
 7/96 [=>...] - ETA: 0s - loss: 0.8638 - accuracy:
 0.8435
 11/96 [==>...] - ETA: 0s - loss: 0.8568 - accuracy:
 0.8485
 17/96 [===>...] - ETA: 0s - loss: 0.8521 - accuracy:
 0.8543
 22/96 [====>...] - ETA: 0s - loss: 0.8306 - accuracy:
 0.8571
 27/96 [=====>...] - ETA: 0s - loss: 0.8403 - accuracy:
 0.8589
 33/96 [=====>...] - ETA: 0s - loss: 0.8606 - accuracy:
 0.8543
 37/96 [=====>...] - ETA: 0s - loss: 0.8687 - accuracy:
 0.8520
 43/96 [=====>...] - ETA: 0s - loss: 0.8456 - accuracy:
 0.8571
 48/96 [=====>...] - ETA: 0s - loss: 0.8462 - accuracy:
 0.8562
 54/96 [=====>...] - ETA: 0s - loss: 0.8542 - accuracy:
 0.8527
 60/96 [=====>...] - ETA: 0s - loss: 0.8508 - accuracy:

```

0.8563
65/96 [=====>...] - ETA: 0s - loss: 0.8428 - accuracy:
0.8593
70/96 [=====>...] - ETA: 0s - loss: 0.8462 - accuracy:
0.8551
75/96 [=====>...] - ETA: 0s - loss: 0.8460 - accuracy:
0.8552
80/96 [=====>...] - ETA: 0s - loss: 0.8356 - accuracy:
0.8583
86/96 [=====>...] - ETA: 0s - loss: 0.8341 - accuracy:
0.8588
90/96 [=====>..] - ETA: 0s - loss: 0.8305 - accuracy:
0.8598
95/96 [=====>.] - ETA: 0s - loss: 0.8259 - accuracy:
0.8607
96/96 [=====] - 1s 14ms/step - loss: 0.8259 - accuracy:
0.8606 - val_loss: 1.7459 - val_accuracy: 0.6319

```

Epoch 12/30

```

1/96 [...] - ETA: 2s - loss: 1.0516 - accuracy:
0.8095
5/96 [>...] - ETA: 1s - loss: 0.6518 - accuracy:
0.9333
10/96 [==>...] - ETA: 1s - loss: 0.6569 - accuracy:
0.9190
16/96 [====>...] - ETA: 0s - loss: 0.6485 - accuracy:
0.9107
22/96 [=====>...] - ETA: 0s - loss: 0.6705 - accuracy:
0.9048
27/96 [=====>...] - ETA: 0s - loss: 0.6773 - accuracy:
0.8995
33/96 [=====>...] - ETA: 0s - loss: 0.6653 - accuracy:
0.9062
39/96 [=====>...] - ETA: 0s - loss: 0.6540 - accuracy:
0.9109
44/96 [=====>...] - ETA: 0s - loss: 0.6614 - accuracy:
0.9102
50/96 [=====>...] - ETA: 0s - loss: 0.6580 - accuracy:
0.9105
56/96 [=====>...] - ETA: 0s - loss: 0.6483 - accuracy:
0.9107
61/96 [=====>...] - ETA: 0s - loss: 0.6510 - accuracy:
0.9118
67/96 [=====>...] - ETA: 0s - loss: 0.6480 - accuracy:
0.9097
73/96 [=====>...] - ETA: 0s - loss: 0.6537 - accuracy:
0.9048

```

78/96 [=====>...] - ETA: 0s - loss: 0.6573 - accuracy:
0.9035
84/96 [=====>...] - ETA: 0s - loss: 0.6556 - accuracy:
0.9048
90/96 [=====>..] - ETA: 0s - loss: 0.6634 - accuracy:
0.9032
95/96 [=====>.] - ETA: 0s - loss: 0.6591 - accuracy:
0.9038
96/96 [=====] - 1s 13ms/step - loss: 0.6602 - accuracy:
0.9030 - val_loss: 1.5877 - val_accuracy: 0.6670

Epoch 13/30

1/96 [...] - ETA: 1s - loss: 0.6241 - accuracy:
0.8571
5/96 [>...] - ETA: 1s - loss: 0.6381 - accuracy:
0.9048
11/96 [==>...] - ETA: 0s - loss: 0.6136 - accuracy:
0.9091
17/96 [====>...] - ETA: 0s - loss: 0.6139 - accuracy:
0.9132
22/96 [=====>...] - ETA: 0s - loss: 0.6076 - accuracy:
0.9134
27/96 [=====>...] - ETA: 0s - loss: 0.6131 - accuracy:
0.9118
33/96 [=====>...] - ETA: 0s - loss: 0.5999 - accuracy:
0.9206
39/96 [=====>...] - ETA: 0s - loss: 0.6192 - accuracy:
0.9133
44/96 [=====>...] - ETA: 0s - loss: 0.6324 - accuracy:
0.9091
50/96 [=====>...] - ETA: 0s - loss: 0.6381 - accuracy:
0.9048
56/96 [=====>...] - ETA: 0s - loss: 0.6330 - accuracy:
0.9082
61/96 [=====>...] - ETA: 0s - loss: 0.6323 - accuracy:
0.9087
67/96 [=====>...] - ETA: 0s - loss: 0.6310 - accuracy:
0.9076
73/96 [=====>...] - ETA: 0s - loss: 0.6258 - accuracy:
0.9087
79/96 [=====>...] - ETA: 0s - loss: 0.6224 - accuracy:
0.9102
83/96 [=====>...] - ETA: 0s - loss: 0.6267 - accuracy:
0.9094
88/96 [=====>...] - ETA: 0s - loss: 0.6331 - accuracy:
0.9075
94/96 [=====>.] - ETA: 0s - loss: 0.6303 - accuracy:

0.9063
96/96 [=====] - 1s 14ms/step - loss: 0.6361 - accuracy:
0.9040 - val_loss: 1.5600 - val_accuracy: 0.6388

Epoch 14/30

1/96 [...] - ETA: 1s - loss: 0.5274 - accuracy:
0.9524
6/96 [>...] - ETA: 0s - loss: 0.5573 - accuracy:
0.9365
12/96 [==>...] - ETA: 0s - loss: 0.5999 - accuracy:
0.9246
18/96 [====>...] - ETA: 0s - loss: 0.5978 - accuracy:
0.9206
24/96 [=====>...] - ETA: 0s - loss: 0.6231 - accuracy:
0.9087
29/96 [=====>...] - ETA: 0s - loss: 0.6092 - accuracy:
0.9097
35/96 [=====>...] - ETA: 0s - loss: 0.6096 - accuracy:
0.9102
41/96 [=====>...] - ETA: 0s - loss: 0.6090 - accuracy:
0.9094
47/96 [=====>...] - ETA: 0s - loss: 0.6124 - accuracy:
0.9088
52/96 [=====>...] - ETA: 0s - loss: 0.6242 - accuracy:
0.9075
58/96 [=====>...] - ETA: 0s - loss: 0.6206 - accuracy:
0.9105
63/96 [=====>...] - ETA: 0s - loss: 0.6184 - accuracy:
0.9093
69/96 [=====>...] - ETA: 0s - loss: 0.6139 - accuracy:
0.9124
74/96 [=====>...] - ETA: 0s - loss: 0.6073 - accuracy:
0.9131
80/96 [=====>...] - ETA: 0s - loss: 0.6041 - accuracy:
0.9149
86/96 [=====>...] - ETA: 0s - loss: 0.6009 - accuracy:
0.9147
91/96 [=====>..] - ETA: 0s - loss: 0.5940 - accuracy:
0.9168
95/96 [=====>.] - ETA: 0s - loss: 0.5938 - accuracy:
0.9163
96/96 [=====] - 1s 12ms/step - loss: 0.5930 - accuracy:
0.9165 - val_loss: 2.0494 - val_accuracy: 0.6516

Epoch 15/30

1/96 [...] - ETA: 2s - loss: 0.3966 - accuracy:

```

1.0000
 6/96 [>...] - ETA: 0s - loss: 0.5330 - accuracy:
0.9286
12/96 [==>...] - ETA: 0s - loss: 0.5319 - accuracy:
0.9286
16/96 [====>...] - ETA: 0s - loss: 0.5149 - accuracy:
0.9286
22/96 [=====>...] - ETA: 0s - loss: 0.5308 - accuracy:
0.9221
27/96 [=====>...] - ETA: 0s - loss: 0.5296 - accuracy:
0.9242
33/96 [=====>...] - ETA: 0s - loss: 0.5361 - accuracy:
0.9250
38/96 [=====>...] - ETA: 0s - loss: 0.5390 - accuracy:
0.9236
42/96 [=====>...] - ETA: 0s - loss: 0.5318 - accuracy:
0.9286
47/96 [=====>...] - ETA: 0s - loss: 0.5429 - accuracy:
0.9291
53/96 [=====>...] - ETA: 0s - loss: 0.5401 - accuracy:
0.9254
58/96 [=====>...] - ETA: 0s - loss: 0.5350 - accuracy:
0.9278
63/96 [=====>...] - ETA: 0s - loss: 0.5397 - accuracy:
0.9259
69/96 [=====>...] - ETA: 0s - loss: 0.5380 - accuracy:
0.9262
75/96 [=====>...] - ETA: 0s - loss: 0.5388 - accuracy:
0.9257
81/96 [=====>...] - ETA: 0s - loss: 0.5388 - accuracy:
0.9259
86/96 [=====>...] - ETA: 0s - loss: 0.5423 - accuracy:
0.9214
92/96 [=====>...] - ETA: 0s - loss: 0.5400 - accuracy:
0.9224
96/96 [=====] - 1s 14ms/step - loss: 0.5410 - accuracy:
0.9225 - val_loss: 1.7809 - val_accuracy: 0.6550

```

Epoch 16/30

```

 1/96 [...] - ETA: 1s - loss: 0.3687 - accuracy:
1.0000
 7/96 [=>...] - ETA: 0s - loss: 0.4440 - accuracy:
0.9592
12/96 [==>...] - ETA: 0s - loss: 0.4869 - accuracy:
0.9286
16/96 [====>...] - ETA: 0s - loss: 0.4844 - accuracy:
0.9315

```

22/96 [====>...] - ETA: 0s - loss: 0.4763 - accuracy:
 0.9351
 28/96 [=====>...] - ETA: 0s - loss: 0.4878 - accuracy:
 0.9303
 33/96 [=====>...] - ETA: 0s - loss: 0.4816 - accuracy:
 0.9336
 39/96 [======>...] - ETA: 0s - loss: 0.4814 - accuracy:
 0.9365
 44/96 [======>...] - ETA: 0s - loss: 0.4833 - accuracy:
 0.9372
 49/96 [======>...] - ETA: 0s - loss: 0.4867 - accuracy:
 0.9368
 55/96 [======>...] - ETA: 0s - loss: 0.4947 - accuracy:
 0.9316
 61/96 [======>...] - ETA: 0s - loss: 0.4963 - accuracy:
 0.9313
 66/96 [======>...] - ETA: 0s - loss: 0.4962 - accuracy:
 0.9300
 72/96 [======>...] - ETA: 0s - loss: 0.5102 - accuracy:
 0.9253
 78/96 [======>...] - ETA: 0s - loss: 0.5087 - accuracy:
 0.9255
 83/96 [======>...] - ETA: 0s - loss: 0.5168 - accuracy:
 0.9254
 89/96 [======>...] - ETA: 0s - loss: 0.5204 - accuracy:
 0.9230
 95/96 [======>.] - ETA: 0s - loss: 0.5244 - accuracy:
 0.9228
 96/96 [=====] - 1s 13ms/step - loss: 0.5245 - accuracy:
 0.9225 - val_loss: 2.4731 - val_accuracy: 0.5004

Epoch 17/30

1/96 [...] - ETA: 1s - loss: 0.6503 - accuracy:
 0.8571
 6/96 [>...] - ETA: 1s - loss: 0.5605 - accuracy:
 0.8968
 12/96 [==>...] - ETA: 0s - loss: 0.5667 - accuracy:
 0.9127
 18/96 [====>...] - ETA: 0s - loss: 0.5508 - accuracy:
 0.9233
 24/96 [=====>...] - ETA: 0s - loss: 0.5218 - accuracy:
 0.9306
 29/96 [=====>...] - ETA: 0s - loss: 0.5148 - accuracy:
 0.9327
 35/96 [======>...] - ETA: 0s - loss: 0.5089 - accuracy:
 0.9374
 41/96 [======>...] - ETA: 0s - loss: 0.5106 - accuracy:

```

0.9373
46/96 [=====>...] - ETA: 0s - loss: 0.5049 - accuracy:
0.9358
52/96 [=====>...] - ETA: 0s - loss: 0.5021 - accuracy:
0.9359
58/96 [=====>...] - ETA: 0s - loss: 0.5054 - accuracy:
0.9335
64/96 [=====>...] - ETA: 0s - loss: 0.5018 - accuracy:
0.9345
69/96 [=====>...] - ETA: 0s - loss: 0.4990 - accuracy:
0.9351
74/96 [=====>...] - ETA: 0s - loss: 0.4928 - accuracy:
0.9363
80/96 [=====>...] - ETA: 0s - loss: 0.4944 - accuracy:
0.9351
85/96 [=====>...] - ETA: 0s - loss: 0.4987 - accuracy:
0.9361
90/96 [=====>..] - ETA: 0s - loss: 0.5015 - accuracy:
0.9333
95/96 [=====>.] - ETA: 0s - loss: 0.5067 - accuracy:
0.9298
96/96 [=====] - 1s 13ms/step - loss: 0.5062 - accuracy:
0.9300 - val_loss: 2.3456 - val_accuracy: 0.5884

```

Epoch 1/30

```

1/96 [...] - ETA: 6:01 - loss: 7.9447 - accuracy:
0.0000e+00
5/96 [>...] - ETA: 1s - loss: 8.9223 - accuracy:
0.0857
8/96 [=>...] - ETA: 1s - loss: 8.5882 - accuracy:
0.0833
13/96 [===>...] - ETA: 1s - loss: 7.8447 - accuracy:
0.1502
18/96 [====>...] - ETA: 1s - loss: 7.5151 - accuracy:
0.1640
22/96 [=====>...] - ETA: 0s - loss: 7.2458 - accuracy:
0.1753
27/96 [=====>...] - ETA: 0s - loss: 7.0384 - accuracy:
0.1869
32/96 [=====>...] - ETA: 0s - loss: 6.8221 - accuracy:
0.1979
37/96 [=====>...] - ETA: 0s - loss: 6.6585 - accuracy:
0.2072
42/96 [=====>...] - ETA: 0s - loss: 6.4979 - accuracy:
0.2256
47/96 [=====>...] - ETA: 0s - loss: 6.3845 - accuracy:
0.2361

```

52/96 [=====>...] - ETA: 0s - loss: 6.2373 - accuracy:
0.2564
56/96 [=====>...] - ETA: 0s - loss: 6.1515 - accuracy:
0.2619
61/96 [=====>...] - ETA: 0s - loss: 6.0557 - accuracy:
0.2693
66/96 [=====>...] - ETA: 0s - loss: 5.9591 - accuracy:
0.2749
70/96 [=====>...] - ETA: 0s - loss: 5.8828 - accuracy:
0.2816
75/96 [=====>...] - ETA: 0s - loss: 5.8044 - accuracy:
0.2889
80/96 [=====>...] - ETA: 0s - loss: 5.7370 - accuracy:
0.2935
84/96 [=====>...] - ETA: 0s - loss: 5.6677 - accuracy:
0.3033
89/96 [=====>...] - ETA: 0s - loss: 5.5925 - accuracy:
0.3087
94/96 [=====>.] - ETA: 0s - loss: 5.5284 - accuracy:
0.3151
96/96 [=====] - 6s 19ms/step - loss: 5.5113 - accuracy:
0.3163 - val_loss: 6.3272 - val_accuracy: 0.1631

Epoch 2/30

1/96 [...] - ETA: 2s - loss: 4.2119 - accuracy:
0.4762
5/96 [>...] - ETA: 1s - loss: 4.1062 - accuracy:
0.4857
10/96 [==>...] - ETA: 1s - loss: 3.9112 - accuracy:
0.5476
15/96 [===>...] - ETA: 0s - loss: 3.8848 - accuracy:
0.5460
18/96 [====>...] - ETA: 1s - loss: 3.8850 - accuracy:
0.5344
23/96 [=====>...] - ETA: 0s - loss: 3.8804 - accuracy:
0.5280
28/96 [=====>...] - ETA: 0s - loss: 3.8321 - accuracy:
0.5306
32/96 [=====>...] - ETA: 0s - loss: 3.7988 - accuracy:
0.5327
36/96 [=====>...] - ETA: 0s - loss: 3.7813 - accuracy:
0.5304
41/96 [=====>...] - ETA: 0s - loss: 3.7656 - accuracy:
0.5250
46/96 [=====>...] - ETA: 0s - loss: 3.7154 - accuracy:
0.5373
49/96 [=====>...] - ETA: 0s - loss: 3.6889 - accuracy:

```

0.5394
54/96 [=====>...] - ETA: 0s - loss: 3.6516 - accuracy:
0.5485
59/96 [=====>...] - ETA: 0s - loss: 3.6079 - accuracy:
0.5537
63/96 [=====>...] - ETA: 0s - loss: 3.5942 - accuracy:
0.5533
68/96 [=====>...] - ETA: 0s - loss: 3.5760 - accuracy:
0.5518
73/96 [=====>...] - ETA: 0s - loss: 3.5583 - accuracy:
0.5532
76/96 [=====>...] - ETA: 0s - loss: 3.5413 - accuracy:
0.5551
81/96 [=====>...] - ETA: 0s - loss: 3.5118 - accuracy:
0.5567
86/96 [=====>...] - ETA: 0s - loss: 3.4741 - accuracy:
0.5626
91/96 [=====>..] - ETA: 0s - loss: 3.4481 - accuracy:
0.5641
96/96 [=====] - ETA: 0s - loss: 3.4173 - accuracy:
0.5687
96/96 [=====] - 1s 15ms/step - loss: 3.4173 - accuracy:
0.5687 - val_loss: 3.5698 - val_accuracy: 0.4108

```

Epoch 3/30

```

1/96 [...] - ETA: 1s - loss: 2.5467 - accuracy:
0.7143
7/96 [=>...] - ETA: 0s - loss: 2.5940 - accuracy:
0.6803
12/96 [==>...] - ETA: 0s - loss: 2.7467 - accuracy:
0.6270
17/96 [====>...] - ETA: 0s - loss: 2.6790 - accuracy:
0.6695
21/96 [=====>...] - ETA: 0s - loss: 2.6527 - accuracy:
0.6780
26/96 [=====>...] - ETA: 0s - loss: 2.6482 - accuracy:
0.6722
32/96 [=====>...] - ETA: 0s - loss: 2.6308 - accuracy:
0.6801
35/96 [=====>...] - ETA: 0s - loss: 2.6184 - accuracy:
0.6762
40/96 [=====>...] - ETA: 0s - loss: 2.5924 - accuracy:
0.6774
45/96 [=====>...] - ETA: 0s - loss: 2.5730 - accuracy:
0.6825
50/96 [=====>...] - ETA: 0s - loss: 2.5527 - accuracy:
0.6848

```

55/96 [=====>...] - ETA: 0s - loss: 2.5416 - accuracy:
0.6814
60/96 [=====>...] - ETA: 0s - loss: 2.5458 - accuracy:
0.6802
65/96 [=====>...] - ETA: 0s - loss: 2.5239 - accuracy:
0.6813
70/96 [=====>...] - ETA: 0s - loss: 2.4998 - accuracy:
0.6837
75/96 [=====>...] - ETA: 0s - loss: 2.4943 - accuracy:
0.6832
80/96 [=====>...] - ETA: 0s - loss: 2.4720 - accuracy:
0.6863
85/96 [=====>...] - ETA: 0s - loss: 2.4547 - accuracy:
0.6868
90/96 [=====>..] - ETA: 0s - loss: 2.4367 - accuracy:
0.6910
95/96 [=====>.] - ETA: 0s - loss: 2.4111 - accuracy:
0.6932
96/96 [=====] - 1s 14ms/step - loss: 2.4119 - accuracy:
0.6927 - val_loss: 2.9573 - val_accuracy: 0.5013

Epoch 4/30

1/96 [...] - ETA: 2s - loss: 2.2706 - accuracy:
0.7143
5/96 [>...] - ETA: 1s - loss: 1.9976 - accuracy:
0.7429
9/96 [=>...] - ETA: 1s - loss: 2.0010 - accuracy:
0.7513
12/96 [==>...] - ETA: 1s - loss: 2.0013 - accuracy:
0.7500
16/96 [===>...] - ETA: 1s - loss: 1.9375 - accuracy:
0.7738
20/96 [====>...] - ETA: 1s - loss: 1.9375 - accuracy:
0.7690
24/96 [=====>...] - ETA: 1s - loss: 1.9141 - accuracy:
0.7718
28/96 [=====>...] - ETA: 0s - loss: 1.9106 - accuracy:
0.7721
32/96 [=====>...] - ETA: 0s - loss: 1.8820 - accuracy:
0.7783
36/96 [=====>...] - ETA: 0s - loss: 1.8483 - accuracy:
0.7870
40/96 [=====>...] - ETA: 0s - loss: 1.8500 - accuracy:
0.7833
44/96 [=====>...] - ETA: 0s - loss: 1.8377 - accuracy:
0.7857
49/96 [=====>...] - ETA: 0s - loss: 1.8362 - accuracy:

0.7833
53/96 [=====>...] - ETA: 0s - loss: 1.8120 - accuracy:
0.7898
56/96 [=====>...] - ETA: 0s - loss: 1.8150 - accuracy:
0.7874
60/96 [=====>...] - ETA: 0s - loss: 1.8016 - accuracy:
0.7889
64/96 [=====>...] - ETA: 0s - loss: 1.7830 - accuracy:
0.7917
68/96 [=====>...] - ETA: 0s - loss: 1.7815 - accuracy:
0.7878
72/96 [=====>...] - ETA: 0s - loss: 1.7674 - accuracy:
0.7917
76/96 [=====>...] - ETA: 0s - loss: 1.7619 - accuracy:
0.7945
80/96 [=====>...] - ETA: 0s - loss: 1.7644 - accuracy:
0.7923
84/96 [=====>...] - ETA: 0s - loss: 1.7610 - accuracy:
0.7925
88/96 [=====>...] - ETA: 0s - loss: 1.7545 - accuracy:
0.7911
92/96 [=====>..] - ETA: 0s - loss: 1.7531 - accuracy:
0.7899
96/96 [=====] - ETA: 0s - loss: 1.7498 - accuracy:
0.7876
96/96 [=====] - 2s 17ms/step - loss: 1.7498 - accuracy:
0.7876 - val_loss: 2.6317 - val_accuracy: 0.4586

Epoch 5/30

1/96 [...] - ETA: 2s - loss: 1.3712 - accuracy:
0.9048
5/96 [>...] - ETA: 1s - loss: 1.4687 - accuracy:
0.7905
8/96 [=>...] - ETA: 1s - loss: 1.4529 - accuracy:
0.8214
12/96 [==>...] - ETA: 1s - loss: 1.4092 - accuracy:
0.8452
16/96 [====>...] - ETA: 1s - loss: 1.4370 - accuracy:
0.8363
20/96 [=====>...] - ETA: 1s - loss: 1.4444 - accuracy:
0.8310
23/96 [=====>...] - ETA: 1s - loss: 1.4752 - accuracy:
0.8199
27/96 [=====>...] - ETA: 1s - loss: 1.4666 - accuracy:
0.8219
31/96 [=====>...] - ETA: 0s - loss: 1.4505 - accuracy:
0.8295


```

35/96 [=====>...] - ETA: 0s - loss: 1.4794 - accuracy:
0.8231
39/96 [=====>...] - ETA: 0s - loss: 1.4701 - accuracy:
0.8205
43/96 [=====>...] - ETA: 0s - loss: 1.4748 - accuracy:
0.8184
46/96 [=====>...] - ETA: 0s - loss: 1.4732 - accuracy:
0.8178
50/96 [=====>...] - ETA: 0s - loss: 1.4727 - accuracy:
0.8133
54/96 [=====>...] - ETA: 0s - loss: 1.4575 - accuracy:
0.8166
58/96 [=====>...] - ETA: 0s - loss: 1.4659 - accuracy:
0.8120
62/96 [=====>...] - ETA: 0s - loss: 1.4675 - accuracy:
0.8080
66/96 [=====>...] - ETA: 0s - loss: 1.4636 - accuracy:
0.8038
69/96 [=====>...] - ETA: 0s - loss: 1.4548 - accuracy:
0.8040
72/96 [=====>...] - ETA: 0s - loss: 1.4470 - accuracy:
0.8042
75/96 [=====>...] - ETA: 0s - loss: 1.4488 - accuracy:
0.8032
78/96 [=====>...] - ETA: 0s - loss: 1.4421 - accuracy:
0.8065
81/96 [=====>...] - ETA: 0s - loss: 1.4373 - accuracy:
0.8072
85/96 [=====>...] - ETA: 0s - loss: 1.4310 - accuracy:
0.8067
89/96 [=====>...] - ETA: 0s - loss: 1.4244 - accuracy:
0.8085
93/96 [=====>.] - ETA: 0s - loss: 1.4230 - accuracy:
0.8075
96/96 [=====] - 2s 18ms/step - loss: 1.4140 - accuracy:
0.8101 - val_loss: 2.3274 - val_accuracy: 0.5013

```

Epoch 6/30

```

1/96 [...] - ETA: 2s - loss: 1.1778 - accuracy:
0.8095
5/96 [>...] - ETA: 1s - loss: 1.1336 - accuracy:
0.8762
10/96 [==>...] - ETA: 1s - loss: 1.1150 - accuracy:
0.8762
15/96 [===>...] - ETA: 0s - loss: 1.1287 - accuracy:
0.8667
19/96 [====>...] - ETA: 0s - loss: 1.1240 - accuracy:

```

0.8697
23/96 [=====>...] - ETA: 0s - loss: 1.1281 - accuracy:
0.8592
28/96 [=====>...] - ETA: 0s - loss: 1.1029 - accuracy:
0.8673
33/96 [=====>...] - ETA: 0s - loss: 1.0842 - accuracy:
0.8730
38/96 [=====>...] - ETA: 0s - loss: 1.0856 - accuracy:
0.8709
42/96 [=====>...] - ETA: 0s - loss: 1.0800 - accuracy:
0.8719
47/96 [=====>...] - ETA: 0s - loss: 1.0691 - accuracy:
0.8734
52/96 [=====>...] - ETA: 0s - loss: 1.0509 - accuracy:
0.8810
57/96 [=====>...] - ETA: 0s - loss: 1.0446 - accuracy:
0.8805
62/96 [=====>...] - ETA: 0s - loss: 1.0489 - accuracy:
0.8748
67/96 [=====>...] - ETA: 0s - loss: 1.0465 - accuracy:
0.8749
72/96 [=====>...] - ETA: 0s - loss: 1.0400 - accuracy:
0.8743
76/96 [=====>...] - ETA: 0s - loss: 1.0413 - accuracy:
0.8716
81/96 [=====>...] - ETA: 0s - loss: 1.0497 - accuracy:
0.8695
86/96 [=====>...] - ETA: 0s - loss: 1.0443 - accuracy:
0.8677
90/96 [=====>...] - ETA: 0s - loss: 1.0356 - accuracy:
0.8704
95/96 [=====>...] - ETA: 0s - loss: 1.0416 - accuracy:
0.8677
96/96 [=====>...] - 1s 14ms/step - loss: 1.0408 - accuracy:
0.8676 - val_loss: 2.5110 - val_accuracy: 0.5295

Epoch 7/30

1/96 [...] - ETA: 2s - loss: 1.0438 - accuracy:
0.7619
6/96 [>...] - ETA: 1s - loss: 0.8714 - accuracy:
0.8810
10/96 [==>...] - ETA: 1s - loss: 0.8848 - accuracy:
0.8905
14/96 [===>...] - ETA: 1s - loss: 0.8918 - accuracy:
0.8878
19/96 [====>...] - ETA: 0s - loss: 0.9016 - accuracy:
0.8897

24/96 [=====>...] - ETA: 0s - loss: 0.8716 - accuracy:
 0.8948
 29/96 [=====>...] - ETA: 0s - loss: 0.8580 - accuracy:
 0.9031
 34/96 [=====>...] - ETA: 0s - loss: 0.8584 - accuracy:
 0.9006
 39/96 [=====>...] - ETA: 0s - loss: 0.8557 - accuracy:
 0.9011
 44/96 [=====>...] - ETA: 0s - loss: 0.8460 - accuracy:
 0.9069
 49/96 [=====>...] - ETA: 0s - loss: 0.8584 - accuracy:
 0.9038
 53/96 [=====>...] - ETA: 0s - loss: 0.8611 - accuracy:
 0.9021
 58/96 [=====>...] - ETA: 0s - loss: 0.8519 - accuracy:
 0.9023
 63/96 [=====>...] - ETA: 0s - loss: 0.8521 - accuracy:
 0.9010
 68/96 [=====>...] - ETA: 0s - loss: 0.8533 - accuracy:
 0.8964
 73/96 [=====>...] - ETA: 0s - loss: 0.8588 - accuracy:
 0.8924
 78/96 [=====>...] - ETA: 0s - loss: 0.8705 - accuracy:
 0.8852
 83/96 [=====>...] - ETA: 0s - loss: 0.8693 - accuracy:
 0.8847
 88/96 [=====>...] - ETA: 0s - loss: 0.8717 - accuracy:
 0.8826
 93/96 [=====>.] - ETA: 0s - loss: 0.8716 - accuracy:
 0.8807
 96/96 [=====>] - 1s 15ms/step - loss: 0.8673 - accuracy:
 0.8821 - val_loss: 1.6980 - val_accuracy: 0.6541

Epoch 8/30

1/96 [...] - ETA: 2s - loss: 0.8236 - accuracy:
 0.8571
 7/96 [=>...] - ETA: 0s - loss: 0.6950 - accuracy:
 0.9048
 12/96 [==>...] - ETA: 0s - loss: 0.6881 - accuracy:
 0.9206
 18/96 [====>...] - ETA: 0s - loss: 0.7008 - accuracy:
 0.9127
 23/96 [=====>...] - ETA: 0s - loss: 0.7462 - accuracy:
 0.8965
 29/96 [=====>...] - ETA: 0s - loss: 0.7506 - accuracy:
 0.8949
 35/96 [=====>...] - ETA: 0s - loss: 0.7453 - accuracy:

```

0.8980
39/96 [=====>...] - ETA: 0s - loss: 0.7631 - accuracy:
0.8877
44/96 [=====>...] - ETA: 0s - loss: 0.7570 - accuracy:
0.8896
49/96 [=====>...] - ETA: 0s - loss: 0.7485 - accuracy:
0.8912
55/96 [=====>...] - ETA: 0s - loss: 0.7433 - accuracy:
0.8944
60/96 [=====>...] - ETA: 0s - loss: 0.7439 - accuracy:
0.8921
65/96 [=====>...] - ETA: 0s - loss: 0.7435 - accuracy:
0.8916
71/96 [=====>...] - ETA: 0s - loss: 0.7384 - accuracy:
0.8907
74/96 [=====>...] - ETA: 0s - loss: 0.7413 - accuracy:
0.8893
79/96 [=====>...] - ETA: 0s - loss: 0.7380 - accuracy:
0.8909
84/96 [=====>...] - ETA: 0s - loss: 0.7424 - accuracy:
0.8878
90/96 [=====>..] - ETA: 0s - loss: 0.7488 - accuracy:
0.8862
95/96 [=====>.] - ETA: 0s - loss: 0.7554 - accuracy:
0.8837
96/96 [=====] - 1s 14ms/step - loss: 0.7548 - accuracy:
0.8841 - val_loss: 2.0164 - val_accuracy: 0.5551

```

Epoch 9/30

```

1/96 [...] - ETA: 2s - loss: 0.5990 - accuracy:
0.9524
6/96 [>...] - ETA: 0s - loss: 0.5966 - accuracy:
0.9206
11/96 [==>...] - ETA: 0s - loss: 0.6385 - accuracy:
0.9091
16/96 [====>...] - ETA: 0s - loss: 0.6828 - accuracy:
0.8899
21/96 [=====>...] - ETA: 0s - loss: 0.6869 - accuracy:
0.8934
26/96 [=====>...] - ETA: 0s - loss: 0.6735 - accuracy:
0.9011
31/96 [=====>...] - ETA: 0s - loss: 0.6755 - accuracy:
0.9002
36/96 [=====>...] - ETA: 0s - loss: 0.6624 - accuracy:
0.9021
40/96 [=====>...] - ETA: 0s - loss: 0.6551 - accuracy:
0.9036

```

46/96 [=====>...] - ETA: 0s - loss: 0.6594 - accuracy:
 0.8975
 51/96 [=====>...] - ETA: 0s - loss: 0.6631 - accuracy:
 0.8945
 56/96 [=====>...] - ETA: 0s - loss: 0.6540 - accuracy:
 0.8988
 61/96 [=====>...] - ETA: 0s - loss: 0.6536 - accuracy:
 0.8985
 66/96 [=====>...] - ETA: 0s - loss: 0.6517 - accuracy:
 0.8990
 70/96 [=====>...] - ETA: 0s - loss: 0.6478 - accuracy:
 0.9000
 75/96 [=====>...] - ETA: 0s - loss: 0.6534 - accuracy:
 0.8984
 81/96 [=====>...] - ETA: 0s - loss: 0.6453 - accuracy:
 0.8995
 87/96 [=====>...] - ETA: 0s - loss: 0.6342 - accuracy:
 0.9037
 91/96 [=====>..] - ETA: 0s - loss: 0.6287 - accuracy:
 0.9053
 96/96 [=====] - ETA: 0s - loss: 0.6352 - accuracy:
 0.9035
 96/96 [=====] - 1s 14ms/step - loss: 0.6352 - accuracy:
 0.9035 - val_loss: 1.7006 - val_accuracy: 0.6371

Epoch 10/30

1/96 [...] - ETA: 2s - loss: 0.7130 - accuracy:
 0.8571
 5/96 [>...] - ETA: 1s - loss: 0.5601 - accuracy:
 0.9143
 10/96 [==>...] - ETA: 1s - loss: 0.6229 - accuracy:
 0.9000
 15/96 [===>...] - ETA: 0s - loss: 0.5980 - accuracy:
 0.9079
 19/96 [====>...] - ETA: 0s - loss: 0.5697 - accuracy:
 0.9173
 24/96 [=====>...] - ETA: 0s - loss: 0.5511 - accuracy:
 0.9206
 29/96 [=====>...] - ETA: 0s - loss: 0.5451 - accuracy:
 0.9245
 34/96 [=====>...] - ETA: 0s - loss: 0.5407 - accuracy:
 0.9230
 39/96 [=====>...] - ETA: 0s - loss: 0.5378 - accuracy:
 0.9231
 44/96 [=====>...] - ETA: 0s - loss: 0.5275 - accuracy:
 0.9297
 50/96 [=====>...] - ETA: 0s - loss: 0.5291 - accuracy:

0.9286
 55/96 [=====>...] - ETA: 0s - loss: 0.5271 - accuracy:
 0.9264
 60/96 [=====>...] - ETA: 0s - loss: 0.5291 - accuracy:
 0.9262
 65/96 [=====>...] - ETA: 0s - loss: 0.5268 - accuracy:
 0.9275
 70/96 [=====>...] - ETA: 0s - loss: 0.5350 - accuracy:
 0.9252
 75/96 [=====>...] - ETA: 0s - loss: 0.5385 - accuracy:
 0.9232
 81/96 [=====>...] - ETA: 0s - loss: 0.5403 - accuracy:
 0.9218
 87/96 [=====>...] - ETA: 0s - loss: 0.5429 - accuracy:
 0.9212
 92/96 [=====>..] - ETA: 0s - loss: 0.5475 - accuracy:
 0.9187
 96/96 [=====] - 1s 14ms/step - loss: 0.5504 - accuracy:
 0.9180 - val_loss: 1.4621 - val_accuracy: 0.6234

Epoch 11/30

1/96 [...] - ETA: 1s - loss: 0.5418 - accuracy:
 0.9048
 6/96 [>...] - ETA: 0s - loss: 0.6365 - accuracy:
 0.8730
 12/96 [==>...] - ETA: 0s - loss: 0.5368 - accuracy:
 0.9087
 17/96 [====>...] - ETA: 0s - loss: 0.5140 - accuracy:
 0.9160
 23/96 [=====>...] - ETA: 0s - loss: 0.5337 - accuracy:
 0.9089
 29/96 [=====>...] - ETA: 0s - loss: 0.5378 - accuracy:
 0.9130
 35/96 [=====>...] - ETA: 0s - loss: 0.5385 - accuracy:
 0.9170
 40/96 [=====>...] - ETA: 0s - loss: 0.5232 - accuracy:
 0.9214
 46/96 [=====>...] - ETA: 0s - loss: 0.5159 - accuracy:
 0.9244
 52/96 [=====>...] - ETA: 0s - loss: 0.5286 - accuracy:
 0.9194
 56/96 [=====>...] - ETA: 0s - loss: 0.5327 - accuracy:
 0.9184
 61/96 [=====>...] - ETA: 0s - loss: 0.5247 - accuracy:
 0.9204
 66/96 [=====>...] - ETA: 0s - loss: 0.5229 - accuracy:
 0.9199

71/96 [=====>...] - ETA: 0s - loss: 0.5228 - accuracy:
0.9209
76/96 [=====>...] - ETA: 0s - loss: 0.5276 - accuracy:
0.9198
82/96 [=====>...] - ETA: 0s - loss: 0.5323 - accuracy:
0.9135
88/96 [=====>...] - ETA: 0s - loss: 0.5339 - accuracy:
0.9123
93/96 [=====>.] - ETA: 0s - loss: 0.5313 - accuracy:
0.9130
96/96 [=====] - 1s 14ms/step - loss: 0.5314 - accuracy:
0.9125 - val_loss: 1.5031 - val_accuracy: 0.7122

Epoch 12/30

1/96 [...] - ETA: 2s - loss: 0.3801 - accuracy:
0.9524
6/96 [>...] - ETA: 0s - loss: 0.4090 - accuracy:
0.9603
11/96 [==>...] - ETA: 0s - loss: 0.4171 - accuracy:
0.9481
16/96 [====>...] - ETA: 0s - loss: 0.4400 - accuracy:
0.9435
21/96 [=====>...] - ETA: 0s - loss: 0.4351 - accuracy:
0.9478
26/96 [=====>...] - ETA: 0s - loss: 0.4253 - accuracy:
0.9505
31/96 [=====>...] - ETA: 0s - loss: 0.4557 - accuracy:
0.9401
36/96 [=====>...] - ETA: 0s - loss: 0.4511 - accuracy:
0.9405
41/96 [=====>...] - ETA: 0s - loss: 0.4436 - accuracy:
0.9431
46/96 [=====>...] - ETA: 0s - loss: 0.4333 - accuracy:
0.9451
52/96 [=====>...] - ETA: 0s - loss: 0.4263 - accuracy:
0.9469
57/96 [=====>...] - ETA: 0s - loss: 0.4200 - accuracy:
0.9482
62/96 [=====>...] - ETA: 0s - loss: 0.4190 - accuracy:
0.9485
68/96 [=====>...] - ETA: 0s - loss: 0.4254 - accuracy:
0.9475
74/96 [=====>...] - ETA: 0s - loss: 0.4333 - accuracy:
0.9434
79/96 [=====>...] - ETA: 0s - loss: 0.4297 - accuracy:
0.9439
84/96 [=====>...] - ETA: 0s - loss: 0.4284 - accuracy:

0.9433
89/96 [=====>...] - ETA: 0s - loss: 0.4319 - accuracy:
0.9417
93/96 [=====>.] - ETA: 0s - loss: 0.4304 - accuracy:
0.9401
96/96 [=====] - 1s 14ms/step - loss: 0.4267 - accuracy:
0.9410 - val_loss: 1.1943 - val_accuracy: 0.7165

Epoch 13/30

1/96 [...] - ETA: 2s - loss: 0.3584 - accuracy:
0.9524
5/96 [>...] - ETA: 1s - loss: 0.3966 - accuracy:
0.9333
9/96 [=>...] - ETA: 1s - loss: 0.3798 - accuracy:
0.9365
13/96 [===>...] - ETA: 1s - loss: 0.3502 - accuracy:
0.9487
17/96 [====>...] - ETA: 1s - loss: 0.3777 - accuracy:
0.9412
21/96 [=====>...] - ETA: 1s - loss: 0.3707 - accuracy:
0.9456
24/96 [=====>...] - ETA: 1s - loss: 0.3738 - accuracy:
0.9425
28/96 [=====>...] - ETA: 0s - loss: 0.3678 - accuracy:
0.9422
32/96 [=====>...] - ETA: 0s - loss: 0.3634 - accuracy:
0.9420
36/96 [=====>...] - ETA: 0s - loss: 0.3717 - accuracy:
0.9378
40/96 [=====>...] - ETA: 0s - loss: 0.3737 - accuracy:
0.9345
43/96 [=====>...] - ETA: 0s - loss: 0.3754 - accuracy:
0.9347
47/96 [=====>...] - ETA: 0s - loss: 0.3767 - accuracy:
0.9331
51/96 [=====>...] - ETA: 0s - loss: 0.3924 - accuracy:
0.9309
55/96 [=====>...] - ETA: 0s - loss: 0.3861 - accuracy:
0.9333
59/96 [=====>...] - ETA: 0s - loss: 0.3892 - accuracy:
0.9322
63/96 [=====>...] - ETA: 0s - loss: 0.3847 - accuracy:
0.9358
67/96 [=====>...] - ETA: 0s - loss: 0.3877 - accuracy:
0.9353
71/96 [=====>...] - ETA: 0s - loss: 0.3867 - accuracy:
0.9349

74/96 [=====>...] - ETA: 0s - loss: 0.3893 - accuracy:
0.9337
78/96 [=====>...] - ETA: 0s - loss: 0.3896 - accuracy:
0.9341
82/96 [=====>...] - ETA: 0s - loss: 0.3910 - accuracy:
0.9332
86/96 [=====>...] - ETA: 0s - loss: 0.3878 - accuracy:
0.9336
90/96 [=====>..] - ETA: 0s - loss: 0.3908 - accuracy:
0.9333
94/96 [=====>.] - ETA: 0s - loss: 0.3893 - accuracy:
0.9341
96/96 [=====] - 2s 18ms/step - loss: 0.3884 - accuracy:
0.9345 - val_loss: 1.3433 - val_accuracy: 0.6943

Epoch 14/30

1/96 [...] - ETA: 1s - loss: 0.2514 - accuracy:
1.0000
4/96 [>...] - ETA: 1s - loss: 0.2860 - accuracy:
0.9881
7/96 [=>...] - ETA: 1s - loss: 0.2984 - accuracy:
0.9864
10/96 [==>...] - ETA: 1s - loss: 0.3375 - accuracy:
0.9619
14/96 [===>...] - ETA: 1s - loss: 0.3655 - accuracy:
0.9456
18/96 [====>...] - ETA: 1s - loss: 0.3584 - accuracy:
0.9497
22/96 [=====>...] - ETA: 1s - loss: 0.3574 - accuracy:
0.9524
26/96 [=====>...] - ETA: 1s - loss: 0.3544 - accuracy:
0.9487
30/96 [=====>...] - ETA: 0s - loss: 0.3579 - accuracy:
0.9460
34/96 [=====>...] - ETA: 0s - loss: 0.3575 - accuracy:
0.9440
39/96 [=====>...] - ETA: 0s - loss: 0.3615 - accuracy:
0.9451
43/96 [=====>...] - ETA: 0s - loss: 0.3695 - accuracy:
0.9435
46/96 [=====>...] - ETA: 0s - loss: 0.3700 - accuracy:
0.9431
49/96 [=====>...] - ETA: 0s - loss: 0.3677 - accuracy:
0.9436
52/96 [=====>...] - ETA: 0s - loss: 0.3697 - accuracy:
0.9432
56/96 [=====>...] - ETA: 0s - loss: 0.3688 - accuracy:

```

0.9430
59/96 [=====>...] - ETA: 0s - loss: 0.3704 - accuracy:
0.9443
62/96 [=====>...] - ETA: 0s - loss: 0.3650 - accuracy:
0.9462
66/96 [=====>...] - ETA: 0s - loss: 0.3665 - accuracy:
0.9459
70/96 [=====>...] - ETA: 0s - loss: 0.3634 - accuracy:
0.9463
74/96 [=====>...] - ETA: 0s - loss: 0.3636 - accuracy:
0.9459
77/96 [=====>...] - ETA: 0s - loss: 0.3612 - accuracy:
0.9468
80/96 [=====>...] - ETA: 0s - loss: 0.3651 - accuracy:
0.9458
83/96 [=====>...] - ETA: 0s - loss: 0.3665 - accuracy:
0.9443
87/96 [=====>...] - ETA: 0s - loss: 0.3652 - accuracy:
0.9453
91/96 [=====>..] - ETA: 0s - loss: 0.3683 - accuracy:
0.9445
94/96 [=====>.] - ETA: 0s - loss: 0.3681 - accuracy:
0.9443
96/96 [=====] - 2s 19ms/step - loss: 0.3689 - accuracy:
0.9445 - val_loss: 1.4663 - val_accuracy: 0.7190

```

Epoch 15/30

```

1/96 [...] - ETA: 2s - loss: 0.2233 - accuracy:
1.0000
6/96 [>...] - ETA: 1s - loss: 0.2363 - accuracy:
0.9841
11/96 [==>...] - ETA: 0s - loss: 0.2737 - accuracy:
0.9654
16/96 [====>...] - ETA: 0s - loss: 0.2855 - accuracy:
0.9673
21/96 [=====>...] - ETA: 0s - loss: 0.3039 - accuracy:
0.9569
25/96 [=====>...] - ETA: 0s - loss: 0.3353 - accuracy:
0.9543
30/96 [=====>...] - ETA: 0s - loss: 0.3325 - accuracy:
0.9540
35/96 [=====>...] - ETA: 0s - loss: 0.3379 - accuracy:
0.9510
40/96 [=====>...] - ETA: 0s - loss: 0.3362 - accuracy:
0.9500
45/96 [=====>...] - ETA: 0s - loss: 0.3317 - accuracy:
0.9524

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50/96 [=====>...] - ETA: 0s - loss: 0.3219 - accuracy:
 0.9552
 54/96 [=====>...] - ETA: 0s - loss: 0.3226 - accuracy:
 0.9541
 59/96 [=====>...] - ETA: 0s - loss: 0.3184 - accuracy:
 0.9556
 63/96 [=====>...] - ETA: 0s - loss: 0.3166 - accuracy:
 0.9546
 68/96 [=====>...] - ETA: 0s - loss: 0.3171 - accuracy:
 0.9545
 73/96 [=====>...] - ETA: 0s - loss: 0.3152 - accuracy:
 0.9550
 78/96 [=====>...] - ETA: 0s - loss: 0.3122 - accuracy:
 0.9548
 84/96 [=====>...] - ETA: 0s - loss: 0.3114 - accuracy:
 0.9552
 90/96 [=====>..] - ETA: 0s - loss: 0.3135 - accuracy:
 0.9534
 94/96 [=====>.] - ETA: 0s - loss: 0.3156 - accuracy:
 0.9529
 96/96 [=====] - 1s 15ms/step - loss: 0.3145 - accuracy:
 0.9530 - val_loss: 1.3207 - val_accuracy: 0.7045

Epoch 16/30

1/96 [...] - ETA: 2s - loss: 0.2685 - accuracy:
 0.9524
 6/96 [>...] - ETA: 0s - loss: 0.2605 - accuracy:
 0.9683
 11/96 [==>...] - ETA: 0s - loss: 0.2792 - accuracy:
 0.9567
 16/96 [====>...] - ETA: 0s - loss: 0.2660 - accuracy:
 0.9613
 21/96 [=====>...] - ETA: 0s - loss: 0.2719 - accuracy:
 0.9569
 26/96 [=====>...] - ETA: 0s - loss: 0.2740 - accuracy:
 0.9597
 30/96 [=====>...] - ETA: 0s - loss: 0.2676 - accuracy:
 0.9635
 35/96 [=====>...] - ETA: 0s - loss: 0.2670 - accuracy:
 0.9646
 40/96 [=====>...] - ETA: 0s - loss: 0.2592 - accuracy:
 0.9667
 45/96 [=====>...] - ETA: 0s - loss: 0.2615 - accuracy:
 0.9672
 50/96 [=====>...] - ETA: 0s - loss: 0.2574 - accuracy:
 0.9686
 55/96 [=====>...] - ETA: 0s - loss: 0.2539 - accuracy:

0.9688
60/96 [=====>...] - ETA: 0s - loss: 0.2500 - accuracy:
0.9698
65/96 [=====>...] - ETA: 0s - loss: 0.2520 - accuracy:
0.9692
70/96 [=====>...] - ETA: 0s - loss: 0.2531 - accuracy:
0.9687
75/96 [=====>...] - ETA: 0s - loss: 0.2518 - accuracy:
0.9702
80/96 [=====>...] - ETA: 0s - loss: 0.2523 - accuracy:
0.9690
85/96 [=====>...] - ETA: 0s - loss: 0.2547 - accuracy:
0.9675
89/96 [=====>...] - ETA: 0s - loss: 0.2546 - accuracy:
0.9668
94/96 [=====>.] - ETA: 0s - loss: 0.2530 - accuracy:
0.9681
96/96 [=====] - 1s 14ms/step - loss: 0.2562 - accuracy:
0.9670 - val_loss: 1.3230 - val_accuracy: 0.7114

Epoch 17/30

1/96 [...] - ETA: 2s - loss: 0.1653 - accuracy:
1.0000
4/96 [>...] - ETA: 1s - loss: 0.1973 - accuracy:
0.9881
8/96 [=>...] - ETA: 1s - loss: 0.1964 - accuracy:
0.9881
13/96 [===>...] - ETA: 1s - loss: 0.2259 - accuracy:
0.9817
18/96 [====>...] - ETA: 0s - loss: 0.2432 - accuracy:
0.9735
24/96 [=====>...] - ETA: 0s - loss: 0.2345 - accuracy:
0.9782
28/96 [=====>...] - ETA: 0s - loss: 0.2256 - accuracy:
0.9813
33/96 [=====>...] - ETA: 0s - loss: 0.2223 - accuracy:
0.9812
38/96 [=====>...] - ETA: 0s - loss: 0.2204 - accuracy:
0.9787
43/96 [=====>...] - ETA: 0s - loss: 0.2207 - accuracy:
0.9767
47/96 [=====>...] - ETA: 0s - loss: 0.2204 - accuracy:
0.9757
52/96 [=====>...] - ETA: 0s - loss: 0.2261 - accuracy:
0.9725
57/96 [=====>...] - ETA: 0s - loss: 0.2276 - accuracy:
0.9724

```

63/96 [=====>...] - ETA: 0s - loss: 0.2294 - accuracy:
0.9713
68/96 [=====>...] - ETA: 0s - loss: 0.2324 - accuracy:
0.9706
73/96 [=====>...] - ETA: 0s - loss: 0.2336 - accuracy:
0.9693
79/96 [=====>...] - ETA: 0s - loss: 0.2350 - accuracy:
0.9687
85/96 [=====>...] - ETA: 0s - loss: 0.2353 - accuracy:
0.9686
90/96 [=====>..] - ETA: 0s - loss: 0.2411 - accuracy:
0.9667
95/96 [=====>.] - ETA: 0s - loss: 0.2384 - accuracy:
0.9679
96/96 [=====] - 1s 14ms/step - loss: 0.2387 - accuracy:
0.9680 - val_loss: 1.2400 - val_accuracy: 0.7276

```

Epoch 18/30

```

1/96 [...] - ETA: 2s - loss: 0.1600 - accuracy:
1.0000
6/96 [>...] - ETA: 0s - loss: 0.2291 - accuracy:
0.9603
11/96 [==>...] - ETA: 0s - loss: 0.2306 - accuracy:
0.9654
16/96 [====>...] - ETA: 0s - loss: 0.2244 - accuracy:
0.9732
21/96 [=====>...] - ETA: 0s - loss: 0.2276 - accuracy:
0.9705
26/96 [=====>...] - ETA: 0s - loss: 0.2489 - accuracy:
0.9689
32/96 [=====>...] - ETA: 0s - loss: 0.2492 - accuracy:
0.9717
36/96 [=====>...] - ETA: 0s - loss: 0.2501 - accuracy:
0.9735
41/96 [=====>...] - ETA: 0s - loss: 0.2480 - accuracy:
0.9744
47/96 [=====>...] - ETA: 0s - loss: 0.2467 - accuracy:
0.9726
53/96 [=====>...] - ETA: 0s - loss: 0.2434 - accuracy:
0.9721
57/96 [=====>...] - ETA: 0s - loss: 0.2428 - accuracy:
0.9708
63/96 [=====>...] - ETA: 0s - loss: 0.2436 - accuracy:
0.9698
68/96 [=====>...] - ETA: 0s - loss: 0.2461 - accuracy:
0.9678
72/96 [=====>...] - ETA: 0s - loss: 0.2455 - accuracy:

```

0.9663
76/96 [=====>...] - ETA: 0s - loss: 0.2501 - accuracy:
0.9643
81/96 [=====>...] - ETA: 0s - loss: 0.2476 - accuracy:
0.9647
86/96 [=====>...] - ETA: 0s - loss: 0.2476 - accuracy:
0.9651
91/96 [=====>..] - ETA: 0s - loss: 0.2444 - accuracy:
0.9665
96/96 [=====] - ETA: 0s - loss: 0.2464 - accuracy:
0.9660
96/96 [=====] - 1s 15ms/step - loss: 0.2464 - accuracy:
0.9660 - val_loss: 1.3544 - val_accuracy: 0.7259

Epoch 19/30

1/96 [...] - ETA: 2s - loss: 0.1701 - accuracy:
1.0000
5/96 [>...] - ETA: 1s - loss: 0.2727 - accuracy:
0.9810
10/96 [==>...] - ETA: 0s - loss: 0.3067 - accuracy:
0.9667
15/96 [===>...] - ETA: 0s - loss: 0.2707 - accuracy:
0.9746
20/96 [=====>...] - ETA: 0s - loss: 0.2646 - accuracy:
0.9714
25/96 [=====>...] - ETA: 0s - loss: 0.2493 - accuracy:
0.9733
30/96 [=====>...] - ETA: 0s - loss: 0.2724 - accuracy:
0.9683
35/96 [=====>...] - ETA: 0s - loss: 0.2662 - accuracy:
0.9673
40/96 [=====>...] - ETA: 0s - loss: 0.2741 - accuracy:
0.9595
45/96 [=====>...] - ETA: 0s - loss: 0.2690 - accuracy:
0.9619
50/96 [=====>...] - ETA: 0s - loss: 0.2781 - accuracy:
0.9590
55/96 [=====>...] - ETA: 0s - loss: 0.2790 - accuracy:
0.9584
60/96 [=====>...] - ETA: 0s - loss: 0.2950 - accuracy:
0.9540
65/96 [=====>...] - ETA: 0s - loss: 0.2967 - accuracy:
0.9538
69/96 [=====>...] - ETA: 0s - loss: 0.3038 - accuracy:
0.9531
74/96 [=====>...] - ETA: 0s - loss: 0.3059 - accuracy:
0.9511

80/96 [=====>...] - ETA: 0s - loss: 0.3122 - accuracy:
0.9488
86/96 [=====>...] - ETA: 0s - loss: 0.3221 - accuracy:
0.9463
91/96 [=====>..] - ETA: 0s - loss: 0.3272 - accuracy:
0.9445
96/96 [=====] - ETA: 0s - loss: 0.3280 - accuracy:
0.9445
96/96 [=====] - 1s 15ms/step - loss: 0.3280 - accuracy:
0.9445 - val_loss: 1.5257 - val_accuracy: 0.6362

Epoch 20/30

1/96 [...] - ETA: 2s - loss: 0.4493 - accuracy:
0.9048
5/96 [>...] - ETA: 1s - loss: 0.3820 - accuracy:
0.9238
10/96 [==>...] - ETA: 1s - loss: 0.3512 - accuracy:
0.9429
15/96 [===>...] - ETA: 0s - loss: 0.3541 - accuracy:
0.9429
20/96 [====>...] - ETA: 0s - loss: 0.3424 - accuracy:
0.9476
25/96 [=====>...] - ETA: 0s - loss: 0.3314 - accuracy:
0.9505
29/96 [=====>...] - ETA: 0s - loss: 0.3242 - accuracy:
0.9507
34/96 [=====>...] - ETA: 0s - loss: 0.3169 - accuracy:
0.9524
39/96 [=====>...] - ETA: 0s - loss: 0.3052 - accuracy:
0.9585
44/96 [=====>...] - ETA: 0s - loss: 0.3068 - accuracy:
0.9578
49/96 [=====>...] - ETA: 0s - loss: 0.2992 - accuracy:
0.9602
55/96 [=====>...] - ETA: 0s - loss: 0.2958 - accuracy:
0.9602
60/96 [=====>...] - ETA: 0s - loss: 0.2934 - accuracy:
0.9611
65/96 [=====>...] - ETA: 0s - loss: 0.2924 - accuracy:
0.9619
71/96 [=====>...] - ETA: 0s - loss: 0.2998 - accuracy:
0.9584
77/96 [=====>...] - ETA: 0s - loss: 0.2996 - accuracy:
0.9567
82/96 [=====>...] - ETA: 0s - loss: 0.2988 - accuracy:
0.9570
87/96 [=====>...] - ETA: 0s - loss: 0.3040 - accuracy:

0.9557
93/96 [=====>.] - ETA: 0s - loss: 0.3009 - accuracy:
0.9555
96/96 [=====] - 1s 14ms/step - loss: 0.3004 - accuracy:
0.9555 - val_loss: 1.4269 - val_accuracy: 0.6422

Epoch 21/30

1/96 [...] - ETA: 2s - loss: 0.2096 - accuracy:
0.9524
6/96 [>...] - ETA: 0s - loss: 0.3463 - accuracy:
0.9206
12/96 [==>...] - ETA: 0s - loss: 0.3951 - accuracy:
0.9286
17/96 [====>...] - ETA: 0s - loss: 0.4042 - accuracy:
0.9244
21/96 [=====>...] - ETA: 0s - loss: 0.4019 - accuracy:
0.9297
26/96 [=====>...] - ETA: 0s - loss: 0.3763 - accuracy:
0.9359
31/96 [=====>...] - ETA: 0s - loss: 0.3765 - accuracy:
0.9401
36/96 [=====>...] - ETA: 0s - loss: 0.3611 - accuracy:
0.9444
41/96 [=====>...] - ETA: 0s - loss: 0.3618 - accuracy:
0.9431
47/96 [=====>...] - ETA: 0s - loss: 0.3583 - accuracy:
0.9422
53/96 [=====>...] - ETA: 0s - loss: 0.3487 - accuracy:
0.9452
58/96 [=====>...] - ETA: 0s - loss: 0.3417 - accuracy:
0.9466
64/96 [=====>...] - ETA: 0s - loss: 0.3384 - accuracy:
0.9464
70/96 [=====>...] - ETA: 0s - loss: 0.3304 - accuracy:
0.9490
74/96 [=====>...] - ETA: 0s - loss: 0.3311 - accuracy:
0.9485
80/96 [=====>...] - ETA: 0s - loss: 0.3362 - accuracy:
0.9464
85/96 [=====>...] - ETA: 0s - loss: 0.3366 - accuracy:
0.9462
90/96 [=====>..] - ETA: 0s - loss: 0.3327 - accuracy:
0.9466
95/96 [=====>.] - ETA: 0s - loss: 0.3326 - accuracy:
0.9464
96/96 [=====] - 1s 14ms/step - loss: 0.3322 - accuracy:
0.9465 - val_loss: 1.8403 - val_accuracy: 0.7028

Epoch 22/30

1/96 [...] - ETA: 2s - loss: 0.1644 - accuracy:
1.0000
5/96 [>...] - ETA: 1s - loss: 0.2640 - accuracy:
0.9619
10/96 [==>...] - ETA: 1s - loss: 0.2649 - accuracy:
0.9619
14/96 [===>...] - ETA: 1s - loss: 0.2567 - accuracy:
0.9626
18/96 [====>...] - ETA: 1s - loss: 0.2802 - accuracy:
0.9603
22/96 [=====>...] - ETA: 0s - loss: 0.2749 - accuracy:
0.9632
26/96 [=====>...] - ETA: 0s - loss: 0.2635 - accuracy:
0.9670
31/96 [=====>...] - ETA: 0s - loss: 0.2725 - accuracy:
0.9647
35/96 [=====>...] - ETA: 0s - loss: 0.2681 - accuracy:
0.9646
39/96 [=====>...] - ETA: 0s - loss: 0.2607 - accuracy:
0.9670
43/96 [=====>...] - ETA: 0s - loss: 0.2583 - accuracy:
0.9679
47/96 [=====>...] - ETA: 0s - loss: 0.2524 - accuracy:
0.9696
51/96 [=====>...] - ETA: 0s - loss: 0.2527 - accuracy:
0.9692
55/96 [=====>...] - ETA: 0s - loss: 0.2461 - accuracy:
0.9714
59/96 [=====>...] - ETA: 0s - loss: 0.2516 - accuracy:
0.9701
63/96 [=====>...] - ETA: 0s - loss: 0.2485 - accuracy:
0.9713
67/96 [=====>...] - ETA: 0s - loss: 0.2450 - accuracy:
0.9723
72/96 [=====>...] - ETA: 0s - loss: 0.2443 - accuracy:
0.9722
76/96 [=====>...] - ETA: 0s - loss: 0.2403 - accuracy:
0.9737
81/96 [=====>...] - ETA: 0s - loss: 0.2364 - accuracy:
0.9747
85/96 [=====>...] - ETA: 0s - loss: 0.2346 - accuracy:
0.9754
89/96 [=====>...] - ETA: 0s - loss: 0.2333 - accuracy:
0.9754
93/96 [=====>.] - ETA: 0s - loss: 0.2307 - accuracy:

0.9764
96/96 [=====] - 2s 17ms/step - loss: 0.2311 - accuracy:
0.9760 - val_loss: 1.1015 - val_accuracy: 0.7284

Epoch 23/30

1/96 [...] - ETA: 2s - loss: 0.3549 - accuracy:
0.9048
5/96 [>...] - ETA: 1s - loss: 0.2179 - accuracy:
0.9714
9/96 [=>...] - ETA: 1s - loss: 0.2025 - accuracy:
0.9788
13/96 [==>...] - ETA: 1s - loss: 0.2045 - accuracy:
0.9744
17/96 [====>...] - ETA: 1s - loss: 0.1995 - accuracy:
0.9776
22/96 [=====>...] - ETA: 0s - loss: 0.1919 - accuracy:
0.9805
26/96 [=====>...] - ETA: 0s - loss: 0.2006 - accuracy:
0.9780
30/96 [=====>...] - ETA: 0s - loss: 0.2033 - accuracy:
0.9794
34/96 [=====>...] - ETA: 0s - loss: 0.2158 - accuracy:
0.9790
38/96 [=====>...] - ETA: 0s - loss: 0.2130 - accuracy:
0.9787
42/96 [=====>...] - ETA: 0s - loss: 0.2144 - accuracy:
0.9785
46/96 [=====>...] - ETA: 0s - loss: 0.2124 - accuracy:
0.9793
50/96 [=====>...] - ETA: 0s - loss: 0.2083 - accuracy:
0.9800
54/96 [=====>...] - ETA: 0s - loss: 0.2063 - accuracy:
0.9797
58/96 [=====>...] - ETA: 0s - loss: 0.2101 - accuracy:
0.9787
62/96 [=====>...] - ETA: 0s - loss: 0.2060 - accuracy:
0.9800
66/96 [=====>...] - ETA: 0s - loss: 0.2079 - accuracy:
0.9798
70/96 [=====>...] - ETA: 0s - loss: 0.2058 - accuracy:
0.9803
74/96 [=====>...] - ETA: 0s - loss: 0.2049 - accuracy:
0.9807
78/96 [=====>...] - ETA: 0s - loss: 0.2050 - accuracy:
0.9805
82/96 [=====>...] - ETA: 0s - loss: 0.2040 - accuracy:
0.9808

86/96 [=====>...] - ETA: 0s - loss: 0.2041 - accuracy:
0.9806
90/96 [=====>..] - ETA: 0s - loss: 0.2016 - accuracy:
0.9815
95/96 [=====>.] - ETA: 0s - loss: 0.2015 - accuracy:
0.9820
96/96 [=====] - 2s 17ms/step - loss: 0.2013 - accuracy:
0.9820 - val_loss: 1.2565 - val_accuracy: 0.7327

Epoch 24/30

1/96 [...] - ETA: 2s - loss: 0.3816 - accuracy:
0.9048
5/96 [>...] - ETA: 1s - loss: 0.1981 - accuracy:
0.9810
9/96 [=>...] - ETA: 1s - loss: 0.1950 - accuracy:
0.9841
13/96 [===>...] - ETA: 1s - loss: 0.1936 - accuracy:
0.9853
17/96 [====>...] - ETA: 1s - loss: 0.1919 - accuracy:
0.9832
20/96 [=====>...] - ETA: 1s - loss: 0.1895 - accuracy:
0.9833
24/96 [=====>...] - ETA: 1s - loss: 0.1819 - accuracy:
0.9861
28/96 [=====>...] - ETA: 0s - loss: 0.1799 - accuracy:
0.9864
33/96 [=====>...] - ETA: 0s - loss: 0.1811 - accuracy:
0.9841
37/96 [=====>...] - ETA: 0s - loss: 0.1799 - accuracy:
0.9846
42/96 [=====>...] - ETA: 0s - loss: 0.1855 - accuracy:
0.9807
47/96 [=====>...] - ETA: 0s - loss: 0.1812 - accuracy:
0.9818
51/96 [=====>...] - ETA: 0s - loss: 0.1841 - accuracy:
0.9804
56/96 [=====>...] - ETA: 0s - loss: 0.1888 - accuracy:
0.9787
61/96 [=====>...] - ETA: 0s - loss: 0.1877 - accuracy:
0.9789
65/96 [=====>...] - ETA: 0s - loss: 0.2001 - accuracy:
0.9751
70/96 [=====>...] - ETA: 0s - loss: 0.2036 - accuracy:
0.9735
75/96 [=====>...] - ETA: 0s - loss: 0.2064 - accuracy:
0.9727
80/96 [=====>...] - ETA: 0s - loss: 0.2067 - accuracy:

0.9732
85/96 [=====>...] - ETA: 0s - loss: 0.2150 - accuracy:
0.9709
90/96 [=====>..] - ETA: 0s - loss: 0.2125 - accuracy:
0.9720
95/96 [=====>.] - ETA: 0s - loss: 0.2164 - accuracy:
0.9704
96/96 [=====] - 1s 15ms/step - loss: 0.2162 - accuracy:
0.9705 - val_loss: 1.6266 - val_accuracy: 0.7336

Epoch 25/30

1/96 [...] - ETA: 2s - loss: 0.5192 - accuracy:
0.8571
6/96 [>...] - ETA: 0s - loss: 0.2324 - accuracy:
0.9683
12/96 [==>...] - ETA: 0s - loss: 0.2433 - accuracy:
0.9643
17/96 [====>...] - ETA: 0s - loss: 0.2249 - accuracy:
0.9664
21/96 [=====>...] - ETA: 0s - loss: 0.2398 - accuracy:
0.9546
26/96 [=====>...] - ETA: 0s - loss: 0.2463 - accuracy:
0.9542
31/96 [=====>...] - ETA: 0s - loss: 0.2429 - accuracy:
0.9570
36/96 [=====>...] - ETA: 0s - loss: 0.2586 - accuracy:
0.9563
40/96 [=====>...] - ETA: 0s - loss: 0.2610 - accuracy:
0.9560
45/96 [=====>...] - ETA: 0s - loss: 0.2632 - accuracy:
0.9545
51/96 [=====>...] - ETA: 0s - loss: 0.2634 - accuracy:
0.9561
57/96 [=====>...] - ETA: 0s - loss: 0.2621 - accuracy:
0.9574
62/96 [=====>...] - ETA: 0s - loss: 0.2612 - accuracy:
0.9555
67/96 [=====>...] - ETA: 0s - loss: 0.2609 - accuracy:
0.9566
73/96 [=====>...] - ETA: 0s - loss: 0.2617 - accuracy:
0.9569
78/96 [=====>...] - ETA: 0s - loss: 0.2593 - accuracy:
0.9573
83/96 [=====>...] - ETA: 0s - loss: 0.2553 - accuracy:
0.9581
88/96 [=====>...] - ETA: 0s - loss: 0.2558 - accuracy:
0.9578

92/96 [=====>..] - ETA: 0s - loss: 0.2586 - accuracy:
0.9581
96/96 [=====] - 1s 14ms/step - loss: 0.2567 - accuracy:
0.9585 - val_loss: 2.0961 - val_accuracy: 0.5927

Epoch 26/30

1/96 [...] - ETA: 1s - loss: 0.1939 - accuracy:
0.9524
7/96 [=>...] - ETA: 0s - loss: 0.2630 - accuracy:
0.9660
11/96 [==>...] - ETA: 0s - loss: 0.2604 - accuracy:
0.9654
16/96 [====>...] - ETA: 0s - loss: 0.2639 - accuracy:
0.9613
21/96 [=====>...] - ETA: 0s - loss: 0.2491 - accuracy:
0.9660
26/96 [=====>...] - ETA: 0s - loss: 0.2426 - accuracy:
0.9670
30/96 [=====>...] - ETA: 0s - loss: 0.2346 - accuracy:
0.9698
35/96 [=====>...] - ETA: 0s - loss: 0.2334 - accuracy:
0.9701
40/96 [=====>...] - ETA: 0s - loss: 0.2243 - accuracy:
0.9738
45/96 [=====>...] - ETA: 0s - loss: 0.2321 - accuracy:
0.9714
50/96 [=====>...] - ETA: 0s - loss: 0.2379 - accuracy:
0.9705
55/96 [=====>...] - ETA: 0s - loss: 0.2333 - accuracy:
0.9714
59/96 [=====>...] - ETA: 0s - loss: 0.2365 - accuracy:
0.9701
65/96 [=====>...] - ETA: 0s - loss: 0.2440 - accuracy:
0.9663
71/96 [=====>...] - ETA: 0s - loss: 0.2394 - accuracy:
0.9678
76/96 [=====>...] - ETA: 0s - loss: 0.2379 - accuracy:
0.9680
81/96 [=====>...] - ETA: 0s - loss: 0.2360 - accuracy:
0.9683
86/96 [=====>...] - ETA: 0s - loss: 0.2419 - accuracy:
0.9668
92/96 [=====>..] - ETA: 0s - loss: 0.2465 - accuracy:
0.9643
96/96 [=====] - 1s 14ms/step - loss: 0.2514 - accuracy:
0.9625 - val_loss: 1.3552 - val_accuracy: 0.7096

Epoch 27/30

1/96 [...] - ETA: 2s - loss: 0.1662 - accuracy:
1.0000
5/96 [>...] - ETA: 1s - loss: 0.1922 - accuracy:
0.9810
11/96 [==>...] - ETA: 0s - loss: 0.2555 - accuracy:
0.9654
16/96 [====>...] - ETA: 0s - loss: 0.2547 - accuracy:
0.9554
20/96 [=====>...] - ETA: 0s - loss: 0.2674 - accuracy:
0.9548
24/96 [=====>...] - ETA: 0s - loss: 0.2668 - accuracy:
0.9563
30/96 [=====>...] - ETA: 0s - loss: 0.2572 - accuracy:
0.9603
35/96 [=====>...] - ETA: 0s - loss: 0.2468 - accuracy:
0.9646
39/96 [=====>...] - ETA: 0s - loss: 0.2463 - accuracy:
0.9634
44/96 [=====>...] - ETA: 0s - loss: 0.2409 - accuracy:
0.9665
49/96 [=====>...] - ETA: 0s - loss: 0.2356 - accuracy:
0.9689
54/96 [=====>...] - ETA: 0s - loss: 0.2389 - accuracy:
0.9665
58/96 [=====>...] - ETA: 0s - loss: 0.2418 - accuracy:
0.9647
63/96 [=====>...] - ETA: 0s - loss: 0.2450 - accuracy:
0.9630
68/96 [=====>...] - ETA: 0s - loss: 0.2476 - accuracy:
0.9615
73/96 [=====>...] - ETA: 0s - loss: 0.2433 - accuracy:
0.9628
78/96 [=====>...] - ETA: 0s - loss: 0.2412 - accuracy:
0.9634
83/96 [=====>...] - ETA: 0s - loss: 0.2406 - accuracy:
0.9633
88/96 [=====>...] - ETA: 0s - loss: 0.2383 - accuracy:
0.9648
92/96 [=====>..] - ETA: 0s - loss: 0.2352 - accuracy:
0.9658
96/96 [=====] - 1s 15ms/step - loss: 0.2333 - accuracy:
0.9660 - val_loss: 1.3447 - val_accuracy: 0.7327

Epoch 28/30

1/96 [...] - ETA: 1s - loss: 0.1503 - accuracy:

```

1.0000
 6/96 [>...] - ETA: 1s - loss: 0.1686 - accuracy:
0.9921
11/96 [==>...] - ETA: 0s - loss: 0.1942 - accuracy:
0.9827
16/96 [====>...] - ETA: 0s - loss: 0.2051 - accuracy:
0.9821
21/96 [=====>...] - ETA: 0s - loss: 0.1954 - accuracy:
0.9841
26/96 [=====>...] - ETA: 0s - loss: 0.1974 - accuracy:
0.9817
31/96 [=====>...] - ETA: 0s - loss: 0.2036 - accuracy:
0.9785
36/96 [=====>...] - ETA: 0s - loss: 0.2138 - accuracy:
0.9775
41/96 [=====>...] - ETA: 0s - loss: 0.2177 - accuracy:
0.9756
47/96 [=====>...] - ETA: 0s - loss: 0.2147 - accuracy:
0.9757
52/96 [=====>...] - ETA: 0s - loss: 0.2232 - accuracy:
0.9734
56/96 [=====>...] - ETA: 0s - loss: 0.2272 - accuracy:
0.9728
61/96 [=====>...] - ETA: 0s - loss: 0.2314 - accuracy:
0.9711
66/96 [=====>...] - ETA: 0s - loss: 0.2386 - accuracy:
0.9683
71/96 [=====>...] - ETA: 0s - loss: 0.2496 - accuracy:
0.9651
76/96 [=====>...] - ETA: 0s - loss: 0.2555 - accuracy:
0.9630
81/96 [=====>...] - ETA: 0s - loss: 0.2605 - accuracy:
0.9624
85/96 [=====>...] - ETA: 0s - loss: 0.2589 - accuracy:
0.9630
91/96 [=====>..] - ETA: 0s - loss: 0.2622 - accuracy:
0.9618
96/96 [=====] - ETA: 0s - loss: 0.2692 - accuracy:
0.9595
96/96 [=====] - 1s 14ms/step - loss: 0.2692 - accuracy:
0.9595 - val_loss: 1.6120 - val_accuracy: 0.5884

```

Epoch 29/30

```

 1/96 [...] - ETA: 1s - loss: 0.3174 - accuracy:
0.9048
 6/96 [>...] - ETA: 0s - loss: 0.2630 - accuracy:
0.9603

```

```

12/96 [==>...] - ETA: 0s - loss: 0.3126 - accuracy:
0.9365
17/96 [====>...] - ETA: 0s - loss: 0.2858 - accuracy:
0.9468
22/96 [=====>...] - ETA: 0s - loss: 0.2844 - accuracy:
0.9524
27/96 [=====>...] - ETA: 0s - loss: 0.2772 - accuracy:
0.9559
32/96 [=====>...] - ETA: 0s - loss: 0.2738 - accuracy:
0.9568
37/96 [=====>...] - ETA: 0s - loss: 0.2606 - accuracy:
0.9614
42/96 [=====>...] - ETA: 0s - loss: 0.2614 - accuracy:
0.9615
47/96 [=====>...] - ETA: 0s - loss: 0.2666 - accuracy:
0.9585
51/96 [=====>...] - ETA: 0s - loss: 0.2651 - accuracy:
0.9599
56/96 [=====>...] - ETA: 0s - loss: 0.2602 - accuracy:
0.9609
61/96 [=====>...] - ETA: 0s - loss: 0.2594 - accuracy:
0.9610
67/96 [=====>...] - ETA: 0s - loss: 0.2621 - accuracy:
0.9588
72/96 [=====>...] - ETA: 0s - loss: 0.2615 - accuracy:
0.9590
77/96 [=====>...] - ETA: 0s - loss: 0.2572 - accuracy:
0.9604
82/96 [=====>...] - ETA: 0s - loss: 0.2544 - accuracy:
0.9623
86/96 [=====>...] - ETA: 0s - loss: 0.2502 - accuracy:
0.9640
90/96 [=====>..] - ETA: 0s - loss: 0.2514 - accuracy:
0.9635
94/96 [=====>.] - ETA: 0s - loss: 0.2516 - accuracy:
0.9640
96/96 [=====] - 1s 15ms/step - loss: 0.2512 - accuracy:
0.9645 - val_loss: 1.7201 - val_accuracy: 0.7096

```

Epoch 1/30

```

1/96 [...] - ETA: 8:50 - loss: 8.1223 - accuracy:
0.0476
5/96 [>...] - ETA: 1s - loss: 7.8534 - accuracy:
0.1619
9/96 [=>...] - ETA: 1s - loss: 7.5828 - accuracy:
0.1693
12/96 [==>...] - ETA: 1s - loss: 7.4222 - accuracy:

```


0.1706
16/96 [====>...] - ETA: 1s - loss: 7.1212 - accuracy:
0.1994
20/96 [=====>...] - ETA: 1s - loss: 7.0099 - accuracy:
0.2071
24/96 [=====>...] - ETA: 1s - loss: 6.8610 - accuracy:
0.2063
28/96 [=====>...] - ETA: 1s - loss: 6.7307 - accuracy:
0.2228
32/96 [=====>...] - ETA: 0s - loss: 6.5968 - accuracy:
0.2336
36/96 [=====>...] - ETA: 0s - loss: 6.5452 - accuracy:
0.2328
40/96 [=====>...] - ETA: 0s - loss: 6.4345 - accuracy:
0.2381
44/96 [=====>...] - ETA: 0s - loss: 6.4067 - accuracy:
0.2316
48/96 [=====>...] - ETA: 0s - loss: 6.3567 - accuracy:
0.2312
52/96 [=====>...] - ETA: 0s - loss: 6.2781 - accuracy:
0.2335
57/96 [=====>...] - ETA: 0s - loss: 6.1824 - accuracy:
0.2389
61/96 [=====>...] - ETA: 0s - loss: 6.0924 - accuracy:
0.2459
66/96 [=====>...] - ETA: 0s - loss: 5.9988 - accuracy:
0.2489
70/96 [=====>...] - ETA: 0s - loss: 5.9111 - accuracy:
0.2544
74/96 [=====>...] - ETA: 0s - loss: 5.8357 - accuracy:
0.2600
78/96 [=====>...] - ETA: 0s - loss: 5.7682 - accuracy:
0.2625
82/96 [=====>...] - ETA: 0s - loss: 5.6884 - accuracy:
0.2729
87/96 [=====>...] - ETA: 0s - loss: 5.5998 - accuracy:
0.2835
91/96 [=====>...] - ETA: 0s - loss: 5.5228 - accuracy:
0.2920
95/96 [=====>...] - ETA: 0s - loss: 5.4551 - accuracy:
0.2992
96/96 [=====>...] - ETA: 0s - loss: 5.4504 - accuracy:
0.2994
96/96 [=====>...] - 8s 26ms/step - loss: 5.4504 - accuracy:
0.2994 - val_loss: 6.0736 - val_accuracy: 0.1349

Epoch 2/30

1/96 [...] - ETA: 1s - loss: 3.5432 - accuracy:
 0.4762
 5/96 [>...] - ETA: 1s - loss: 3.7289 - accuracy:
 0.4952
 9/96 [=>...] - ETA: 1s - loss: 3.8388 - accuracy:
 0.4709
 14/96 [==>...] - ETA: 1s - loss: 3.7764 - accuracy:
 0.4932
 18/96 [====>...] - ETA: 1s - loss: 3.7916 - accuracy:
 0.4841
 22/96 [=====>...] - ETA: 0s - loss: 3.7538 - accuracy:
 0.4892
 26/96 [=====>...] - ETA: 0s - loss: 3.7128 - accuracy:
 0.5037
 30/96 [=====>...] - ETA: 0s - loss: 3.7037 - accuracy:
 0.5032
 34/96 [=====>...] - ETA: 0s - loss: 3.6653 - accuracy:
 0.5070
 38/96 [=====>...] - ETA: 0s - loss: 3.6312 - accuracy:
 0.5138
 42/96 [=====>...] - ETA: 0s - loss: 3.5718 - accuracy:
 0.5249
 46/96 [=====>...] - ETA: 0s - loss: 3.5266 - accuracy:
 0.5321
 51/96 [=====>...] - ETA: 0s - loss: 3.4952 - accuracy:
 0.5331
 55/96 [=====>...] - ETA: 0s - loss: 3.4579 - accuracy:
 0.5394
 59/96 [=====>...] - ETA: 0s - loss: 3.4218 - accuracy:
 0.5448
 63/96 [=====>...] - ETA: 0s - loss: 3.3948 - accuracy:
 0.5457
 67/96 [=====>...] - ETA: 0s - loss: 3.3572 - accuracy:
 0.5529
 71/96 [=====>...] - ETA: 0s - loss: 3.3225 - accuracy:
 0.5587
 75/96 [=====>...] - ETA: 0s - loss: 3.2971 - accuracy:
 0.5625
 80/96 [=====>...] - ETA: 0s - loss: 3.2674 - accuracy:
 0.5673
 84/96 [=====>...] - ETA: 0s - loss: 3.2386 - accuracy:
 0.5709
 88/96 [=====>...] - ETA: 0s - loss: 3.2189 - accuracy:
 0.5725
 93/96 [=====>.] - ETA: 0s - loss: 3.1724 - accuracy:
 0.5817
 96/96 [=====] - 2s 17ms/step - loss: 3.1588 - accuracy:
 0.5817 - val_loss: 3.0047 - val_accuracy: 0.5124

Epoch 3/30

1/96 [...] - ETA: 2s - loss: 2.3378 - accuracy:
0.7143
4/96 [>...] - ETA: 1s - loss: 2.1792 - accuracy:
0.8214
8/96 [=>...] - ETA: 1s - loss: 2.2781 - accuracy:
0.7500
12/96 [==>...] - ETA: 1s - loss: 2.3004 - accuracy:
0.7341
16/96 [====>...] - ETA: 1s - loss: 2.2660 - accuracy:
0.7500
20/96 [=====>...] - ETA: 1s - loss: 2.2608 - accuracy:
0.7476
25/96 [=====>...] - ETA: 0s - loss: 2.2563 - accuracy:
0.7429
29/96 [=====>...] - ETA: 0s - loss: 2.2417 - accuracy:
0.7455
34/96 [=====>...] - ETA: 0s - loss: 2.2356 - accuracy:
0.7437
39/96 [=====>...] - ETA: 0s - loss: 2.2143 - accuracy:
0.7460
43/96 [=====>...] - ETA: 0s - loss: 2.2219 - accuracy:
0.7409
47/96 [=====>...] - ETA: 0s - loss: 2.1997 - accuracy:
0.7477
51/96 [=====>...] - ETA: 0s - loss: 2.1890 - accuracy:
0.7498
56/96 [=====>...] - ETA: 0s - loss: 2.1718 - accuracy:
0.7500
60/96 [=====>...] - ETA: 0s - loss: 2.1563 - accuracy:
0.7476
64/96 [=====>...] - ETA: 0s - loss: 2.1478 - accuracy:
0.7455
68/96 [=====>...] - ETA: 0s - loss: 2.1513 - accuracy:
0.7367
72/96 [=====>...] - ETA: 0s - loss: 2.1481 - accuracy:
0.7368
76/96 [=====>...] - ETA: 0s - loss: 2.1578 - accuracy:
0.7325
81/96 [=====>...] - ETA: 0s - loss: 2.1447 - accuracy:
0.7313
85/96 [=====>...] - ETA: 0s - loss: 2.1347 - accuracy:
0.7305
89/96 [=====>...] - ETA: 0s - loss: 2.1228 - accuracy:
0.7314
93/96 [=====>.] - ETA: 0s - loss: 2.1045 - accuracy:

0.7348
96/96 [=====] - 2s 17ms/step - loss: 2.1001 - accuracy:
0.7346 - val_loss: 3.3306 - val_accuracy: 0.3040

Epoch 4/30

1/96 [...] - ETA: 1s - loss: 1.5318 - accuracy:
0.8571
6/96 [>...] - ETA: 1s - loss: 1.8076 - accuracy:
0.7540
11/96 [==>...] - ETA: 0s - loss: 1.7828 - accuracy:
0.7532
16/96 [====>...] - ETA: 0s - loss: 1.7300 - accuracy:
0.7798
20/96 [=====>...] - ETA: 0s - loss: 1.7406 - accuracy:
0.7810
24/96 [=====>...] - ETA: 0s - loss: 1.6992 - accuracy:
0.7996
29/96 [=====>...] - ETA: 0s - loss: 1.6816 - accuracy:
0.7997
34/96 [=====>...] - ETA: 0s - loss: 1.6647 - accuracy:
0.7983
38/96 [=====>...] - ETA: 0s - loss: 1.6537 - accuracy:
0.7995
42/96 [=====>...] - ETA: 0s - loss: 1.6358 - accuracy:
0.8050
46/96 [=====>...] - ETA: 0s - loss: 1.6161 - accuracy:
0.8085
50/96 [=====>...] - ETA: 0s - loss: 1.5941 - accuracy:
0.8162
54/96 [=====>...] - ETA: 0s - loss: 1.5930 - accuracy:
0.8157
58/96 [=====>...] - ETA: 0s - loss: 1.5823 - accuracy:
0.8136
63/96 [=====>...] - ETA: 0s - loss: 1.5852 - accuracy:
0.8125
68/96 [=====>...] - ETA: 0s - loss: 1.5800 - accuracy:
0.8102
72/96 [=====>...] - ETA: 0s - loss: 1.5604 - accuracy:
0.8148
76/96 [=====>...] - ETA: 0s - loss: 1.5533 - accuracy:
0.8133
80/96 [=====>...] - ETA: 0s - loss: 1.5470 - accuracy:
0.8131
85/96 [=====>...] - ETA: 0s - loss: 1.5362 - accuracy:
0.8146
89/96 [=====>...] - ETA: 0s - loss: 1.5265 - accuracy:
0.8143

93/96 [=====>.] - ETA: 0s - loss: 1.5117 - accuracy:
0.8182
96/96 [=====] - 2s 16ms/step - loss: 1.5061 - accuracy:
0.8206 - val_loss: 1.9147 - val_accuracy: 0.6789

Epoch 5/30

1/96 [...] - ETA: 2s - loss: 1.0769 - accuracy:
0.9048
4/96 [>...] - ETA: 1s - loss: 1.0437 - accuracy:
0.9167
9/96 [=>...] - ETA: 1s - loss: 1.0611 - accuracy:
0.9048
13/96 [===>...] - ETA: 1s - loss: 1.1287 - accuracy:
0.8828
17/96 [====>...] - ETA: 1s - loss: 1.1355 - accuracy:
0.8824
21/96 [=====>...] - ETA: 1s - loss: 1.1459 - accuracy:
0.8685
25/96 [=====>...] - ETA: 0s - loss: 1.1536 - accuracy:
0.8667
28/96 [=====>...] - ETA: 0s - loss: 1.1492 - accuracy:
0.8656
32/96 [=====>...] - ETA: 0s - loss: 1.1732 - accuracy:
0.8616
36/96 [=====>...] - ETA: 0s - loss: 1.1431 - accuracy:
0.8730
40/96 [=====>...] - ETA: 0s - loss: 1.1385 - accuracy:
0.8738
44/96 [=====>...] - ETA: 0s - loss: 1.1302 - accuracy:
0.8745
48/96 [=====>...] - ETA: 0s - loss: 1.1256 - accuracy:
0.8750
52/96 [=====>...] - ETA: 0s - loss: 1.1108 - accuracy:
0.8764
56/96 [=====>...] - ETA: 0s - loss: 1.0989 - accuracy:
0.8784
60/96 [=====>...] - ETA: 0s - loss: 1.0900 - accuracy:
0.8778
63/96 [=====>...] - ETA: 0s - loss: 1.0831 - accuracy:
0.8798
68/96 [=====>...] - ETA: 0s - loss: 1.0794 - accuracy:
0.8789
71/96 [=====>...] - ETA: 0s - loss: 1.0793 - accuracy:
0.8793
75/96 [=====>...] - ETA: 0s - loss: 1.0780 - accuracy:
0.8775
80/96 [=====>...] - ETA: 0s - loss: 1.0734 - accuracy:

0.8762
84/96 [=====>...] - ETA: 0s - loss: 1.0665 - accuracy:
0.8776
88/96 [=====>...] - ETA: 0s - loss: 1.0649 - accuracy:
0.8772
92/96 [=====>..] - ETA: 0s - loss: 1.0638 - accuracy:
0.8763
96/96 [=====] - ETA: 0s - loss: 1.0584 - accuracy:
0.8761
96/96 [=====] - 2s 17ms/step - loss: 1.0584 - accuracy:
0.8761 - val_loss: 1.7361 - val_accuracy: 0.6618

Epoch 6/30

1/96 [...] - ETA: 2s - loss: 0.8583 - accuracy:
0.9048
5/96 [>...] - ETA: 1s - loss: 1.0568 - accuracy:
0.8476
9/96 [=>...] - ETA: 1s - loss: 1.0433 - accuracy:
0.8360
12/96 [==>...] - ETA: 1s - loss: 1.0013 - accuracy:
0.8571
16/96 [====>...] - ETA: 1s - loss: 0.9569 - accuracy:
0.8690
19/96 [====>...] - ETA: 1s - loss: 0.9344 - accuracy:
0.8797
22/96 [=====>...] - ETA: 1s - loss: 0.9184 - accuracy:
0.8874
26/96 [=====>...] - ETA: 1s - loss: 0.9218 - accuracy:
0.8883
29/96 [=====>...] - ETA: 1s - loss: 0.9138 - accuracy:
0.8916
32/96 [=====>...] - ETA: 1s - loss: 0.8980 - accuracy:
0.8943
35/96 [=====>...] - ETA: 1s - loss: 0.9168 - accuracy:
0.8803
38/96 [=====>...] - ETA: 0s - loss: 0.9243 - accuracy:
0.8772
42/96 [=====>...] - ETA: 0s - loss: 0.9139 - accuracy:
0.8798
45/96 [=====>...] - ETA: 0s - loss: 0.9208 - accuracy:
0.8741
49/96 [=====>...] - ETA: 0s - loss: 0.9219 - accuracy:
0.8766
53/96 [=====>...] - ETA: 0s - loss: 0.9209 - accuracy:
0.8760
57/96 [=====>...] - ETA: 0s - loss: 0.9173 - accuracy:
0.8772

60/96 [=====>...] - ETA: 0s - loss: 0.9131 - accuracy:
 0.8786
 63/96 [=====>...] - ETA: 0s - loss: 0.9072 - accuracy:
 0.8791
 67/96 [=====>...] - ETA: 0s - loss: 0.9126 - accuracy:
 0.8785
 71/96 [=====>...] - ETA: 0s - loss: 0.9064 - accuracy:
 0.8799
 74/96 [=====>...] - ETA: 0s - loss: 0.9023 - accuracy:
 0.8803
 77/96 [=====>...] - ETA: 0s - loss: 0.9056 - accuracy:
 0.8788
 81/96 [=====>...] - ETA: 0s - loss: 0.8987 - accuracy:
 0.8789
 85/96 [=====>...] - ETA: 0s - loss: 0.9028 - accuracy:
 0.8756
 88/96 [=====>...] - ETA: 0s - loss: 0.9003 - accuracy:
 0.8755
 92/96 [=====>..] - ETA: 0s - loss: 0.8991 - accuracy:
 0.8763
 95/96 [=====>.] - ETA: 0s - loss: 0.8978 - accuracy:
 0.8752
 96/96 [=====] - 2s 20ms/step - loss: 0.8998 - accuracy:
 0.8746 - val_loss: 1.5803 - val_accuracy: 0.6208

Epoch 7/30

1/96 [...] - ETA: 2s - loss: 0.6580 - accuracy:
 0.9048
 5/96 [>...] - ETA: 1s - loss: 0.6926 - accuracy:
 0.8952
 8/96 [=>...] - ETA: 1s - loss: 0.6782 - accuracy:
 0.9048
 11/96 [==>...] - ETA: 1s - loss: 0.6835 - accuracy:
 0.9134
 15/96 [===>...] - ETA: 1s - loss: 0.6672 - accuracy:
 0.9175
 18/96 [====>...] - ETA: 1s - loss: 0.6640 - accuracy:
 0.9180
 21/96 [=====>...] - ETA: 1s - loss: 0.6540 - accuracy:
 0.9206
 24/96 [=====>...] - ETA: 1s - loss: 0.6469 - accuracy:
 0.9246
 27/96 [=====>...] - ETA: 1s - loss: 0.6417 - accuracy:
 0.9242
 30/96 [=====>...] - ETA: 1s - loss: 0.6440 - accuracy:
 0.9222
 33/96 [=====>...] - ETA: 1s - loss: 0.6852 - accuracy:

```

0.9091
36/96 [=====>...] - ETA: 1s - loss: 0.6826 - accuracy:
0.9087
39/96 [=====>...] - ETA: 1s - loss: 0.6697 - accuracy:
0.9133
42/96 [=====>...] - ETA: 0s - loss: 0.6711 - accuracy:
0.9127
45/96 [=====>...] - ETA: 0s - loss: 0.6620 - accuracy:
0.9164
48/96 [=====>...] - ETA: 0s - loss: 0.6601 - accuracy:
0.9157
51/96 [=====>...] - ETA: 0s - loss: 0.6582 - accuracy:
0.9150
54/96 [=====>...] - ETA: 0s - loss: 0.6550 - accuracy:
0.9171
58/96 [=====>...] - ETA: 0s - loss: 0.6524 - accuracy:
0.9154
62/96 [=====>...] - ETA: 0s - loss: 0.6494 - accuracy:
0.9147
66/96 [=====>...] - ETA: 0s - loss: 0.6498 - accuracy:
0.9149
70/96 [=====>...] - ETA: 0s - loss: 0.6488 - accuracy:
0.9156
74/96 [=====>...] - ETA: 0s - loss: 0.6474 - accuracy:
0.9157
78/96 [=====>...] - ETA: 0s - loss: 0.6489 - accuracy:
0.9151
82/96 [=====>...] - ETA: 0s - loss: 0.6462 - accuracy:
0.9164
85/96 [=====>...] - ETA: 0s - loss: 0.6439 - accuracy:
0.9165
89/96 [=====>...] - ETA: 0s - loss: 0.6367 - accuracy:
0.9187
92/96 [=====>..] - ETA: 0s - loss: 0.6367 - accuracy:
0.9187
96/96 [=====] - ETA: 0s - loss: 0.6332 - accuracy:
0.9200
96/96 [=====] - 2s 20ms/step - loss: 0.6332 - accuracy:
0.9200 - val_loss: 1.7323 - val_accuracy: 0.7045

```

Epoch 8/30

```

1/96 [...] - ETA: 2s - loss: 0.4126 - accuracy:
1.0000
5/96 [>...] - ETA: 1s - loss: 0.4776 - accuracy:
0.9524
9/96 [=>...] - ETA: 1s - loss: 0.4727 - accuracy:
0.9524

```



```

13/96 [==>...] - ETA: 1s - loss: 0.5066 - accuracy:
0.9414
17/96 [====>...] - ETA: 1s - loss: 0.5149 - accuracy:
0.9468
20/96 [=====>...] - ETA: 1s - loss: 0.5007 - accuracy:
0.9524
24/96 [=====>...] - ETA: 1s - loss: 0.5291 - accuracy:
0.9464
28/96 [=====>...] - ETA: 0s - loss: 0.5224 - accuracy:
0.9490
32/96 [=====>...] - ETA: 0s - loss: 0.5353 - accuracy:
0.9390
36/96 [=====>...] - ETA: 0s - loss: 0.5263 - accuracy:
0.9431
39/96 [=====>...] - ETA: 0s - loss: 0.5183 - accuracy:
0.9463
43/96 [=====>...] - ETA: 0s - loss: 0.5106 - accuracy:
0.9491
47/96 [=====>...] - ETA: 0s - loss: 0.5125 - accuracy:
0.9473
51/96 [=====>...] - ETA: 0s - loss: 0.5142 - accuracy:
0.9468
56/96 [=====>...] - ETA: 0s - loss: 0.5070 - accuracy:
0.9490
60/96 [=====>...] - ETA: 0s - loss: 0.5019 - accuracy:
0.9500
64/96 [=====>...] - ETA: 0s - loss: 0.4992 - accuracy:
0.9501
68/96 [=====>...] - ETA: 0s - loss: 0.4921 - accuracy:
0.9517
72/96 [=====>...] - ETA: 0s - loss: 0.4856 - accuracy:
0.9530
76/96 [=====>...] - ETA: 0s - loss: 0.4903 - accuracy:
0.9505
80/96 [=====>...] - ETA: 0s - loss: 0.4896 - accuracy:
0.9494
84/96 [=====>...] - ETA: 0s - loss: 0.4887 - accuracy:
0.9490
88/96 [=====>...] - ETA: 0s - loss: 0.4966 - accuracy:
0.9453
91/96 [=====>..] - ETA: 0s - loss: 0.4968 - accuracy:
0.9445
95/96 [=====>.] - ETA: 0s - loss: 0.4949 - accuracy:
0.9449
96/96 [=====] - 2s 18ms/step - loss: 0.4969 - accuracy:
0.9445 - val_loss: 1.5881 - val_accuracy: 0.5909

```

Epoch 9/30

1/96 [...] - ETA: 2s - loss: 0.3619 - accuracy:
 1.0000
 5/96 [>...] - ETA: 1s - loss: 0.3912 - accuracy:
 0.9714
 9/96 [=>...] - ETA: 1s - loss: 0.4148 - accuracy:
 0.9630
 13/96 [===>...] - ETA: 1s - loss: 0.4420 - accuracy:
 0.9597
 17/96 [====>...] - ETA: 1s - loss: 0.4509 - accuracy:
 0.9468
 21/96 [=====>...] - ETA: 1s - loss: 0.4387 - accuracy:
 0.9501
 25/96 [=====>...] - ETA: 0s - loss: 0.4348 - accuracy:
 0.9486
 29/96 [=====>...] - ETA: 0s - loss: 0.4300 - accuracy:
 0.9491
 34/96 [=====>...] - ETA: 0s - loss: 0.4254 - accuracy:
 0.9510
 38/96 [=====>...] - ETA: 0s - loss: 0.4313 - accuracy:
 0.9474
 42/96 [=====>...] - ETA: 0s - loss: 0.4384 - accuracy:
 0.9433
 46/96 [=====>...] - ETA: 0s - loss: 0.4314 - accuracy:
 0.9451
 50/96 [=====>...] - ETA: 0s - loss: 0.4320 - accuracy:
 0.9467
 53/96 [=====>...] - ETA: 0s - loss: 0.4285 - accuracy:
 0.9479
 57/96 [=====>...] - ETA: 0s - loss: 0.4255 - accuracy:
 0.9490
 61/96 [=====>...] - ETA: 0s - loss: 0.4200 - accuracy:
 0.9500
 66/96 [=====>...] - ETA: 0s - loss: 0.4232 - accuracy:
 0.9488
 70/96 [=====>...] - ETA: 0s - loss: 0.4249 - accuracy:
 0.9463
 75/96 [=====>...] - ETA: 0s - loss: 0.4249 - accuracy:
 0.9454
 79/96 [=====>...] - ETA: 0s - loss: 0.4277 - accuracy:
 0.9445
 83/96 [=====>...] - ETA: 0s - loss: 0.4230 - accuracy:
 0.9449
 87/96 [=====>...] - ETA: 0s - loss: 0.4193 - accuracy:
 0.9464
 92/96 [=====>..] - ETA: 0s - loss: 0.4211 - accuracy:
 0.9446
 96/96 [=====] - ETA: 0s - loss: 0.4265 - accuracy:

0.9430
96/96 [=====] - 2s 17ms/step - loss: 0.4265 - accuracy:
0.9430 - val_loss: 1.8590 - val_accuracy: 0.6652

Epoch 10/30

1/96 [...] - ETA: 2s - loss: 0.3684 - accuracy:
1.0000
6/96 [>...] - ETA: 1s - loss: 0.4446 - accuracy:
0.9365
10/96 [==>...] - ETA: 1s - loss: 0.4278 - accuracy:
0.9429
14/96 [===>...] - ETA: 1s - loss: 0.4391 - accuracy:
0.9320
18/96 [====>...] - ETA: 1s - loss: 0.4349 - accuracy:
0.9259
22/96 [=====>...] - ETA: 0s - loss: 0.4541 - accuracy:
0.9264
27/96 [=====>...] - ETA: 0s - loss: 0.4612 - accuracy:
0.9206
31/96 [=====>...] - ETA: 0s - loss: 0.4542 - accuracy:
0.9263
35/96 [=====>...] - ETA: 0s - loss: 0.4532 - accuracy:
0.9265
39/96 [=====>...] - ETA: 0s - loss: 0.4436 - accuracy:
0.9316
44/96 [=====>...] - ETA: 0s - loss: 0.4361 - accuracy:
0.9351
48/96 [=====>...] - ETA: 0s - loss: 0.4257 - accuracy:
0.9385
52/96 [=====>...] - ETA: 0s - loss: 0.4329 - accuracy:
0.9359
56/96 [=====>...] - ETA: 0s - loss: 0.4355 - accuracy:
0.9337
59/96 [=====>...] - ETA: 0s - loss: 0.4288 - accuracy:
0.9354
63/96 [=====>...] - ETA: 0s - loss: 0.4266 - accuracy:
0.9365
67/96 [=====>...] - ETA: 0s - loss: 0.4199 - accuracy:
0.9382
71/96 [=====>...] - ETA: 0s - loss: 0.4184 - accuracy:
0.9376
75/96 [=====>...] - ETA: 0s - loss: 0.4145 - accuracy:
0.9378
79/96 [=====>...] - ETA: 0s - loss: 0.4109 - accuracy:
0.9385
83/96 [=====>...] - ETA: 0s - loss: 0.4085 - accuracy:
0.9380

86/96 [=====>...] - ETA: 0s - loss: 0.4093 - accuracy:
0.9380
90/96 [=====>..] - ETA: 0s - loss: 0.4071 - accuracy:
0.9392
94/96 [=====>.] - ETA: 0s - loss: 0.4038 - accuracy:
0.9402
96/96 [=====] - 2s 17ms/step - loss: 0.4020 - accuracy:
0.9410 - val_loss: 1.2132 - val_accuracy: 0.7370

Epoch 11/30

1/96 [...] - ETA: 2s - loss: 0.2172 - accuracy:
1.0000
5/96 [>...] - ETA: 1s - loss: 0.3041 - accuracy:
0.9619
9/96 [=>...] - ETA: 1s - loss: 0.3157 - accuracy:
0.9630
13/96 [===>...] - ETA: 1s - loss: 0.3139 - accuracy:
0.9634
17/96 [====>...] - ETA: 1s - loss: 0.3182 - accuracy:
0.9580
21/96 [=====>...] - ETA: 0s - loss: 0.3086 - accuracy:
0.9615
25/96 [=====>...] - ETA: 0s - loss: 0.3152 - accuracy:
0.9581
28/96 [=====>...] - ETA: 0s - loss: 0.3108 - accuracy:
0.9592
32/96 [=====>...] - ETA: 0s - loss: 0.3059 - accuracy:
0.9628
36/96 [=====>...] - ETA: 0s - loss: 0.3085 - accuracy:
0.9616
40/96 [=====>...] - ETA: 0s - loss: 0.3075 - accuracy:
0.9619
44/96 [=====>...] - ETA: 0s - loss: 0.3144 - accuracy:
0.9610
48/96 [=====>...] - ETA: 0s - loss: 0.3208 - accuracy:
0.9593
52/96 [=====>...] - ETA: 0s - loss: 0.3195 - accuracy:
0.9597
56/96 [=====>...] - ETA: 0s - loss: 0.3160 - accuracy:
0.9609
60/96 [=====>...] - ETA: 0s - loss: 0.3170 - accuracy:
0.9595
64/96 [=====>...] - ETA: 0s - loss: 0.3269 - accuracy:
0.9546
68/96 [=====>...] - ETA: 0s - loss: 0.3232 - accuracy:
0.9552
72/96 [=====>...] - ETA: 0s - loss: 0.3308 - accuracy:

0.9537
75/96 [=====>...] - ETA: 0s - loss: 0.3299 - accuracy:
0.9549
79/96 [=====>...] - ETA: 0s - loss: 0.3286 - accuracy:
0.9560
83/96 [=====>...] - ETA: 0s - loss: 0.3282 - accuracy:
0.9564
87/96 [=====>...] - ETA: 0s - loss: 0.3288 - accuracy:
0.9562
91/96 [=====>..] - ETA: 0s - loss: 0.3262 - accuracy:
0.9560
95/96 [=====>.] - ETA: 0s - loss: 0.3247 - accuracy:
0.9564
96/96 [=====] - 2s 17ms/step - loss: 0.3243 - accuracy:
0.9565 - val_loss: 1.5755 - val_accuracy: 0.6413

Epoch 12/30

1/96 [...] - ETA: 1s - loss: 0.2309 - accuracy:
0.9524
6/96 [>...] - ETA: 1s - loss: 0.3660 - accuracy:
0.9365
10/96 [==>...] - ETA: 1s - loss: 0.3123 - accuracy:
0.9571
14/96 [===>...] - ETA: 1s - loss: 0.3324 - accuracy:
0.9524
18/96 [====>...] - ETA: 1s - loss: 0.3018 - accuracy:
0.9630
21/96 [=====>...] - ETA: 1s - loss: 0.3005 - accuracy:
0.9615
25/96 [=====>...] - ETA: 1s - loss: 0.2951 - accuracy:
0.9657
29/96 [=====>...] - ETA: 0s - loss: 0.2883 - accuracy:
0.9655
33/96 [=====>...] - ETA: 0s - loss: 0.2846 - accuracy:
0.9668
38/96 [=====>...] - ETA: 0s - loss: 0.2858 - accuracy:
0.9649
42/96 [=====>...] - ETA: 0s - loss: 0.2801 - accuracy:
0.9671
46/96 [=====>...] - ETA: 0s - loss: 0.2820 - accuracy:
0.9658
50/96 [=====>...] - ETA: 0s - loss: 0.2764 - accuracy:
0.9676
54/96 [=====>...] - ETA: 0s - loss: 0.2740 - accuracy:
0.9683
58/96 [=====>...] - ETA: 0s - loss: 0.2715 - accuracy:
0.9696

```

62/96 [=====>...] - ETA: 0s - loss: 0.2689 - accuracy:
0.9700
66/96 [=====>...] - ETA: 0s - loss: 0.2698 - accuracy:
0.9690
70/96 [=====>...] - ETA: 0s - loss: 0.2669 - accuracy:
0.9701
74/96 [=====>...] - ETA: 0s - loss: 0.2674 - accuracy:
0.9698
78/96 [=====>...] - ETA: 0s - loss: 0.2670 - accuracy:
0.9695
82/96 [=====>...] - ETA: 0s - loss: 0.2638 - accuracy:
0.9698
85/96 [=====>...] - ETA: 0s - loss: 0.2684 - accuracy:
0.9669
89/96 [=====>...] - ETA: 0s - loss: 0.2807 - accuracy:
0.9636
92/96 [=====>..] - ETA: 0s - loss: 0.2882 - accuracy:
0.9607
96/96 [=====] - ETA: 0s - loss: 0.2859 - accuracy:
0.9615
96/96 [=====] - 2s 18ms/step - loss: 0.2859 - accuracy:
0.9615 - val_loss: 1.2361 - val_accuracy: 0.7122

```

Epoch 13/30

```

1/96 [...] - ETA: 2s - loss: 0.2811 - accuracy:
0.9048
5/96 [>...] - ETA: 1s - loss: 0.2496 - accuracy:
0.9619
9/96 [=>...] - ETA: 1s - loss: 0.2144 - accuracy:
0.9788
13/96 [==>...] - ETA: 1s - loss: 0.2195 - accuracy:
0.9744
16/96 [===>...] - ETA: 1s - loss: 0.2192 - accuracy:
0.9762
19/96 [===>...] - ETA: 1s - loss: 0.2123 - accuracy:
0.9799
23/96 [=====>...] - ETA: 1s - loss: 0.2285 - accuracy:
0.9752
26/96 [=====>...] - ETA: 1s - loss: 0.2252 - accuracy:
0.9780
29/96 [=====>...] - ETA: 1s - loss: 0.2275 - accuracy:
0.9770
33/96 [=====>...] - ETA: 0s - loss: 0.2219 - accuracy:
0.9798
37/96 [=====>...] - ETA: 0s - loss: 0.2386 - accuracy:
0.9743
40/96 [=====>...] - ETA: 0s - loss: 0.2363 - accuracy:

```

0.9738
 44/96 [=====>...] - ETA: 0s - loss: 0.2484 - accuracy:
 0.9729
 48/96 [=====>...] - ETA: 0s - loss: 0.2457 - accuracy:
 0.9732
 51/96 [=====>...] - ETA: 0s - loss: 0.2437 - accuracy:
 0.9739
 54/96 [=====>...] - ETA: 0s - loss: 0.2432 - accuracy:
 0.9735
 57/96 [=====>...] - ETA: 0s - loss: 0.2405 - accuracy:
 0.9749
 60/96 [=====>...] - ETA: 0s - loss: 0.2402 - accuracy:
 0.9746
 63/96 [=====>...] - ETA: 0s - loss: 0.2433 - accuracy:
 0.9735
 67/96 [=====>...] - ETA: 0s - loss: 0.2436 - accuracy:
 0.9744
 71/96 [=====>...] - ETA: 0s - loss: 0.2438 - accuracy:
 0.9738
 74/96 [=====>...] - ETA: 0s - loss: 0.2419 - accuracy:
 0.9743
 78/96 [=====>...] - ETA: 0s - loss: 0.2434 - accuracy:
 0.9719
 82/96 [=====>...] - ETA: 0s - loss: 0.2426 - accuracy:
 0.9721
 86/96 [=====>...] - ETA: 0s - loss: 0.2453 - accuracy:
 0.9718
 90/96 [=====>..] - ETA: 0s - loss: 0.2434 - accuracy:
 0.9725
 93/96 [=====>.] - ETA: 0s - loss: 0.2409 - accuracy:
 0.9734
 96/96 [=====] - 2s 20ms/step - loss: 0.2395 - accuracy:
 0.9740 - val_loss: 1.4144 - val_accuracy: 0.6849

Epoch 14/30

1/96 [...] - ETA: 2s - loss: 0.1870 - accuracy:
 1.0000
 4/96 [>...] - ETA: 1s - loss: 0.1961 - accuracy:
 0.9881
 7/96 [=>...] - ETA: 1s - loss: 0.2358 - accuracy:
 0.9660
 10/96 [==>...] - ETA: 1s - loss: 0.2456 - accuracy:
 0.9667
 13/96 [===>...] - ETA: 1s - loss: 0.2752 - accuracy:
 0.9560
 16/96 [====>...] - ETA: 1s - loss: 0.2726 - accuracy:
 0.9524

19/96 [====>...] - ETA: 1s - loss: 0.2602 - accuracy:
 0.9574
 22/96 [====>...] - ETA: 1s - loss: 0.2520 - accuracy:
 0.9610
 25/96 [=====>...] - ETA: 1s - loss: 0.2456 - accuracy:
 0.9619
 29/96 [=====>...] - ETA: 1s - loss: 0.2636 - accuracy:
 0.9589
 33/96 [=====>...] - ETA: 1s - loss: 0.2559 - accuracy:
 0.9610
 37/96 [=====>...] - ETA: 1s - loss: 0.2543 - accuracy:
 0.9614
 41/96 [=====>...] - ETA: 0s - loss: 0.2508 - accuracy:
 0.9617
 44/96 [=====>...] - ETA: 0s - loss: 0.2550 - accuracy:
 0.9578
 47/96 [=====>...] - ETA: 0s - loss: 0.2644 - accuracy:
 0.9554
 50/96 [=====>...] - ETA: 0s - loss: 0.2641 - accuracy:
 0.9552
 53/96 [=====>...] - ETA: 0s - loss: 0.2639 - accuracy:
 0.9551
 56/96 [=====>...] - ETA: 0s - loss: 0.2695 - accuracy:
 0.9515
 59/96 [=====>...] - ETA: 0s - loss: 0.2696 - accuracy:
 0.9524
 62/96 [=====>...] - ETA: 0s - loss: 0.2732 - accuracy:
 0.9508
 65/96 [=====>...] - ETA: 0s - loss: 0.2733 - accuracy:
 0.9509
 68/96 [=====>...] - ETA: 0s - loss: 0.2772 - accuracy:
 0.9510
 71/96 [=====>...] - ETA: 0s - loss: 0.2802 - accuracy:
 0.9504
 74/96 [=====>...] - ETA: 0s - loss: 0.2773 - accuracy:
 0.9517
 77/96 [=====>...] - ETA: 0s - loss: 0.2748 - accuracy:
 0.9524
 80/96 [=====>...] - ETA: 0s - loss: 0.2725 - accuracy:
 0.9530
 83/96 [=====>...] - ETA: 0s - loss: 0.2685 - accuracy:
 0.9547
 86/96 [=====>...] - ETA: 0s - loss: 0.2659 - accuracy:
 0.9557
 89/96 [=====>...] - ETA: 0s - loss: 0.2634 - accuracy:
 0.9561
 92/96 [=====>...] - ETA: 0s - loss: 0.2600 - accuracy:
 0.9576

95/96 [=====>.] - ETA: 0s - loss: 0.2584 - accuracy:
0.9579
96/96 [=====] - 2s 25ms/step - loss: 0.2581 - accuracy:
0.9580 - val_loss: 1.3328 - val_accuracy: 0.7284

Epoch 15/30

1/96 [...] - ETA: 2s - loss: 0.1334 - accuracy:
1.0000
5/96 [>...] - ETA: 1s - loss: 0.1973 - accuracy:
0.9619
9/96 [=>...] - ETA: 1s - loss: 0.1849 - accuracy:
0.9683
13/96 [===>...] - ETA: 1s - loss: 0.1751 - accuracy:
0.9780
17/96 [====>...] - ETA: 1s - loss: 0.1765 - accuracy:
0.9776
21/96 [=====>...] - ETA: 1s - loss: 0.1741 - accuracy:
0.9773
25/96 [=====>...] - ETA: 1s - loss: 0.1925 - accuracy:
0.9771
29/96 [=====>...] - ETA: 0s - loss: 0.2005 - accuracy:
0.9737
33/96 [=====>...] - ETA: 0s - loss: 0.1938 - accuracy:
0.9769
36/96 [=====>...] - ETA: 0s - loss: 0.1894 - accuracy:
0.9788
39/96 [=====>...] - ETA: 0s - loss: 0.1875 - accuracy:
0.9805
43/96 [=====>...] - ETA: 0s - loss: 0.1964 - accuracy:
0.9779
46/96 [=====>...] - ETA: 0s - loss: 0.1925 - accuracy:
0.9793
50/96 [=====>...] - ETA: 0s - loss: 0.1960 - accuracy:
0.9781
54/96 [=====>...] - ETA: 0s - loss: 0.1930 - accuracy:
0.9797
58/96 [=====>...] - ETA: 0s - loss: 0.1890 - accuracy:
0.9811
62/96 [=====>...] - ETA: 0s - loss: 0.1920 - accuracy:
0.9808
66/96 [=====>...] - ETA: 0s - loss: 0.1926 - accuracy:
0.9805
70/96 [=====>...] - ETA: 0s - loss: 0.1925 - accuracy:
0.9810
73/96 [=====>...] - ETA: 0s - loss: 0.1924 - accuracy:
0.9804
77/96 [=====>...] - ETA: 0s - loss: 0.1937 - accuracy:

0.9790
81/96 [=====>...] - ETA: 0s - loss: 0.1916 - accuracy:
0.9800
85/96 [=====>...] - ETA: 0s - loss: 0.1891 - accuracy:
0.9804
89/96 [=====>...] - ETA: 0s - loss: 0.1901 - accuracy:
0.9797
93/96 [=====>.] - ETA: 0s - loss: 0.1888 - accuracy:
0.9805
96/96 [=====] - 2s 18ms/step - loss: 0.1880 - accuracy:
0.9810 - val_loss: 1.4825 - val_accuracy: 0.7165

Epoch 1/30

1/96 [...] - ETA: 5:03 - loss: 7.7009 - accuracy:
0.0952
6/96 [>...] - ETA: 1s - loss: 7.7449 - accuracy:
0.1508
10/96 [==>...] - ETA: 1s - loss: 7.5132 - accuracy:
0.1524
15/96 [===>...] - ETA: 0s - loss: 7.2396 - accuracy:
0.1683
20/96 [====>...] - ETA: 0s - loss: 6.9257 - accuracy:
0.2071
26/96 [=====>...] - ETA: 0s - loss: 6.7001 - accuracy:
0.2198
31/96 [=====>...] - ETA: 0s - loss: 6.5062 - accuracy:
0.2320
35/96 [=====>...] - ETA: 0s - loss: 6.3815 - accuracy:
0.2381
40/96 [=====>...] - ETA: 0s - loss: 6.2526 - accuracy:
0.2452
46/96 [=====>...] - ETA: 0s - loss: 6.0884 - accuracy:
0.2640
51/96 [=====>...] - ETA: 0s - loss: 5.9955 - accuracy:
0.2633
56/96 [=====>...] - ETA: 0s - loss: 5.9081 - accuracy:
0.2704
62/96 [=====>...] - ETA: 0s - loss: 5.8117 - accuracy:
0.2750
67/96 [=====>...] - ETA: 0s - loss: 5.7327 - accuracy:
0.2822
72/96 [=====>...] - ETA: 0s - loss: 5.6542 - accuracy:
0.2897
78/96 [=====>...] - ETA: 0s - loss: 5.5774 - accuracy:
0.2930
83/96 [=====>...] - ETA: 0s - loss: 5.5075 - accuracy:
0.2960

88/96 [=====>...] - ETA: 0s - loss: 5.4510 - accuracy:
0.2992
92/96 [=====>..] - ETA: 0s - loss: 5.4087 - accuracy:
0.3018
96/96 [=====] - 5s 18ms/step - loss: 5.3705 - accuracy:
0.3048 - val_loss: 5.8966 - val_accuracy: 0.2340

Epoch 2/30

1/96 [...] - ETA: 2s - loss: 3.8115 - accuracy:
0.5714
6/96 [>...] - ETA: 0s - loss: 3.9718 - accuracy:
0.5000
12/96 [==>...] - ETA: 0s - loss: 3.8955 - accuracy:
0.5000
17/96 [====>...] - ETA: 0s - loss: 3.9097 - accuracy:
0.4818
22/96 [=====>...] - ETA: 0s - loss: 3.8994 - accuracy:
0.4719
27/96 [=====>...] - ETA: 0s - loss: 3.8849 - accuracy:
0.4709
32/96 [=====>...] - ETA: 0s - loss: 3.8286 - accuracy:
0.4940
38/96 [=====>...] - ETA: 0s - loss: 3.8063 - accuracy:
0.4862
43/96 [=====>...] - ETA: 0s - loss: 3.7862 - accuracy:
0.4806
48/96 [=====>...] - ETA: 0s - loss: 3.7966 - accuracy:
0.4692
52/96 [=====>...] - ETA: 0s - loss: 3.7767 - accuracy:
0.4753
57/96 [=====>...] - ETA: 0s - loss: 3.7448 - accuracy:
0.4779
63/96 [=====>...] - ETA: 0s - loss: 3.7118 - accuracy:
0.4837
68/96 [=====>...] - ETA: 0s - loss: 3.6878 - accuracy:
0.4846
74/96 [=====>...] - ETA: 0s - loss: 3.6603 - accuracy:
0.4852
79/96 [=====>...] - ETA: 0s - loss: 3.6172 - accuracy:
0.4937
85/96 [=====>...] - ETA: 0s - loss: 3.5874 - accuracy:
0.4936
90/96 [=====>..] - ETA: 0s - loss: 3.5527 - accuracy:
0.5011
95/96 [=====>.] - ETA: 0s - loss: 3.5247 - accuracy:
0.5033
96/96 [=====] - 1s 14ms/step - loss: 3.5236 - accuracy:

0.5037 - val_loss: 3.4734 - val_accuracy: 0.3903

Epoch 3/30

1/96 [...] - ETA: 2s - loss: 2.6874 - accuracy:
0.6667
5/96 [>...] - ETA: 1s - loss: 2.9975 - accuracy:
0.5810
10/96 [==>...] - ETA: 1s - loss: 2.8815 - accuracy:
0.6000
16/96 [====>...] - ETA: 0s - loss: 2.7977 - accuracy:
0.6071
22/96 [=====>...] - ETA: 0s - loss: 2.8467 - accuracy:
0.5909
28/96 [=====>...] - ETA: 0s - loss: 2.7724 - accuracy:
0.6173
34/96 [=====>...] - ETA: 0s - loss: 2.7461 - accuracy:
0.6162
40/96 [=====>...] - ETA: 0s - loss: 2.7260 - accuracy:
0.6190
46/96 [=====>...] - ETA: 0s - loss: 2.6933 - accuracy:
0.6232
52/96 [=====>...] - ETA: 0s - loss: 2.6598 - accuracy:
0.6310
56/96 [=====>...] - ETA: 0s - loss: 2.6477 - accuracy:
0.6301
61/96 [=====>...] - ETA: 0s - loss: 2.6348 - accuracy:
0.6292
67/96 [=====>...] - ETA: 0s - loss: 2.6195 - accuracy:
0.6290
73/96 [=====>...] - ETA: 0s - loss: 2.5900 - accuracy:
0.6334
79/96 [=====>...] - ETA: 0s - loss: 2.5712 - accuracy:
0.6341
84/96 [=====>...] - ETA: 0s - loss: 2.5536 - accuracy:
0.6349
89/96 [=====>...] - ETA: 0s - loss: 2.5443 - accuracy:
0.6340
94/96 [=====>.] - ETA: 0s - loss: 2.5374 - accuracy:
0.6322
96/96 [=====] - 1s 14ms/step - loss: 2.5340 - accuracy:
0.6322 - val_loss: 2.9604 - val_accuracy: 0.4415

Epoch 4/30

1/96 [...] - ETA: 2s - loss: 1.9174 - accuracy:
0.7619
5/96 [>...] - ETA: 1s - loss: 1.8445 - accuracy:

0.7905
10/96 [==>...] - ETA: 1s - loss: 2.0341 - accuracy:
0.7143
14/96 [===>...] - ETA: 1s - loss: 2.0221 - accuracy:
0.7177
18/96 [====>...] - ETA: 0s - loss: 2.0227 - accuracy:
0.7249
23/96 [=====>...] - ETA: 0s - loss: 2.0322 - accuracy:
0.7226
27/96 [=====>...] - ETA: 0s - loss: 2.0145 - accuracy:
0.7266
31/96 [=====>...] - ETA: 0s - loss: 2.0204 - accuracy:
0.7250
35/96 [=====>...] - ETA: 0s - loss: 2.0196 - accuracy:
0.7224
40/96 [=====>...] - ETA: 0s - loss: 2.0116 - accuracy:
0.7155
45/96 [=====>...] - ETA: 0s - loss: 1.9878 - accuracy:
0.7217
50/96 [=====>...] - ETA: 0s - loss: 1.9712 - accuracy:
0.7267
55/96 [=====>...] - ETA: 0s - loss: 1.9752 - accuracy:
0.7247
60/96 [=====>...] - ETA: 0s - loss: 1.9585 - accuracy:
0.7254
65/96 [=====>...] - ETA: 0s - loss: 1.9464 - accuracy:
0.7238
71/96 [=====>...] - ETA: 0s - loss: 1.9406 - accuracy:
0.7250
76/96 [=====>...] - ETA: 0s - loss: 1.9329 - accuracy:
0.7237
80/96 [=====>...] - ETA: 0s - loss: 1.9195 - accuracy:
0.7262
84/96 [=====>...] - ETA: 0s - loss: 1.9290 - accuracy:
0.7245
88/96 [=====>...] - ETA: 0s - loss: 1.9457 - accuracy:
0.7181
93/96 [=====>.] - ETA: 0s - loss: 1.9470 - accuracy:
0.7153
96/96 [=====] - 1s 15ms/step - loss: 1.9428 - accuracy:
0.7156 - val_loss: 2.3464 - val_accuracy: 0.5389

Epoch 5/30

1/96 [...] - ETA: 2s - loss: 1.6023 - accuracy:
0.7619
5/96 [>...] - ETA: 1s - loss: 1.6138 - accuracy:
0.7714

9/96 [=>...] - ETA: 1s - loss: 1.6505 - accuracy:
 0.7672
 13/96 [==>...] - ETA: 1s - loss: 1.6155 - accuracy:
 0.7839
 17/96 [===>...] - ETA: 1s - loss: 1.6265 - accuracy:
 0.7731
 21/96 [====>...] - ETA: 1s - loss: 1.6139 - accuracy:
 0.7710
 26/96 [=====>...] - ETA: 0s - loss: 1.6029 - accuracy:
 0.7692
 30/96 [=====>...] - ETA: 0s - loss: 1.5920 - accuracy:
 0.7778
 34/96 [=====>...] - ETA: 0s - loss: 1.5758 - accuracy:
 0.7815
 39/96 [=====>...] - ETA: 0s - loss: 1.5743 - accuracy:
 0.7790
 44/96 [=====>...] - ETA: 0s - loss: 1.5735 - accuracy:
 0.7749
 48/96 [=====>...] - ETA: 0s - loss: 1.5905 - accuracy:
 0.7659
 52/96 [=====>...] - ETA: 0s - loss: 1.5723 - accuracy:
 0.7711
 56/96 [=====>...] - ETA: 0s - loss: 1.5622 - accuracy:
 0.7747
 61/96 [=====>...] - ETA: 0s - loss: 1.5526 - accuracy:
 0.7760
 65/96 [=====>...] - ETA: 0s - loss: 1.5478 - accuracy:
 0.7758
 70/96 [=====>...] - ETA: 0s - loss: 1.5499 - accuracy:
 0.7741
 75/96 [=====>...] - ETA: 0s - loss: 1.5537 - accuracy:
 0.7695
 80/96 [=====>...] - ETA: 0s - loss: 1.5507 - accuracy:
 0.7690
 84/96 [=====>...] - ETA: 0s - loss: 1.5473 - accuracy:
 0.7664
 88/96 [=====>...] - ETA: 0s - loss: 1.5356 - accuracy:
 0.7673
 92/96 [=====>..] - ETA: 0s - loss: 1.5369 - accuracy:
 0.7671
 96/96 [=====] - 2s 16ms/step - loss: 1.5316 - accuracy:
 0.7676 - val_loss: 2.0635 - val_accuracy: 0.5551

Epoch 6/30

1/96 [...] - ETA: 2s - loss: 1.3218 - accuracy:
 0.7619
 5/96 [>...] - ETA: 1s - loss: 1.3483 - accuracy:

0.7810
10/96 [==>...] - ETA: 1s - loss: 1.3791 - accuracy:
0.7619
16/96 [====>...] - ETA: 0s - loss: 1.3363 - accuracy:
0.7857
21/96 [=====>...] - ETA: 0s - loss: 1.3519 - accuracy:
0.7823
27/96 [=====>...] - ETA: 0s - loss: 1.3002 - accuracy:
0.8042
31/96 [=====>...] - ETA: 0s - loss: 1.3159 - accuracy:
0.7972
36/96 [=====>...] - ETA: 0s - loss: 1.2869 - accuracy:
0.8095
41/96 [=====>...] - ETA: 0s - loss: 1.2808 - accuracy:
0.8060
46/96 [=====>...] - ETA: 0s - loss: 1.2751 - accuracy:
0.8075
51/96 [=====>...] - ETA: 0s - loss: 1.2607 - accuracy:
0.8114
56/96 [=====>...] - ETA: 0s - loss: 1.2533 - accuracy:
0.8129
61/96 [=====>...] - ETA: 0s - loss: 1.2632 - accuracy:
0.8119
66/96 [=====>...] - ETA: 0s - loss: 1.2612 - accuracy:
0.8117
72/96 [=====>...] - ETA: 0s - loss: 1.2574 - accuracy:
0.8122
78/96 [=====>...] - ETA: 0s - loss: 1.2569 - accuracy:
0.8120
84/96 [=====>...] - ETA: 0s - loss: 1.2395 - accuracy:
0.8152
90/96 [=====>..] - ETA: 0s - loss: 1.2326 - accuracy:
0.8169
96/96 [=====] - ETA: 0s - loss: 1.2272 - accuracy:
0.8171
96/96 [=====] - 1s 14ms/step - loss: 1.2272 - accuracy:
0.8171 - val_loss: 1.8805 - val_accuracy: 0.5816

Epoch 7/30

1/96 [...] - ETA: 2s - loss: 0.8383 - accuracy:
0.9048
5/96 [>...] - ETA: 1s - loss: 1.0318 - accuracy:
0.8095
11/96 [==>...] - ETA: 0s - loss: 1.0930 - accuracy:
0.8052
17/96 [====>...] - ETA: 0s - loss: 1.1259 - accuracy:
0.8039

22/96 [====>...] - ETA: 0s - loss: 1.1123 - accuracy:
 0.8074
 28/96 [=====>...] - ETA: 0s - loss: 1.0852 - accuracy:
 0.8180
 33/96 [=====>...] - ETA: 0s - loss: 1.1011 - accuracy:
 0.8081
 39/96 [======>...] - ETA: 0s - loss: 1.0866 - accuracy:
 0.8181
 45/96 [======>...] - ETA: 0s - loss: 1.0888 - accuracy:
 0.8233
 50/96 [======>...] - ETA: 0s - loss: 1.0888 - accuracy:
 0.8210
 56/96 [======>...] - ETA: 0s - loss: 1.0697 - accuracy:
 0.8265
 62/96 [======>...] - ETA: 0s - loss: 1.0706 - accuracy:
 0.8226
 68/96 [======>...] - ETA: 0s - loss: 1.0654 - accuracy:
 0.8249
 74/96 [======>...] - ETA: 0s - loss: 1.0629 - accuracy:
 0.8275
 80/96 [======>...] - ETA: 0s - loss: 1.0612 - accuracy:
 0.8274
 86/96 [======>...] - ETA: 0s - loss: 1.0674 - accuracy:
 0.8234
 91/96 [======>..] - ETA: 0s - loss: 1.0653 - accuracy:
 0.8242
 96/96 [=====] - 1s 13ms/step - loss: 1.0605 - accuracy:
 0.8256 - val_loss: 1.7244 - val_accuracy: 0.5986

Epoch 8/30

1/96 [...] - ETA: 1s - loss: 0.8458 - accuracy:
 0.9048
 7/96 [=>...] - ETA: 0s - loss: 0.9754 - accuracy:
 0.8299
 13/96 [==>...] - ETA: 0s - loss: 0.9934 - accuracy:
 0.8242
 18/96 [====>...] - ETA: 0s - loss: 0.9809 - accuracy:
 0.8254
 24/96 [=====>...] - ETA: 0s - loss: 0.9765 - accuracy:
 0.8313
 30/96 [=====>...] - ETA: 0s - loss: 0.9583 - accuracy:
 0.8365
 36/96 [======>...] - ETA: 0s - loss: 0.9413 - accuracy:
 0.8492
 42/96 [======>...] - ETA: 0s - loss: 0.9420 - accuracy:
 0.8458
 48/96 [======>...] - ETA: 0s - loss: 0.9333 - accuracy:

0.8482
54/96 [=====>...] - ETA: 0s - loss: 0.9338 - accuracy:
0.8501
60/96 [=====>...] - ETA: 0s - loss: 0.9228 - accuracy:
0.8516
65/96 [=====>...] - ETA: 0s - loss: 0.9138 - accuracy:
0.8564
71/96 [=====>...] - ETA: 0s - loss: 0.9128 - accuracy:
0.8592
76/96 [=====>...] - ETA: 0s - loss: 0.9081 - accuracy:
0.8615
82/96 [=====>...] - ETA: 0s - loss: 0.9072 - accuracy:
0.8600
88/96 [=====>...] - ETA: 0s - loss: 0.9055 - accuracy:
0.8571
94/96 [=====>.] - ETA: 0s - loss: 0.9049 - accuracy:
0.8556
96/96 [=====] - 1s 13ms/step - loss: 0.9012 - accuracy:
0.8571 - val_loss: 1.5693 - val_accuracy: 0.6473

Epoch 9/30

1/96 [...] - ETA: 2s - loss: 0.6893 - accuracy:
0.9048
6/96 [>...] - ETA: 0s - loss: 0.7593 - accuracy:
0.8968
12/96 [==>...] - ETA: 0s - loss: 0.7645 - accuracy:
0.8968
18/96 [====>...] - ETA: 0s - loss: 0.7848 - accuracy:
0.8889
24/96 [=====>...] - ETA: 0s - loss: 0.7699 - accuracy:
0.8909
28/96 [=====>...] - ETA: 0s - loss: 0.7963 - accuracy:
0.8827
34/96 [=====>...] - ETA: 0s - loss: 0.7903 - accuracy:
0.8838
38/96 [=====>...] - ETA: 0s - loss: 0.8102 - accuracy:
0.8772
44/96 [=====>...] - ETA: 0s - loss: 0.8053 - accuracy:
0.8788
49/96 [=====>...] - ETA: 0s - loss: 0.7931 - accuracy:
0.8824
53/96 [=====>...] - ETA: 0s - loss: 0.7877 - accuracy:
0.8841
59/96 [=====>...] - ETA: 0s - loss: 0.8089 - accuracy:
0.8773
64/96 [=====>...] - ETA: 0s - loss: 0.8022 - accuracy:
0.8757

70/96 [=====>...] - ETA: 0s - loss: 0.8066 - accuracy:
0.8728
75/96 [=====>...] - ETA: 0s - loss: 0.7985 - accuracy:
0.8749
81/96 [=====>...] - ETA: 0s - loss: 0.7936 - accuracy:
0.8742
87/96 [=====>...] - ETA: 0s - loss: 0.7961 - accuracy:
0.8752
93/96 [=====>.] - ETA: 0s - loss: 0.7996 - accuracy:
0.8735
96/96 [=====] - 1s 13ms/step - loss: 0.8012 - accuracy:
0.8721 - val_loss: 1.6371 - val_accuracy: 0.6695

Epoch 10/30

1/96 [...] - ETA: 1s - loss: 0.7335 - accuracy:
0.8571
6/96 [>...] - ETA: 0s - loss: 0.7223 - accuracy:
0.8730
11/96 [==>...] - ETA: 0s - loss: 0.7480 - accuracy:
0.8615
17/96 [====>...] - ETA: 0s - loss: 0.7729 - accuracy:
0.8515
23/96 [=====>...] - ETA: 0s - loss: 0.7611 - accuracy:
0.8613
29/96 [=====>...] - ETA: 0s - loss: 0.7406 - accuracy:
0.8736
33/96 [=====>...] - ETA: 0s - loss: 0.7427 - accuracy:
0.8730
38/96 [=====>...] - ETA: 0s - loss: 0.7326 - accuracy:
0.8772
44/96 [=====>...] - ETA: 0s - loss: 0.7282 - accuracy:
0.8799
50/96 [=====>...] - ETA: 0s - loss: 0.7141 - accuracy:
0.8857
56/96 [=====>...] - ETA: 0s - loss: 0.7050 - accuracy:
0.8920
60/96 [=====>...] - ETA: 0s - loss: 0.7065 - accuracy:
0.8921
66/96 [=====>...] - ETA: 0s - loss: 0.7102 - accuracy:
0.8896
71/96 [=====>...] - ETA: 0s - loss: 0.7124 - accuracy:
0.8873
76/96 [=====>...] - ETA: 0s - loss: 0.7101 - accuracy:
0.8872
82/96 [=====>...] - ETA: 0s - loss: 0.7093 - accuracy:
0.8879
88/96 [=====>...] - ETA: 0s - loss: 0.7150 - accuracy:

0.8837
94/96 [=====>.] - ETA: 0s - loss: 0.7142 - accuracy:
0.8835
96/96 [=====] - 1s 13ms/step - loss: 0.7128 - accuracy:
0.8836 - val_loss: 1.7729 - val_accuracy: 0.5995

Epoch 11/30

1/96 [...] - ETA: 2s - loss: 0.6927 - accuracy:
0.8095
6/96 [>...] - ETA: 0s - loss: 0.5722 - accuracy:
0.9206
11/96 [==>...] - ETA: 0s - loss: 0.6327 - accuracy:
0.9048
17/96 [====>...] - ETA: 0s - loss: 0.6281 - accuracy:
0.9076
22/96 [=====>...] - ETA: 0s - loss: 0.6069 - accuracy:
0.9177
27/96 [=====>...] - ETA: 0s - loss: 0.6063 - accuracy:
0.9171
32/96 [=====>...] - ETA: 0s - loss: 0.6040 - accuracy:
0.9196
37/96 [=====>...] - ETA: 0s - loss: 0.6091 - accuracy:
0.9151
42/96 [=====>...] - ETA: 0s - loss: 0.6167 - accuracy:
0.9150
47/96 [=====>...] - ETA: 0s - loss: 0.6142 - accuracy:
0.9159
52/96 [=====>...] - ETA: 0s - loss: 0.6262 - accuracy:
0.9148
57/96 [=====>...] - ETA: 0s - loss: 0.6185 - accuracy:
0.9165
62/96 [=====>...] - ETA: 0s - loss: 0.6278 - accuracy:
0.9086
68/96 [=====>...] - ETA: 0s - loss: 0.6299 - accuracy:
0.9083
74/96 [=====>...] - ETA: 0s - loss: 0.6299 - accuracy:
0.9073
80/96 [=====>...] - ETA: 0s - loss: 0.6277 - accuracy:
0.9077
85/96 [=====>...] - ETA: 0s - loss: 0.6340 - accuracy:
0.9064
91/96 [=====>..] - ETA: 0s - loss: 0.6402 - accuracy:
0.9032
96/96 [=====] - ETA: 0s - loss: 0.6466 - accuracy:
0.9000
96/96 [=====] - 1s 14ms/step - loss: 0.6466 - accuracy:
0.9000 - val_loss: 1.9627 - val_accuracy: 0.5858

Epoch 12/30

1/96 [...] - ETA: 1s - loss: 0.6402 - accuracy:
0.9048
6/96 [>...] - ETA: 0s - loss: 0.6278 - accuracy:
0.9127
12/96 [==>...] - ETA: 0s - loss: 0.6306 - accuracy:
0.9048
17/96 [====>...] - ETA: 0s - loss: 0.6198 - accuracy:
0.9020
22/96 [=====>...] - ETA: 0s - loss: 0.6107 - accuracy:
0.9069
28/96 [=====>...] - ETA: 0s - loss: 0.6255 - accuracy:
0.9065
33/96 [=====>...] - ETA: 0s - loss: 0.6237 - accuracy:
0.9076
38/96 [=====>...] - ETA: 0s - loss: 0.6424 - accuracy:
0.8997
44/96 [=====>...] - ETA: 0s - loss: 0.6494 - accuracy:
0.8983
50/96 [=====>...] - ETA: 0s - loss: 0.6510 - accuracy:
0.8952
55/96 [=====>...] - ETA: 0s - loss: 0.6466 - accuracy:
0.8970
61/96 [=====>...] - ETA: 0s - loss: 0.6362 - accuracy:
0.9009
67/96 [=====>...] - ETA: 0s - loss: 0.6355 - accuracy:
0.9033
73/96 [=====>...] - ETA: 0s - loss: 0.6334 - accuracy:
0.9041
78/96 [=====>...] - ETA: 0s - loss: 0.6303 - accuracy:
0.9054
84/96 [=====>...] - ETA: 0s - loss: 0.6358 - accuracy:
0.9025
90/96 [=====>..] - ETA: 0s - loss: 0.6403 - accuracy:
0.9000
96/96 [=====] - ETA: 0s - loss: 0.6428 - accuracy:
0.8996
96/96 [=====] - 1s 13ms/step - loss: 0.6428 - accuracy:
0.8996 - val_loss: 1.7340 - val_accuracy: 0.6447

Epoch 13/30

1/96 [...] - ETA: 1s - loss: 0.4768 - accuracy:
1.0000
7/96 [=>...] - ETA: 0s - loss: 0.6110 - accuracy:
0.9116

12/96 [==>...] - ETA: 0s - loss: 0.5772 - accuracy:
 0.9206
 16/96 [====>...] - ETA: 0s - loss: 0.5669 - accuracy:
 0.9226
 21/96 [=====>...] - ETA: 0s - loss: 0.5630 - accuracy:
 0.9274
 27/96 [=====>...] - ETA: 0s - loss: 0.5681 - accuracy:
 0.9277
 32/96 [=====>...] - ETA: 0s - loss: 0.5563 - accuracy:
 0.9315
 37/96 [=====>...] - ETA: 0s - loss: 0.5563 - accuracy:
 0.9318
 41/96 [=====>...] - ETA: 0s - loss: 0.5548 - accuracy:
 0.9303
 46/96 [=====>...] - ETA: 0s - loss: 0.5712 - accuracy:
 0.9265
 51/96 [=====>...] - ETA: 0s - loss: 0.5709 - accuracy:
 0.9244
 57/96 [=====>...] - ETA: 0s - loss: 0.5673 - accuracy:
 0.9256
 63/96 [=====>...] - ETA: 0s - loss: 0.5612 - accuracy:
 0.9274
 68/96 [=====>...] - ETA: 0s - loss: 0.5676 - accuracy:
 0.9230
 74/96 [=====>...] - ETA: 0s - loss: 0.5696 - accuracy:
 0.9221
 80/96 [=====>...] - ETA: 0s - loss: 0.5691 - accuracy:
 0.9220
 86/96 [=====>...] - ETA: 0s - loss: 0.5692 - accuracy:
 0.9230
 91/96 [=====>..] - ETA: 0s - loss: 0.5662 - accuracy:
 0.9236
 96/96 [=====] - ETA: 0s - loss: 0.5745 - accuracy:
 0.9215
 96/96 [=====] - 1s 13ms/step - loss: 0.5745 - accuracy:
 0.9215 - val_loss: 1.5994 - val_accuracy: 0.6311

Epoch 14/30

1/96 [...] - ETA: 1s - loss: 0.4395 - accuracy:
 0.9524
 6/96 [>...] - ETA: 1s - loss: 0.5333 - accuracy:
 0.9048
 11/96 [==>...] - ETA: 0s - loss: 0.5258 - accuracy:
 0.9221
 16/96 [====>...] - ETA: 0s - loss: 0.5238 - accuracy:
 0.9167
 21/96 [=====>...] - ETA: 0s - loss: 0.5005 - accuracy:

```

0.9297
25/96 [=====>...] - ETA: 0s - loss: 0.4991 - accuracy:
0.9314
29/96 [=====>...] - ETA: 0s - loss: 0.4960 - accuracy:
0.9294
33/96 [=====>...] - ETA: 0s - loss: 0.4966 - accuracy:
0.9278
38/96 [=====>...] - ETA: 0s - loss: 0.4986 - accuracy:
0.9286
42/96 [=====>...] - ETA: 0s - loss: 0.5061 - accuracy:
0.9240
47/96 [=====>...] - ETA: 0s - loss: 0.5109 - accuracy:
0.9220
52/96 [=====>...] - ETA: 0s - loss: 0.5290 - accuracy:
0.9176
56/96 [=====>...] - ETA: 0s - loss: 0.5259 - accuracy:
0.9209
60/96 [=====>...] - ETA: 0s - loss: 0.5264 - accuracy:
0.9206
65/96 [=====>...] - ETA: 0s - loss: 0.5213 - accuracy:
0.9216
70/96 [=====>...] - ETA: 0s - loss: 0.5395 - accuracy:
0.9184
74/96 [=====>...] - ETA: 0s - loss: 0.5426 - accuracy:
0.9176
79/96 [=====>...] - ETA: 0s - loss: 0.5470 - accuracy:
0.9174
84/96 [=====>...] - ETA: 0s - loss: 0.5509 - accuracy:
0.9155
89/96 [=====>...] - ETA: 0s - loss: 0.5558 - accuracy:
0.9149
94/96 [=====>.] - ETA: 0s - loss: 0.5642 - accuracy:
0.9108
96/96 [=====>] - 1s 16ms/step - loss: 0.5624 - accuracy:
0.9110 - val_loss: 1.7087 - val_accuracy: 0.6302

```

Epoch 1/30

```

1/96 [...] - ETA: 4:07 - loss: 24.5731 - accuracy:
0.0952
6/96 [>...] - ETA: 1s - loss: 32.7322 - accuracy:
0.1508
11/96 [==>...] - ETA: 0s - loss: 33.2398 - accuracy:
0.1558
16/96 [====>...] - ETA: 0s - loss: 30.5423 - accuracy:
0.1756
20/96 [=====>...] - ETA: 0s - loss: 28.3431 - accuracy:
0.2000

```

25/96 [=====>...] - ETA: 0s - loss: 26.2303 - accuracy:
 0.2133
 31/96 [=====>...] - ETA: 0s - loss: 24.3287 - accuracy:
 0.2197
 37/96 [=====>...] - ETA: 0s - loss: 22.9080 - accuracy:
 0.2214
 43/96 [=====>...] - ETA: 0s - loss: 21.7501 - accuracy:
 0.2303
 47/96 [=====>...] - ETA: 0s - loss: 21.1158 - accuracy:
 0.2300
 53/96 [=====>...] - ETA: 0s - loss: 20.2897 - accuracy:
 0.2336
 58/96 [=====>...] - ETA: 0s - loss: 19.6922 - accuracy:
 0.2381
 64/96 [=====>...] - ETA: 0s - loss: 19.0580 - accuracy:
 0.2478
 70/96 [=====>...] - ETA: 0s - loss: 18.5109 - accuracy:
 0.2490
 76/96 [=====>...] - ETA: 0s - loss: 18.0334 - accuracy:
 0.2469
 83/96 [=====>...] - ETA: 0s - loss: 17.5080 - accuracy:
 0.2536
 89/96 [=====>...] - ETA: 0s - loss: 17.1068 - accuracy:
 0.2563
 95/96 [=====>.] - ETA: 0s - loss: 16.7328 - accuracy:
 0.2627
 96/96 [=====>] - 4s 16ms/step - loss: 16.7149 -
 accuracy: 0.2629 - val_loss: 11.8462 - val_accuracy: 0.2058

Epoch 2/30

1/96 [...] - ETA: 1s - loss: 10.9308 - accuracy:
 0.2857
 7/96 [=>...] - ETA: 0s - loss: 10.7075 - accuracy:
 0.3537
 13/96 [==>...] - ETA: 0s - loss: 10.5780 - accuracy:
 0.3516
 19/96 [====>...] - ETA: 0s - loss: 10.4706 - accuracy:
 0.3559
 24/96 [=====>...] - ETA: 0s - loss: 10.3490 - accuracy:
 0.3532
 30/96 [=====>...] - ETA: 0s - loss: 10.2074 - accuracy:
 0.3635
 36/96 [=====>...] - ETA: 0s - loss: 10.0793 - accuracy:
 0.3651
 43/96 [=====>...] - ETA: 0s - loss: 9.9291 - accuracy:
 0.3721
 49/96 [=====>...] - ETA: 0s - loss: 9.7897 - accuracy:

0.3712
54/96 [=====>...] - ETA: 0s - loss: 9.6815 - accuracy:
0.3774
61/96 [=====>...] - ETA: 0s - loss: 9.5467 - accuracy:
0.3770
67/96 [=====>...] - ETA: 0s - loss: 9.4285 - accuracy:
0.3824
72/96 [=====>...] - ETA: 0s - loss: 9.3476 - accuracy:
0.3783
76/96 [=====>...] - ETA: 0s - loss: 9.2822 - accuracy:
0.3759
82/96 [=====>...] - ETA: 0s - loss: 9.1832 - accuracy:
0.3751
88/96 [=====>...] - ETA: 0s - loss: 9.0808 - accuracy:
0.3734
94/96 [=====>.] - ETA: 0s - loss: 8.9755 - accuracy:
0.3728
96/96 [=====] - 1s 13ms/step - loss: 8.9541 - accuracy:
0.3723 - val_loss: 7.9015 - val_accuracy: 0.2562

Epoch 3/30

1/96 [...] - ETA: 1s - loss: 7.7156 - accuracy:
0.3333
5/96 [>...] - ETA: 1s - loss: 7.3254 - accuracy:
0.3905
11/96 [==>...] - ETA: 0s - loss: 7.1511 - accuracy:
0.4156
17/96 [====>...] - ETA: 0s - loss: 7.0324 - accuracy:
0.4118
23/96 [=====>...] - ETA: 0s - loss: 6.9728 - accuracy:
0.4058
28/96 [=====>...] - ETA: 0s - loss: 6.9054 - accuracy:
0.4082
33/96 [=====>...] - ETA: 0s - loss: 6.8516 - accuracy:
0.4026
38/96 [=====>...] - ETA: 0s - loss: 6.7776 - accuracy:
0.4085
44/96 [=====>...] - ETA: 0s - loss: 6.7078 - accuracy:
0.4080
50/96 [=====>...] - ETA: 0s - loss: 6.6369 - accuracy:
0.4171
56/96 [=====>...] - ETA: 0s - loss: 6.5518 - accuracy:
0.4269
63/96 [=====>...] - ETA: 0s - loss: 6.4700 - accuracy:
0.4286
69/96 [=====>...] - ETA: 0s - loss: 6.4142 - accuracy:
0.4231

76/96 [=====>...] - ETA: 0s - loss: 6.3252 - accuracy:
0.4305
82/96 [=====>...] - ETA: 0s - loss: 6.2612 - accuracy:
0.4321
87/96 [=====>...] - ETA: 0s - loss: 6.2029 - accuracy:
0.4313
94/96 [=====>.] - ETA: 0s - loss: 6.1194 - accuracy:
0.4347
96/96 [=====] - 1s 11ms/step - loss: 6.1038 - accuracy:
0.4353 - val_loss: 5.6129 - val_accuracy: 0.3134

Epoch 4/30

1/96 [...] - ETA: 1s - loss: 4.7029 - accuracy:
0.4762
8/96 [=>...] - ETA: 0s - loss: 4.9979 - accuracy:
0.4226
14/96 [===>...] - ETA: 0s - loss: 4.9153 - accuracy:
0.4456
19/96 [====>...] - ETA: 0s - loss: 4.9107 - accuracy:
0.4436
25/96 [=====>...] - ETA: 0s - loss: 4.8494 - accuracy:
0.4419
31/96 [=====>...] - ETA: 0s - loss: 4.7787 - accuracy:
0.4654
35/96 [=====>...] - ETA: 0s - loss: 4.7477 - accuracy:
0.4707
40/96 [=====>...] - ETA: 0s - loss: 4.7021 - accuracy:
0.4798
44/96 [=====>...] - ETA: 0s - loss: 4.6804 - accuracy:
0.4762
50/96 [=====>...] - ETA: 0s - loss: 4.6194 - accuracy:
0.4857
56/96 [=====>...] - ETA: 0s - loss: 4.5812 - accuracy:
0.4872
62/96 [=====>...] - ETA: 0s - loss: 4.5493 - accuracy:
0.4823
68/96 [=====>...] - ETA: 0s - loss: 4.5002 - accuracy:
0.4860
73/96 [=====>...] - ETA: 0s - loss: 4.4868 - accuracy:
0.4808
78/96 [=====>...] - ETA: 0s - loss: 4.4694 - accuracy:
0.4774
84/96 [=====>...] - ETA: 0s - loss: 4.4411 - accuracy:
0.4773
89/96 [=====>...] - ETA: 0s - loss: 4.4100 - accuracy:
0.4831
95/96 [=====>.] - ETA: 0s - loss: 4.3679 - accuracy:

0.4857
96/96 [=====] - 1s 12ms/step - loss: 4.3662 - accuracy:
0.4853 - val_loss: 4.3956 - val_accuracy: 0.3826

Epoch 5/30

1/96 [...] - ETA: 1s - loss: 4.1805 - accuracy:
0.3810
7/96 [=>...] - ETA: 0s - loss: 3.6439 - accuracy:
0.5646
13/96 [==>...] - ETA: 0s - loss: 3.6686 - accuracy:
0.5641
18/96 [====>...] - ETA: 0s - loss: 3.6701 - accuracy:
0.5423
23/96 [=====>...] - ETA: 0s - loss: 3.6392 - accuracy:
0.5445
29/96 [=====>...] - ETA: 0s - loss: 3.5721 - accuracy:
0.5616
35/96 [=====>...] - ETA: 0s - loss: 3.5471 - accuracy:
0.5524
41/96 [=====>...] - ETA: 0s - loss: 3.5199 - accuracy:
0.5482
45/96 [=====>...] - ETA: 0s - loss: 3.5013 - accuracy:
0.5481
51/96 [=====>...] - ETA: 0s - loss: 3.4810 - accuracy:
0.5425
57/96 [=====>...] - ETA: 0s - loss: 3.4601 - accuracy:
0.5414
63/96 [=====>...] - ETA: 0s - loss: 3.4288 - accuracy:
0.5427
68/96 [=====>...] - ETA: 0s - loss: 3.4003 - accuracy:
0.5462
75/96 [=====>...] - ETA: 0s - loss: 3.3668 - accuracy:
0.5486
80/96 [=====>...] - ETA: 0s - loss: 3.3337 - accuracy:
0.5530
86/96 [=====>...] - ETA: 0s - loss: 3.3041 - accuracy:
0.5570
93/96 [=====>.] - ETA: 0s - loss: 3.2966 - accuracy:
0.5535
96/96 [=====] - 1s 12ms/step - loss: 3.2924 - accuracy:
0.5522 - val_loss: 3.5111 - val_accuracy: 0.4125

Epoch 6/30

1/96 [...] - ETA: 1s - loss: 2.7486 - accuracy:
0.6190
7/96 [=>...] - ETA: 0s - loss: 2.7074 - accuracy:

```

0.6735
14/96 [==>...] - ETA: 0s - loss: 2.8241 - accuracy:
0.6156
20/96 [====>...] - ETA: 0s - loss: 2.7935 - accuracy:
0.6214
27/96 [=====>...] - ETA: 0s - loss: 2.7769 - accuracy:
0.6085
34/96 [=====>...] - ETA: 0s - loss: 2.7456 - accuracy:
0.6022
40/96 [======>...] - ETA: 0s - loss: 2.7341 - accuracy:
0.6024
46/96 [======>...] - ETA: 0s - loss: 2.7472 - accuracy:
0.5942
52/96 [======>...] - ETA: 0s - loss: 2.7165 - accuracy:
0.5971
59/96 [======>...] - ETA: 0s - loss: 2.6770 - accuracy:
0.6021
65/96 [======>...] - ETA: 0s - loss: 2.6762 - accuracy:
0.5993
71/96 [======>...] - ETA: 0s - loss: 2.6602 - accuracy:
0.5962
77/96 [======>...] - ETA: 0s - loss: 2.6346 - accuracy:
0.5986
83/96 [======>...] - ETA: 0s - loss: 2.6268 - accuracy:
0.5984
90/96 [======>..] - ETA: 0s - loss: 2.6065 - accuracy:
0.5979
96/96 [=====] - 1s 12ms/step - loss: 2.5937 - accuracy:
0.5987 - val_loss: 3.3629 - val_accuracy: 0.3655

```

Epoch 7/30

```

1/96 [...] - ETA: 2s - loss: 2.2647 - accuracy:
0.6190
7/96 [=>...] - ETA: 0s - loss: 2.6126 - accuracy:
0.5986
13/96 [==>...] - ETA: 0s - loss: 2.4808 - accuracy:
0.6081
19/96 [====>...] - ETA: 0s - loss: 2.3529 - accuracy:
0.6241
24/96 [=====>...] - ETA: 0s - loss: 2.3275 - accuracy:
0.6270
30/96 [=====>...] - ETA: 0s - loss: 2.3570 - accuracy:
0.6095
36/96 [======>...] - ETA: 0s - loss: 2.3029 - accuracy:
0.6270
41/96 [======>...] - ETA: 0s - loss: 2.2653 - accuracy:
0.6341

```

46/96 [=====>...] - ETA: 0s - loss: 2.2443 - accuracy:
 0.6408
 51/96 [=====>...] - ETA: 0s - loss: 2.2305 - accuracy:
 0.6415
 57/96 [=====>...] - ETA: 0s - loss: 2.2272 - accuracy:
 0.6416
 63/96 [=====>...] - ETA: 0s - loss: 2.2116 - accuracy:
 0.6410
 70/96 [=====>...] - ETA: 0s - loss: 2.2107 - accuracy:
 0.6401
 75/96 [=====>...] - ETA: 0s - loss: 2.2071 - accuracy:
 0.6387
 80/96 [=====>...] - ETA: 0s - loss: 2.2077 - accuracy:
 0.6363
 85/96 [=====>...] - ETA: 0s - loss: 2.2052 - accuracy:
 0.6347
 90/96 [=====>..] - ETA: 0s - loss: 2.1901 - accuracy:
 0.6386
 95/96 [=====>.] - ETA: 0s - loss: 2.1775 - accuracy:
 0.6396
 96/96 [=====] - 1s 14ms/step - loss: 2.1790 - accuracy:
 0.6387 - val_loss: 2.6123 - val_accuracy: 0.5098

Epoch 8/30

1/96 [...] - ETA: 1s - loss: 2.1267 - accuracy:
 0.6667
 5/96 [>...] - ETA: 1s - loss: 1.8719 - accuracy:
 0.7238
 10/96 [==>...] - ETA: 1s - loss: 1.9119 - accuracy:
 0.6857
 15/96 [===>...] - ETA: 0s - loss: 1.8528 - accuracy:
 0.6794
 20/96 [=====>...] - ETA: 0s - loss: 1.8387 - accuracy:
 0.6857
 24/96 [=====>...] - ETA: 0s - loss: 1.8112 - accuracy:
 0.6944
 29/96 [=====>...] - ETA: 0s - loss: 1.7659 - accuracy:
 0.7126
 34/96 [=====>...] - ETA: 0s - loss: 1.7471 - accuracy:
 0.7157
 38/96 [=====>...] - ETA: 0s - loss: 1.7433 - accuracy:
 0.7105
 43/96 [=====>...] - ETA: 0s - loss: 1.7543 - accuracy:
 0.7043
 48/96 [=====>...] - ETA: 0s - loss: 1.7432 - accuracy:
 0.7063
 53/96 [=====>...] - ETA: 0s - loss: 1.7510 - accuracy:

```

0.7008
57/96 [=====>...] - ETA: 0s - loss: 1.7739 - accuracy:
0.6984
62/96 [=====>...] - ETA: 0s - loss: 1.7552 - accuracy:
0.7051
67/96 [=====>...] - ETA: 0s - loss: 1.7478 - accuracy:
0.7107
72/96 [=====>...] - ETA: 0s - loss: 1.7590 - accuracy:
0.7077
77/96 [=====>...] - ETA: 0s - loss: 1.7645 - accuracy:
0.7062
82/96 [=====>...] - ETA: 0s - loss: 1.7718 - accuracy:
0.7033
87/96 [=====>...] - ETA: 0s - loss: 1.7743 - accuracy:
0.7022
91/96 [=====>..] - ETA: 0s - loss: 1.7772 - accuracy:
0.7012
96/96 [=====] - ETA: 0s - loss: 1.7768 - accuracy:
0.7006
96/96 [=====] - 1s 15ms/step - loss: 1.7768 - accuracy:
0.7006 - val_loss: 2.7540 - val_accuracy: 0.4902

```

Epoch 9/30

```

1/96 [...] - ETA: 1s - loss: 1.4010 - accuracy:
0.7619
5/96 [>...] - ETA: 1s - loss: 1.6229 - accuracy:
0.7429
10/96 [==>...] - ETA: 1s - loss: 1.6616 - accuracy:
0.7381
15/96 [===>...] - ETA: 0s - loss: 1.6982 - accuracy:
0.7079
19/96 [====>...] - ETA: 0s - loss: 1.6741 - accuracy:
0.7218
23/96 [=====>...] - ETA: 0s - loss: 1.6391 - accuracy:
0.7391
29/96 [=====>...] - ETA: 0s - loss: 1.6018 - accuracy:
0.7504
34/96 [=====>...] - ETA: 0s - loss: 1.5757 - accuracy:
0.7591
39/96 [=====>...] - ETA: 0s - loss: 1.5760 - accuracy:
0.7570
44/96 [=====>...] - ETA: 0s - loss: 1.5640 - accuracy:
0.7608
49/96 [=====>...] - ETA: 0s - loss: 1.5723 - accuracy:
0.7570
54/96 [=====>...] - ETA: 0s - loss: 1.5728 - accuracy:
0.7584

```

58/96 [=====>...] - ETA: 0s - loss: 1.5795 - accuracy:
 0.7586
 62/96 [=====>...] - ETA: 0s - loss: 1.5745 - accuracy:
 0.7604
 67/96 [=====>...] - ETA: 0s - loss: 1.5735 - accuracy:
 0.7598
 72/96 [=====>...] - ETA: 0s - loss: 1.5692 - accuracy:
 0.7593
 77/96 [=====>...] - ETA: 0s - loss: 1.5834 - accuracy:
 0.7514
 82/96 [=====>...] - ETA: 0s - loss: 1.5947 - accuracy:
 0.7451
 88/96 [=====>...] - ETA: 0s - loss: 1.6002 - accuracy:
 0.7408
 92/96 [=====>..] - ETA: 0s - loss: 1.6137 - accuracy:
 0.7365
 96/96 [=====] - 1s 15ms/step - loss: 1.6135 - accuracy:
 0.7381 - val_loss: 2.6609 - val_accuracy: 0.4902

Epoch 10/30

1/96 [...] - ETA: 1s - loss: 3.2064 - accuracy:
 0.6667
 7/96 [=>...] - ETA: 0s - loss: 1.9268 - accuracy:
 0.7143
 13/96 [==>...] - ETA: 0s - loss: 1.8349 - accuracy:
 0.7143
 19/96 [===>...] - ETA: 0s - loss: 1.7757 - accuracy:
 0.7243
 24/96 [=====>...] - ETA: 0s - loss: 1.7238 - accuracy:
 0.7440
 30/96 [=====>...] - ETA: 0s - loss: 1.7213 - accuracy:
 0.7365
 36/96 [=====>...] - ETA: 0s - loss: 1.7129 - accuracy:
 0.7421
 41/96 [=====>...] - ETA: 0s - loss: 1.6975 - accuracy:
 0.7456
 46/96 [=====>...] - ETA: 0s - loss: 1.7179 - accuracy:
 0.7381
 52/96 [=====>...] - ETA: 0s - loss: 1.6884 - accuracy:
 0.7463
 58/96 [=====>...] - ETA: 0s - loss: 1.6656 - accuracy:
 0.7537
 64/96 [=====>...] - ETA: 0s - loss: 1.6446 - accuracy:
 0.7604
 70/96 [=====>...] - ETA: 0s - loss: 1.6502 - accuracy:
 0.7551
 75/96 [=====>...] - ETA: 0s - loss: 1.6377 - accuracy:

0.7556
82/96 [=====>...] - ETA: 0s - loss: 1.6126 - accuracy:
0.7625
88/96 [=====>...] - ETA: 0s - loss: 1.6051 - accuracy:
0.7603
94/96 [=====>.] - ETA: 0s - loss: 1.5874 - accuracy:
0.7634
96/96 [=====] - 1s 12ms/step - loss: 1.5881 - accuracy:
0.7626 - val_loss: 2.5133 - val_accuracy: 0.4953

Epoch 11/30

1/96 [...] - ETA: 2s - loss: 1.5255 - accuracy:
0.7143
7/96 [=>...] - ETA: 0s - loss: 1.2878 - accuracy:
0.8095
13/96 [===>...] - ETA: 0s - loss: 1.3592 - accuracy:
0.7875
19/96 [====>...] - ETA: 0s - loss: 1.3346 - accuracy:
0.7920
25/96 [=====>...] - ETA: 0s - loss: 1.3234 - accuracy:
0.7962
29/96 [=====>...] - ETA: 0s - loss: 1.3038 - accuracy:
0.8013
34/96 [=====>...] - ETA: 0s - loss: 1.2858 - accuracy:
0.8095
40/96 [=====>...] - ETA: 0s - loss: 1.2624 - accuracy:
0.8155
46/96 [=====>...] - ETA: 0s - loss: 1.2533 - accuracy:
0.8199
52/96 [=====>...] - ETA: 0s - loss: 1.2473 - accuracy:
0.8178
58/96 [=====>...] - ETA: 0s - loss: 1.2379 - accuracy:
0.8194
65/96 [=====>...] - ETA: 0s - loss: 1.2292 - accuracy:
0.8242
72/96 [=====>...] - ETA: 0s - loss: 1.2394 - accuracy:
0.8181
78/96 [=====>...] - ETA: 0s - loss: 1.2263 - accuracy:
0.8199
84/96 [=====>...] - ETA: 0s - loss: 1.2272 - accuracy:
0.8197
90/96 [=====>..] - ETA: 0s - loss: 1.2333 - accuracy:
0.8169
96/96 [=====] - 1s 13ms/step - loss: 1.2329 - accuracy:
0.8166 - val_loss: 2.1666 - val_accuracy: 0.5781

Epoch 12/30

```

1/96 [...] - ETA: 2s - loss: 1.1007 - accuracy:
0.9048
6/96 [>...] - ETA: 0s - loss: 1.1767 - accuracy:
0.8175
11/96 [==>...] - ETA: 0s - loss: 1.1134 - accuracy:
0.8312
17/96 [====>...] - ETA: 0s - loss: 1.1238 - accuracy:
0.8291
24/96 [=====>...] - ETA: 0s - loss: 1.1086 - accuracy:
0.8353
31/96 [=====>...] - ETA: 0s - loss: 1.1033 - accuracy:
0.8418
38/96 [======>...] - ETA: 0s - loss: 1.1227 - accuracy:
0.8358
43/96 [======>...] - ETA: 0s - loss: 1.1292 - accuracy:
0.8350
49/96 [======>...] - ETA: 0s - loss: 1.1166 - accuracy:
0.8367
55/96 [======>...] - ETA: 0s - loss: 1.1111 - accuracy:
0.8398
61/96 [======>...] - ETA: 0s - loss: 1.1160 - accuracy:
0.8407
67/96 [======>...] - ETA: 0s - loss: 1.1245 - accuracy:
0.8394
73/96 [======>...] - ETA: 0s - loss: 1.1409 - accuracy:
0.8311
79/96 [======>...] - ETA: 0s - loss: 1.1653 - accuracy:
0.8240
85/96 [======>...] - ETA: 0s - loss: 1.1662 - accuracy:
0.8269
91/96 [======>..] - ETA: 0s - loss: 1.1766 - accuracy:
0.8247
96/96 [=====] - 1s 13ms/step - loss: 1.1820 - accuracy:
0.8251 - val_loss: 2.4704 - val_accuracy: 0.5482

```

Epoch 13/30

```

1/96 [...] - ETA: 2s - loss: 1.2371 - accuracy:
0.8571
6/96 [>...] - ETA: 0s - loss: 1.1224 - accuracy:
0.8492
12/96 [==>...] - ETA: 0s - loss: 1.1278 - accuracy:
0.8492
18/96 [====>...] - ETA: 0s - loss: 1.1084 - accuracy:
0.8466
24/96 [=====>...] - ETA: 0s - loss: 1.1439 - accuracy:
0.8472

```


30/96 [=====>...] - ETA: 0s - loss: 1.1352 - accuracy:
 0.8508
 36/96 [=====>...] - ETA: 0s - loss: 1.1157 - accuracy:
 0.8571
 42/96 [=====>...] - ETA: 0s - loss: 1.1180 - accuracy:
 0.8526
 48/96 [=====>...] - ETA: 0s - loss: 1.0995 - accuracy:
 0.8581
 54/96 [=====>...] - ETA: 0s - loss: 1.0993 - accuracy:
 0.8554
 60/96 [=====>...] - ETA: 0s - loss: 1.0965 - accuracy:
 0.8571
 67/96 [=====>...] - ETA: 0s - loss: 1.0944 - accuracy:
 0.8571
 74/96 [=====>...] - ETA: 0s - loss: 1.0961 - accuracy:
 0.8565
 81/96 [=====>...] - ETA: 0s - loss: 1.1124 - accuracy:
 0.8489
 88/96 [=====>...] - ETA: 0s - loss: 1.1297 - accuracy:
 0.8436
 94/96 [=====>.] - ETA: 0s - loss: 1.1472 - accuracy:
 0.8369
 96/96 [=====] - 1s 12ms/step - loss: 1.1515 - accuracy:
 0.8351 - val_loss: 2.8943 - val_accuracy: 0.4868

Epoch 14/30

1/96 [...] - ETA: 1s - loss: 1.2689 - accuracy:
 0.8095
 8/96 [=>...] - ETA: 0s - loss: 1.4161 - accuracy:
 0.7857
 15/96 [===>...] - ETA: 0s - loss: 1.4503 - accuracy:
 0.7810
 21/96 [=====>...] - ETA: 0s - loss: 1.4975 - accuracy:
 0.7823
 27/96 [=====>...] - ETA: 0s - loss: 1.4686 - accuracy:
 0.7919
 33/96 [=====>...] - ETA: 0s - loss: 1.4425 - accuracy:
 0.7980
 39/96 [=====>...] - ETA: 0s - loss: 1.3979 - accuracy:
 0.8132
 44/96 [=====>...] - ETA: 0s - loss: 1.3958 - accuracy:
 0.8160
 50/96 [=====>...] - ETA: 0s - loss: 1.3660 - accuracy:
 0.8286
 56/96 [=====>...] - ETA: 0s - loss: 1.3450 - accuracy:
 0.8367
 62/96 [=====>...] - ETA: 0s - loss: 1.3344 - accuracy:

0.8387
68/96 [=====>...] - ETA: 0s - loss: 1.3304 - accuracy:
0.8396
74/96 [=====>...] - ETA: 0s - loss: 1.3178 - accuracy:
0.8417
80/96 [=====>...] - ETA: 0s - loss: 1.3155 - accuracy:
0.8399
85/96 [=====>...] - ETA: 0s - loss: 1.3019 - accuracy:
0.8431
91/96 [=====>..] - ETA: 0s - loss: 1.2975 - accuracy:
0.8446
96/96 [=====] - 1s 13ms/step - loss: 1.2957 - accuracy:
0.8441 - val_loss: 2.3509 - val_accuracy: 0.5909

Epoch 15/30

1/96 [...] - ETA: 2s - loss: 1.3305 - accuracy:
0.8095
7/96 [=>...] - ETA: 0s - loss: 1.1255 - accuracy:
0.8844
13/96 [===>...] - ETA: 0s - loss: 1.1168 - accuracy:
0.8828
19/96 [====>...] - ETA: 0s - loss: 1.1197 - accuracy:
0.8772
24/96 [=====>...] - ETA: 0s - loss: 1.0807 - accuracy:
0.8869
29/96 [=====>...] - ETA: 0s - loss: 1.0862 - accuracy:
0.8818
35/96 [=====>...] - ETA: 0s - loss: 1.0747 - accuracy:
0.8830
42/96 [=====>...] - ETA: 0s - loss: 1.0479 - accuracy:
0.8912
48/96 [=====>...] - ETA: 0s - loss: 1.0408 - accuracy:
0.8929
54/96 [=====>...] - ETA: 0s - loss: 1.0400 - accuracy:
0.8898
59/96 [=====>...] - ETA: 0s - loss: 1.0458 - accuracy:
0.8862
66/96 [=====>...] - ETA: 0s - loss: 1.0552 - accuracy:
0.8824
71/96 [=====>...] - ETA: 0s - loss: 1.0642 - accuracy:
0.8793
78/96 [=====>...] - ETA: 0s - loss: 1.0569 - accuracy:
0.8810
84/96 [=====>...] - ETA: 0s - loss: 1.0576 - accuracy:
0.8793
91/96 [=====>..] - ETA: 0s - loss: 1.0602 - accuracy:
0.8791

96/96 [=====] - 1s 12ms/step - loss: 1.0709 - accuracy:
0.8756 - val_loss: 2.1966 - val_accuracy: 0.5901

Epoch 16/30

1/96 [...] - ETA: 2s - loss: 0.8818 - accuracy:
0.8571
7/96 [=>...] - ETA: 0s - loss: 0.9229 - accuracy:
0.9048
14/96 [===>...] - ETA: 0s - loss: 0.9382 - accuracy:
0.9014
19/96 [====>...] - ETA: 0s - loss: 0.9566 - accuracy:
0.9023
25/96 [=====>...] - ETA: 0s - loss: 0.9448 - accuracy:
0.9048
31/96 [=====>...] - ETA: 0s - loss: 0.9584 - accuracy:
0.9078
37/96 [=====>...] - ETA: 0s - loss: 0.9513 - accuracy:
0.9125
42/96 [=====>...] - ETA: 0s - loss: 0.9738 - accuracy:
0.9104
46/96 [=====>...] - ETA: 0s - loss: 0.9722 - accuracy:
0.9110
51/96 [=====>...] - ETA: 0s - loss: 0.9707 - accuracy:
0.9104
56/96 [=====>...] - ETA: 0s - loss: 0.9711 - accuracy:
0.9099
62/96 [=====>...] - ETA: 0s - loss: 0.9809 - accuracy:
0.9086
68/96 [=====>...] - ETA: 0s - loss: 0.9678 - accuracy:
0.9132
73/96 [=====>...] - ETA: 0s - loss: 0.9674 - accuracy:
0.9106
79/96 [=====>...] - ETA: 0s - loss: 0.9587 - accuracy:
0.9108
85/96 [=====>...] - ETA: 0s - loss: 0.9551 - accuracy:
0.9092
91/96 [=====>..] - ETA: 0s - loss: 0.9607 - accuracy:
0.9053
96/96 [=====] - 1s 13ms/step - loss: 0.9602 - accuracy:
0.9030 - val_loss: 2.2364 - val_accuracy: 0.6029

Epoch 17/30

1/96 [...] - ETA: 1s - loss: 0.8291 - accuracy:
0.9524
6/96 [>...] - ETA: 0s - loss: 0.9523 - accuracy:
0.8810

12/96 [==>...] - ETA: 0s - loss: 0.8852 - accuracy:
0.9008
18/96 [====>...] - ETA: 0s - loss: 0.9058 - accuracy:
0.9074
23/96 [=====>...] - ETA: 0s - loss: 0.9348 - accuracy:
0.8944
28/96 [=====>...] - ETA: 0s - loss: 0.9311 - accuracy:
0.8980
34/96 [=====>...] - ETA: 0s - loss: 0.9664 - accuracy:
0.8894
40/96 [=====>...] - ETA: 0s - loss: 0.9868 - accuracy:
0.8881
45/96 [=====>...] - ETA: 0s - loss: 1.0027 - accuracy:
0.8868
50/96 [=====>...] - ETA: 0s - loss: 0.9932 - accuracy:
0.8895
56/96 [=====>...] - ETA: 0s - loss: 1.0035 - accuracy:
0.8895
62/96 [=====>...] - ETA: 0s - loss: 1.0083 - accuracy:
0.8879
68/96 [=====>...] - ETA: 0s - loss: 1.0003 - accuracy:
0.8929
74/96 [=====>...] - ETA: 0s - loss: 1.0084 - accuracy:
0.8900
79/96 [=====>...] - ETA: 0s - loss: 1.0133 - accuracy:
0.8879
85/96 [=====>...] - ETA: 0s - loss: 1.0174 - accuracy:
0.8868
91/96 [=====>...] - ETA: 0s - loss: 1.0161 - accuracy:
0.8875
96/96 [=====] - 1s 13ms/step - loss: 1.0285 - accuracy:
0.8841 - val_loss: 2.5823 - val_accuracy: 0.5406

Epoch 18/30

1/96 [...] - ETA: 2s - loss: 0.8445 - accuracy:
1.0000
6/96 [>...] - ETA: 0s - loss: 1.0279 - accuracy:
0.8889
11/96 [==>...] - ETA: 0s - loss: 1.0624 - accuracy:
0.8745
16/96 [====>...] - ETA: 0s - loss: 1.0337 - accuracy:
0.8839
21/96 [=====>...] - ETA: 0s - loss: 0.9967 - accuracy:
0.8980
26/96 [=====>...] - ETA: 0s - loss: 0.9914 - accuracy:
0.8974
31/96 [=====>...] - ETA: 0s - loss: 0.9735 - accuracy:

```

0.9032
36/96 [=====>...] - ETA: 0s - loss: 0.9713 - accuracy:
0.9048
41/96 [=====>...] - ETA: 0s - loss: 0.9572 - accuracy:
0.9094
45/96 [=====>...] - ETA: 0s - loss: 0.9426 - accuracy:
0.9101
49/96 [=====>...] - ETA: 0s - loss: 0.9422 - accuracy:
0.9086
54/96 [=====>...] - ETA: 0s - loss: 0.9434 - accuracy:
0.9083
58/96 [=====>...] - ETA: 0s - loss: 0.9401 - accuracy:
0.9080
63/96 [=====>...] - ETA: 0s - loss: 0.9468 - accuracy:
0.9048
67/96 [=====>...] - ETA: 0s - loss: 0.9474 - accuracy:
0.9033
72/96 [=====>...] - ETA: 0s - loss: 0.9591 - accuracy:
0.8988
76/96 [=====>...] - ETA: 0s - loss: 0.9774 - accuracy:
0.8947
81/96 [=====>...] - ETA: 0s - loss: 0.9921 - accuracy:
0.8912
86/96 [=====>...] - ETA: 0s - loss: 1.0105 - accuracy:
0.8882
91/96 [=====>..] - ETA: 0s - loss: 1.0250 - accuracy:
0.8838
96/96 [=====] - ETA: 0s - loss: 1.0338 - accuracy:
0.8831
96/96 [=====] - 1s 15ms/step - loss: 1.0338 - accuracy:
0.8831 - val_loss: 2.7759 - val_accuracy: 0.4962

```

Epoch 19/30

```

1/96 [...] - ETA: 1s - loss: 0.8808 - accuracy:
1.0000
5/96 [>...] - ETA: 1s - loss: 1.1888 - accuracy:
0.8857
10/96 [==>...] - ETA: 1s - loss: 1.2648 - accuracy:
0.8667
15/96 [===>...] - ETA: 0s - loss: 1.2802 - accuracy:
0.8635
19/96 [====>...] - ETA: 0s - loss: 1.2626 - accuracy:
0.8647
24/96 [=====>...] - ETA: 0s - loss: 1.2793 - accuracy:
0.8571
28/96 [=====>...] - ETA: 0s - loss: 1.2755 - accuracy:
0.8622

```

33/96 [=====>...] - ETA: 0s - loss: 1.2700 - accuracy:
 0.8629
 37/96 [=====>...] - ETA: 0s - loss: 1.2482 - accuracy:
 0.8662
 42/96 [=====>...] - ETA: 0s - loss: 1.2767 - accuracy:
 0.8560
 46/96 [=====>...] - ETA: 0s - loss: 1.2694 - accuracy:
 0.8571
 50/96 [=====>...] - ETA: 0s - loss: 1.2660 - accuracy:
 0.8571
 55/96 [=====>...] - ETA: 0s - loss: 1.2604 - accuracy:
 0.8589
 59/96 [=====>...] - ETA: 0s - loss: 1.2586 - accuracy:
 0.8563
 63/96 [=====>...] - ETA: 0s - loss: 1.2638 - accuracy:
 0.8549
 68/96 [=====>...] - ETA: 0s - loss: 1.2501 - accuracy:
 0.8592
 73/96 [=====>...] - ETA: 0s - loss: 1.2549 - accuracy:
 0.8571
 78/96 [=====>...] - ETA: 0s - loss: 1.2516 - accuracy:
 0.8590
 83/96 [=====>...] - ETA: 0s - loss: 1.2428 - accuracy:
 0.8600
 88/96 [=====>...] - ETA: 0s - loss: 1.2293 - accuracy:
 0.8636
 92/96 [=====>..] - ETA: 0s - loss: 1.2348 - accuracy:
 0.8618
 95/96 [=====>.] - ETA: 0s - loss: 1.2309 - accuracy:
 0.8632
 96/96 [=====] - 2s 16ms/step - loss: 1.2333 - accuracy:
 0.8626 - val_loss: 2.4993 - val_accuracy: 0.5756

Epoch 20/30

1/96 [...] - ETA: 2s - loss: 0.8553 - accuracy:
 0.9524
 6/96 [>...] - ETA: 1s - loss: 1.1296 - accuracy:
 0.8730
 11/96 [==>...] - ETA: 0s - loss: 1.1008 - accuracy:
 0.8745
 15/96 [===>...] - ETA: 0s - loss: 1.1161 - accuracy:
 0.8794
 19/96 [====>...] - ETA: 0s - loss: 1.1344 - accuracy:
 0.8647
 24/96 [=====>...] - ETA: 0s - loss: 1.1400 - accuracy:
 0.8710
 29/96 [=====>...] - ETA: 0s - loss: 1.1243 - accuracy:

0.8768
33/96 [=====>...] - ETA: 0s - loss: 1.1267 - accuracy:
0.8788
38/96 [=====>...] - ETA: 0s - loss: 1.1322 - accuracy:
0.8759
43/96 [=====>...] - ETA: 0s - loss: 1.1213 - accuracy:
0.8760
48/96 [=====>...] - ETA: 0s - loss: 1.1186 - accuracy:
0.8800
53/96 [=====>...] - ETA: 0s - loss: 1.1189 - accuracy:
0.8850
59/96 [=====>...] - ETA: 0s - loss: 1.1047 - accuracy:
0.8894
65/96 [=====>...] - ETA: 0s - loss: 1.1130 - accuracy:
0.8879
70/96 [=====>...] - ETA: 0s - loss: 1.1091 - accuracy:
0.8905
76/96 [=====>...] - ETA: 0s - loss: 1.1049 - accuracy:
0.8891
81/96 [=====>...] - ETA: 0s - loss: 1.0929 - accuracy:
0.8924
87/96 [=====>...] - ETA: 0s - loss: 1.0852 - accuracy:
0.8944
92/96 [=====>..] - ETA: 0s - loss: 1.0868 - accuracy:
0.8923
96/96 [=====] - 1s 13ms/step - loss: 1.0927 - accuracy:
0.8901 - val_loss: 2.8106 - val_accuracy: 0.5816

Epoch 21/30

1/96 [...] - ETA: 1s - loss: 0.8073 - accuracy:
0.9524
8/96 [=>...] - ETA: 0s - loss: 1.0587 - accuracy:
0.9226
14/96 [===>...] - ETA: 0s - loss: 1.0744 - accuracy:
0.8980
20/96 [=====>...] - ETA: 0s - loss: 1.0522 - accuracy:
0.9048
25/96 [=====>...] - ETA: 0s - loss: 1.0523 - accuracy:
0.8990
31/96 [=====>...] - ETA: 0s - loss: 1.0490 - accuracy:
0.9078
37/96 [=====>...] - ETA: 0s - loss: 1.0449 - accuracy:
0.9073
43/96 [=====>...] - ETA: 0s - loss: 1.0463 - accuracy:
0.9103
47/96 [=====>...] - ETA: 0s - loss: 1.0500 - accuracy:
0.9068

53/96 [=====>...] - ETA: 0s - loss: 1.0413 - accuracy:
 0.9084
 59/96 [=====>...] - ETA: 0s - loss: 1.0361 - accuracy:
 0.9104
 66/96 [=====>...] - ETA: 0s - loss: 1.0287 - accuracy:
 0.9120
 72/96 [=====>...] - ETA: 0s - loss: 1.0338 - accuracy:
 0.9087
 76/96 [=====>...] - ETA: 0s - loss: 1.0329 - accuracy:
 0.9104
 83/96 [=====>...] - ETA: 0s - loss: 1.0327 - accuracy:
 0.9088
 90/96 [=====>..] - ETA: 0s - loss: 1.0221 - accuracy:
 0.9090
 96/96 [=====] - 1s 13ms/step - loss: 1.0221 - accuracy:
 0.9085 - val_loss: 2.4071 - val_accuracy: 0.6174

Epoch 22/30

1/96 [...] - ETA: 2s - loss: 0.7350 - accuracy:
 1.0000
 7/96 [=>...] - ETA: 0s - loss: 0.8444 - accuracy:
 0.9252
 11/96 [==>...] - ETA: 0s - loss: 0.8212 - accuracy:
 0.9481
 17/96 [===>...] - ETA: 0s - loss: 0.7892 - accuracy:
 0.9608
 23/96 [=====>...] - ETA: 0s - loss: 0.7799 - accuracy:
 0.9669
 29/96 [=====>...] - ETA: 0s - loss: 0.7814 - accuracy:
 0.9589
 35/96 [=====>...] - ETA: 0s - loss: 0.7930 - accuracy:
 0.9578
 40/96 [=====>...] - ETA: 0s - loss: 0.7956 - accuracy:
 0.9571
 47/96 [=====>...] - ETA: 0s - loss: 0.7976 - accuracy:
 0.9544
 53/96 [=====>...] - ETA: 0s - loss: 0.7907 - accuracy:
 0.9542
 59/96 [=====>...] - ETA: 0s - loss: 0.7896 - accuracy:
 0.9524
 64/96 [=====>...] - ETA: 0s - loss: 0.7802 - accuracy:
 0.9539
 70/96 [=====>...] - ETA: 0s - loss: 0.7752 - accuracy:
 0.9524
 76/96 [=====>...] - ETA: 0s - loss: 0.7741 - accuracy:
 0.9505
 82/96 [=====>...] - ETA: 0s - loss: 0.7742 - accuracy:

0.9501
87/96 [=====>...] - ETA: 0s - loss: 0.7747 - accuracy:
0.9513
93/96 [=====>.] - ETA: 0s - loss: 0.7704 - accuracy:
0.9514
96/96 [=====] - 1s 13ms/step - loss: 0.7711 - accuracy:
0.9495 - val_loss: 2.2223 - val_accuracy: 0.6097

Epoch 23/30

1/96 [...] - ETA: 1s - loss: 0.7733 - accuracy:
0.9048
7/96 [=>...] - ETA: 0s - loss: 0.8048 - accuracy:
0.9252
12/96 [==>...] - ETA: 0s - loss: 0.7620 - accuracy:
0.9325
18/96 [====>...] - ETA: 0s - loss: 0.8035 - accuracy:
0.9259
24/96 [=====>...] - ETA: 0s - loss: 0.8047 - accuracy:
0.9306
30/96 [=====>...] - ETA: 0s - loss: 0.7836 - accuracy:
0.9365
35/96 [=====>...] - ETA: 0s - loss: 0.7692 - accuracy:
0.9388
41/96 [=====>...] - ETA: 0s - loss: 0.7595 - accuracy:
0.9396
47/96 [=====>...] - ETA: 0s - loss: 0.7509 - accuracy:
0.9412
53/96 [=====>...] - ETA: 0s - loss: 0.7456 - accuracy:
0.9416
60/96 [=====>...] - ETA: 0s - loss: 0.7390 - accuracy:
0.9429
65/96 [=====>...] - ETA: 0s - loss: 0.7367 - accuracy:
0.9421
70/96 [=====>...] - ETA: 0s - loss: 0.7295 - accuracy:
0.9456
76/96 [=====>...] - ETA: 0s - loss: 0.7290 - accuracy:
0.9442
82/96 [=====>...] - ETA: 0s - loss: 0.7224 - accuracy:
0.9466
88/96 [=====>...] - ETA: 0s - loss: 0.7274 - accuracy:
0.9448
94/96 [=====>.] - ETA: 0s - loss: 0.7259 - accuracy:
0.9453
96/96 [=====] - 1s 13ms/step - loss: 0.7259 - accuracy:
0.9450 - val_loss: 2.4112 - val_accuracy: 0.6080

Epoch 24/30

```

1/96 [...] - ETA: 1s - loss: 0.5897 - accuracy:
1.0000
6/96 [>...] - ETA: 1s - loss: 0.7127 - accuracy:
0.9365
12/96 [==>...] - ETA: 0s - loss: 0.6901 - accuracy:
0.9444
18/96 [====>...] - ETA: 0s - loss: 0.7217 - accuracy:
0.9497
24/96 [=====>...] - ETA: 0s - loss: 0.7425 - accuracy:
0.9385
30/96 [=====>...] - ETA: 0s - loss: 0.7523 - accuracy:
0.9397
35/96 [=====>...] - ETA: 0s - loss: 0.7444 - accuracy:
0.9388
40/96 [=====>...] - ETA: 0s - loss: 0.7391 - accuracy:
0.9393
46/96 [=====>...] - ETA: 0s - loss: 0.7473 - accuracy:
0.9358
52/96 [=====>...] - ETA: 0s - loss: 0.7374 - accuracy:
0.9377
58/96 [=====>...] - ETA: 0s - loss: 0.7412 - accuracy:
0.9368
64/96 [=====>...] - ETA: 0s - loss: 0.7344 - accuracy:
0.9368
70/96 [=====>...] - ETA: 0s - loss: 0.7386 - accuracy:
0.9367
75/96 [=====>...] - ETA: 0s - loss: 0.7406 - accuracy:
0.9346
82/96 [=====>...] - ETA: 0s - loss: 0.7419 - accuracy:
0.9332
88/96 [=====>...] - ETA: 0s - loss: 0.7448 - accuracy:
0.9334
94/96 [=====>.] - ETA: 0s - loss: 0.7467 - accuracy:
0.9316
96/96 [=====] - 1s 13ms/step - loss: 0.7451 - accuracy:
0.9325 - val_loss: 2.4519 - val_accuracy: 0.5209

```

Epoch 25/30

```

1/96 [...] - ETA: 1s - loss: 0.6173 - accuracy:
1.0000
8/96 [=>...] - ETA: 0s - loss: 0.8135 - accuracy:
0.9286
15/96 [===>...] - ETA: 0s - loss: 0.7849 - accuracy:
0.9302
20/96 [====>...] - ETA: 0s - loss: 0.7533 - accuracy:
0.9405

```

26/96 [=====>...] - ETA: 0s - loss: 0.7597 - accuracy:
 0.9359
 32/96 [=====>...] - ETA: 0s - loss: 0.7679 - accuracy:
 0.9390
 38/96 [=====>...] - ETA: 0s - loss: 0.7674 - accuracy:
 0.9373
 44/96 [=====>...] - ETA: 0s - loss: 0.7791 - accuracy:
 0.9329
 49/96 [=====>...] - ETA: 0s - loss: 0.7803 - accuracy:
 0.9300
 54/96 [=====>...] - ETA: 0s - loss: 0.7855 - accuracy:
 0.9268
 60/96 [=====>...] - ETA: 0s - loss: 0.7969 - accuracy:
 0.9254
 66/96 [=====>...] - ETA: 0s - loss: 0.7934 - accuracy:
 0.9271
 72/96 [=====>...] - ETA: 0s - loss: 0.8104 - accuracy:
 0.9239
 78/96 [=====>...] - ETA: 0s - loss: 0.8194 - accuracy:
 0.9212
 84/96 [=====>...] - ETA: 0s - loss: 0.8251 - accuracy:
 0.9189
 90/96 [=====>...] - ETA: 0s - loss: 0.8304 - accuracy:
 0.9196
 96/96 [=====>...] - ETA: 0s - loss: 0.8405 - accuracy:
 0.9185
 96/96 [=====>...] - 1s 12ms/step - loss: 0.8405 - accuracy:
 0.9185 - val_loss: 2.8997 - val_accuracy: 0.5952

Epoch 26/30

1/96 [...] - ETA: 1s - loss: 0.9779 - accuracy:
 0.9048
 7/96 [=>...] - ETA: 0s - loss: 0.8573 - accuracy:
 0.9252
 12/96 [==>...] - ETA: 0s - loss: 0.9319 - accuracy:
 0.9087
 18/96 [===>...] - ETA: 0s - loss: 0.9247 - accuracy:
 0.9180
 24/96 [=====>...] - ETA: 0s - loss: 0.9391 - accuracy:
 0.9127
 30/96 [=====>...] - ETA: 0s - loss: 0.9557 - accuracy:
 0.9063
 36/96 [=====>...] - ETA: 0s - loss: 0.9463 - accuracy:
 0.9114
 42/96 [=====>...] - ETA: 0s - loss: 0.9375 - accuracy:
 0.9150
 47/96 [=====>...] - ETA: 0s - loss: 0.9290 - accuracy:

```

0.9189
52/96 [=====>...] - ETA: 0s - loss: 0.9231 - accuracy:
0.9222
58/96 [=====>...] - ETA: 0s - loss: 0.9267 - accuracy:
0.9212
65/96 [=====>...] - ETA: 0s - loss: 0.9153 - accuracy:
0.9216
71/96 [=====>...] - ETA: 0s - loss: 0.9141 - accuracy:
0.9195
76/96 [=====>...] - ETA: 0s - loss: 0.9111 - accuracy:
0.9204
82/96 [=====>...] - ETA: 0s - loss: 0.9108 - accuracy:
0.9187
88/96 [=====>...] - ETA: 0s - loss: 0.9058 - accuracy:
0.9205
94/96 [=====>.] - ETA: 0s - loss: 0.9097 - accuracy:
0.9184
96/96 [=====] - 1s 12ms/step - loss: 0.9094 - accuracy:
0.9190 - val_loss: 2.4784 - val_accuracy: 0.5978

```

Epoch 1/30

```

1/96 [...] - ETA: 5:31 - loss: 7.1381 - accuracy:
0.0000e+00
6/96 [>...] - ETA: 1s - loss: 8.0132 - accuracy:
0.1190
10/96 [==>...] - ETA: 1s - loss: 7.5094 - accuracy:
0.1667
15/96 [===>...] - ETA: 0s - loss: 7.2116 - accuracy:
0.1841
19/96 [====>...] - ETA: 0s - loss: 6.9752 - accuracy:
0.2005
24/96 [=====>...] - ETA: 0s - loss: 6.6975 - accuracy:
0.2302
28/96 [=====>...] - ETA: 0s - loss: 6.5368 - accuracy:
0.2432
32/96 [=====>...] - ETA: 0s - loss: 6.4195 - accuracy:
0.2455
37/96 [=====>...] - ETA: 0s - loss: 6.2764 - accuracy:
0.2535
41/96 [=====>...] - ETA: 0s - loss: 6.1863 - accuracy:
0.2567
45/96 [=====>...] - ETA: 0s - loss: 6.0894 - accuracy:
0.2624
50/96 [=====>...] - ETA: 0s - loss: 5.9831 - accuracy:
0.2686
55/96 [=====>...] - ETA: 0s - loss: 5.8994 - accuracy:
0.2719

```

59/96 [=====>...] - ETA: 0s - loss: 5.8211 - accuracy:
0.2768
63/96 [=====>...] - ETA: 0s - loss: 5.7701 - accuracy:
0.2797
66/96 [=====>...] - ETA: 0s - loss: 5.7157 - accuracy:
0.2850
70/96 [=====>...] - ETA: 0s - loss: 5.6653 - accuracy:
0.2857
75/96 [=====>...] - ETA: 0s - loss: 5.5933 - accuracy:
0.2902
80/96 [=====>...] - ETA: 0s - loss: 5.5301 - accuracy:
0.2923
84/96 [=====>...] - ETA: 0s - loss: 5.4917 - accuracy:
0.2902
89/96 [=====>...] - ETA: 0s - loss: 5.4352 - accuracy:
0.2921
94/96 [=====>.] - ETA: 0s - loss: 5.3766 - accuracy:
0.2974
96/96 [=====] - 5s 20ms/step - loss: 5.3635 - accuracy:
0.2994 - val_loss: 5.6337 - val_accuracy: 0.1896

Epoch 2/30

1/96 [...] - ETA: 1s - loss: 3.8530 - accuracy:
0.5238
6/96 [>...] - ETA: 0s - loss: 3.9725 - accuracy:
0.4762
11/96 [==>...] - ETA: 0s - loss: 3.9564 - accuracy:
0.4675
15/96 [===>...] - ETA: 0s - loss: 3.9220 - accuracy:
0.4603
21/96 [====>...] - ETA: 0s - loss: 3.9278 - accuracy:
0.4535
27/96 [=====>...] - ETA: 0s - loss: 3.8912 - accuracy:
0.4621
32/96 [=====>...] - ETA: 0s - loss: 3.8349 - accuracy:
0.4717
38/96 [=====>...] - ETA: 0s - loss: 3.7867 - accuracy:
0.4875
43/96 [=====>...] - ETA: 0s - loss: 3.7529 - accuracy:
0.4983
49/96 [=====>...] - ETA: 0s - loss: 3.7430 - accuracy:
0.4947
55/96 [=====>...] - ETA: 0s - loss: 3.7217 - accuracy:
0.4944
60/96 [=====>...] - ETA: 0s - loss: 3.6965 - accuracy:
0.5008
65/96 [=====>...] - ETA: 0s - loss: 3.6697 - accuracy:

0.4996
70/96 [=====>...] - ETA: 0s - loss: 3.6394 - accuracy:
0.5054
75/96 [=====>...] - ETA: 0s - loss: 3.6261 - accuracy:
0.5067
80/96 [=====>...] - ETA: 0s - loss: 3.6009 - accuracy:
0.5060
86/96 [=====>...] - ETA: 0s - loss: 3.5806 - accuracy:
0.5072
91/96 [=====>..] - ETA: 0s - loss: 3.5607 - accuracy:
0.5086
95/96 [=====>.] - ETA: 0s - loss: 3.5393 - accuracy:
0.5108
96/96 [=====] - 1s 14ms/step - loss: 3.5361 - accuracy:
0.5117 - val_loss: 4.0246 - val_accuracy: 0.2955

Epoch 3/30

1/96 [...] - ETA: 1s - loss: 2.8498 - accuracy:
0.5238
7/96 [=>...] - ETA: 0s - loss: 2.9425 - accuracy:
0.5646
11/96 [==>...] - ETA: 0s - loss: 2.9728 - accuracy:
0.5671
16/96 [====>...] - ETA: 0s - loss: 2.8669 - accuracy:
0.6101
21/96 [=====>...] - ETA: 0s - loss: 2.8869 - accuracy:
0.5964
27/96 [=====>...] - ETA: 0s - loss: 2.8940 - accuracy:
0.5873
33/96 [=====>...] - ETA: 0s - loss: 2.8710 - accuracy:
0.5859
38/96 [=====>...] - ETA: 0s - loss: 2.8213 - accuracy:
0.5965
43/96 [=====>...] - ETA: 0s - loss: 2.8031 - accuracy:
0.5969
48/96 [=====>...] - ETA: 0s - loss: 2.7795 - accuracy:
0.6012
53/96 [=====>...] - ETA: 0s - loss: 2.7596 - accuracy:
0.6002
58/96 [=====>...] - ETA: 0s - loss: 2.7369 - accuracy:
0.6059
63/96 [=====>...] - ETA: 0s - loss: 2.7161 - accuracy:
0.6062
69/96 [=====>...] - ETA: 0s - loss: 2.6896 - accuracy:
0.6108
75/96 [=====>...] - ETA: 0s - loss: 2.6772 - accuracy:
0.6089

81/96 [=====>...] - ETA: 0s - loss: 2.6572 - accuracy:
0.6114
85/96 [=====>...] - ETA: 0s - loss: 2.6519 - accuracy:
0.6118
91/96 [=====>..] - ETA: 0s - loss: 2.6284 - accuracy:
0.6154
96/96 [=====] - ETA: 0s - loss: 2.6307 - accuracy:
0.6147
96/96 [=====] - 1s 14ms/step - loss: 2.6307 - accuracy:
0.6147 - val_loss: 3.4057 - val_accuracy: 0.3390

Epoch 4/30

1/96 [...] - ETA: 1s - loss: 2.0182 - accuracy:
0.8095
6/96 [>...] - ETA: 0s - loss: 2.1415 - accuracy:
0.6905
11/96 [==>...] - ETA: 0s - loss: 2.1243 - accuracy:
0.6970
16/96 [====>...] - ETA: 0s - loss: 2.1150 - accuracy:
0.6875
21/96 [=====>...] - ETA: 0s - loss: 2.1773 - accuracy:
0.6712
26/96 [=====>...] - ETA: 0s - loss: 2.1653 - accuracy:
0.6777
32/96 [=====>...] - ETA: 0s - loss: 2.1384 - accuracy:
0.6845
36/96 [=====>...] - ETA: 0s - loss: 2.1403 - accuracy:
0.6892
42/96 [=====>...] - ETA: 0s - loss: 2.1381 - accuracy:
0.6859
48/96 [=====>...] - ETA: 0s - loss: 2.1214 - accuracy:
0.6885
53/96 [=====>...] - ETA: 0s - loss: 2.1179 - accuracy:
0.6846
59/96 [=====>...] - ETA: 0s - loss: 2.1193 - accuracy:
0.6780
64/96 [=====>...] - ETA: 0s - loss: 2.1123 - accuracy:
0.6786
69/96 [=====>...] - ETA: 0s - loss: 2.1063 - accuracy:
0.6791
75/96 [=====>...] - ETA: 0s - loss: 2.1020 - accuracy:
0.6781
80/96 [=====>...] - ETA: 0s - loss: 2.0816 - accuracy:
0.6821
85/96 [=====>...] - ETA: 0s - loss: 2.0809 - accuracy:
0.6801
91/96 [=====>..] - ETA: 0s - loss: 2.0686 - accuracy:

0.6777
95/96 [=====>.] - ETA: 0s - loss: 2.0509 - accuracy:
0.6822
96/96 [=====] - 1s 14ms/step - loss: 2.0505 - accuracy:
0.6822 - val_loss: 2.5908 - val_accuracy: 0.4842

Epoch 5/30

1/96 [...] - ETA: 1s - loss: 1.9411 - accuracy:
0.7143
6/96 [>...] - ETA: 1s - loss: 1.7209 - accuracy:
0.7381
12/96 [==>...] - ETA: 0s - loss: 1.6976 - accuracy:
0.7421
18/96 [====>...] - ETA: 0s - loss: 1.6771 - accuracy:
0.7566
22/96 [=====>...] - ETA: 0s - loss: 1.6879 - accuracy:
0.7468
28/96 [=====>...] - ETA: 0s - loss: 1.6941 - accuracy:
0.7449
33/96 [=====>...] - ETA: 0s - loss: 1.6744 - accuracy:
0.7460
38/96 [=====>...] - ETA: 0s - loss: 1.6633 - accuracy:
0.7506
44/96 [=====>...] - ETA: 0s - loss: 1.6679 - accuracy:
0.7478
50/96 [=====>...] - ETA: 0s - loss: 1.6656 - accuracy:
0.7486
56/96 [=====>...] - ETA: 0s - loss: 1.6693 - accuracy:
0.7423
62/96 [=====>...] - ETA: 0s - loss: 1.6702 - accuracy:
0.7366
67/96 [=====>...] - ETA: 0s - loss: 1.6704 - accuracy:
0.7356
72/96 [=====>...] - ETA: 0s - loss: 1.6585 - accuracy:
0.7388
77/96 [=====>...] - ETA: 0s - loss: 1.6529 - accuracy:
0.7396
82/96 [=====>...] - ETA: 0s - loss: 1.6477 - accuracy:
0.7381
88/96 [=====>...] - ETA: 0s - loss: 1.6378 - accuracy:
0.7408
93/96 [=====>.] - ETA: 0s - loss: 1.6314 - accuracy:
0.7424
96/96 [=====] - 1s 13ms/step - loss: 1.6296 - accuracy:
0.7421 - val_loss: 2.1429 - val_accuracy: 0.5482

Epoch 6/30

1/96 [...] - ETA: 1s - loss: 1.2143 - accuracy:
0.8571
6/96 [>...] - ETA: 0s - loss: 1.2797 - accuracy:
0.8413
12/96 [==>...] - ETA: 0s - loss: 1.3830 - accuracy:
0.7897
18/96 [====>...] - ETA: 0s - loss: 1.3280 - accuracy:
0.8122
24/96 [=====>...] - ETA: 0s - loss: 1.3656 - accuracy:
0.7937
30/96 [=====>...] - ETA: 0s - loss: 1.3528 - accuracy:
0.7873
34/96 [=====>...] - ETA: 0s - loss: 1.3766 - accuracy:
0.7787
40/96 [=====>...] - ETA: 0s - loss: 1.3728 - accuracy:
0.7810
46/96 [=====>...] - ETA: 0s - loss: 1.4019 - accuracy:
0.7733
51/96 [=====>...] - ETA: 0s - loss: 1.3948 - accuracy:
0.7759
56/96 [=====>...] - ETA: 0s - loss: 1.3845 - accuracy:
0.7789
61/96 [=====>...] - ETA: 0s - loss: 1.3862 - accuracy:
0.7736
66/96 [=====>...] - ETA: 0s - loss: 1.3846 - accuracy:
0.7734
72/96 [=====>...] - ETA: 0s - loss: 1.3772 - accuracy:
0.7751
78/96 [=====>...] - ETA: 0s - loss: 1.3705 - accuracy:
0.7741
84/96 [=====>...] - ETA: 0s - loss: 1.3671 - accuracy:
0.7732
90/96 [=====>..] - ETA: 0s - loss: 1.3694 - accuracy:
0.7698
95/96 [=====>.] - ETA: 0s - loss: 1.3653 - accuracy:
0.7704
96/96 [=====] - 1s 12ms/step - loss: 1.3662 - accuracy:
0.7701 - val_loss: 2.3105 - val_accuracy: 0.4859

Epoch 7/30

1/96 [...] - ETA: 1s - loss: 1.1539 - accuracy:
0.7619
7/96 [>...] - ETA: 0s - loss: 1.2168 - accuracy:
0.7959
13/96 [==>...] - ETA: 0s - loss: 1.1973 - accuracy:
0.8095

```

19/96 [====>...] - ETA: 0s - loss: 1.1868 - accuracy:
0.8095
25/96 [=====>...] - ETA: 0s - loss: 1.1350 - accuracy:
0.8362
30/96 [======>...] - ETA: 0s - loss: 1.1523 - accuracy:
0.8317
36/96 [======>...] - ETA: 0s - loss: 1.1190 - accuracy:
0.8439
42/96 [======>...] - ETA: 0s - loss: 1.1251 - accuracy:
0.8311
48/96 [======>...] - ETA: 0s - loss: 1.1227 - accuracy:
0.8274
54/96 [======>...] - ETA: 0s - loss: 1.1214 - accuracy:
0.8272
59/96 [======>...] - ETA: 0s - loss: 1.1087 - accuracy:
0.8313
64/96 [======>...] - ETA: 0s - loss: 1.1237 - accuracy:
0.8259
69/96 [======>...] - ETA: 0s - loss: 1.1271 - accuracy:
0.8233
74/96 [======>...] - ETA: 0s - loss: 1.1165 - accuracy:
0.8256
80/96 [======>...] - ETA: 0s - loss: 1.1186 - accuracy:
0.8250
86/96 [======>...] - ETA: 0s - loss: 1.1310 - accuracy:
0.8228
91/96 [======>...] - ETA: 0s - loss: 1.1348 - accuracy:
0.8200
96/96 [=====] - ETA: 0s - loss: 1.1317 - accuracy:
0.8206
96/96 [=====] - 1s 13ms/step - loss: 1.1317 - accuracy:
0.8206 - val_loss: 2.0021 - val_accuracy: 0.5611

```

Epoch 8/30

```

1/96 [...] - ETA: 1s - loss: 0.7862 - accuracy:
0.9048
7/96 [=>...] - ETA: 0s - loss: 0.9652 - accuracy:
0.8707
13/96 [===>...] - ETA: 0s - loss: 0.9594 - accuracy:
0.8571
19/96 [====>...] - ETA: 0s - loss: 0.9584 - accuracy:
0.8571
24/96 [=====>...] - ETA: 0s - loss: 0.9434 - accuracy:
0.8591
28/96 [======>...] - ETA: 0s - loss: 0.9324 - accuracy:
0.8622
34/96 [======>...] - ETA: 0s - loss: 0.9434 - accuracy:

```

0.8557
40/96 [=====>...] - ETA: 0s - loss: 0.9454 - accuracy:
0.8536
46/96 [=====>...] - ETA: 0s - loss: 0.9297 - accuracy:
0.8592
52/96 [=====>...] - ETA: 0s - loss: 0.9490 - accuracy:
0.8516
57/96 [=====>...] - ETA: 0s - loss: 0.9577 - accuracy:
0.8480
63/96 [=====>...] - ETA: 0s - loss: 0.9700 - accuracy:
0.8435
69/96 [=====>...] - ETA: 0s - loss: 0.9711 - accuracy:
0.8440
74/96 [=====>...] - ETA: 0s - loss: 0.9775 - accuracy:
0.8417
79/96 [=====>...] - ETA: 0s - loss: 0.9729 - accuracy:
0.8451
84/96 [=====>...] - ETA: 0s - loss: 0.9779 - accuracy:
0.8435
88/96 [=====>...] - ETA: 0s - loss: 0.9789 - accuracy:
0.8409
94/96 [=====>.] - ETA: 0s - loss: 0.9811 - accuracy:
0.8374
96/96 [=====] - 1s 14ms/step - loss: 0.9815 - accuracy:
0.8366 - val_loss: 1.9334 - val_accuracy: 0.5542

Epoch 9/30

1/96 [...] - ETA: 2s - loss: 1.2065 - accuracy:
0.8095
7/96 [=>...] - ETA: 0s - loss: 0.9582 - accuracy:
0.8435
13/96 [===>...] - ETA: 0s - loss: 0.9201 - accuracy:
0.8498
19/96 [====>...] - ETA: 0s - loss: 0.9208 - accuracy:
0.8596
25/96 [=====>...] - ETA: 0s - loss: 0.8955 - accuracy:
0.8648
29/96 [=====>...] - ETA: 0s - loss: 0.8989 - accuracy:
0.8654
35/96 [=====>...] - ETA: 0s - loss: 0.9113 - accuracy:
0.8558
41/96 [=====>...] - ETA: 0s - loss: 0.9177 - accuracy:
0.8525
46/96 [=====>...] - ETA: 0s - loss: 0.9347 - accuracy:
0.8458
51/96 [=====>...] - ETA: 0s - loss: 0.9203 - accuracy:
0.8487

```

55/96 [=====>...] - ETA: 0s - loss: 0.9215 - accuracy:
0.8485
59/96 [=====>...] - ETA: 0s - loss: 0.9297 - accuracy:
0.8442
63/96 [=====>...] - ETA: 0s - loss: 0.9334 - accuracy:
0.8428
68/96 [=====>...] - ETA: 0s - loss: 0.9437 - accuracy:
0.8375
72/96 [=====>...] - ETA: 0s - loss: 0.9454 - accuracy:
0.8360
76/96 [=====>...] - ETA: 0s - loss: 0.9367 - accuracy:
0.8383
80/96 [=====>...] - ETA: 0s - loss: 0.9304 - accuracy:
0.8411
84/96 [=====>...] - ETA: 0s - loss: 0.9452 - accuracy:
0.8362
88/96 [=====>...] - ETA: 0s - loss: 0.9461 - accuracy:
0.8360
92/96 [=====>..] - ETA: 0s - loss: 0.9434 - accuracy:
0.8375
96/96 [=====] - 1s 15ms/step - loss: 0.9391 - accuracy:
0.8386 - val_loss: 1.8184 - val_accuracy: 0.5927

```

Epoch 10/30

```

1/96 [...] - ETA: 2s - loss: 0.7198 - accuracy:
0.9048
5/96 [>...] - ETA: 1s - loss: 0.7037 - accuracy:
0.9238
9/96 [=>...] - ETA: 1s - loss: 0.8165 - accuracy:
0.8889
14/96 [===>...] - ETA: 1s - loss: 0.8116 - accuracy:
0.8844
18/96 [====>...] - ETA: 0s - loss: 0.8382 - accuracy:
0.8730
23/96 [=====>...] - ETA: 0s - loss: 0.8252 - accuracy:
0.8737
27/96 [=====>...] - ETA: 0s - loss: 0.7961 - accuracy:
0.8801
32/96 [=====>...] - ETA: 0s - loss: 0.7938 - accuracy:
0.8839
36/96 [=====>...] - ETA: 0s - loss: 0.7951 - accuracy:
0.8849
40/96 [=====>...] - ETA: 0s - loss: 0.8081 - accuracy:
0.8774
45/96 [=====>...] - ETA: 0s - loss: 0.7996 - accuracy:
0.8794
49/96 [=====>...] - ETA: 0s - loss: 0.7971 - accuracy:

```

```

0.8805
53/96 [=====>...] - ETA: 0s - loss: 0.7869 - accuracy:
0.8832
58/96 [=====>...] - ETA: 0s - loss: 0.7759 - accuracy:
0.8867
62/96 [=====>...] - ETA: 0s - loss: 0.7805 - accuracy:
0.8840
67/96 [=====>...] - ETA: 0s - loss: 0.7789 - accuracy:
0.8842
72/96 [=====>...] - ETA: 0s - loss: 0.7702 - accuracy:
0.8856
77/96 [=====>...] - ETA: 0s - loss: 0.7632 - accuracy:
0.8862
83/96 [=====>...] - ETA: 0s - loss: 0.7645 - accuracy:
0.8830
88/96 [=====>...] - ETA: 0s - loss: 0.7714 - accuracy:
0.8793
92/96 [=====>..] - ETA: 0s - loss: 0.7696 - accuracy:
0.8794
96/96 [=====] - ETA: 0s - loss: 0.7746 - accuracy:
0.8776
96/96 [=====] - 2s 16ms/step - loss: 0.7746 - accuracy:
0.8776 - val_loss: 1.8252 - val_accuracy: 0.5952

```

Epoch 11/30

```

1/96 [...] - ETA: 1s - loss: 0.6751 - accuracy:
0.9048
5/96 [>...] - ETA: 1s - loss: 0.6812 - accuracy:
0.9143
10/96 [==>...] - ETA: 1s - loss: 0.6799 - accuracy:
0.9238
14/96 [===>...] - ETA: 1s - loss: 0.6731 - accuracy:
0.9184
18/96 [====>...] - ETA: 1s - loss: 0.7130 - accuracy:
0.9021
22/96 [=====>...] - ETA: 1s - loss: 0.6985 - accuracy:
0.9069
26/96 [=====>...] - ETA: 0s - loss: 0.7278 - accuracy:
0.8938
30/96 [=====>...] - ETA: 0s - loss: 0.7489 - accuracy:
0.8889
34/96 [=====>...] - ETA: 0s - loss: 0.7484 - accuracy:
0.8852
38/96 [=====>...] - ETA: 0s - loss: 0.7414 - accuracy:
0.8885
42/96 [=====>...] - ETA: 0s - loss: 0.7367 - accuracy:
0.8912

```

46/96 [=====>...] - ETA: 0s - loss: 0.7251 - accuracy:
 0.8944
 50/96 [=====>...] - ETA: 0s - loss: 0.7257 - accuracy:
 0.8905
 54/96 [=====>...] - ETA: 0s - loss: 0.7200 - accuracy:
 0.8915
 58/96 [=====>...] - ETA: 0s - loss: 0.7338 - accuracy:
 0.8875
 62/96 [=====>...] - ETA: 0s - loss: 0.7345 - accuracy:
 0.8886
 67/96 [=====>...] - ETA: 0s - loss: 0.7350 - accuracy:
 0.8891
 72/96 [=====>...] - ETA: 0s - loss: 0.7364 - accuracy:
 0.8876
 78/96 [=====>...] - ETA: 0s - loss: 0.7347 - accuracy:
 0.8871
 84/96 [=====>...] - ETA: 0s - loss: 0.7369 - accuracy:
 0.8855
 90/96 [=====>..] - ETA: 0s - loss: 0.7390 - accuracy:
 0.8831
 94/96 [=====>.] - ETA: 0s - loss: 0.7407 - accuracy:
 0.8815
 96/96 [=====] - 1s 15ms/step - loss: 0.7430 - accuracy:
 0.8801 - val_loss: 1.7208 - val_accuracy: 0.5909

Epoch 12/30

1/96 [...] - ETA: 1s - loss: 0.8419 - accuracy:
 0.7619
 6/96 [>...] - ETA: 0s - loss: 0.7374 - accuracy:
 0.8571
 11/96 [==>...] - ETA: 0s - loss: 0.7090 - accuracy:
 0.8658
 16/96 [====>...] - ETA: 0s - loss: 0.6940 - accuracy:
 0.8780
 20/96 [=====>...] - ETA: 0s - loss: 0.6577 - accuracy:
 0.8929
 24/96 [=====>...] - ETA: 0s - loss: 0.6684 - accuracy:
 0.8889
 29/96 [=====>...] - ETA: 0s - loss: 0.6781 - accuracy:
 0.8900
 35/96 [=====>...] - ETA: 0s - loss: 0.6737 - accuracy:
 0.8844
 40/96 [=====>...] - ETA: 0s - loss: 0.6612 - accuracy:
 0.8869
 46/96 [=====>...] - ETA: 0s - loss: 0.6760 - accuracy:
 0.8799
 50/96 [=====>...] - ETA: 0s - loss: 0.6755 - accuracy:

0.8819
55/96 [=====>...] - ETA: 0s - loss: 0.6724 - accuracy:
0.8840
60/96 [=====>...] - ETA: 0s - loss: 0.6639 - accuracy:
0.8881
66/96 [=====>...] - ETA: 0s - loss: 0.6639 - accuracy:
0.8867
72/96 [=====>...] - ETA: 0s - loss: 0.6578 - accuracy:
0.8896
77/96 [=====>...] - ETA: 0s - loss: 0.6572 - accuracy:
0.8899
82/96 [=====>...] - ETA: 0s - loss: 0.6632 - accuracy:
0.8873
87/96 [=====>...] - ETA: 0s - loss: 0.6554 - accuracy:
0.8905
92/96 [=====>..] - ETA: 0s - loss: 0.6498 - accuracy:
0.8929
96/96 [=====] - 1s 14ms/step - loss: 0.6549 - accuracy:
0.8906 - val_loss: 1.9137 - val_accuracy: 0.5696

Epoch 13/30

1/96 [...] - ETA: 1s - loss: 0.5234 - accuracy:
0.9524
7/96 [=>...] - ETA: 0s - loss: 0.5724 - accuracy:
0.9116
13/96 [===>...] - ETA: 0s - loss: 0.5633 - accuracy:
0.9194
19/96 [====>...] - ETA: 0s - loss: 0.5583 - accuracy:
0.9198
23/96 [=====>...] - ETA: 0s - loss: 0.5466 - accuracy:
0.9255
29/96 [=====>...] - ETA: 0s - loss: 0.5355 - accuracy:
0.9294
33/96 [=====>...] - ETA: 0s - loss: 0.5413 - accuracy:
0.9235
38/96 [=====>...] - ETA: 0s - loss: 0.5540 - accuracy:
0.9185
43/96 [=====>...] - ETA: 0s - loss: 0.5736 - accuracy:
0.9125
47/96 [=====>...] - ETA: 0s - loss: 0.5764 - accuracy:
0.9119
52/96 [=====>...] - ETA: 0s - loss: 0.5798 - accuracy:
0.9093
58/96 [=====>...] - ETA: 0s - loss: 0.5821 - accuracy:
0.9080
64/96 [=====>...] - ETA: 0s - loss: 0.5974 - accuracy:
0.9055

69/96 [=====>...] - ETA: 0s - loss: 0.5983 - accuracy:
0.9034
74/96 [=====>...] - ETA: 0s - loss: 0.6000 - accuracy:
0.9041
79/96 [=====>...] - ETA: 0s - loss: 0.6049 - accuracy:
0.9030
85/96 [=====>...] - ETA: 0s - loss: 0.5960 - accuracy:
0.9048
90/96 [=====>..] - ETA: 0s - loss: 0.6024 - accuracy:
0.9037
96/96 [=====] - ETA: 0s - loss: 0.6129 - accuracy:
0.9005
96/96 [=====] - 1s 14ms/step - loss: 0.6129 - accuracy:
0.9005 - val_loss: 1.8118 - val_accuracy: 0.6191

Epoch 14/30

1/96 [...] - ETA: 1s - loss: 0.6222 - accuracy:
0.9048
7/96 [=>...] - ETA: 0s - loss: 0.6270 - accuracy:
0.8844
13/96 [==>...] - ETA: 0s - loss: 0.5937 - accuracy:
0.8901
19/96 [===>...] - ETA: 0s - loss: 0.5683 - accuracy:
0.9048
24/96 [=====>...] - ETA: 0s - loss: 0.5782 - accuracy:
0.9087
29/96 [=====>...] - ETA: 0s - loss: 0.5715 - accuracy:
0.9146
35/96 [=====>...] - ETA: 0s - loss: 0.5659 - accuracy:
0.9129
40/96 [=====>...] - ETA: 0s - loss: 0.5763 - accuracy:
0.9048
45/96 [=====>...] - ETA: 0s - loss: 0.5903 - accuracy:
0.9016
50/96 [=====>...] - ETA: 0s - loss: 0.5963 - accuracy:
0.8981
55/96 [=====>...] - ETA: 0s - loss: 0.5973 - accuracy:
0.8987
60/96 [=====>...] - ETA: 0s - loss: 0.6068 - accuracy:
0.8968
66/96 [=====>...] - ETA: 0s - loss: 0.6124 - accuracy:
0.8932
71/96 [=====>...] - ETA: 0s - loss: 0.6126 - accuracy:
0.8913
77/96 [=====>...] - ETA: 0s - loss: 0.6067 - accuracy:
0.8924
81/96 [=====>...] - ETA: 0s - loss: 0.6072 - accuracy:

0.8936
86/96 [=====>...] - ETA: 0s - loss: 0.6067 - accuracy:
0.8942
92/96 [=====>..] - ETA: 0s - loss: 0.6106 - accuracy:
0.8949
96/96 [=====] - 1s 13ms/step - loss: 0.6126 - accuracy:
0.8921 - val_loss: 1.9190 - val_accuracy: 0.5713

Epoch 15/30

1/96 [...] - ETA: 1s - loss: 0.5740 - accuracy:
0.9524
7/96 [=>...] - ETA: 0s - loss: 0.7550 - accuracy:
0.8503
11/96 [==>...] - ETA: 0s - loss: 0.6850 - accuracy:
0.8745
16/96 [====>...] - ETA: 0s - loss: 0.6614 - accuracy:
0.8780
21/96 [=====>...] - ETA: 0s - loss: 0.6739 - accuracy:
0.8753
27/96 [=====>...] - ETA: 0s - loss: 0.6591 - accuracy:
0.8801
31/96 [=====>...] - ETA: 0s - loss: 0.6577 - accuracy:
0.8786
36/96 [=====>...] - ETA: 0s - loss: 0.6693 - accuracy:
0.8770
41/96 [=====>...] - ETA: 0s - loss: 0.6582 - accuracy:
0.8839
46/96 [=====>...] - ETA: 0s - loss: 0.6590 - accuracy:
0.8820
51/96 [=====>...] - ETA: 0s - loss: 0.6712 - accuracy:
0.8796
55/96 [=====>...] - ETA: 0s - loss: 0.6726 - accuracy:
0.8753
60/96 [=====>...] - ETA: 0s - loss: 0.6693 - accuracy:
0.8746
65/96 [=====>...] - ETA: 0s - loss: 0.6686 - accuracy:
0.8755
70/96 [=====>...] - ETA: 0s - loss: 0.6609 - accuracy:
0.8789
75/96 [=====>...] - ETA: 0s - loss: 0.6682 - accuracy:
0.8775
80/96 [=====>...] - ETA: 0s - loss: 0.6736 - accuracy:
0.8750
85/96 [=====>...] - ETA: 0s - loss: 0.6793 - accuracy:
0.8723
91/96 [=====>..] - ETA: 0s - loss: 0.6772 - accuracy:
0.8734

96/96 [=====] - 1s 14ms/step - loss: 0.6820 - accuracy:
0.8721 - val_loss: 1.9922 - val_accuracy: 0.5525

Epoch 16/30

1/96 [...] - ETA: 1s - loss: 0.5023 - accuracy:
0.9524
5/96 [>...] - ETA: 1s - loss: 0.5606 - accuracy:
0.9238
10/96 [==>...] - ETA: 1s - loss: 0.5939 - accuracy:
0.9048
16/96 [====>...] - ETA: 0s - loss: 0.5892 - accuracy:
0.9167
21/96 [=====>...] - ETA: 0s - loss: 0.5887 - accuracy:
0.9093
25/96 [=====>...] - ETA: 0s - loss: 0.6033 - accuracy:
0.9048
31/96 [=====>...] - ETA: 0s - loss: 0.6101 - accuracy:
0.9048
37/96 [=====>...] - ETA: 0s - loss: 0.5940 - accuracy:
0.9112
43/96 [=====>...] - ETA: 0s - loss: 0.5882 - accuracy:
0.9114
49/96 [=====>...] - ETA: 0s - loss: 0.5768 - accuracy:
0.9155
53/96 [=====>...] - ETA: 0s - loss: 0.5801 - accuracy:
0.9146
59/96 [=====>...] - ETA: 0s - loss: 0.5791 - accuracy:
0.9136
64/96 [=====>...] - ETA: 0s - loss: 0.5720 - accuracy:
0.9174
70/96 [=====>...] - ETA: 0s - loss: 0.5730 - accuracy:
0.9163
75/96 [=====>...] - ETA: 0s - loss: 0.5741 - accuracy:
0.9162
79/96 [=====>...] - ETA: 0s - loss: 0.5737 - accuracy:
0.9162
84/96 [=====>...] - ETA: 0s - loss: 0.5774 - accuracy:
0.9133
89/96 [=====>...] - ETA: 0s - loss: 0.5785 - accuracy:
0.9112
94/96 [=====>.] - ETA: 0s - loss: 0.5798 - accuracy:
0.9119
96/96 [=====] - 1s 14ms/step - loss: 0.5790 - accuracy:
0.9120 - val_loss: 1.7298 - val_accuracy: 0.6277

Epoch 17/30

```

1/96 [...] - ETA: 2s - loss: 0.6376 - accuracy:
0.8571
6/96 [>...] - ETA: 0s - loss: 0.4810 - accuracy:
0.9603
12/96 [==>...] - ETA: 0s - loss: 0.4913 - accuracy:
0.9563
17/96 [====>...] - ETA: 0s - loss: 0.4763 - accuracy:
0.9636
22/96 [=====>...] - ETA: 0s - loss: 0.4766 - accuracy:
0.9610
26/96 [=====>...] - ETA: 0s - loss: 0.4758 - accuracy:
0.9615
32/96 [=====>...] - ETA: 0s - loss: 0.4606 - accuracy:
0.9613
38/96 [=====>...] - ETA: 0s - loss: 0.4494 - accuracy:
0.9637
43/96 [=====>...] - ETA: 0s - loss: 0.4698 - accuracy:
0.9568
48/96 [=====>...] - ETA: 0s - loss: 0.4717 - accuracy:
0.9524
52/96 [=====>...] - ETA: 0s - loss: 0.4737 - accuracy:
0.9515
57/96 [=====>...] - ETA: 0s - loss: 0.4906 - accuracy:
0.9457
62/96 [=====>...] - ETA: 0s - loss: 0.4936 - accuracy:
0.9424
68/96 [=====>...] - ETA: 0s - loss: 0.5003 - accuracy:
0.9384
73/96 [=====>...] - ETA: 0s - loss: 0.5083 - accuracy:
0.9354
78/96 [=====>...] - ETA: 0s - loss: 0.5087 - accuracy:
0.9347
83/96 [=====>...] - ETA: 0s - loss: 0.5109 - accuracy:
0.9346
88/96 [=====>...] - ETA: 0s - loss: 0.5135 - accuracy:
0.9334
94/96 [=====>.] - ETA: 0s - loss: 0.5088 - accuracy:
0.9341
96/96 [=====] - 1s 14ms/step - loss: 0.5075 - accuracy:
0.9345 - val_loss: 1.9703 - val_accuracy: 0.6208

```

Epoch 18/30

```

1/96 [...] - ETA: 2s - loss: 0.3289 - accuracy:
1.0000
6/96 [>...] - ETA: 0s - loss: 0.4825 - accuracy:
0.9603
11/96 [==>...] - ETA: 0s - loss: 0.4962 - accuracy:

```

0.9481
17/96 [====>...] - ETA: 0s - loss: 0.5020 - accuracy:
0.9468
22/96 [=====>...] - ETA: 0s - loss: 0.4908 - accuracy:
0.9459
26/96 [=====>...] - ETA: 0s - loss: 0.4953 - accuracy:
0.9432
31/96 [=====>...] - ETA: 0s - loss: 0.4888 - accuracy:
0.9478
37/96 [=====>...] - ETA: 0s - loss: 0.4919 - accuracy:
0.9434
42/96 [=====>...] - ETA: 0s - loss: 0.4788 - accuracy:
0.9478
48/96 [=====>...] - ETA: 0s - loss: 0.4697 - accuracy:
0.9524
54/96 [=====>...] - ETA: 0s - loss: 0.4715 - accuracy:
0.9489
58/96 [=====>...] - ETA: 0s - loss: 0.4722 - accuracy:
0.9491
64/96 [=====>...] - ETA: 0s - loss: 0.4703 - accuracy:
0.9479
70/96 [=====>...] - ETA: 0s - loss: 0.4651 - accuracy:
0.9469
75/96 [=====>...] - ETA: 0s - loss: 0.4693 - accuracy:
0.9441
80/96 [=====>...] - ETA: 0s - loss: 0.4663 - accuracy:
0.9458
84/96 [=====>...] - ETA: 0s - loss: 0.4712 - accuracy:
0.9427
89/96 [=====>...] - ETA: 0s - loss: 0.4733 - accuracy:
0.9411
95/96 [=====>.] - ETA: 0s - loss: 0.4793 - accuracy:
0.9398
96/96 [=====>] - 1s 13ms/step - loss: 0.4798 - accuracy:
0.9390 - val_loss: 2.0710 - val_accuracy: 0.5961

Epoch 19/30

1/96 [...] - ETA: 1s - loss: 0.5000 - accuracy:
0.9524
6/96 [>...] - ETA: 1s - loss: 0.4511 - accuracy:
0.9603
10/96 [==>...] - ETA: 1s - loss: 0.4638 - accuracy:
0.9476
14/96 [==>...] - ETA: 1s - loss: 0.4837 - accuracy:
0.9354
18/96 [====>...] - ETA: 0s - loss: 0.4734 - accuracy:
0.9365

22/96 [====>...] - ETA: 0s - loss: 0.4827 - accuracy:
 0.9351
 26/96 [=====>...] - ETA: 0s - loss: 0.4790 - accuracy:
 0.9377
 30/96 [=====>...] - ETA: 0s - loss: 0.4809 - accuracy:
 0.9349
 35/96 [=====>...] - ETA: 0s - loss: 0.4811 - accuracy:
 0.9347
 39/96 [=====>...] - ETA: 0s - loss: 0.4817 - accuracy:
 0.9341
 43/96 [=====>...] - ETA: 0s - loss: 0.4799 - accuracy:
 0.9336
 47/96 [=====>...] - ETA: 0s - loss: 0.4885 - accuracy:
 0.9301
 52/96 [=====>...] - ETA: 0s - loss: 0.4876 - accuracy:
 0.9304
 57/96 [=====>...] - ETA: 0s - loss: 0.4802 - accuracy:
 0.9323
 62/96 [=====>...] - ETA: 0s - loss: 0.4831 - accuracy:
 0.9332
 66/96 [=====>...] - ETA: 0s - loss: 0.4816 - accuracy:
 0.9329
 70/96 [=====>...] - ETA: 0s - loss: 0.4865 - accuracy:
 0.9299
 74/96 [=====>...] - ETA: 0s - loss: 0.4934 - accuracy:
 0.9279
 78/96 [=====>...] - ETA: 0s - loss: 0.4923 - accuracy:
 0.9280
 82/96 [=====>...] - ETA: 0s - loss: 0.4938 - accuracy:
 0.9274
 85/96 [=====>...] - ETA: 0s - loss: 0.4947 - accuracy:
 0.9261
 89/96 [=====>...] - ETA: 0s - loss: 0.4946 - accuracy:
 0.9262
 93/96 [=====>.] - ETA: 0s - loss: 0.4934 - accuracy:
 0.9263
 96/96 [=====>] - 2s 16ms/step - loss: 0.4937 - accuracy:
 0.9265 - val_loss: 2.2664 - val_accuracy: 0.5816

Epoch 20/30

1/96 [...] - ETA: 1s - loss: 0.4451 - accuracy:
 0.9524
 6/96 [>...] - ETA: 1s - loss: 0.5143 - accuracy:
 0.9127
 11/96 [==>...] - ETA: 0s - loss: 0.4856 - accuracy:
 0.9264
 15/96 [===>...] - ETA: 0s - loss: 0.4765 - accuracy:

```

0.9429
19/96 [====>...] - ETA: 0s - loss: 0.4673 - accuracy:
0.9499
23/96 [=====>...] - ETA: 0s - loss: 0.4656 - accuracy:
0.9503
27/96 [=====>...] - ETA: 0s - loss: 0.4728 - accuracy:
0.9453
31/96 [=====>...] - ETA: 0s - loss: 0.4670 - accuracy:
0.9493
35/96 [=====>...] - ETA: 0s - loss: 0.4654 - accuracy:
0.9497
39/96 [=====>...] - ETA: 0s - loss: 0.4753 - accuracy:
0.9463
44/96 [=====>...] - ETA: 0s - loss: 0.4782 - accuracy:
0.9426
47/96 [=====>...] - ETA: 0s - loss: 0.4795 - accuracy:
0.9402
51/96 [=====>...] - ETA: 0s - loss: 0.4787 - accuracy:
0.9421
55/96 [=====>...] - ETA: 0s - loss: 0.4816 - accuracy:
0.9411
59/96 [=====>...] - ETA: 0s - loss: 0.4897 - accuracy:
0.9338
63/96 [=====>...] - ETA: 0s - loss: 0.4966 - accuracy:
0.9327
67/96 [=====>...] - ETA: 0s - loss: 0.4928 - accuracy:
0.9346
71/96 [=====>...] - ETA: 0s - loss: 0.4955 - accuracy:
0.9329
75/96 [=====>...] - ETA: 0s - loss: 0.4975 - accuracy:
0.9327
79/96 [=====>...] - ETA: 0s - loss: 0.4997 - accuracy:
0.9331
83/96 [=====>...] - ETA: 0s - loss: 0.4974 - accuracy:
0.9334
87/96 [=====>...] - ETA: 0s - loss: 0.4981 - accuracy:
0.9332
91/96 [=====>...] - ETA: 0s - loss: 0.5039 - accuracy:
0.9304
95/96 [=====>...] - ETA: 0s - loss: 0.5072 - accuracy:
0.9293
96/96 [=====>...] - 2s 17ms/step - loss: 0.5082 - accuracy:
0.9290 - val_loss: 2.2257 - val_accuracy: 0.5628

```

Epoch 21/30

```

1/96 [...] - ETA: 2s - loss: 0.4818 - accuracy:
0.9048

```

5/96 [>...] - ETA: 1s - loss: 0.4315 - accuracy:
 0.9429
 9/96 [=>...] - ETA: 1s - loss: 0.5165 - accuracy:
 0.9259
 13/96 [===>...] - ETA: 1s - loss: 0.5315 - accuracy:
 0.9231
 17/96 [====>...] - ETA: 1s - loss: 0.5301 - accuracy:
 0.9300
 21/96 [=====>...] - ETA: 1s - loss: 0.5474 - accuracy:
 0.9297
 25/96 [=====>...] - ETA: 0s - loss: 0.5547 - accuracy:
 0.9276
 30/96 [=====>...] - ETA: 0s - loss: 0.5622 - accuracy:
 0.9254
 35/96 [=====>...] - ETA: 0s - loss: 0.5716 - accuracy:
 0.9211
 40/96 [=====>...] - ETA: 0s - loss: 0.5703 - accuracy:
 0.9202
 45/96 [=====>...] - ETA: 0s - loss: 0.5708 - accuracy:
 0.9185
 50/96 [=====>...] - ETA: 0s - loss: 0.5672 - accuracy:
 0.9190
 56/96 [=====>...] - ETA: 0s - loss: 0.5689 - accuracy:
 0.9167
 62/96 [=====>...] - ETA: 0s - loss: 0.5732 - accuracy:
 0.9140
 68/96 [=====>...] - ETA: 0s - loss: 0.5757 - accuracy:
 0.9118
 73/96 [=====>...] - ETA: 0s - loss: 0.5697 - accuracy:
 0.9145
 78/96 [=====>...] - ETA: 0s - loss: 0.5826 - accuracy:
 0.9103
 82/96 [=====>...] - ETA: 0s - loss: 0.5797 - accuracy:
 0.9123
 87/96 [=====>...] - ETA: 0s - loss: 0.5799 - accuracy:
 0.9097
 93/96 [=====>.] - ETA: 0s - loss: 0.5812 - accuracy:
 0.9078
 96/96 [=====] - 1s 14ms/step - loss: 0.5801 - accuracy:
 0.9075 - val_loss: 2.0852 - val_accuracy: 0.5918

Epoch 1/30

1/96 [...] - ETA: 6:06 - loss: 10.8904 - accuracy:
 0.2381
 4/96 [>...] - ETA: 1s - loss: 12.8052 - accuracy:
 0.2619
 7/96 [=>...] - ETA: 1s - loss: 13.4801 - accuracy:

0.2177
10/96 [==>...] - ETA: 1s - loss: 13.4164 - accuracy:
0.1905
14/96 [===>...] - ETA: 1s - loss: 12.7223 - accuracy:
0.1871
18/96 [====>...] - ETA: 1s - loss: 11.9247 - accuracy:
0.1958
22/96 [=====>...] - ETA: 1s - loss: 11.3585 - accuracy:
0.2078
26/96 [=====>...] - ETA: 1s - loss: 11.0350 - accuracy:
0.2198
30/96 [=====>...] - ETA: 1s - loss: 10.7226 - accuracy:
0.2317
33/96 [=====>...] - ETA: 1s - loss: 10.5340 - accuracy:
0.2193
37/96 [=====>...] - ETA: 0s - loss: 10.3060 - accuracy:
0.2214
42/96 [=====>...] - ETA: 0s - loss: 10.0045 - accuracy:
0.2290
47/96 [=====>...] - ETA: 0s - loss: 9.7641 - accuracy:
0.2411
51/96 [=====>...] - ETA: 0s - loss: 9.5878 - accuracy:
0.2409
55/96 [=====>...] - ETA: 0s - loss: 9.4003 - accuracy:
0.2519
59/96 [=====>...] - ETA: 0s - loss: 9.2640 - accuracy:
0.2526
64/96 [=====>...] - ETA: 0s - loss: 9.0661 - accuracy:
0.2597
69/96 [=====>...] - ETA: 0s - loss: 8.8957 - accuracy:
0.2650
73/96 [=====>...] - ETA: 0s - loss: 8.7756 - accuracy:
0.2701
77/96 [=====>...] - ETA: 0s - loss: 8.6541 - accuracy:
0.2777
81/96 [=====>...] - ETA: 0s - loss: 8.5520 - accuracy:
0.2798
85/96 [=====>...] - ETA: 0s - loss: 8.4458 - accuracy:
0.2840
90/96 [=====>..] - ETA: 0s - loss: 8.3130 - accuracy:
0.2915
93/96 [=====>..] - ETA: 0s - loss: 8.2315 - accuracy:
0.2985
96/96 [=====] - 6s 21ms/step - loss: 8.1785 - accuracy:
0.2999 - val_loss: 8.9712 - val_accuracy: 0.1187

Epoch 2/30

1/96 [...] - ETA: 2s - loss: 5.6964 - accuracy:
0.3810
5/96 [>...] - ETA: 1s - loss: 5.8896 - accuracy:
0.4000
10/96 [==>...] - ETA: 1s - loss: 5.8400 - accuracy:
0.4095
15/96 [===>...] - ETA: 0s - loss: 5.7342 - accuracy:
0.4317
19/96 [====>...] - ETA: 0s - loss: 5.6720 - accuracy:
0.4386
23/96 [=====>...] - ETA: 0s - loss: 5.6309 - accuracy:
0.4493
28/96 [=====>...] - ETA: 0s - loss: 5.5648 - accuracy:
0.4592
33/96 [=====>...] - ETA: 0s - loss: 5.5210 - accuracy:
0.4603
38/96 [=====>...] - ETA: 0s - loss: 5.4771 - accuracy:
0.4599
43/96 [=====>...] - ETA: 0s - loss: 5.4133 - accuracy:
0.4640
47/96 [=====>...] - ETA: 0s - loss: 5.3823 - accuracy:
0.4661
51/96 [=====>...] - ETA: 0s - loss: 5.3392 - accuracy:
0.4641
56/96 [=====>...] - ETA: 0s - loss: 5.2896 - accuracy:
0.4592
61/96 [=====>...] - ETA: 0s - loss: 5.2345 - accuracy:
0.4637
66/96 [=====>...] - ETA: 0s - loss: 5.1644 - accuracy:
0.4726
71/96 [=====>...] - ETA: 0s - loss: 5.1206 - accuracy:
0.4728
75/96 [=====>...] - ETA: 0s - loss: 5.0847 - accuracy:
0.4724
79/96 [=====>...] - ETA: 0s - loss: 5.0442 - accuracy:
0.4762
84/96 [=====>...] - ETA: 0s - loss: 4.9812 - accuracy:
0.4824
89/96 [=====>...] - ETA: 0s - loss: 4.9211 - accuracy:
0.4901
94/96 [=====>.] - ETA: 0s - loss: 4.8621 - accuracy:
0.4985
96/96 [=====] - 1s 15ms/step - loss: 4.8441 - accuracy:
0.5012 - val_loss: 4.4243 - val_accuracy: 0.3877

Epoch 3/30

1/96 [...] - ETA: 1s - loss: 3.6524 - accuracy:

0.5714
 6/96 [>...] - ETA: 0s - loss: 3.7179 - accuracy:
 0.6032
 10/96 [==>...] - ETA: 1s - loss: 3.7179 - accuracy:
 0.6048
 15/96 [===>...] - ETA: 0s - loss: 3.6452 - accuracy:
 0.6222
 19/96 [====>...] - ETA: 0s - loss: 3.5888 - accuracy:
 0.6216
 24/96 [=====>...] - ETA: 0s - loss: 3.5862 - accuracy:
 0.6230
 29/96 [=====>...] - ETA: 0s - loss: 3.5849 - accuracy:
 0.6158
 34/96 [=====>...] - ETA: 0s - loss: 3.5674 - accuracy:
 0.6204
 38/96 [=====>...] - ETA: 0s - loss: 3.5212 - accuracy:
 0.6341
 42/96 [=====>...] - ETA: 0s - loss: 3.4870 - accuracy:
 0.6383
 46/96 [=====>...] - ETA: 0s - loss: 3.4611 - accuracy:
 0.6460
 51/96 [=====>...] - ETA: 0s - loss: 3.4148 - accuracy:
 0.6471
 56/96 [=====>...] - ETA: 0s - loss: 3.3605 - accuracy:
 0.6616
 61/96 [=====>...] - ETA: 0s - loss: 3.3227 - accuracy:
 0.6674
 65/96 [=====>...] - ETA: 0s - loss: 3.2982 - accuracy:
 0.6703
 69/96 [=====>...] - ETA: 0s - loss: 3.2601 - accuracy:
 0.6763
 73/96 [=====>...] - ETA: 0s - loss: 3.2268 - accuracy:
 0.6823
 76/96 [=====>...] - ETA: 0s - loss: 3.2106 - accuracy:
 0.6836
 80/96 [=====>...] - ETA: 0s - loss: 3.1790 - accuracy:
 0.6875
 83/96 [=====>...] - ETA: 0s - loss: 3.1632 - accuracy:
 0.6890
 87/96 [=====>...] - ETA: 0s - loss: 3.1402 - accuracy:
 0.6907
 90/96 [=====>..] - ETA: 0s - loss: 3.1172 - accuracy:
 0.6952
 93/96 [=====>.] - ETA: 0s - loss: 3.1059 - accuracy:
 0.6989
 96/96 [=====] - ETA: 0s - loss: 3.0899 - accuracy:
 0.7006
 96/96 [=====] - 2s 17ms/step - loss: 3.0899 - accuracy:

0.7006 - val_loss: 2.9366 - val_accuracy: 0.6405

Epoch 4/30

1/96 [...] - ETA: 2s - loss: 2.4761 - accuracy:
0.7619
5/96 [>...] - ETA: 1s - loss: 2.4326 - accuracy:
0.7619
9/96 [=>...] - ETA: 1s - loss: 2.4485 - accuracy:
0.7513
13/96 [===>...] - ETA: 1s - loss: 2.3957 - accuracy:
0.7729
17/96 [====>...] - ETA: 1s - loss: 2.3648 - accuracy:
0.7815
21/96 [=====>...] - ETA: 1s - loss: 2.3373 - accuracy:
0.7937
24/96 [=====>...] - ETA: 1s - loss: 2.3018 - accuracy:
0.8056
27/96 [=====>...] - ETA: 1s - loss: 2.2898 - accuracy:
0.8060
31/96 [=====>...] - ETA: 0s - loss: 2.2800 - accuracy:
0.8034
34/96 [=====>...] - ETA: 0s - loss: 2.2869 - accuracy:
0.7955
38/96 [=====>...] - ETA: 0s - loss: 2.2717 - accuracy:
0.7907
42/96 [=====>...] - ETA: 0s - loss: 2.2738 - accuracy:
0.7834
45/96 [=====>...] - ETA: 0s - loss: 2.2624 - accuracy:
0.7841
48/96 [=====>...] - ETA: 0s - loss: 2.2492 - accuracy:
0.7847
52/96 [=====>...] - ETA: 0s - loss: 2.2327 - accuracy:
0.7866
56/96 [=====>...] - ETA: 0s - loss: 2.2143 - accuracy:
0.7900
60/96 [=====>...] - ETA: 0s - loss: 2.2103 - accuracy:
0.7881
63/96 [=====>...] - ETA: 0s - loss: 2.2199 - accuracy:
0.7808
66/96 [=====>...] - ETA: 0s - loss: 2.1989 - accuracy:
0.7857
70/96 [=====>...] - ETA: 0s - loss: 2.1895 - accuracy:
0.7823
73/96 [=====>...] - ETA: 0s - loss: 2.1787 - accuracy:
0.7821
76/96 [=====>...] - ETA: 0s - loss: 2.1693 - accuracy:
0.7857

80/96 [=====>...] - ETA: 0s - loss: 2.1598 - accuracy:
0.7863
84/96 [=====>...] - ETA: 0s - loss: 2.1568 - accuracy:
0.7834
87/96 [=====>...] - ETA: 0s - loss: 2.1501 - accuracy:
0.7833
91/96 [=====>..] - ETA: 0s - loss: 2.1495 - accuracy:
0.7823
95/96 [=====>.] - ETA: 0s - loss: 2.1499 - accuracy:
0.7794
96/96 [=====] - 2s 19ms/step - loss: 2.1490 - accuracy:
0.7796 - val_loss: 3.0934 - val_accuracy: 0.4466

Epoch 5/30

1/96 [...] - ETA: 1s - loss: 1.6899 - accuracy:
0.8095
5/96 [>...] - ETA: 1s - loss: 1.7613 - accuracy:
0.8190
9/96 [=>...] - ETA: 1s - loss: 1.6771 - accuracy:
0.8519
13/96 [===>...] - ETA: 1s - loss: 1.6750 - accuracy:
0.8498
16/96 [====>...] - ETA: 1s - loss: 1.6725 - accuracy:
0.8542
20/96 [=====>...] - ETA: 1s - loss: 1.6866 - accuracy:
0.8476
24/96 [=====>...] - ETA: 1s - loss: 1.6787 - accuracy:
0.8512
28/96 [=====>...] - ETA: 0s - loss: 1.6925 - accuracy:
0.8435
31/96 [=====>...] - ETA: 0s - loss: 1.6987 - accuracy:
0.8372
35/96 [=====>...] - ETA: 0s - loss: 1.6963 - accuracy:
0.8327
39/96 [=====>...] - ETA: 0s - loss: 1.6778 - accuracy:
0.8327
43/96 [=====>...] - ETA: 0s - loss: 1.6731 - accuracy:
0.8328
47/96 [=====>...] - ETA: 0s - loss: 1.6488 - accuracy:
0.8369
52/96 [=====>...] - ETA: 0s - loss: 1.6421 - accuracy:
0.8361
56/96 [=====>...] - ETA: 0s - loss: 1.6391 - accuracy:
0.8350
61/96 [=====>...] - ETA: 0s - loss: 1.6324 - accuracy:
0.8345
65/96 [=====>...] - ETA: 0s - loss: 1.6270 - accuracy:

0.8337
69/96 [=====>...] - ETA: 0s - loss: 1.6210 - accuracy:
0.8344
73/96 [=====>...] - ETA: 0s - loss: 1.6187 - accuracy:
0.8317
78/96 [=====>...] - ETA: 0s - loss: 1.6156 - accuracy:
0.8284
83/96 [=====>...] - ETA: 0s - loss: 1.6137 - accuracy:
0.8262
87/96 [=====>...] - ETA: 0s - loss: 1.6159 - accuracy:
0.8232
92/96 [=====>..] - ETA: 0s - loss: 1.5942 - accuracy:
0.8256
96/96 [=====] - 2s 16ms/step - loss: 1.5951 - accuracy:
0.8236 - val_loss: 1.9502 - val_accuracy: 0.6644

Epoch 6/30

1/96 [...] - ETA: 2s - loss: 1.3092 - accuracy:
0.8571
5/96 [>...] - ETA: 1s - loss: 1.3119 - accuracy:
0.8667
10/96 [==>...] - ETA: 1s - loss: 1.3128 - accuracy:
0.8667
15/96 [===>...] - ETA: 0s - loss: 1.3024 - accuracy:
0.8730
18/96 [====>...] - ETA: 0s - loss: 1.2922 - accuracy:
0.8624
23/96 [=====>...] - ETA: 0s - loss: 1.2606 - accuracy:
0.8716
27/96 [=====>...] - ETA: 0s - loss: 1.2382 - accuracy:
0.8765
32/96 [=====>...] - ETA: 0s - loss: 1.2034 - accuracy:
0.8839
37/96 [=====>...] - ETA: 0s - loss: 1.1927 - accuracy:
0.8829
41/96 [=====>...] - ETA: 0s - loss: 1.1884 - accuracy:
0.8827
45/96 [=====>...] - ETA: 0s - loss: 1.1872 - accuracy:
0.8815
50/96 [=====>...] - ETA: 0s - loss: 1.1802 - accuracy:
0.8800
55/96 [=====>...] - ETA: 0s - loss: 1.1781 - accuracy:
0.8771
60/96 [=====>...] - ETA: 0s - loss: 1.1750 - accuracy:
0.8770
65/96 [=====>...] - ETA: 0s - loss: 1.1836 - accuracy:
0.8711

69/96 [=====>...] - ETA: 0s - loss: 1.1811 - accuracy:
0.8709
73/96 [=====>...] - ETA: 0s - loss: 1.1787 - accuracy:
0.8695
77/96 [=====>...] - ETA: 0s - loss: 1.1750 - accuracy:
0.8701
82/96 [=====>...] - ETA: 0s - loss: 1.1833 - accuracy:
0.8659
87/96 [=====>...] - ETA: 0s - loss: 1.1812 - accuracy:
0.8648
92/96 [=====>..] - ETA: 0s - loss: 1.1727 - accuracy:
0.8665
96/96 [=====] - ETA: 0s - loss: 1.1733 - accuracy:
0.8656
96/96 [=====] - 2s 16ms/step - loss: 1.1733 - accuracy:
0.8656 - val_loss: 1.8306 - val_accuracy: 0.6533

Epoch 7/30

1/96 [...] - ETA: 2s - loss: 1.0025 - accuracy:
0.9048
6/96 [>...] - ETA: 1s - loss: 0.9001 - accuracy:
0.9286
10/96 [==>...] - ETA: 1s - loss: 0.9533 - accuracy:
0.8905
13/96 [===>...] - ETA: 1s - loss: 0.9286 - accuracy:
0.9011
16/96 [====>...] - ETA: 1s - loss: 0.9617 - accuracy:
0.8988
20/96 [=====>...] - ETA: 1s - loss: 0.9166 - accuracy:
0.9119
24/96 [=====>...] - ETA: 0s - loss: 0.9068 - accuracy:
0.9127
29/96 [=====>...] - ETA: 0s - loss: 0.9240 - accuracy:
0.9031
33/96 [=====>...] - ETA: 0s - loss: 0.9388 - accuracy:
0.9019
36/96 [=====>...] - ETA: 0s - loss: 0.9387 - accuracy:
0.8981
41/96 [=====>...] - ETA: 0s - loss: 0.9514 - accuracy:
0.8908
45/96 [=====>...] - ETA: 0s - loss: 0.9533 - accuracy:
0.8889
49/96 [=====>...] - ETA: 0s - loss: 0.9618 - accuracy:
0.8863
53/96 [=====>...] - ETA: 0s - loss: 0.9483 - accuracy:
0.8895
57/96 [=====>...] - ETA: 0s - loss: 0.9525 - accuracy:

```

0.8881
61/96 [=====>...] - ETA: 0s - loss: 0.9573 - accuracy:
0.8852
65/96 [=====>...] - ETA: 0s - loss: 0.9463 - accuracy:
0.8872
70/96 [=====>...] - ETA: 0s - loss: 0.9475 - accuracy:
0.8864
75/96 [=====>...] - ETA: 0s - loss: 0.9340 - accuracy:
0.8883
79/96 [=====>...] - ETA: 0s - loss: 0.9351 - accuracy:
0.8855
83/96 [=====>...] - ETA: 0s - loss: 0.9326 - accuracy:
0.8853
87/96 [=====>...] - ETA: 0s - loss: 0.9361 - accuracy:
0.8845
92/96 [=====>..] - ETA: 0s - loss: 0.9277 - accuracy:
0.8866
96/96 [=====] - 2s 17ms/step - loss: 0.9318 - accuracy:
0.8846 - val_loss: 1.6626 - val_accuracy: 0.7011

```

Epoch 8/30

```

1/96 [...] - ETA: 2s - loss: 0.6229 - accuracy:
1.0000
5/96 [>...] - ETA: 1s - loss: 0.7422 - accuracy:
0.9333
9/96 [=>...] - ETA: 1s - loss: 0.7176 - accuracy:
0.9418
13/96 [===>...] - ETA: 1s - loss: 0.7818 - accuracy:
0.9194
16/96 [====>...] - ETA: 1s - loss: 0.7793 - accuracy:
0.9137
19/96 [====>...] - ETA: 1s - loss: 0.7620 - accuracy:
0.9173
23/96 [=====>...] - ETA: 1s - loss: 0.7600 - accuracy:
0.9151
27/96 [=====>...] - ETA: 0s - loss: 0.7491 - accuracy:
0.9153
32/96 [=====>...] - ETA: 0s - loss: 0.7673 - accuracy:
0.9018
36/96 [=====>...] - ETA: 0s - loss: 0.7630 - accuracy:
0.8995
41/96 [=====>...] - ETA: 0s - loss: 0.7519 - accuracy:
0.9036
45/96 [=====>...] - ETA: 0s - loss: 0.7528 - accuracy:
0.9048
49/96 [=====>...] - ETA: 0s - loss: 0.7446 - accuracy:
0.9086

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54/96 [=====>...] - ETA: 0s - loss: 0.7341 - accuracy:
 0.9118
 59/96 [=====>...] - ETA: 0s - loss: 0.7384 - accuracy:
 0.9072
 64/96 [=====>...] - ETA: 0s - loss: 0.7436 - accuracy:
 0.9055
 69/96 [=====>...] - ETA: 0s - loss: 0.7345 - accuracy:
 0.9089
 73/96 [=====>...] - ETA: 0s - loss: 0.7348 - accuracy:
 0.9080
 78/96 [=====>...] - ETA: 0s - loss: 0.7322 - accuracy:
 0.9060
 83/96 [=====>...] - ETA: 0s - loss: 0.7327 - accuracy:
 0.9065
 86/96 [=====>...] - ETA: 0s - loss: 0.7386 - accuracy:
 0.9031
 91/96 [=====>..] - ETA: 0s - loss: 0.7498 - accuracy:
 0.8985
 95/96 [=====>.] - ETA: 0s - loss: 0.7533 - accuracy:
 0.8952
 96/96 [=====] - 2s 17ms/step - loss: 0.7530 - accuracy:
 0.8951 - val_loss: 1.5942 - val_accuracy: 0.6892

Epoch 9/30

1/96 [...] - ETA: 1s - loss: 0.4439 - accuracy:
 1.0000
 6/96 [>...] - ETA: 1s - loss: 0.5487 - accuracy:
 0.9524
 9/96 [=>...] - ETA: 1s - loss: 0.6366 - accuracy:
 0.9153
 13/96 [===>...] - ETA: 1s - loss: 0.6404 - accuracy:
 0.9194
 18/96 [====>...] - ETA: 1s - loss: 0.6634 - accuracy:
 0.9101
 23/96 [=====>...] - ETA: 0s - loss: 0.7165 - accuracy:
 0.8986
 28/96 [=====>...] - ETA: 0s - loss: 0.7138 - accuracy:
 0.8980
 32/96 [=====>...] - ETA: 0s - loss: 0.7156 - accuracy:
 0.9018
 36/96 [=====>...] - ETA: 0s - loss: 0.7226 - accuracy:
 0.8995
 41/96 [=====>...] - ETA: 0s - loss: 0.7340 - accuracy:
 0.8908
 46/96 [=====>...] - ETA: 0s - loss: 0.7214 - accuracy:
 0.8944
 51/96 [=====>...] - ETA: 0s - loss: 0.7226 - accuracy:


```

0.8936
55/96 [=====>...] - ETA: 0s - loss: 0.7238 - accuracy:
0.8909
59/96 [=====>...] - ETA: 0s - loss: 0.7177 - accuracy:
0.8918
63/96 [=====>...] - ETA: 0s - loss: 0.7156 - accuracy:
0.8904
67/96 [=====>...] - ETA: 0s - loss: 0.7061 - accuracy:
0.8927
71/96 [=====>...] - ETA: 0s - loss: 0.7027 - accuracy:
0.8940
76/96 [=====>...] - ETA: 0s - loss: 0.6925 - accuracy:
0.8966
80/96 [=====>...] - ETA: 0s - loss: 0.6867 - accuracy:
0.8982
84/96 [=====>...] - ETA: 0s - loss: 0.6806 - accuracy:
0.8991
88/96 [=====>...] - ETA: 0s - loss: 0.6757 - accuracy:
0.9004
93/96 [=====>.] - ETA: 0s - loss: 0.6691 - accuracy:
0.9012
96/96 [=====] - 2s 16ms/step - loss: 0.6683 - accuracy:
0.9020 - val_loss: 1.5215 - val_accuracy: 0.6900

```

Epoch 10/30

```

1/96 [...] - ETA: 1s - loss: 0.4108 - accuracy:
1.0000
5/96 [>...] - ETA: 1s - loss: 0.4541 - accuracy:
0.9619
10/96 [==>...] - ETA: 1s - loss: 0.4743 - accuracy:
0.9524
14/96 [===>...] - ETA: 1s - loss: 0.4999 - accuracy:
0.9354
18/96 [====>...] - ETA: 1s - loss: 0.4953 - accuracy:
0.9392
22/96 [=====>...] - ETA: 0s - loss: 0.4987 - accuracy:
0.9351
26/96 [=====>...] - ETA: 0s - loss: 0.5112 - accuracy:
0.9304
30/96 [=====>...] - ETA: 0s - loss: 0.5084 - accuracy:
0.9333
35/96 [=====>...] - ETA: 0s - loss: 0.5297 - accuracy:
0.9306
39/96 [=====>...] - ETA: 0s - loss: 0.5330 - accuracy:
0.9267
42/96 [=====>...] - ETA: 0s - loss: 0.5416 - accuracy:
0.9240

```

46/96 [=====>...] - ETA: 0s - loss: 0.5438 - accuracy:
 0.9203
 51/96 [=====>...] - ETA: 0s - loss: 0.5396 - accuracy:
 0.9234
 56/96 [=====>...] - ETA: 0s - loss: 0.5492 - accuracy:
 0.9226
 60/96 [=====>...] - ETA: 0s - loss: 0.5449 - accuracy:
 0.9246
 64/96 [=====>...] - ETA: 0s - loss: 0.5454 - accuracy:
 0.9241
 68/96 [=====>...] - ETA: 0s - loss: 0.5513 - accuracy:
 0.9216
 73/96 [=====>...] - ETA: 0s - loss: 0.5516 - accuracy:
 0.9224
 78/96 [=====>...] - ETA: 0s - loss: 0.5489 - accuracy:
 0.9237
 83/96 [=====>...] - ETA: 0s - loss: 0.5488 - accuracy:
 0.9243
 87/96 [=====>...] - ETA: 0s - loss: 0.5455 - accuracy:
 0.9250
 91/96 [=====>..] - ETA: 0s - loss: 0.5407 - accuracy:
 0.9267
 95/96 [=====>.] - ETA: 0s - loss: 0.5361 - accuracy:
 0.9278
 96/96 [=====] - 2s 16ms/step - loss: 0.5359 - accuracy:
 0.9280 - val_loss: 1.3308 - val_accuracy: 0.7199

Epoch 11/30

1/96 [...] - ETA: 2s - loss: 0.3728 - accuracy:
 1.0000
 5/96 [>...] - ETA: 1s - loss: 0.4254 - accuracy:
 0.9619
 9/96 [=>...] - ETA: 1s - loss: 0.4640 - accuracy:
 0.9418
 13/96 [==>...] - ETA: 1s - loss: 0.4606 - accuracy:
 0.9414
 17/96 [===>...] - ETA: 1s - loss: 0.4633 - accuracy:
 0.9384
 22/96 [====>...] - ETA: 0s - loss: 0.4637 - accuracy:
 0.9351
 27/96 [=====>...] - ETA: 0s - loss: 0.4559 - accuracy:
 0.9400
 31/96 [=====>...] - ETA: 0s - loss: 0.4721 - accuracy:
 0.9370
 35/96 [=====>...] - ETA: 0s - loss: 0.4713 - accuracy:
 0.9347
 40/96 [=====>...] - ETA: 0s - loss: 0.4679 - accuracy:

```

0.9381
45/96 [=====>...] - ETA: 0s - loss: 0.4805 - accuracy:
0.9344
50/96 [=====>...] - ETA: 0s - loss: 0.4717 - accuracy:
0.9362
54/96 [=====>...] - ETA: 0s - loss: 0.4718 - accuracy:
0.9365
58/96 [=====>...] - ETA: 0s - loss: 0.4727 - accuracy:
0.9351
63/96 [=====>...] - ETA: 0s - loss: 0.4697 - accuracy:
0.9350
68/96 [=====>...] - ETA: 0s - loss: 0.4701 - accuracy:
0.9342
72/96 [=====>...] - ETA: 0s - loss: 0.4673 - accuracy:
0.9352
77/96 [=====>...] - ETA: 0s - loss: 0.4654 - accuracy:
0.9351
81/96 [=====>...] - ETA: 0s - loss: 0.4614 - accuracy:
0.9359
85/96 [=====>...] - ETA: 0s - loss: 0.4632 - accuracy:
0.9350
88/96 [=====>...] - ETA: 0s - loss: 0.4590 - accuracy:
0.9367
91/96 [=====>..] - ETA: 0s - loss: 0.4603 - accuracy:
0.9372
94/96 [=====>.] - ETA: 0s - loss: 0.4648 - accuracy:
0.9357
96/96 [=====] - 2s 17ms/step - loss: 0.4663 - accuracy:
0.9350 - val_loss: 1.5149 - val_accuracy: 0.6985

```

Epoch 12/30

```

1/96 [...] - ETA: 2s - loss: 0.3430 - accuracy:
0.9524
4/96 [>...] - ETA: 1s - loss: 0.3962 - accuracy:
0.9643
8/96 [=>...] - ETA: 1s - loss: 0.4072 - accuracy:
0.9524
12/96 [==>...] - ETA: 1s - loss: 0.4372 - accuracy:
0.9444
16/96 [====>...] - ETA: 1s - loss: 0.4269 - accuracy:
0.9464
20/96 [=====>...] - ETA: 1s - loss: 0.4329 - accuracy:
0.9429
23/96 [=====>...] - ETA: 1s - loss: 0.4324 - accuracy:
0.9400
26/96 [=====>...] - ETA: 1s - loss: 0.4437 - accuracy:
0.9396

```

29/96 [=====>...] - ETA: 1s - loss: 0.4533 - accuracy:
 0.9343
 32/96 [=====>...] - ETA: 1s - loss: 0.4466 - accuracy:
 0.9360
 36/96 [=====>...] - ETA: 0s - loss: 0.4492 - accuracy:
 0.9352
 40/96 [=====>...] - ETA: 0s - loss: 0.4440 - accuracy:
 0.9369
 44/96 [=====>...] - ETA: 0s - loss: 0.4625 - accuracy:
 0.9297
 48/96 [=====>...] - ETA: 0s - loss: 0.4531 - accuracy:
 0.9335
 52/96 [=====>...] - ETA: 0s - loss: 0.4486 - accuracy:
 0.9341
 56/96 [=====>...] - ETA: 0s - loss: 0.4547 - accuracy:
 0.9320
 60/96 [=====>...] - ETA: 0s - loss: 0.4569 - accuracy:
 0.9310
 64/96 [=====>...] - ETA: 0s - loss: 0.4569 - accuracy:
 0.9301
 68/96 [=====>...] - ETA: 0s - loss: 0.4639 - accuracy:
 0.9272
 72/96 [=====>...] - ETA: 0s - loss: 0.4591 - accuracy:
 0.9286
 75/96 [=====>...] - ETA: 0s - loss: 0.4604 - accuracy:
 0.9289
 78/96 [=====>...] - ETA: 0s - loss: 0.4592 - accuracy:
 0.9298
 82/96 [=====>...] - ETA: 0s - loss: 0.4603 - accuracy:
 0.9286
 85/96 [=====>...] - ETA: 0s - loss: 0.4574 - accuracy:
 0.9300
 88/96 [=====>...] - ETA: 0s - loss: 0.4640 - accuracy:
 0.9286
 92/96 [=====>...] - ETA: 0s - loss: 0.4668 - accuracy:
 0.9281
 96/96 [=====] - ETA: 0s - loss: 0.4679 - accuracy:
 0.9280
 96/96 [=====] - 2s 19ms/step - loss: 0.4679 - accuracy:
 0.9280 - val_loss: 1.8257 - val_accuracy: 0.5824

Epoch 13/30

1/96 [...] - ETA: 2s - loss: 0.4474 - accuracy:
 0.9048
 4/96 [>...] - ETA: 1s - loss: 0.4128 - accuracy:
 0.9524
 7/96 [=>...] - ETA: 1s - loss: 0.4334 - accuracy:

0.9456
 11/96 [==>...] - ETA: 1s - loss: 0.4658 - accuracy:
 0.9307
 15/96 [===>...] - ETA: 1s - loss: 0.4646 - accuracy:
 0.9333
 19/96 [====>...] - ETA: 1s - loss: 0.4572 - accuracy:
 0.9373
 23/96 [=====>...] - ETA: 1s - loss: 0.4491 - accuracy:
 0.9400
 27/96 [=====>...] - ETA: 1s - loss: 0.4649 - accuracy:
 0.9330
 30/96 [=====>...] - ETA: 1s - loss: 0.4667 - accuracy:
 0.9302
 33/96 [=====>...] - ETA: 1s - loss: 0.4645 - accuracy:
 0.9307
 36/96 [=====>...] - ETA: 0s - loss: 0.4671 - accuracy:
 0.9286
 39/96 [=====>...] - ETA: 0s - loss: 0.4643 - accuracy:
 0.9267
 42/96 [=====>...] - ETA: 0s - loss: 0.4581 - accuracy:
 0.9274
 45/96 [=====>...] - ETA: 0s - loss: 0.4604 - accuracy:
 0.9259
 49/96 [=====>...] - ETA: 0s - loss: 0.4534 - accuracy:
 0.9271
 52/96 [=====>...] - ETA: 0s - loss: 0.4458 - accuracy:
 0.9295
 56/96 [=====>...] - ETA: 0s - loss: 0.4364 - accuracy:
 0.9337
 60/96 [=====>...] - ETA: 0s - loss: 0.4399 - accuracy:
 0.9317
 65/96 [=====>...] - ETA: 0s - loss: 0.4484 - accuracy:
 0.9311
 70/96 [=====>...] - ETA: 0s - loss: 0.4467 - accuracy:
 0.9333
 75/96 [=====>...] - ETA: 0s - loss: 0.4516 - accuracy:
 0.9321
 79/96 [=====>...] - ETA: 0s - loss: 0.4558 - accuracy:
 0.9307
 84/96 [=====>...] - ETA: 0s - loss: 0.4541 - accuracy:
 0.9320
 88/96 [=====>...] - ETA: 0s - loss: 0.4568 - accuracy:
 0.9313
 93/96 [=====>.] - ETA: 0s - loss: 0.4538 - accuracy:
 0.9314
 96/96 [=====] - 2s 18ms/step - loss: 0.4556 - accuracy:
 0.9310 - val_loss: 1.7152 - val_accuracy: 0.6268

Epoch 14/30

1/96 [...] - ETA: 1s - loss: 0.2420 - accuracy:
1.0000
6/96 [>...] - ETA: 1s - loss: 0.3995 - accuracy:
0.9524
10/96 [==>...] - ETA: 1s - loss: 0.4133 - accuracy:
0.9476
14/96 [===>...] - ETA: 1s - loss: 0.4190 - accuracy:
0.9456
19/96 [====>...] - ETA: 0s - loss: 0.3923 - accuracy:
0.9474
23/96 [=====>...] - ETA: 0s - loss: 0.3803 - accuracy:
0.9503
27/96 [=====>...] - ETA: 0s - loss: 0.3799 - accuracy:
0.9489
32/96 [=====>...] - ETA: 0s - loss: 0.3803 - accuracy:
0.9479
36/96 [=====>...] - ETA: 0s - loss: 0.3701 - accuracy:
0.9511
41/96 [=====>...] - ETA: 0s - loss: 0.3832 - accuracy:
0.9477
46/96 [=====>...] - ETA: 0s - loss: 0.3858 - accuracy:
0.9472
51/96 [=====>...] - ETA: 0s - loss: 0.3889 - accuracy:
0.9458
55/96 [=====>...] - ETA: 0s - loss: 0.3884 - accuracy:
0.9455
58/96 [=====>...] - ETA: 0s - loss: 0.3881 - accuracy:
0.9442
62/96 [=====>...] - ETA: 0s - loss: 0.3858 - accuracy:
0.9447
67/96 [=====>...] - ETA: 0s - loss: 0.3836 - accuracy:
0.9460
71/96 [=====>...] - ETA: 0s - loss: 0.3783 - accuracy:
0.9477
76/96 [=====>...] - ETA: 0s - loss: 0.3754 - accuracy:
0.9474
80/96 [=====>...] - ETA: 0s - loss: 0.3731 - accuracy:
0.9482
85/96 [=====>...] - ETA: 0s - loss: 0.3810 - accuracy:
0.9473
90/96 [=====>..] - ETA: 0s - loss: 0.3824 - accuracy:
0.9460
95/96 [=====>.] - ETA: 0s - loss: 0.3804 - accuracy:
0.9469
96/96 [=====] - 2s 16ms/step - loss: 0.3799 - accuracy:
0.9470 - val_loss: 1.6646 - val_accuracy: 0.6225

Epoch 15/30

1/96 [...] - ETA: 2s - loss: 0.4177 - accuracy:
0.9524
5/96 [>...] - ETA: 1s - loss: 0.4298 - accuracy:
0.9619
9/96 [=>...] - ETA: 1s - loss: 0.3818 - accuracy:
0.9683
12/96 [==>...] - ETA: 1s - loss: 0.3853 - accuracy:
0.9603
15/96 [===>...] - ETA: 1s - loss: 0.3836 - accuracy:
0.9524
19/96 [====>...] - ETA: 1s - loss: 0.3937 - accuracy:
0.9449
23/96 [=====>...] - ETA: 1s - loss: 0.3860 - accuracy:
0.9420
27/96 [=====>...] - ETA: 1s - loss: 0.3695 - accuracy:
0.9471
32/96 [=====>...] - ETA: 0s - loss: 0.3584 - accuracy:
0.9509
37/96 [=====>...] - ETA: 0s - loss: 0.3515 - accuracy:
0.9537
40/96 [=====>...] - ETA: 0s - loss: 0.3544 - accuracy:
0.9524
43/96 [=====>...] - ETA: 0s - loss: 0.3542 - accuracy:
0.9502
48/96 [=====>...] - ETA: 0s - loss: 0.3541 - accuracy:
0.9484
52/96 [=====>...] - ETA: 0s - loss: 0.3526 - accuracy:
0.9496
57/96 [=====>...] - ETA: 0s - loss: 0.3481 - accuracy:
0.9515
62/96 [=====>...] - ETA: 0s - loss: 0.3402 - accuracy:
0.9539
66/96 [=====>...] - ETA: 0s - loss: 0.3437 - accuracy:
0.9531
71/96 [=====>...] - ETA: 0s - loss: 0.3430 - accuracy:
0.9531
76/96 [=====>...] - ETA: 0s - loss: 0.3365 - accuracy:
0.9555
81/96 [=====>...] - ETA: 0s - loss: 0.3327 - accuracy:
0.9559
86/96 [=====>...] - ETA: 0s - loss: 0.3307 - accuracy:
0.9568
90/96 [=====>..] - ETA: 0s - loss: 0.3324 - accuracy:
0.9577
94/96 [=====>.] - ETA: 0s - loss: 0.3366 - accuracy:

0.9549
96/96 [=====] - 2s 16ms/step - loss: 0.3374 - accuracy:
0.9545 - val_loss: 1.7543 - val_accuracy: 0.6149

Epoch 1/30

1/96 [...] - ETA: 7:54 - loss: 14.5510 - accuracy:
0.0476
4/96 [>...] - ETA: 1s - loss: 15.3528 - accuracy:
0.1071
7/96 [=>...] - ETA: 1s - loss: 14.3073 - accuracy:
0.1293
10/96 [==>...] - ETA: 1s - loss: 13.1470 - accuracy:
0.1667
13/96 [===>...] - ETA: 1s - loss: 12.2725 - accuracy:
0.2051
16/96 [====>...] - ETA: 1s - loss: 11.7620 - accuracy:
0.2143
18/96 [====>...] - ETA: 1s - loss: 11.4904 - accuracy:
0.2249
21/96 [=====>...] - ETA: 1s - loss: 11.2041 - accuracy:
0.2177
24/96 [=====>...] - ETA: 1s - loss: 10.9075 - accuracy:
0.2163
27/96 [=====>...] - ETA: 1s - loss: 10.6423 - accuracy:
0.2134
30/96 [=====>...] - ETA: 1s - loss: 10.3778 - accuracy:
0.2317
33/96 [=====>...] - ETA: 1s - loss: 10.1663 - accuracy:
0.2381
36/96 [=====>...] - ETA: 1s - loss: 9.9781 - accuracy:
0.2394
39/96 [=====>...] - ETA: 1s - loss: 9.8159 - accuracy:
0.2418
42/96 [=====>...] - ETA: 1s - loss: 9.6688 - accuracy:
0.2415
45/96 [=====>...] - ETA: 0s - loss: 9.5153 - accuracy:
0.2455
48/96 [=====>...] - ETA: 0s - loss: 9.3710 - accuracy:
0.2490
51/96 [=====>...] - ETA: 0s - loss: 9.2529 - accuracy:
0.2465
54/96 [=====>...] - ETA: 0s - loss: 9.1272 - accuracy:
0.2549
58/96 [=====>...] - ETA: 0s - loss: 8.9825 - accuracy:
0.2570
61/96 [=====>...] - ETA: 0s - loss: 8.8740 - accuracy:
0.2615


```

65/96 [=====>...] - ETA: 0s - loss: 8.7389 - accuracy:
0.2689
68/96 [=====>...] - ETA: 0s - loss: 8.6414 - accuracy:
0.2738
71/96 [=====>...] - ETA: 0s - loss: 8.5368 - accuracy:
0.2830
74/96 [=====>...] - ETA: 0s - loss: 8.4484 - accuracy:
0.2857
77/96 [=====>...] - ETA: 0s - loss: 8.3674 - accuracy:
0.2870
80/96 [=====>...] - ETA: 0s - loss: 8.2874 - accuracy:
0.2887
84/96 [=====>...] - ETA: 0s - loss: 8.1912 - accuracy:
0.2931
88/96 [=====>...] - ETA: 0s - loss: 8.0963 - accuracy:
0.2955
91/96 [=====>..] - ETA: 0s - loss: 8.0221 - accuracy:
0.2993
94/96 [=====>.] - ETA: 0s - loss: 7.9592 - accuracy:
0.3009
96/96 [=====] - 7s 26ms/step - loss: 7.9315 - accuracy:
0.3013 - val_loss: 8.0870 - val_accuracy: 0.1418

```

Epoch 2/30

```

1/96 [...] - ETA: 2s - loss: 5.5968 - accuracy:
0.5238
5/96 [>...] - ETA: 1s - loss: 5.7449 - accuracy:
0.4190
9/96 [=>...] - ETA: 1s - loss: 5.5635 - accuracy:
0.4603
14/96 [==>...] - ETA: 1s - loss: 5.5345 - accuracy:
0.4286
18/96 [===>...] - ETA: 1s - loss: 5.5046 - accuracy:
0.4392
22/96 [====>...] - ETA: 0s - loss: 5.4640 - accuracy:
0.4394
26/96 [=====>...] - ETA: 0s - loss: 5.3974 - accuracy:
0.4469
30/96 [=====>...] - ETA: 0s - loss: 5.3610 - accuracy:
0.4476
34/96 [=====>...] - ETA: 0s - loss: 5.3194 - accuracy:
0.4454
39/96 [=====>...] - ETA: 0s - loss: 5.2681 - accuracy:
0.4530
43/96 [=====>...] - ETA: 0s - loss: 5.2094 - accuracy:
0.4629
47/96 [=====>...] - ETA: 0s - loss: 5.1632 - accuracy:

```

```

0.4792
52/96 [=====>...] - ETA: 0s - loss: 5.1126 - accuracy:
0.4853
57/96 [=====>...] - ETA: 0s - loss: 5.0467 - accuracy:
0.4954
62/96 [=====>...] - ETA: 0s - loss: 4.9976 - accuracy:
0.5061
66/96 [=====>...] - ETA: 0s - loss: 4.9498 - accuracy:
0.5137
70/96 [=====>...] - ETA: 0s - loss: 4.9093 - accuracy:
0.5150
74/96 [=====>...] - ETA: 0s - loss: 4.8779 - accuracy:
0.5167
79/96 [=====>...] - ETA: 0s - loss: 4.8298 - accuracy:
0.5214
84/96 [=====>...] - ETA: 0s - loss: 4.7752 - accuracy:
0.5306
89/96 [=====>...] - ETA: 0s - loss: 4.7350 - accuracy:
0.5334
93/96 [=====>.] - ETA: 0s - loss: 4.6908 - accuracy:
0.5397
96/96 [=====] - 2s 16ms/step - loss: 4.6622 - accuracy:
0.5437 - val_loss: 4.3745 - val_accuracy: 0.4005

```

Epoch 3/30

```

1/96 [...] - ETA: 1s - loss: 3.5298 - accuracy:
0.6190
5/96 [>...] - ETA: 1s - loss: 3.7067 - accuracy:
0.6190
10/96 [==>...] - ETA: 1s - loss: 3.5974 - accuracy:
0.6714
14/96 [===>...] - ETA: 1s - loss: 3.4990 - accuracy:
0.6973
17/96 [====>...] - ETA: 1s - loss: 3.5003 - accuracy:
0.7003
21/96 [=====>...] - ETA: 1s - loss: 3.5332 - accuracy:
0.6848
25/96 [=====>...] - ETA: 0s - loss: 3.4849 - accuracy:
0.6933
29/96 [=====>...] - ETA: 0s - loss: 3.4546 - accuracy:
0.6962
33/96 [=====>...] - ETA: 0s - loss: 3.4626 - accuracy:
0.6883
37/96 [=====>...] - ETA: 0s - loss: 3.4275 - accuracy:
0.6924
41/96 [=====>...] - ETA: 0s - loss: 3.4011 - accuracy:
0.6969

```

45/96 [=====>...] - ETA: 0s - loss: 3.3915 - accuracy:
 0.6921
 50/96 [=====>...] - ETA: 0s - loss: 3.3496 - accuracy:
 0.6933
 55/96 [=====>...] - ETA: 0s - loss: 3.3031 - accuracy:
 0.6987
 59/96 [=====>...] - ETA: 0s - loss: 3.2994 - accuracy:
 0.6933
 63/96 [=====>...] - ETA: 0s - loss: 3.2649 - accuracy:
 0.6977
 67/96 [=====>...] - ETA: 0s - loss: 3.2537 - accuracy:
 0.6958
 72/96 [=====>...] - ETA: 0s - loss: 3.2255 - accuracy:
 0.6991
 77/96 [=====>...] - ETA: 0s - loss: 3.2091 - accuracy:
 0.7007
 82/96 [=====>...] - ETA: 0s - loss: 3.1837 - accuracy:
 0.7003
 86/96 [=====>...] - ETA: 0s - loss: 3.1568 - accuracy:
 0.7043
 90/96 [=====>..] - ETA: 0s - loss: 3.1319 - accuracy:
 0.7074
 95/96 [=====>.] - ETA: 0s - loss: 3.0978 - accuracy:
 0.7118
 96/96 [=====] - 2s 16ms/step - loss: 3.0974 - accuracy:
 0.7116 - val_loss: 3.1082 - val_accuracy: 0.5858

Epoch 4/30

1/96 [...] - ETA: 2s - loss: 2.4568 - accuracy:
 0.7619
 6/96 [>...] - ETA: 1s - loss: 2.5889 - accuracy:
 0.7222
 9/96 [=>...] - ETA: 1s - loss: 2.5569 - accuracy:
 0.7513
 14/96 [==>...] - ETA: 1s - loss: 2.4901 - accuracy:
 0.7585
 19/96 [===>...] - ETA: 0s - loss: 2.4175 - accuracy:
 0.7769
 24/96 [=====>...] - ETA: 0s - loss: 2.3984 - accuracy:
 0.7817
 28/96 [=====>...] - ETA: 0s - loss: 2.3432 - accuracy:
 0.7976
 33/96 [=====>...] - ETA: 0s - loss: 2.3439 - accuracy:
 0.7908
 36/96 [=====>...] - ETA: 0s - loss: 2.3389 - accuracy:
 0.7923
 41/96 [=====>...] - ETA: 0s - loss: 2.3132 - accuracy:

```

0.7909
46/96 [=====>...] - ETA: 0s - loss: 2.3009 - accuracy:
0.7950
51/96 [=====>...] - ETA: 0s - loss: 2.2888 - accuracy:
0.7937
56/96 [=====>...] - ETA: 0s - loss: 2.2757 - accuracy:
0.7883
60/96 [=====>...] - ETA: 0s - loss: 2.2558 - accuracy:
0.7937
65/96 [=====>...] - ETA: 0s - loss: 2.2288 - accuracy:
0.8000
70/96 [=====>...] - ETA: 0s - loss: 2.2266 - accuracy:
0.7959
74/96 [=====>...] - ETA: 0s - loss: 2.2158 - accuracy:
0.7973
78/96 [=====>...] - ETA: 0s - loss: 2.2070 - accuracy:
0.7937
82/96 [=====>...] - ETA: 0s - loss: 2.1901 - accuracy:
0.7944
86/96 [=====>...] - ETA: 0s - loss: 2.1857 - accuracy:
0.7935
91/96 [=====>..] - ETA: 0s - loss: 2.1733 - accuracy:
0.7923
96/96 [=====] - ETA: 0s - loss: 2.1680 - accuracy:
0.7901
96/96 [=====] - 2s 16ms/step - loss: 2.1680 - accuracy:
0.7901 - val_loss: 2.5184 - val_accuracy: 0.5816

```

Epoch 5/30

```

1/96 [...] - ETA: 2s - loss: 1.6855 - accuracy:
0.8571
5/96 [>...] - ETA: 1s - loss: 1.9052 - accuracy:
0.7810
9/96 [=>...] - ETA: 1s - loss: 1.8890 - accuracy:
0.7937
13/96 [==>...] - ETA: 1s - loss: 1.8972 - accuracy:
0.7912
17/96 [====>...] - ETA: 1s - loss: 1.8808 - accuracy:
0.7983
22/96 [=====>...] - ETA: 1s - loss: 1.8283 - accuracy:
0.8030
27/96 [=====>...] - ETA: 0s - loss: 1.8032 - accuracy:
0.8042
32/96 [=====>...] - ETA: 0s - loss: 1.7793 - accuracy:
0.8125
37/96 [=====>...] - ETA: 0s - loss: 1.7567 - accuracy:
0.8160

```

42/96 [=====>...] - ETA: 0s - loss: 1.7776 - accuracy:
 0.8016
 47/96 [=====>...] - ETA: 0s - loss: 1.7532 - accuracy:
 0.8045
 52/96 [=====>...] - ETA: 0s - loss: 1.7386 - accuracy:
 0.8059
 56/96 [=====>...] - ETA: 0s - loss: 1.7338 - accuracy:
 0.8053
 60/96 [=====>...] - ETA: 0s - loss: 1.7105 - accuracy:
 0.8111
 65/96 [=====>...] - ETA: 0s - loss: 1.6978 - accuracy:
 0.8147
 69/96 [=====>...] - ETA: 0s - loss: 1.6788 - accuracy:
 0.8192
 73/96 [=====>...] - ETA: 0s - loss: 1.6739 - accuracy:
 0.8206
 77/96 [=====>...] - ETA: 0s - loss: 1.6644 - accuracy:
 0.8225
 82/96 [=====>...] - ETA: 0s - loss: 1.6555 - accuracy:
 0.8246
 85/96 [=====>...] - ETA: 0s - loss: 1.6515 - accuracy:
 0.8258
 90/96 [=====>..] - ETA: 0s - loss: 1.6464 - accuracy:
 0.8259
 94/96 [=====>.] - ETA: 0s - loss: 1.6336 - accuracy:
 0.8288
 96/96 [=====] - 2s 16ms/step - loss: 1.6257 - accuracy:
 0.8311 - val_loss: 2.6540 - val_accuracy: 0.5167

Epoch 6/30

1/96 [...] - ETA: 2s - loss: 1.1024 - accuracy:
 1.0000
 5/96 [>...] - ETA: 1s - loss: 1.3645 - accuracy:
 0.8286
 9/96 [=>...] - ETA: 1s - loss: 1.3618 - accuracy:
 0.8413
 13/96 [==>...] - ETA: 1s - loss: 1.3620 - accuracy:
 0.8498
 17/96 [====>...] - ETA: 1s - loss: 1.3418 - accuracy:
 0.8515
 22/96 [=====>...] - ETA: 0s - loss: 1.3222 - accuracy:
 0.8550
 25/96 [=====>...] - ETA: 0s - loss: 1.3140 - accuracy:
 0.8571
 29/96 [=====>...] - ETA: 0s - loss: 1.3149 - accuracy:
 0.8555
 33/96 [=====>...] - ETA: 0s - loss: 1.3051 - accuracy:

```

0.8571
38/96 [=====>...] - ETA: 0s - loss: 1.2888 - accuracy:
0.8647
42/96 [=====>...] - ETA: 0s - loss: 1.2871 - accuracy:
0.8662
46/96 [=====>...] - ETA: 0s - loss: 1.2819 - accuracy:
0.8654
50/96 [=====>...] - ETA: 0s - loss: 1.2878 - accuracy:
0.8638
55/96 [=====>...] - ETA: 0s - loss: 1.2760 - accuracy:
0.8632
60/96 [=====>...] - ETA: 0s - loss: 1.2720 - accuracy:
0.8627
65/96 [=====>...] - ETA: 0s - loss: 1.2629 - accuracy:
0.8637
69/96 [=====>...] - ETA: 0s - loss: 1.2486 - accuracy:
0.8668
73/96 [=====>...] - ETA: 0s - loss: 1.2409 - accuracy:
0.8689
78/96 [=====>...] - ETA: 0s - loss: 1.2357 - accuracy:
0.8681
83/96 [=====>...] - ETA: 0s - loss: 1.2248 - accuracy:
0.8692
87/96 [=====>...] - ETA: 0s - loss: 1.2273 - accuracy:
0.8659
91/96 [=====>..] - ETA: 0s - loss: 1.2219 - accuracy:
0.8676
95/96 [=====>.] - ETA: 0s - loss: 1.2196 - accuracy:
0.8677
96/96 [=====] - 2s 17ms/step - loss: 1.2197 - accuracy:
0.8676 - val_loss: 1.8036 - val_accuracy: 0.6926

```

Epoch 7/30

```

1/96 [...] - ETA: 1s - loss: 1.3105 - accuracy:
0.7619
6/96 [>...] - ETA: 1s - loss: 0.9772 - accuracy:
0.9127
11/96 [==>...] - ETA: 0s - loss: 0.9492 - accuracy:
0.9264
16/96 [====>...] - ETA: 0s - loss: 0.9349 - accuracy:
0.9226
20/96 [=====>...] - ETA: 0s - loss: 0.9445 - accuracy:
0.9167
24/96 [=====>...] - ETA: 0s - loss: 0.9778 - accuracy:
0.9127
29/96 [=====>...] - ETA: 0s - loss: 0.9637 - accuracy:
0.9113

```

```

34/96 [=====>...] - ETA: 0s - loss: 0.9539 - accuracy:
0.9118
39/96 [=====>...] - ETA: 0s - loss: 0.9505 - accuracy:
0.9145
42/96 [=====>...] - ETA: 0s - loss: 0.9466 - accuracy:
0.9138
46/96 [=====>...] - ETA: 0s - loss: 0.9516 - accuracy:
0.9079
51/96 [=====>...] - ETA: 0s - loss: 0.9421 - accuracy:
0.9113
55/96 [=====>...] - ETA: 0s - loss: 0.9479 - accuracy:
0.9091
59/96 [=====>...] - ETA: 0s - loss: 0.9374 - accuracy:
0.9128
64/96 [=====>...] - ETA: 0s - loss: 0.9339 - accuracy:
0.9122
67/96 [=====>...] - ETA: 0s - loss: 0.9335 - accuracy:
0.9133
70/96 [=====>...] - ETA: 0s - loss: 0.9315 - accuracy:
0.9122
74/96 [=====>...] - ETA: 0s - loss: 0.9355 - accuracy:
0.9099
78/96 [=====>...] - ETA: 0s - loss: 0.9406 - accuracy:
0.9066
83/96 [=====>...] - ETA: 0s - loss: 0.9333 - accuracy:
0.9076
88/96 [=====>...] - ETA: 0s - loss: 0.9329 - accuracy:
0.9053
92/96 [=====>..] - ETA: 0s - loss: 0.9364 - accuracy:
0.9032
96/96 [=====] - ETA: 0s - loss: 0.9372 - accuracy:
0.9020
96/96 [=====] - 2s 17ms/step - loss: 0.9372 - accuracy:
0.9020 - val_loss: 1.7160 - val_accuracy: 0.6661

```

Epoch 8/30

```

1/96 [...] - ETA: 2s - loss: 0.9133 - accuracy:
0.8095
6/96 [>...] - ETA: 1s - loss: 0.8669 - accuracy:
0.8810
10/96 [==>...] - ETA: 1s - loss: 0.9063 - accuracy:
0.8762
13/96 [===>...] - ETA: 1s - loss: 0.8756 - accuracy:
0.8828
16/96 [====>...] - ETA: 1s - loss: 0.8752 - accuracy:
0.8839
20/96 [=====>...] - ETA: 1s - loss: 0.8699 - accuracy:

```

0.8810
23/96 [=====>...] - ETA: 1s - loss: 0.8462 - accuracy:
0.8882
26/96 [=====>...] - ETA: 1s - loss: 0.8599 - accuracy:
0.8846
30/96 [=====>...] - ETA: 1s - loss: 0.8388 - accuracy:
0.8905
33/96 [=====>...] - ETA: 0s - loss: 0.8290 - accuracy:
0.8903
37/96 [=====>...] - ETA: 0s - loss: 0.8150 - accuracy:
0.8945
41/96 [=====>...] - ETA: 0s - loss: 0.8137 - accuracy:
0.8955
45/96 [=====>...] - ETA: 0s - loss: 0.8051 - accuracy:
0.8995
48/96 [=====>...] - ETA: 0s - loss: 0.8071 - accuracy:
0.8998
51/96 [=====>...] - ETA: 0s - loss: 0.8005 - accuracy:
0.9010
54/96 [=====>...] - ETA: 0s - loss: 0.7985 - accuracy:
0.9004
57/96 [=====>...] - ETA: 0s - loss: 0.7942 - accuracy:
0.9023
60/96 [=====>...] - ETA: 0s - loss: 0.7939 - accuracy:
0.9016
63/96 [=====>...] - ETA: 0s - loss: 0.7905 - accuracy:
0.9017
67/96 [=====>...] - ETA: 0s - loss: 0.7773 - accuracy:
0.9069
71/96 [=====>...] - ETA: 0s - loss: 0.7716 - accuracy:
0.9101
75/96 [=====>...] - ETA: 0s - loss: 0.7650 - accuracy:
0.9105
78/96 [=====>...] - ETA: 0s - loss: 0.7662 - accuracy:
0.9103
82/96 [=====>...] - ETA: 0s - loss: 0.7618 - accuracy:
0.9111
85/96 [=====>...] - ETA: 0s - loss: 0.7601 - accuracy:
0.9104
89/96 [=====>...] - ETA: 0s - loss: 0.7563 - accuracy:
0.9112
93/96 [=====>.] - ETA: 0s - loss: 0.7603 - accuracy:
0.9078
96/96 [=====>] - 2s 20ms/step - loss: 0.7580 - accuracy:
0.9080 - val_loss: 1.4763 - val_accuracy: 0.7011

Epoch 9/30

1/96 [...] - ETA: 2s - loss: 0.5362 - accuracy:
 1.0000
 5/96 [>...] - ETA: 1s - loss: 0.6639 - accuracy:
 0.9143
 9/96 [=>...] - ETA: 1s - loss: 0.6420 - accuracy:
 0.9206
 13/96 [==>...] - ETA: 1s - loss: 0.6403 - accuracy:
 0.9231
 17/96 [===>...] - ETA: 1s - loss: 0.6610 - accuracy:
 0.9104
 21/96 [====>...] - ETA: 1s - loss: 0.6457 - accuracy:
 0.9161
 25/96 [=====>...] - ETA: 0s - loss: 0.6602 - accuracy:
 0.9143
 29/96 [=====>...] - ETA: 0s - loss: 0.6567 - accuracy:
 0.9195
 32/96 [=====>...] - ETA: 0s - loss: 0.6536 - accuracy:
 0.9167
 35/96 [=====>...] - ETA: 0s - loss: 0.6539 - accuracy:
 0.9156
 38/96 [=====>...] - ETA: 0s - loss: 0.6538 - accuracy:
 0.9148
 42/96 [=====>...] - ETA: 0s - loss: 0.6586 - accuracy:
 0.9127
 45/96 [=====>...] - ETA: 0s - loss: 0.6575 - accuracy:
 0.9101
 49/96 [=====>...] - ETA: 0s - loss: 0.6640 - accuracy:
 0.9067
 53/96 [=====>...] - ETA: 0s - loss: 0.6776 - accuracy:
 0.9021
 56/96 [=====>...] - ETA: 0s - loss: 0.6845 - accuracy:
 0.9014
 60/96 [=====>...] - ETA: 0s - loss: 0.6976 - accuracy:
 0.8992
 63/96 [=====>...] - ETA: 0s - loss: 0.6943 - accuracy:
 0.9002
 67/96 [=====>...] - ETA: 0s - loss: 0.6877 - accuracy:
 0.9019
 70/96 [=====>...] - ETA: 0s - loss: 0.6935 - accuracy:
 0.9000
 74/96 [=====>...] - ETA: 0s - loss: 0.6886 - accuracy:
 0.8990
 78/96 [=====>...] - ETA: 0s - loss: 0.6932 - accuracy:
 0.8987
 82/96 [=====>...] - ETA: 0s - loss: 0.6848 - accuracy:
 0.9001
 86/96 [=====>...] - ETA: 0s - loss: 0.6826 - accuracy:
 0.9020

90/96 [=====>...] - ETA: 0s - loss: 0.6834 - accuracy:
0.9016
93/96 [=====>...] - ETA: 0s - loss: 0.6802 - accuracy:
0.9022
96/96 [=====] - 2s 19ms/step - loss: 0.6800 - accuracy:
0.9010 - val_loss: 1.7488 - val_accuracy: 0.6678

Epoch 10/30

1/96 [...] - ETA: 2s - loss: 0.4637 - accuracy:
1.0000
5/96 [>...] - ETA: 1s - loss: 0.5725 - accuracy:
0.9429
10/96 [==>...] - ETA: 1s - loss: 0.5534 - accuracy:
0.9381
14/96 [===>...] - ETA: 1s - loss: 0.5517 - accuracy:
0.9286
18/96 [====>...] - ETA: 0s - loss: 0.5345 - accuracy:
0.9339
22/96 [=====>...] - ETA: 0s - loss: 0.5430 - accuracy:
0.9329
26/96 [=====>...] - ETA: 0s - loss: 0.5607 - accuracy:
0.9286
30/96 [=====>...] - ETA: 0s - loss: 0.5615 - accuracy:
0.9286
34/96 [=====>...] - ETA: 0s - loss: 0.5478 - accuracy:
0.9314
38/96 [=====>...] - ETA: 0s - loss: 0.5612 - accuracy:
0.9286
42/96 [=====>...] - ETA: 0s - loss: 0.5609 - accuracy:
0.9286
46/96 [=====>...] - ETA: 0s - loss: 0.5488 - accuracy:
0.9327
49/96 [=====>...] - ETA: 0s - loss: 0.5426 - accuracy:
0.9349
53/96 [=====>...] - ETA: 0s - loss: 0.5508 - accuracy:
0.9326
57/96 [=====>...] - ETA: 0s - loss: 0.5432 - accuracy:
0.9332
62/96 [=====>...] - ETA: 0s - loss: 0.5505 - accuracy:
0.9316
66/96 [=====>...] - ETA: 0s - loss: 0.5505 - accuracy:
0.9322
70/96 [=====>...] - ETA: 0s - loss: 0.5506 - accuracy:
0.9320
74/96 [=====>...] - ETA: 0s - loss: 0.5527 - accuracy:
0.9318
78/96 [=====>...] - ETA: 0s - loss: 0.5556 - accuracy:

0.9292
83/96 [=====>...] - ETA: 0s - loss: 0.5505 - accuracy:
0.9294
87/96 [=====>...] - ETA: 0s - loss: 0.5446 - accuracy:
0.9310
91/96 [=====>..] - ETA: 0s - loss: 0.5491 - accuracy:
0.9304
95/96 [=====>.] - ETA: 0s - loss: 0.5514 - accuracy:
0.9293
96/96 [=====] - 2s 17ms/step - loss: 0.5533 - accuracy:
0.9290 - val_loss: 1.5161 - val_accuracy: 0.6704

Epoch 11/30

1/96 [...] - ETA: 2s - loss: 0.4524 - accuracy:
0.9524
5/96 [>...] - ETA: 1s - loss: 0.6487 - accuracy:
0.9143
10/96 [==>...] - ETA: 1s - loss: 0.7383 - accuracy:
0.8714
14/96 [===>...] - ETA: 1s - loss: 0.7217 - accuracy:
0.8878
18/96 [====>...] - ETA: 1s - loss: 0.7018 - accuracy:
0.8915
22/96 [=====>...] - ETA: 0s - loss: 0.6912 - accuracy:
0.8896
26/96 [=====>...] - ETA: 0s - loss: 0.6912 - accuracy:
0.8846
31/96 [=====>...] - ETA: 0s - loss: 0.6646 - accuracy:
0.8909
36/96 [=====>...] - ETA: 0s - loss: 0.6544 - accuracy:
0.8915
40/96 [=====>...] - ETA: 0s - loss: 0.6376 - accuracy:
0.8976
45/96 [=====>...] - ETA: 0s - loss: 0.6309 - accuracy:
0.8963
49/96 [=====>...] - ETA: 0s - loss: 0.6366 - accuracy:
0.8941
53/96 [=====>...] - ETA: 0s - loss: 0.6317 - accuracy:
0.8949
57/96 [=====>...] - ETA: 0s - loss: 0.6340 - accuracy:
0.8939
61/96 [=====>...] - ETA: 0s - loss: 0.6217 - accuracy:
0.8977
65/96 [=====>...] - ETA: 0s - loss: 0.6188 - accuracy:
0.8989
69/96 [=====>...] - ETA: 0s - loss: 0.6153 - accuracy:
0.8992

73/96 [=====>...] - ETA: 0s - loss: 0.6100 - accuracy:
0.8989
77/96 [=====>...] - ETA: 0s - loss: 0.6045 - accuracy:
0.9011
81/96 [=====>...] - ETA: 0s - loss: 0.6027 - accuracy:
0.9030
85/96 [=====>...] - ETA: 0s - loss: 0.5943 - accuracy:
0.9053
89/96 [=====>...] - ETA: 0s - loss: 0.5933 - accuracy:
0.9058
93/96 [=====>.] - ETA: 0s - loss: 0.5928 - accuracy:
0.9048
96/96 [=====] - 2s 17ms/step - loss: 0.5891 - accuracy:
0.9055 - val_loss: 2.3300 - val_accuracy: 0.5047

Epoch 12/30

1/96 [...] - ETA: 1s - loss: 0.9528 - accuracy:
0.8095
6/96 [>...] - ETA: 1s - loss: 0.5016 - accuracy:
0.9286
11/96 [==>...] - ETA: 0s - loss: 0.4270 - accuracy:
0.9610
16/96 [====>...] - ETA: 0s - loss: 0.4235 - accuracy:
0.9613
20/96 [=====>...] - ETA: 0s - loss: 0.4158 - accuracy:
0.9619
24/96 [=====>...] - ETA: 0s - loss: 0.4061 - accuracy:
0.9643
28/96 [=====>...] - ETA: 0s - loss: 0.4096 - accuracy:
0.9626
32/96 [=====>...] - ETA: 0s - loss: 0.4171 - accuracy:
0.9613
37/96 [=====>...] - ETA: 0s - loss: 0.4052 - accuracy:
0.9640
42/96 [=====>...] - ETA: 0s - loss: 0.4085 - accuracy:
0.9615
46/96 [=====>...] - ETA: 0s - loss: 0.4059 - accuracy:
0.9607
50/96 [=====>...] - ETA: 0s - loss: 0.4234 - accuracy:
0.9524
54/96 [=====>...] - ETA: 0s - loss: 0.4214 - accuracy:
0.9524
59/96 [=====>...] - ETA: 0s - loss: 0.4325 - accuracy:
0.9483
64/96 [=====>...] - ETA: 0s - loss: 0.4273 - accuracy:
0.9494
69/96 [=====>...] - ETA: 0s - loss: 0.4257 - accuracy:

0.9496
73/96 [=====>...] - ETA: 0s - loss: 0.4274 - accuracy:
0.9491
77/96 [=====>...] - ETA: 0s - loss: 0.4289 - accuracy:
0.9487
82/96 [=====>...] - ETA: 0s - loss: 0.4338 - accuracy:
0.9460
87/96 [=====>...] - ETA: 0s - loss: 0.4327 - accuracy:
0.9453
92/96 [=====>..] - ETA: 0s - loss: 0.4358 - accuracy:
0.9441
96/96 [=====] - 1s 15ms/step - loss: 0.4331 - accuracy:
0.9445 - val_loss: 1.3819 - val_accuracy: 0.7071

Epoch 13/30

1/96 [...] - ETA: 1s - loss: 0.3950 - accuracy:
0.9524
5/96 [>...] - ETA: 1s - loss: 0.3290 - accuracy:
0.9714
9/96 [=>...] - ETA: 1s - loss: 0.4325 - accuracy:
0.9365
14/96 [===>...] - ETA: 1s - loss: 0.3945 - accuracy:
0.9490
18/96 [====>...] - ETA: 1s - loss: 0.3888 - accuracy:
0.9497
22/96 [=====>...] - ETA: 0s - loss: 0.4054 - accuracy:
0.9459
26/96 [=====>...] - ETA: 0s - loss: 0.3885 - accuracy:
0.9524
30/96 [=====>...] - ETA: 0s - loss: 0.3897 - accuracy:
0.9540
33/96 [=====>...] - ETA: 0s - loss: 0.3844 - accuracy:
0.9553
38/96 [=====>...] - ETA: 0s - loss: 0.3895 - accuracy:
0.9524
42/96 [=====>...] - ETA: 0s - loss: 0.3896 - accuracy:
0.9512
47/96 [=====>...] - ETA: 0s - loss: 0.3985 - accuracy:
0.9493
51/96 [=====>...] - ETA: 0s - loss: 0.4050 - accuracy:
0.9468
54/96 [=====>...] - ETA: 0s - loss: 0.4132 - accuracy:
0.9453
58/96 [=====>...] - ETA: 0s - loss: 0.4242 - accuracy:
0.9425
63/96 [=====>...] - ETA: 0s - loss: 0.4172 - accuracy:
0.9448

68/96 [=====>...] - ETA: 0s - loss: 0.4171 - accuracy:
0.9433
73/96 [=====>...] - ETA: 0s - loss: 0.4163 - accuracy:
0.9439
76/96 [=====>...] - ETA: 0s - loss: 0.4149 - accuracy:
0.9436
80/96 [=====>...] - ETA: 0s - loss: 0.4118 - accuracy:
0.9446
85/96 [=====>...] - ETA: 0s - loss: 0.4132 - accuracy:
0.9429
90/96 [=====>..] - ETA: 0s - loss: 0.4169 - accuracy:
0.9423
94/96 [=====>.] - ETA: 0s - loss: 0.4170 - accuracy:
0.9422
96/96 [=====] - 2s 17ms/step - loss: 0.4183 - accuracy:
0.9415 - val_loss: 1.4485 - val_accuracy: 0.6567

Epoch 14/30

1/96 [...] - ETA: 2s - loss: 0.2266 - accuracy:
1.0000
5/96 [>...] - ETA: 1s - loss: 0.3848 - accuracy:
0.9429
10/96 [==>...] - ETA: 1s - loss: 0.3704 - accuracy:
0.9381
14/96 [===>...] - ETA: 1s - loss: 0.3501 - accuracy:
0.9524
18/96 [====>...] - ETA: 0s - loss: 0.3292 - accuracy:
0.9603
21/96 [=====>...] - ETA: 0s - loss: 0.3250 - accuracy:
0.9660
26/96 [=====>...] - ETA: 0s - loss: 0.3305 - accuracy:
0.9670
30/96 [=====>...] - ETA: 0s - loss: 0.3417 - accuracy:
0.9667
35/96 [=====>...] - ETA: 0s - loss: 0.3430 - accuracy:
0.9660
39/96 [=====>...] - ETA: 0s - loss: 0.3370 - accuracy:
0.9670
43/96 [=====>...] - ETA: 0s - loss: 0.3368 - accuracy:
0.9679
47/96 [=====>...] - ETA: 0s - loss: 0.3396 - accuracy:
0.9656
51/96 [=====>...] - ETA: 0s - loss: 0.3363 - accuracy:
0.9664
56/96 [=====>...] - ETA: 0s - loss: 0.3308 - accuracy:
0.9685
61/96 [=====>...] - ETA: 0s - loss: 0.3336 - accuracy:

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0.9657
66/96 [=====>...] - ETA: 0s - loss: 0.3322 - accuracy:
0.9646
71/96 [=====>...] - ETA: 0s - loss: 0.3315 - accuracy:
0.9645
76/96 [=====>...] - ETA: 0s - loss: 0.3301 - accuracy:
0.9643
80/96 [=====>...] - ETA: 0s - loss: 0.3285 - accuracy:
0.9643
84/96 [=====>...] - ETA: 0s - loss: 0.3283 - accuracy:
0.9649
88/96 [=====>...] - ETA: 0s - loss: 0.3339 - accuracy:
0.9637
92/96 [=====>..] - ETA: 0s - loss: 0.3307 - accuracy:
0.9643
96/96 [=====] - 1s 15ms/step - loss: 0.3304 - accuracy:
0.9635 - val_loss: 1.4799 - val_accuracy: 0.6678

```

Epoch 15/30

```

1/96 [...] - ETA: 1s - loss: 0.2749 - accuracy:
1.0000
6/96 [>...] - ETA: 1s - loss: 0.3099 - accuracy:
0.9683
11/96 [==>...] - ETA: 0s - loss: 0.2825 - accuracy:
0.9740
15/96 [===>...] - ETA: 0s - loss: 0.2836 - accuracy:
0.9746
19/96 [====>...] - ETA: 0s - loss: 0.2969 - accuracy:
0.9699
24/96 [=====>...] - ETA: 0s - loss: 0.2934 - accuracy:
0.9683
29/96 [=====>...] - ETA: 0s - loss: 0.2847 - accuracy:
0.9721
33/96 [=====>...] - ETA: 0s - loss: 0.2785 - accuracy:
0.9740
37/96 [=====>...] - ETA: 0s - loss: 0.2816 - accuracy:
0.9730
40/96 [=====>...] - ETA: 0s - loss: 0.2869 - accuracy:
0.9714
45/96 [=====>...] - ETA: 0s - loss: 0.2867 - accuracy:
0.9714
50/96 [=====>...] - ETA: 0s - loss: 0.2843 - accuracy:
0.9714
55/96 [=====>...] - ETA: 0s - loss: 0.2851 - accuracy:
0.9714
60/96 [=====>...] - ETA: 0s - loss: 0.2873 - accuracy:
0.9690

```

64/96 [=====>...] - ETA: 0s - loss: 0.2826 - accuracy:
0.9702
68/96 [=====>...] - ETA: 0s - loss: 0.2792 - accuracy:
0.9706
72/96 [=====>...] - ETA: 0s - loss: 0.2869 - accuracy:
0.9696
76/96 [=====>...] - ETA: 0s - loss: 0.2838 - accuracy:
0.9706
81/96 [=====>...] - ETA: 0s - loss: 0.2808 - accuracy:
0.9712
85/96 [=====>...] - ETA: 0s - loss: 0.2788 - accuracy:
0.9714
89/96 [=====>...] - ETA: 0s - loss: 0.2751 - accuracy:
0.9727
94/96 [=====>.] - ETA: 0s - loss: 0.2787 - accuracy:
0.9721
96/96 [=====] - 2s 16ms/step - loss: 0.2780 - accuracy:
0.9720 - val_loss: 1.4378 - val_accuracy: 0.6900

Epoch 16/30

1/96 [...] - ETA: 2s - loss: 0.2080 - accuracy:
1.0000
6/96 [>...] - ETA: 1s - loss: 0.2464 - accuracy:
0.9762
9/96 [=>...] - ETA: 1s - loss: 0.2435 - accuracy:
0.9735
13/96 [===>...] - ETA: 1s - loss: 0.2379 - accuracy:
0.9744
17/96 [====>...] - ETA: 1s - loss: 0.2289 - accuracy:
0.9776
21/96 [=====>...] - ETA: 1s - loss: 0.2297 - accuracy:
0.9773
25/96 [=====>...] - ETA: 0s - loss: 0.2234 - accuracy:
0.9810
30/96 [=====>...] - ETA: 0s - loss: 0.2293 - accuracy:
0.9778
33/96 [=====>...] - ETA: 0s - loss: 0.2417 - accuracy:
0.9726
37/96 [=====>...] - ETA: 0s - loss: 0.2368 - accuracy:
0.9743
42/96 [=====>...] - ETA: 0s - loss: 0.2510 - accuracy:
0.9671
47/96 [=====>...] - ETA: 0s - loss: 0.2524 - accuracy:
0.9676
50/96 [=====>...] - ETA: 0s - loss: 0.2520 - accuracy:
0.9686
54/96 [=====>...] - ETA: 0s - loss: 0.2512 - accuracy:

0.9691
58/96 [=====>...] - ETA: 0s - loss: 0.2491 - accuracy:
0.9704
62/96 [=====>...] - ETA: 0s - loss: 0.2635 - accuracy:
0.9677
66/96 [=====>...] - ETA: 0s - loss: 0.2704 - accuracy:
0.9654
70/96 [=====>...] - ETA: 0s - loss: 0.2699 - accuracy:
0.9646
74/96 [=====>...] - ETA: 0s - loss: 0.2730 - accuracy:
0.9640
77/96 [=====>...] - ETA: 0s - loss: 0.2713 - accuracy:
0.9654
81/96 [=====>...] - ETA: 0s - loss: 0.2858 - accuracy:
0.9618
84/96 [=====>...] - ETA: 0s - loss: 0.2860 - accuracy:
0.9620
88/96 [=====>...] - ETA: 0s - loss: 0.2946 - accuracy:
0.9589
92/96 [=====>..] - ETA: 0s - loss: 0.3025 - accuracy:
0.9576
96/96 [=====] - ETA: 0s - loss: 0.3063 - accuracy:
0.9560
96/96 [=====] - 2s 18ms/step - loss: 0.3063 - accuracy:
0.9560 - val_loss: 2.8661 - val_accuracy: 0.5568

Epoch 17/30

1/96 [...] - ETA: 2s - loss: 0.4784 - accuracy:
0.9048
4/96 [>...] - ETA: 1s - loss: 0.4106 - accuracy:
0.9048
7/96 [=>...] - ETA: 1s - loss: 0.3337 - accuracy:
0.9456
11/96 [==>...] - ETA: 1s - loss: 0.4019 - accuracy:
0.9394
15/96 [===>...] - ETA: 1s - loss: 0.4090 - accuracy:
0.9397
18/96 [====>...] - ETA: 1s - loss: 0.3935 - accuracy:
0.9444
22/96 [=====>...] - ETA: 1s - loss: 0.3819 - accuracy:
0.9437
26/96 [=====>...] - ETA: 1s - loss: 0.3916 - accuracy:
0.9432
29/96 [=====>...] - ETA: 1s - loss: 0.3811 - accuracy:
0.9475
32/96 [=====>...] - ETA: 1s - loss: 0.3837 - accuracy:
0.9435

35/96 [=====>...] - ETA: 0s - loss: 0.3812 - accuracy:
0.9429
38/96 [=====>...] - ETA: 0s - loss: 0.3887 - accuracy:
0.9411
41/96 [=====>...] - ETA: 0s - loss: 0.3964 - accuracy:
0.9419
44/96 [=====>...] - ETA: 0s - loss: 0.3933 - accuracy:
0.9448
48/96 [=====>...] - ETA: 0s - loss: 0.3896 - accuracy:
0.9454
51/96 [=====>...] - ETA: 0s - loss: 0.3878 - accuracy:
0.9458
54/96 [=====>...] - ETA: 0s - loss: 0.4029 - accuracy:
0.9409
58/96 [=====>...] - ETA: 0s - loss: 0.3971 - accuracy:
0.9425
62/96 [=====>...] - ETA: 0s - loss: 0.3983 - accuracy:
0.9424
65/96 [=====>...] - ETA: 0s - loss: 0.3965 - accuracy:
0.9429
69/96 [=====>...] - ETA: 0s - loss: 0.3888 - accuracy:
0.9448
73/96 [=====>...] - ETA: 0s - loss: 0.3899 - accuracy:
0.9446
76/96 [=====>...] - ETA: 0s - loss: 0.3885 - accuracy:
0.9449
79/96 [=====>...] - ETA: 0s - loss: 0.3958 - accuracy:
0.9433
83/96 [=====>...] - ETA: 0s - loss: 0.3885 - accuracy:
0.9455
86/96 [=====>...] - ETA: 0s - loss: 0.3864 - accuracy:
0.9452
90/96 [=====>..] - ETA: 0s - loss: 0.3833 - accuracy:
0.9455
94/96 [=====>.] - ETA: 0s - loss: 0.3824 - accuracy:
0.9458
96/96 [=====] - 2s 23ms/step - loss: 0.3855 - accuracy:
0.9435 - val_loss: 2.2033 - val_accuracy: 0.6849

Epoch 1/30

1/96 [...] - ETA: 4:56 - loss: 6.7465 - accuracy:
0.0952
5/96 [>...] - ETA: 1s - loss: 7.6976 - accuracy:
0.1619
10/96 [==>...] - ETA: 1s - loss: 7.3093 - accuracy:
0.1762
15/96 [===>...] - ETA: 0s - loss: 6.9207 - accuracy:

0.1937
 20/96 [=====>...] - ETA: 0s - loss: 6.6683 - accuracy:
 0.2071
 25/96 [=====>...] - ETA: 0s - loss: 6.4988 - accuracy:
 0.2171
 30/96 [=====>...] - ETA: 0s - loss: 6.3773 - accuracy:
 0.2254
 35/96 [=====>...] - ETA: 0s - loss: 6.2271 - accuracy:
 0.2435
 41/96 [=====>...] - ETA: 0s - loss: 6.0870 - accuracy:
 0.2555
 47/96 [=====>...] - ETA: 0s - loss: 5.9901 - accuracy:
 0.2584
 53/96 [=====>...] - ETA: 0s - loss: 5.8900 - accuracy:
 0.2686
 58/96 [=====>...] - ETA: 0s - loss: 5.8092 - accuracy:
 0.2734
 64/96 [=====>...] - ETA: 0s - loss: 5.7187 - accuracy:
 0.2790
 68/96 [=====>...] - ETA: 0s - loss: 5.6750 - accuracy:
 0.2808
 73/96 [=====>...] - ETA: 0s - loss: 5.6163 - accuracy:
 0.2890
 79/96 [=====>...] - ETA: 0s - loss: 5.5356 - accuracy:
 0.2960
 84/96 [=====>...] - ETA: 0s - loss: 5.4783 - accuracy:
 0.2988
 89/96 [=====>...] - ETA: 0s - loss: 5.4159 - accuracy:
 0.3012
 94/96 [=====>...] - ETA: 0s - loss: 5.3586 - accuracy:
 0.3075
 96/96 [=====>...] - 5s 17ms/step - loss: 5.3445 - accuracy:
 0.3083 - val_loss: 5.1498 - val_accuracy: 0.2340

Epoch 2/30

1/96 [...] - ETA: 2s - loss: 4.1134 - accuracy:
 0.4762
 6/96 [>...] - ETA: 1s - loss: 4.2132 - accuracy:
 0.4365
 11/96 [==>...] - ETA: 0s - loss: 4.0589 - accuracy:
 0.4805
 16/96 [====>...] - ETA: 0s - loss: 4.0363 - accuracy:
 0.4821
 19/96 [====>...] - ETA: 0s - loss: 4.0517 - accuracy:
 0.4737
 25/96 [=====>...] - ETA: 0s - loss: 4.0207 - accuracy:
 0.4629

31/96 [=====>...] - ETA: 0s - loss: 3.9775 - accuracy:
 0.4731
 37/96 [=====>...] - ETA: 0s - loss: 3.9567 - accuracy:
 0.4762
 43/96 [=====>...] - ETA: 0s - loss: 3.9328 - accuracy:
 0.4718
 48/96 [=====>...] - ETA: 0s - loss: 3.9192 - accuracy:
 0.4702
 52/96 [=====>...] - ETA: 0s - loss: 3.8969 - accuracy:
 0.4661
 58/96 [=====>...] - ETA: 0s - loss: 3.8431 - accuracy:
 0.4778
 62/96 [=====>...] - ETA: 0s - loss: 3.8167 - accuracy:
 0.4823
 68/96 [=====>...] - ETA: 0s - loss: 3.7762 - accuracy:
 0.4895
 73/96 [=====>...] - ETA: 0s - loss: 3.7545 - accuracy:
 0.4886
 77/96 [=====>...] - ETA: 0s - loss: 3.7236 - accuracy:
 0.4917
 82/96 [=====>...] - ETA: 0s - loss: 3.7047 - accuracy:
 0.4907
 88/96 [=====>...] - ETA: 0s - loss: 3.6846 - accuracy:
 0.4919
 94/96 [=====>.] - ETA: 0s - loss: 3.6483 - accuracy:
 0.4990
 96/96 [=====] - 1s 14ms/step - loss: 3.6451 - accuracy:
 0.4988 - val_loss: 3.6451 - val_accuracy: 0.3826

Epoch 3/30

1/96 [...] - ETA: 1s - loss: 2.8321 - accuracy:
 0.6190
 6/96 [>...] - ETA: 0s - loss: 3.0048 - accuracy:
 0.5714
 12/96 [==>...] - ETA: 0s - loss: 2.8571 - accuracy:
 0.6349
 18/96 [===>...] - ETA: 0s - loss: 2.8443 - accuracy:
 0.6270
 23/96 [=====>...] - ETA: 0s - loss: 2.8552 - accuracy:
 0.6108
 27/96 [=====>...] - ETA: 0s - loss: 2.8213 - accuracy:
 0.6155
 31/96 [=====>...] - ETA: 0s - loss: 2.8330 - accuracy:
 0.6114
 36/96 [=====>...] - ETA: 0s - loss: 2.8403 - accuracy:
 0.6071
 41/96 [=====>...] - ETA: 0s - loss: 2.8315 - accuracy:

0.6051
 46/96 [=====>...] - ETA: 0s - loss: 2.8152 - accuracy:
 0.6035
 52/96 [=====>...] - ETA: 0s - loss: 2.8103 - accuracy:
 0.6026
 58/96 [=====>...] - ETA: 0s - loss: 2.7911 - accuracy:
 0.6010
 62/96 [=====>...] - ETA: 0s - loss: 2.7943 - accuracy:
 0.5968
 67/96 [=====>...] - ETA: 0s - loss: 2.7736 - accuracy:
 0.6048
 72/96 [=====>...] - ETA: 0s - loss: 2.7580 - accuracy:
 0.6065
 77/96 [=====>...] - ETA: 0s - loss: 2.7419 - accuracy:
 0.6067
 82/96 [=====>...] - ETA: 0s - loss: 2.7229 - accuracy:
 0.6115
 88/96 [=====>...] - ETA: 0s - loss: 2.7021 - accuracy:
 0.6131
 93/96 [=====>.] - ETA: 0s - loss: 2.6995 - accuracy:
 0.6114
 96/96 [=====] - 1s 14ms/step - loss: 2.6902 - accuracy:
 0.6137 - val_loss: 3.0409 - val_accuracy: 0.3954

Epoch 4/30

1/96 [...] - ETA: 2s - loss: 2.3855 - accuracy:
 0.7143
 6/96 [>...] - ETA: 1s - loss: 2.4080 - accuracy:
 0.6508
 12/96 [==>...] - ETA: 0s - loss: 2.2502 - accuracy:
 0.7103
 17/96 [====>...] - ETA: 0s - loss: 2.2228 - accuracy:
 0.7143
 21/96 [=====>...] - ETA: 0s - loss: 2.2336 - accuracy:
 0.6984
 27/96 [=====>...] - ETA: 0s - loss: 2.2289 - accuracy:
 0.6949
 32/96 [=====>...] - ETA: 0s - loss: 2.2597 - accuracy:
 0.6726
 37/96 [=====>...] - ETA: 0s - loss: 2.2369 - accuracy:
 0.6731
 42/96 [=====>...] - ETA: 0s - loss: 2.2290 - accuracy:
 0.6791
 47/96 [=====>...] - ETA: 0s - loss: 2.2016 - accuracy:
 0.6829
 52/96 [=====>...] - ETA: 0s - loss: 2.1853 - accuracy:
 0.6877

57/96 [=====>...] - ETA: 0s - loss: 2.1727 - accuracy:
0.6934
63/96 [=====>...] - ETA: 0s - loss: 2.1710 - accuracy:
0.6893
69/96 [=====>...] - ETA: 0s - loss: 2.1621 - accuracy:
0.6874
74/96 [=====>...] - ETA: 0s - loss: 2.1569 - accuracy:
0.6873
79/96 [=====>...] - ETA: 0s - loss: 2.1577 - accuracy:
0.6817
83/96 [=====>...] - ETA: 0s - loss: 2.1504 - accuracy:
0.6804
88/96 [=====>...] - ETA: 0s - loss: 2.1360 - accuracy:
0.6867
94/96 [=====>.] - ETA: 0s - loss: 2.1209 - accuracy:
0.6874
96/96 [=====] - 1s 14ms/step - loss: 2.1197 - accuracy:
0.6867 - val_loss: 2.5227 - val_accuracy: 0.5098

Epoch 5/30

1/96 [...] - ETA: 1s - loss: 1.7510 - accuracy:
0.7143
6/96 [>...] - ETA: 0s - loss: 1.6693 - accuracy:
0.7857
11/96 [==>...] - ETA: 0s - loss: 1.8175 - accuracy:
0.7446
15/96 [===>...] - ETA: 0s - loss: 1.7748 - accuracy:
0.7524
20/96 [====>...] - ETA: 0s - loss: 1.7983 - accuracy:
0.7429
25/96 [=====>...] - ETA: 0s - loss: 1.7924 - accuracy:
0.7410
29/96 [=====>...] - ETA: 0s - loss: 1.7652 - accuracy:
0.7455
33/96 [=====>...] - ETA: 0s - loss: 1.7909 - accuracy:
0.7403
37/96 [=====>...] - ETA: 0s - loss: 1.7848 - accuracy:
0.7362
41/96 [=====>...] - ETA: 0s - loss: 1.7677 - accuracy:
0.7375
45/96 [=====>...] - ETA: 0s - loss: 1.7625 - accuracy:
0.7376
49/96 [=====>...] - ETA: 0s - loss: 1.7584 - accuracy:
0.7376
54/96 [=====>...] - ETA: 0s - loss: 1.7325 - accuracy:
0.7443
58/96 [=====>...] - ETA: 0s - loss: 1.7330 - accuracy:

0.7397
62/96 [=====>...] - ETA: 0s - loss: 1.7219 - accuracy:
0.7404
66/96 [=====>...] - ETA: 0s - loss: 1.7199 - accuracy:
0.7359
70/96 [=====>...] - ETA: 0s - loss: 1.7049 - accuracy:
0.7388
75/96 [=====>...] - ETA: 0s - loss: 1.6881 - accuracy:
0.7429
79/96 [=====>...] - ETA: 0s - loss: 1.6892 - accuracy:
0.7408
83/96 [=====>...] - ETA: 0s - loss: 1.6912 - accuracy:
0.7367
87/96 [=====>...] - ETA: 0s - loss: 1.7005 - accuracy:
0.7345
91/96 [=====>..] - ETA: 0s - loss: 1.6859 - accuracy:
0.7363
95/96 [=====>.] - ETA: 0s - loss: 1.6765 - accuracy:
0.7383
96/96 [=====] - 2s 17ms/step - loss: 1.6756 - accuracy:
0.7386 - val_loss: 2.2706 - val_accuracy: 0.5474

Epoch 6/30

1/96 [...] - ETA: 1s - loss: 1.4004 - accuracy:
0.8571
6/96 [>...] - ETA: 0s - loss: 1.4896 - accuracy:
0.7460
10/96 [==>...] - ETA: 0s - loss: 1.4691 - accuracy:
0.7381
14/96 [===>...] - ETA: 0s - loss: 1.4297 - accuracy:
0.7585
18/96 [====>...] - ETA: 0s - loss: 1.3850 - accuracy:
0.7884
23/96 [=====>...] - ETA: 0s - loss: 1.4113 - accuracy:
0.7867
28/96 [=====>...] - ETA: 0s - loss: 1.4068 - accuracy:
0.7925
33/96 [=====>...] - ETA: 0s - loss: 1.4196 - accuracy:
0.7879
37/96 [=====>...] - ETA: 0s - loss: 1.4148 - accuracy:
0.7876
42/96 [=====>...] - ETA: 0s - loss: 1.4300 - accuracy:
0.7834
47/96 [=====>...] - ETA: 0s - loss: 1.4395 - accuracy:
0.7822
51/96 [=====>...] - ETA: 0s - loss: 1.4340 - accuracy:
0.7852

55/96 [=====>...] - ETA: 0s - loss: 1.4344 - accuracy:
0.7827
59/96 [=====>...] - ETA: 0s - loss: 1.4364 - accuracy:
0.7813
63/96 [=====>...] - ETA: 0s - loss: 1.4272 - accuracy:
0.7823
68/96 [=====>...] - ETA: 0s - loss: 1.4222 - accuracy:
0.7808
72/96 [=====>...] - ETA: 0s - loss: 1.4249 - accuracy:
0.7765
77/96 [=====>...] - ETA: 0s - loss: 1.4183 - accuracy:
0.7767
81/96 [=====>...] - ETA: 0s - loss: 1.4252 - accuracy:
0.7731
85/96 [=====>...] - ETA: 0s - loss: 1.4160 - accuracy:
0.7748
89/96 [=====>...] - ETA: 0s - loss: 1.4217 - accuracy:
0.7705
92/96 [=====>..] - ETA: 0s - loss: 1.4219 - accuracy:
0.7702
95/96 [=====>.] - ETA: 0s - loss: 1.4211 - accuracy:
0.7684
96/96 [=====] - 2s 17ms/step - loss: 1.4228 - accuracy:
0.7676 - val_loss: 1.9843 - val_accuracy: 0.5611

Epoch 7/30

1/96 [...] - ETA: 2s - loss: 1.5149 - accuracy:
0.6667
5/96 [>...] - ETA: 1s - loss: 1.3315 - accuracy:
0.7714
9/96 [=>...] - ETA: 1s - loss: 1.2159 - accuracy:
0.8201
14/96 [===>...] - ETA: 1s - loss: 1.2369 - accuracy:
0.8027
18/96 [====>...] - ETA: 1s - loss: 1.2354 - accuracy:
0.8042
22/96 [=====>...] - ETA: 0s - loss: 1.2531 - accuracy:
0.7922
27/96 [=====>...] - ETA: 0s - loss: 1.2319 - accuracy:
0.7989
32/96 [=====>...] - ETA: 0s - loss: 1.2125 - accuracy:
0.8036
38/96 [=====>...] - ETA: 0s - loss: 1.2090 - accuracy:
0.8070
43/96 [=====>...] - ETA: 0s - loss: 1.1990 - accuracy:
0.8040
49/96 [=====>...] - ETA: 0s - loss: 1.1957 - accuracy:

0.8027
 55/96 [=====>...] - ETA: 0s - loss: 1.2040 - accuracy:
 0.8000
 59/96 [=====>...] - ETA: 0s - loss: 1.2079 - accuracy:
 0.8006
 64/96 [=====>...] - ETA: 0s - loss: 1.1937 - accuracy:
 0.8065
 68/96 [=====>...] - ETA: 0s - loss: 1.1922 - accuracy:
 0.8074
 74/96 [=====>...] - ETA: 0s - loss: 1.1950 - accuracy:
 0.8076
 80/96 [=====>...] - ETA: 0s - loss: 1.1961 - accuracy:
 0.8036
 85/96 [=====>...] - ETA: 0s - loss: 1.2010 - accuracy:
 0.8045
 91/96 [=====>..] - ETA: 0s - loss: 1.1942 - accuracy:
 0.8048
 96/96 [=====] - 1s 14ms/step - loss: 1.1944 - accuracy:
 0.8031 - val_loss: 1.9256 - val_accuracy: 0.5602

Epoch 8/30

1/96 [...] - ETA: 1s - loss: 0.7625 - accuracy:
 0.9524
 6/96 [>...] - ETA: 0s - loss: 1.0586 - accuracy:
 0.8492
 11/96 [==>...] - ETA: 0s - loss: 1.0452 - accuracy:
 0.8442
 16/96 [====>...] - ETA: 0s - loss: 1.0712 - accuracy:
 0.8274
 21/96 [=====>...] - ETA: 0s - loss: 1.0858 - accuracy:
 0.8231
 26/96 [=====>...] - ETA: 0s - loss: 1.0857 - accuracy:
 0.8278
 31/96 [=====>...] - ETA: 0s - loss: 1.0740 - accuracy:
 0.8341
 37/96 [=====>...] - ETA: 0s - loss: 1.0728 - accuracy:
 0.8275
 42/96 [=====>...] - ETA: 0s - loss: 1.0558 - accuracy:
 0.8311
 48/96 [=====>...] - ETA: 0s - loss: 1.0372 - accuracy:
 0.8383
 54/96 [=====>...] - ETA: 0s - loss: 1.0350 - accuracy:
 0.8404
 60/96 [=====>...] - ETA: 0s - loss: 1.0310 - accuracy:
 0.8389
 64/96 [=====>...] - ETA: 0s - loss: 1.0295 - accuracy:
 0.8378

69/96 [=====>...] - ETA: 0s - loss: 1.0249 - accuracy:
0.8371
75/96 [=====>...] - ETA: 0s - loss: 1.0235 - accuracy:
0.8356
81/96 [=====>...] - ETA: 0s - loss: 1.0380 - accuracy:
0.8301
87/96 [=====>...] - ETA: 0s - loss: 1.0361 - accuracy:
0.8298
93/96 [=====>.] - ETA: 0s - loss: 1.0372 - accuracy:
0.8274
96/96 [=====] - 1s 13ms/step - loss: 1.0397 - accuracy:
0.8261 - val_loss: 2.0714 - val_accuracy: 0.5619

Epoch 9/30

1/96 [...] - ETA: 1s - loss: 1.0436 - accuracy:
0.9048
7/96 [=>...] - ETA: 0s - loss: 0.9967 - accuracy:
0.8435
12/96 [==>...] - ETA: 0s - loss: 0.9966 - accuracy:
0.8333
17/96 [====>...] - ETA: 0s - loss: 0.9595 - accuracy:
0.8487
23/96 [=====>...] - ETA: 0s - loss: 0.9358 - accuracy:
0.8489
29/96 [=====>...] - ETA: 0s - loss: 0.9605 - accuracy:
0.8440
34/96 [=====>...] - ETA: 0s - loss: 0.9526 - accuracy:
0.8515
40/96 [=====>...] - ETA: 0s - loss: 0.9498 - accuracy:
0.8488
46/96 [=====>...] - ETA: 0s - loss: 0.9410 - accuracy:
0.8520
50/96 [=====>...] - ETA: 0s - loss: 0.9332 - accuracy:
0.8524
55/96 [=====>...] - ETA: 0s - loss: 0.9259 - accuracy:
0.8528
61/96 [=====>...] - ETA: 0s - loss: 0.9242 - accuracy:
0.8517
66/96 [=====>...] - ETA: 0s - loss: 0.9152 - accuracy:
0.8543
71/96 [=====>...] - ETA: 0s - loss: 0.9171 - accuracy:
0.8518
77/96 [=====>...] - ETA: 0s - loss: 0.9135 - accuracy:
0.8534
82/96 [=====>...] - ETA: 0s - loss: 0.9037 - accuracy:
0.8577
87/96 [=====>...] - ETA: 0s - loss: 0.8995 - accuracy:

0.8588
93/96 [=====>.] - ETA: 0s - loss: 0.8983 - accuracy:
0.8587
96/96 [=====] - 1s 13ms/step - loss: 0.9048 - accuracy:
0.8566 - val_loss: 1.9315 - val_accuracy: 0.5226

Epoch 10/30

1/96 [...] - ETA: 1s - loss: 0.9836 - accuracy:
0.8095
7/96 [=>...] - ETA: 0s - loss: 0.8501 - accuracy:
0.8639
12/96 [==>...] - ETA: 0s - loss: 0.7902 - accuracy:
0.8730
18/96 [====>...] - ETA: 0s - loss: 0.8213 - accuracy:
0.8624
23/96 [=====>...] - ETA: 0s - loss: 0.8434 - accuracy:
0.8551
28/96 [=====>...] - ETA: 0s - loss: 0.8484 - accuracy:
0.8520
34/96 [=====>...] - ETA: 0s - loss: 0.8595 - accuracy:
0.8515
39/96 [=====>...] - ETA: 0s - loss: 0.8616 - accuracy:
0.8462
45/96 [=====>...] - ETA: 0s - loss: 0.8601 - accuracy:
0.8455
51/96 [=====>...] - ETA: 0s - loss: 0.8570 - accuracy:
0.8487
55/96 [=====>...] - ETA: 0s - loss: 0.8691 - accuracy:
0.8416
59/96 [=====>...] - ETA: 0s - loss: 0.8630 - accuracy:
0.8458
65/96 [=====>...] - ETA: 0s - loss: 0.8543 - accuracy:
0.8491
71/96 [=====>...] - ETA: 0s - loss: 0.8480 - accuracy:
0.8518
77/96 [=====>...] - ETA: 0s - loss: 0.8394 - accuracy:
0.8547
83/96 [=====>...] - ETA: 0s - loss: 0.8395 - accuracy:
0.8537
89/96 [=====>...] - ETA: 0s - loss: 0.8437 - accuracy:
0.8539
93/96 [=====>.] - ETA: 0s - loss: 0.8521 - accuracy:
0.8525
96/96 [=====] - 1s 14ms/step - loss: 0.8522 - accuracy:
0.8531 - val_loss: 1.7459 - val_accuracy: 0.5892

Epoch 11/30

```

1/96 [...] - ETA: 1s - loss: 0.6659 - accuracy:
0.9048
7/96 [=>...] - ETA: 0s - loss: 0.7028 - accuracy:
0.9048
13/96 [==>...] - ETA: 0s - loss: 0.7071 - accuracy:
0.8974
19/96 [===>...] - ETA: 0s - loss: 0.7253 - accuracy:
0.8947
23/96 [=====>...] - ETA: 0s - loss: 0.7364 - accuracy:
0.8986
28/96 [=====>...] - ETA: 0s - loss: 0.7351 - accuracy:
0.8997
33/96 [======>...] - ETA: 0s - loss: 0.7451 - accuracy:
0.8932
38/96 [======>...] - ETA: 0s - loss: 0.7482 - accuracy:
0.8910
43/96 [======>...] - ETA: 0s - loss: 0.7507 - accuracy:
0.8848
48/96 [======>...] - ETA: 0s - loss: 0.7420 - accuracy:
0.8899
53/96 [======>...] - ETA: 0s - loss: 0.7546 - accuracy:
0.8868
57/96 [======>...] - ETA: 0s - loss: 0.7661 - accuracy:
0.8847
61/96 [======>...] - ETA: 0s - loss: 0.7686 - accuracy:
0.8837
65/96 [======>...] - ETA: 0s - loss: 0.7598 - accuracy:
0.8857
71/96 [======>...] - ETA: 0s - loss: 0.7567 - accuracy:
0.8867
76/96 [======>...] - ETA: 0s - loss: 0.7547 - accuracy:
0.8866
81/96 [======>...] - ETA: 0s - loss: 0.7569 - accuracy:
0.8836
86/96 [======>...] - ETA: 0s - loss: 0.7593 - accuracy:
0.8821
91/96 [======>..] - ETA: 0s - loss: 0.7540 - accuracy:
0.8833
95/96 [======>.] - ETA: 0s - loss: 0.7585 - accuracy:
0.8807
96/96 [=====] - 1s 15ms/step - loss: 0.7592 - accuracy:
0.8806 - val_loss: 1.7338 - val_accuracy: 0.6371

```

Epoch 12/30

```

1/96 [...] - ETA: 1s - loss: 0.5402 - accuracy:
1.0000

```

```

6/96 [>...] - ETA: 0s - loss: 0.6896 - accuracy:
0.8968
12/96 [==>...] - ETA: 0s - loss: 0.6703 - accuracy:
0.8889
17/96 [====>...] - ETA: 0s - loss: 0.6841 - accuracy:
0.8936
22/96 [=====>...] - ETA: 0s - loss: 0.7087 - accuracy:
0.8853
28/96 [=====>...] - ETA: 0s - loss: 0.7270 - accuracy:
0.8810
32/96 [=====>...] - ETA: 0s - loss: 0.7291 - accuracy:
0.8839
37/96 [=====>...] - ETA: 0s - loss: 0.7220 - accuracy:
0.8867
42/96 [=====>...] - ETA: 0s - loss: 0.7150 - accuracy:
0.8934
47/96 [=====>...] - ETA: 0s - loss: 0.7101 - accuracy:
0.8956
51/96 [=====>...] - ETA: 0s - loss: 0.7010 - accuracy:
0.8964
56/96 [=====>...] - ETA: 0s - loss: 0.6976 - accuracy:
0.8954
62/96 [=====>...] - ETA: 0s - loss: 0.6928 - accuracy:
0.8971
68/96 [=====>...] - ETA: 0s - loss: 0.6943 - accuracy:
0.8950
73/96 [=====>...] - ETA: 0s - loss: 0.6986 - accuracy:
0.8917
77/96 [=====>...] - ETA: 0s - loss: 0.6938 - accuracy:
0.8942
81/96 [=====>...] - ETA: 0s - loss: 0.6927 - accuracy:
0.8948
87/96 [=====>...] - ETA: 0s - loss: 0.6917 - accuracy:
0.8955
93/96 [=====>.] - ETA: 0s - loss: 0.6959 - accuracy:
0.8935
96/96 [=====] - 1s 14ms/step - loss: 0.6978 - accuracy:
0.8926 - val_loss: 1.7647 - val_accuracy: 0.6132

```

Epoch 13/30

```

1/96 [...] - ETA: 2s - loss: 0.6963 - accuracy:
0.8571
6/96 [>...] - ETA: 0s - loss: 0.7030 - accuracy:
0.8571
12/96 [==>...] - ETA: 0s - loss: 0.6292 - accuracy:
0.8929
18/96 [====>...] - ETA: 0s - loss: 0.6139 - accuracy:

```

0.9074
24/96 [=====>...] - ETA: 0s - loss: 0.6210 - accuracy:
0.9008
30/96 [=====>...] - ETA: 0s - loss: 0.6258 - accuracy:
0.9000
36/96 [=====>...] - ETA: 0s - loss: 0.6305 - accuracy:
0.9021
41/96 [=====>...] - ETA: 0s - loss: 0.6311 - accuracy:
0.9001
46/96 [=====>...] - ETA: 0s - loss: 0.6464 - accuracy:
0.8975
52/96 [=====>...] - ETA: 0s - loss: 0.6419 - accuracy:
0.9011
58/96 [=====>...] - ETA: 0s - loss: 0.6459 - accuracy:
0.8990
64/96 [=====>...] - ETA: 0s - loss: 0.6500 - accuracy:
0.8988
70/96 [=====>...] - ETA: 0s - loss: 0.6496 - accuracy:
0.9014
76/96 [=====>...] - ETA: 0s - loss: 0.6500 - accuracy:
0.8991
80/96 [=====>...] - ETA: 0s - loss: 0.6482 - accuracy:
0.8994
86/96 [=====>...] - ETA: 0s - loss: 0.6396 - accuracy:
0.9031
92/96 [=====>...] - ETA: 0s - loss: 0.6499 - accuracy:
0.8991
96/96 [=====>...] - 1s 12ms/step - loss: 0.6509 - accuracy:
0.8986 - val_loss: 2.0739 - val_accuracy: 0.5995

Epoch 14/30

1/96 [...] - ETA: 1s - loss: 0.5311 - accuracy:
0.9524
6/96 [>...] - ETA: 0s - loss: 0.5089 - accuracy:
0.9683
12/96 [==>...] - ETA: 0s - loss: 0.5777 - accuracy:
0.9206
18/96 [====>...] - ETA: 0s - loss: 0.5738 - accuracy:
0.9286
23/96 [=====>...] - ETA: 0s - loss: 0.5722 - accuracy:
0.9296
28/96 [=====>...] - ETA: 0s - loss: 0.5684 - accuracy:
0.9337
34/96 [=====>...] - ETA: 0s - loss: 0.5897 - accuracy:
0.9230
40/96 [=====>...] - ETA: 0s - loss: 0.5921 - accuracy:
0.9167

46/96 [=====>...] - ETA: 0s - loss: 0.5964 - accuracy:
0.9120
52/96 [=====>...] - ETA: 0s - loss: 0.5975 - accuracy:
0.9139
58/96 [=====>...] - ETA: 0s - loss: 0.5986 - accuracy:
0.9130
62/96 [=====>...] - ETA: 0s - loss: 0.5970 - accuracy:
0.9124
68/96 [=====>...] - ETA: 0s - loss: 0.5997 - accuracy:
0.9132
74/96 [=====>...] - ETA: 0s - loss: 0.5935 - accuracy:
0.9157
79/96 [=====>...] - ETA: 0s - loss: 0.5922 - accuracy:
0.9174
84/96 [=====>...] - ETA: 0s - loss: 0.5884 - accuracy:
0.9189
89/96 [=====>...] - ETA: 0s - loss: 0.5875 - accuracy:
0.9192
95/96 [=====>.] - ETA: 0s - loss: 0.5954 - accuracy:
0.9173
96/96 [=====] - 1s 14ms/step - loss: 0.5955 - accuracy:
0.9170 - val_loss: 2.0244 - val_accuracy: 0.6003

Epoch 15/30

1/96 [...] - ETA: 2s - loss: 0.6961 - accuracy:
0.8571
5/96 [>...] - ETA: 1s - loss: 0.5518 - accuracy:
0.9333
9/96 [=>...] - ETA: 1s - loss: 0.6047 - accuracy:
0.9259
14/96 [==>...] - ETA: 1s - loss: 0.5941 - accuracy:
0.9218
19/96 [===>...] - ETA: 0s - loss: 0.5881 - accuracy:
0.9148
24/96 [=====>...] - ETA: 0s - loss: 0.5950 - accuracy:
0.9147
28/96 [=====>...] - ETA: 0s - loss: 0.5817 - accuracy:
0.9235
32/96 [=====>...] - ETA: 0s - loss: 0.5717 - accuracy:
0.9256
36/96 [=====>...] - ETA: 0s - loss: 0.5646 - accuracy:
0.9272
40/96 [=====>...] - ETA: 0s - loss: 0.5616 - accuracy:
0.9274
44/96 [=====>...] - ETA: 0s - loss: 0.5699 - accuracy:
0.9221
48/96 [=====>...] - ETA: 0s - loss: 0.5727 - accuracy:

0.9206
52/96 [=====>...] - ETA: 0s - loss: 0.5700 - accuracy:
0.9194
56/96 [=====>...] - ETA: 0s - loss: 0.5782 - accuracy:
0.9192
60/96 [=====>...] - ETA: 0s - loss: 0.5832 - accuracy:
0.9167
64/96 [=====>...] - ETA: 0s - loss: 0.5761 - accuracy:
0.9189
68/96 [=====>...] - ETA: 0s - loss: 0.5830 - accuracy:
0.9153
72/96 [=====>...] - ETA: 0s - loss: 0.5874 - accuracy:
0.9127
77/96 [=====>...] - ETA: 0s - loss: 0.5904 - accuracy:
0.9122
82/96 [=====>...] - ETA: 0s - loss: 0.5921 - accuracy:
0.9111
86/96 [=====>...] - ETA: 0s - loss: 0.5930 - accuracy:
0.9120
91/96 [=====>..] - ETA: 0s - loss: 0.5990 - accuracy:
0.9100
96/96 [=====] - ETA: 0s - loss: 0.5985 - accuracy:
0.9095
96/96 [=====] - 2s 17ms/step - loss: 0.5985 - accuracy:
0.9095 - val_loss: 2.0237 - val_accuracy: 0.5662

Epoch 16/30

1/96 [...] - ETA: 2s - loss: 0.3662 - accuracy:
1.0000
6/96 [>...] - ETA: 0s - loss: 0.5138 - accuracy:
0.9524
11/96 [==>...] - ETA: 0s - loss: 0.5675 - accuracy:
0.9177
16/96 [====>...] - ETA: 0s - loss: 0.5544 - accuracy:
0.9226
21/96 [=====>...] - ETA: 0s - loss: 0.5381 - accuracy:
0.9297
26/96 [=====>...] - ETA: 0s - loss: 0.5325 - accuracy:
0.9322
31/96 [=====>...] - ETA: 0s - loss: 0.5360 - accuracy:
0.9278
36/96 [=====>...] - ETA: 0s - loss: 0.5285 - accuracy:
0.9325
40/96 [=====>...] - ETA: 0s - loss: 0.5303 - accuracy:
0.9286
44/96 [=====>...] - ETA: 0s - loss: 0.5282 - accuracy:
0.9275

48/96 [=====>...] - ETA: 0s - loss: 0.5250 - accuracy:
 0.9315
 52/96 [=====>...] - ETA: 0s - loss: 0.5252 - accuracy:
 0.9322
 56/96 [=====>...] - ETA: 0s - loss: 0.5213 - accuracy:
 0.9328
 61/96 [=====>...] - ETA: 0s - loss: 0.5167 - accuracy:
 0.9360
 66/96 [=====>...] - ETA: 0s - loss: 0.5079 - accuracy:
 0.9387
 71/96 [=====>...] - ETA: 0s - loss: 0.5085 - accuracy:
 0.9396
 75/96 [=====>...] - ETA: 0s - loss: 0.5070 - accuracy:
 0.9397
 80/96 [=====>...] - ETA: 0s - loss: 0.5065 - accuracy:
 0.9387
 84/96 [=====>...] - ETA: 0s - loss: 0.5079 - accuracy:
 0.9371
 89/96 [=====>...] - ETA: 0s - loss: 0.5028 - accuracy:
 0.9385
 94/96 [=====>.] - ETA: 0s - loss: 0.5078 - accuracy:
 0.9362
 96/96 [=====] - 2s 16ms/step - loss: 0.5070 - accuracy:
 0.9365 - val_loss: 1.8655 - val_accuracy: 0.5824

Epoch 1/30

1/96 [...] - ETA: 7:19 - loss: 3.5132 - accuracy:
 0.0476
 6/96 [>...] - ETA: 1s - loss: 3.3309 - accuracy:
 0.1587
 9/96 [=>...] - ETA: 1s - loss: 3.2590 - accuracy:
 0.1693
 14/96 [===>...] - ETA: 1s - loss: 3.1443 - accuracy:
 0.1871
 18/96 [====>...] - ETA: 1s - loss: 3.0816 - accuracy:
 0.2063
 22/96 [=====>...] - ETA: 0s - loss: 3.0343 - accuracy:
 0.2165
 27/96 [=====>...] - ETA: 0s - loss: 2.9976 - accuracy:
 0.2046
 32/96 [=====>...] - ETA: 0s - loss: 2.9336 - accuracy:
 0.2173
 37/96 [=====>...] - ETA: 0s - loss: 2.8783 - accuracy:
 0.2291
 41/96 [=====>...] - ETA: 0s - loss: 2.8493 - accuracy:
 0.2300
 45/96 [=====>...] - ETA: 0s - loss: 2.8246 - accuracy:

0.2381
 49/96 [=====>...] - ETA: 0s - loss: 2.8056 - accuracy:
 0.2371
 52/96 [=====>...] - ETA: 0s - loss: 2.7897 - accuracy:
 0.2427
 56/96 [=====>...] - ETA: 0s - loss: 2.7677 - accuracy:
 0.2483
 59/96 [=====>...] - ETA: 0s - loss: 2.7624 - accuracy:
 0.2446
 63/96 [=====>...] - ETA: 0s - loss: 2.7409 - accuracy:
 0.2509
 66/96 [=====>...] - ETA: 0s - loss: 2.7180 - accuracy:
 0.2597
 69/96 [=====>...] - ETA: 0s - loss: 2.7042 - accuracy:
 0.2643
 73/96 [=====>...] - ETA: 0s - loss: 2.6817 - accuracy:
 0.2720
 76/96 [=====>...] - ETA: 0s - loss: 2.6726 - accuracy:
 0.2744
 79/96 [=====>...] - ETA: 0s - loss: 2.6604 - accuracy:
 0.2767
 83/96 [=====>...] - ETA: 0s - loss: 2.6374 - accuracy:
 0.2817
 86/96 [=====>...] - ETA: 0s - loss: 2.6308 - accuracy:
 0.2835
 90/96 [=====>..] - ETA: 0s - loss: 2.6123 - accuracy:
 0.2873
 93/96 [=====>.] - ETA: 0s - loss: 2.6026 - accuracy:
 0.2878
 96/96 [=====] - 7s 22ms/step - loss: 2.5979 - accuracy:
 0.2874 - val_loss: 3.8389 - val_accuracy: 0.1486

Epoch 2/30

1/96 [...] - ETA: 2s - loss: 1.9843 - accuracy:
 0.4762
 4/96 [>...] - ETA: 1s - loss: 2.0673 - accuracy:
 0.4524
 7/96 [=>...] - ETA: 1s - loss: 2.1530 - accuracy:
 0.4014
 10/96 [==>...] - ETA: 1s - loss: 2.1745 - accuracy:
 0.3905
 13/96 [===>...] - ETA: 1s - loss: 2.1470 - accuracy:
 0.3919
 16/96 [====>...] - ETA: 1s - loss: 2.1664 - accuracy:
 0.3690
 19/96 [====>...] - ETA: 1s - loss: 2.1725 - accuracy:
 0.3684

22/96 [=====>...] - ETA: 1s - loss: 2.1628 - accuracy:
 0.3874
 25/96 [=====>...] - ETA: 1s - loss: 2.1609 - accuracy:
 0.3943
 28/96 [=====>...] - ETA: 1s - loss: 2.1387 - accuracy:
 0.3963
 31/96 [=====>...] - ETA: 1s - loss: 2.1288 - accuracy:
 0.4040
 34/96 [=====>...] - ETA: 1s - loss: 2.1068 - accuracy:
 0.4146
 38/96 [=====>...] - ETA: 1s - loss: 2.0995 - accuracy:
 0.4085
 41/96 [=====>...] - ETA: 1s - loss: 2.1001 - accuracy:
 0.4135
 44/96 [=====>...] - ETA: 0s - loss: 2.0715 - accuracy:
 0.4242
 47/96 [=====>...] - ETA: 0s - loss: 2.0468 - accuracy:
 0.4367
 50/96 [=====>...] - ETA: 0s - loss: 2.0358 - accuracy:
 0.4362
 53/96 [=====>...] - ETA: 0s - loss: 2.0178 - accuracy:
 0.4394
 57/96 [=====>...] - ETA: 0s - loss: 2.0042 - accuracy:
 0.4394
 60/96 [=====>...] - ETA: 0s - loss: 1.9906 - accuracy:
 0.4452
 63/96 [=====>...] - ETA: 0s - loss: 1.9834 - accuracy:
 0.4490
 66/96 [=====>...] - ETA: 0s - loss: 1.9718 - accuracy:
 0.4524
 69/96 [=====>...] - ETA: 0s - loss: 1.9577 - accuracy:
 0.4576
 71/96 [=====>...] - ETA: 0s - loss: 1.9536 - accuracy:
 0.4594
 74/96 [=====>...] - ETA: 0s - loss: 1.9452 - accuracy:
 0.4588
 77/96 [=====>...] - ETA: 0s - loss: 1.9396 - accuracy:
 0.4613
 80/96 [=====>...] - ETA: 0s - loss: 1.9289 - accuracy:
 0.4667
 83/96 [=====>...] - ETA: 0s - loss: 1.9193 - accuracy:
 0.4722
 86/96 [=====>...] - ETA: 0s - loss: 1.9091 - accuracy:
 0.4745
 89/96 [=====>...] - ETA: 0s - loss: 1.8985 - accuracy:
 0.4751
 92/96 [=====>...] - ETA: 0s - loss: 1.8873 - accuracy:
 0.4788

95/96 [=====>.] - ETA: 0s - loss: 1.8862 - accuracy:
0.4792
96/96 [=====] - 2s 23ms/step - loss: 1.8862 - accuracy:
0.4793 - val_loss: 3.6492 - val_accuracy: 0.1759

Epoch 3/30

1/96 [...] - ETA: 2s - loss: 1.2184 - accuracy:
0.7619
6/96 [>...] - ETA: 1s - loss: 1.6363 - accuracy:
0.5794
11/96 [==>...] - ETA: 0s - loss: 1.4809 - accuracy:
0.6277
16/96 [====>...] - ETA: 0s - loss: 1.4607 - accuracy:
0.6190
20/96 [=====>...] - ETA: 0s - loss: 1.4777 - accuracy:
0.6238
23/96 [=====>...] - ETA: 0s - loss: 1.4728 - accuracy:
0.6232
27/96 [=====>...] - ETA: 0s - loss: 1.4664 - accuracy:
0.6173
31/96 [=====>...] - ETA: 0s - loss: 1.4559 - accuracy:
0.6190
35/96 [=====>...] - ETA: 0s - loss: 1.4589 - accuracy:
0.6163
40/96 [=====>...] - ETA: 0s - loss: 1.4577 - accuracy:
0.6190
44/96 [=====>...] - ETA: 0s - loss: 1.4635 - accuracy:
0.6180
47/96 [=====>...] - ETA: 0s - loss: 1.4644 - accuracy:
0.6160
50/96 [=====>...] - ETA: 0s - loss: 1.4558 - accuracy:
0.6152
54/96 [=====>...] - ETA: 0s - loss: 1.4386 - accuracy:
0.6217
59/96 [=====>...] - ETA: 0s - loss: 1.4422 - accuracy:
0.6199
63/96 [=====>...] - ETA: 0s - loss: 1.4457 - accuracy:
0.6168
67/96 [=====>...] - ETA: 0s - loss: 1.4432 - accuracy:
0.6183
71/96 [=====>...] - ETA: 0s - loss: 1.4372 - accuracy:
0.6190
74/96 [=====>...] - ETA: 0s - loss: 1.4298 - accuracy:
0.6197
77/96 [=====>...] - ETA: 0s - loss: 1.4253 - accuracy:
0.6190
81/96 [=====>...] - ETA: 0s - loss: 1.4277 - accuracy:

0.6173
86/96 [=====>...] - ETA: 0s - loss: 1.4274 - accuracy:
0.6168
90/96 [=====>..] - ETA: 0s - loss: 1.4266 - accuracy:
0.6164
94/96 [=====>.] - ETA: 0s - loss: 1.4159 - accuracy:
0.6170
96/96 [=====] - 2s 17ms/step - loss: 1.4156 - accuracy:
0.6162 - val_loss: 2.5648 - val_accuracy: 0.2912

Epoch 4/30

1/96 [...] - ETA: 2s - loss: 1.1117 - accuracy:
0.7619
5/96 [>...] - ETA: 1s - loss: 1.2734 - accuracy:
0.6762
9/96 [=>...] - ETA: 1s - loss: 1.3177 - accuracy:
0.6561
13/96 [===>...] - ETA: 1s - loss: 1.2585 - accuracy:
0.6593
17/96 [====>...] - ETA: 1s - loss: 1.2565 - accuracy:
0.6499
21/96 [=====>...] - ETA: 1s - loss: 1.2376 - accuracy:
0.6576
25/96 [=====>...] - ETA: 0s - loss: 1.2186 - accuracy:
0.6629
29/96 [=====>...] - ETA: 0s - loss: 1.2183 - accuracy:
0.6601
32/96 [=====>...] - ETA: 0s - loss: 1.2311 - accuracy:
0.6637
37/96 [=====>...] - ETA: 0s - loss: 1.2266 - accuracy:
0.6705
41/96 [=====>...] - ETA: 0s - loss: 1.2207 - accuracy:
0.6748
44/96 [=====>...] - ETA: 0s - loss: 1.2046 - accuracy:
0.6775
48/96 [=====>...] - ETA: 0s - loss: 1.1896 - accuracy:
0.6815
53/96 [=====>...] - ETA: 0s - loss: 1.1905 - accuracy:
0.6810
57/96 [=====>...] - ETA: 0s - loss: 1.1758 - accuracy:
0.6850
61/96 [=====>...] - ETA: 0s - loss: 1.1750 - accuracy:
0.6831
65/96 [=====>...] - ETA: 0s - loss: 1.1651 - accuracy:
0.6894
70/96 [=====>...] - ETA: 0s - loss: 1.1716 - accuracy:
0.6878

75/96 [=====>...] - ETA: 0s - loss: 1.1665 - accuracy:
0.6889
79/96 [=====>...] - ETA: 0s - loss: 1.1589 - accuracy:
0.6914
83/96 [=====>...] - ETA: 0s - loss: 1.1654 - accuracy:
0.6885
86/96 [=====>...] - ETA: 0s - loss: 1.1678 - accuracy:
0.6872
90/96 [=====>..] - ETA: 0s - loss: 1.1727 - accuracy:
0.6852
94/96 [=====>..] - ETA: 0s - loss: 1.1731 - accuracy:
0.6839
96/96 [=====] - 2s 17ms/step - loss: 1.1709 - accuracy:
0.6857 - val_loss: 1.8344 - val_accuracy: 0.4833

Epoch 5/30

1/96 [...] - ETA: 2s - loss: 1.1073 - accuracy:
0.7619
5/96 [>...] - ETA: 1s - loss: 1.1755 - accuracy:
0.6762
9/96 [=>...] - ETA: 1s - loss: 1.0624 - accuracy:
0.7037
14/96 [===>...] - ETA: 1s - loss: 1.0419 - accuracy:
0.7279
17/96 [====>...] - ETA: 1s - loss: 1.0835 - accuracy:
0.7171
20/96 [=====>...] - ETA: 1s - loss: 1.0303 - accuracy:
0.7429
24/96 [=====>...] - ETA: 1s - loss: 1.0259 - accuracy:
0.7480
28/96 [=====>...] - ETA: 0s - loss: 0.9999 - accuracy:
0.7602
32/96 [=====>...] - ETA: 0s - loss: 0.9978 - accuracy:
0.7634
36/96 [=====>...] - ETA: 0s - loss: 1.0014 - accuracy:
0.7632
40/96 [=====>...] - ETA: 0s - loss: 1.0053 - accuracy:
0.7607
43/96 [=====>...] - ETA: 0s - loss: 0.9967 - accuracy:
0.7608
47/96 [=====>...] - ETA: 0s - loss: 1.0195 - accuracy:
0.7548
51/96 [=====>...] - ETA: 0s - loss: 1.0310 - accuracy:
0.7470
55/96 [=====>...] - ETA: 0s - loss: 1.0299 - accuracy:
0.7489
59/96 [=====>...] - ETA: 0s - loss: 1.0243 - accuracy:

```

0.7498
63/96 [=====>...] - ETA: 0s - loss: 1.0305 - accuracy:
0.7468
67/96 [=====>...] - ETA: 0s - loss: 1.0325 - accuracy:
0.7456
70/96 [=====>...] - ETA: 0s - loss: 1.0328 - accuracy:
0.7435
75/96 [=====>...] - ETA: 0s - loss: 1.0435 - accuracy:
0.7410
78/96 [=====>...] - ETA: 0s - loss: 1.0404 - accuracy:
0.7424
83/96 [=====>...] - ETA: 0s - loss: 1.0373 - accuracy:
0.7435
88/96 [=====>...] - ETA: 0s - loss: 1.0389 - accuracy:
0.7419
93/96 [=====>.] - ETA: 0s - loss: 1.0390 - accuracy:
0.7399
96/96 [=====] - 2s 17ms/step - loss: 1.0467 - accuracy:
0.7386 - val_loss: 1.5410 - val_accuracy: 0.5628

```

Epoch 6/30

```

1/96 [...] - ETA: 1s - loss: 1.0661 - accuracy:
0.7619
5/96 [>...] - ETA: 1s - loss: 0.8574 - accuracy:
0.7810
10/96 [==>...] - ETA: 1s - loss: 0.9420 - accuracy:
0.7667
15/96 [===>...] - ETA: 0s - loss: 0.8879 - accuracy:
0.7873
20/96 [=====>...] - ETA: 0s - loss: 0.8738 - accuracy:
0.7881
25/96 [=====>...] - ETA: 0s - loss: 0.8688 - accuracy:
0.7905
29/96 [=====>...] - ETA: 0s - loss: 0.8766 - accuracy:
0.7915
32/96 [=====>...] - ETA: 0s - loss: 0.8730 - accuracy:
0.7902
37/96 [=====>...] - ETA: 0s - loss: 0.8563 - accuracy:
0.7979
41/96 [=====>...] - ETA: 0s - loss: 0.8565 - accuracy:
0.7944
46/96 [=====>...] - ETA: 0s - loss: 0.8514 - accuracy:
0.7919
51/96 [=====>...] - ETA: 0s - loss: 0.8281 - accuracy:
0.7993
56/96 [=====>...] - ETA: 0s - loss: 0.8333 - accuracy:
0.7968

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60/96 [=====>...] - ETA: 0s - loss: 0.8359 - accuracy:
 0.7944
 64/96 [=====>...] - ETA: 0s - loss: 0.8407 - accuracy:
 0.7917
 69/96 [=====>...] - ETA: 0s - loss: 0.8468 - accuracy:
 0.7854
 74/96 [=====>...] - ETA: 0s - loss: 0.8343 - accuracy:
 0.7883
 79/96 [=====>...] - ETA: 0s - loss: 0.8446 - accuracy:
 0.7848
 83/96 [=====>...] - ETA: 0s - loss: 0.8523 - accuracy:
 0.7814
 87/96 [=====>...] - ETA: 0s - loss: 0.8535 - accuracy:
 0.7811
 90/96 [=====>..] - ETA: 0s - loss: 0.8518 - accuracy:
 0.7810
 95/96 [=====>.] - ETA: 0s - loss: 0.8522 - accuracy:
 0.7810
 96/96 [=====] - 1s 15ms/step - loss: 0.8524 - accuracy:
 0.7806 - val_loss: 1.6913 - val_accuracy: 0.5465

Epoch 7/30

1/96 [...] - ETA: 1s - loss: 1.0285 - accuracy:
 0.7143
 5/96 [>...] - ETA: 1s - loss: 0.7163 - accuracy:
 0.8190
 10/96 [==>...] - ETA: 1s - loss: 0.7578 - accuracy:
 0.7905
 15/96 [===>...] - ETA: 0s - loss: 0.7833 - accuracy:
 0.7841
 20/96 [=====>...] - ETA: 0s - loss: 0.8006 - accuracy:
 0.7786
 25/96 [=====>...] - ETA: 0s - loss: 0.8211 - accuracy:
 0.7771
 29/96 [=====>...] - ETA: 0s - loss: 0.7946 - accuracy:
 0.7865
 34/96 [=====>...] - ETA: 0s - loss: 0.7914 - accuracy:
 0.7899
 39/96 [=====>...] - ETA: 0s - loss: 0.8381 - accuracy:
 0.7705
 44/96 [=====>...] - ETA: 0s - loss: 0.8376 - accuracy:
 0.7727
 48/96 [=====>...] - ETA: 0s - loss: 0.8178 - accuracy:
 0.7847
 53/96 [=====>...] - ETA: 0s - loss: 0.8040 - accuracy:
 0.7907
 57/96 [=====>...] - ETA: 0s - loss: 0.8008 - accuracy:

0.7903
61/96 [=====>...] - ETA: 0s - loss: 0.7902 - accuracy:
0.7931
66/96 [=====>...] - ETA: 0s - loss: 0.7780 - accuracy:
0.8001
71/96 [=====>...] - ETA: 0s - loss: 0.7688 - accuracy:
0.8035
76/96 [=====>...] - ETA: 0s - loss: 0.7654 - accuracy:
0.8076
81/96 [=====>...] - ETA: 0s - loss: 0.7649 - accuracy:
0.8089
86/96 [=====>...] - ETA: 0s - loss: 0.7652 - accuracy:
0.8095
91/96 [=====>..] - ETA: 0s - loss: 0.7537 - accuracy:
0.8127
95/96 [=====>.] - ETA: 0s - loss: 0.7569 - accuracy:
0.8095
96/96 [=====] - 1s 14ms/step - loss: 0.7573 - accuracy:
0.8091 - val_loss: 1.6851 - val_accuracy: 0.5534

Epoch 8/30

1/96 [...] - ETA: 1s - loss: 0.4579 - accuracy:
0.8571
6/96 [>...] - ETA: 1s - loss: 0.5642 - accuracy:
0.8651
10/96 [==>...] - ETA: 1s - loss: 0.6036 - accuracy:
0.8667
14/96 [===>...] - ETA: 1s - loss: 0.5809 - accuracy:
0.8776
19/96 [====>...] - ETA: 1s - loss: 0.6070 - accuracy:
0.8647
23/96 [=====>...] - ETA: 0s - loss: 0.6413 - accuracy:
0.8571
28/96 [=====>...] - ETA: 0s - loss: 0.6389 - accuracy:
0.8605
33/96 [=====>...] - ETA: 0s - loss: 0.6260 - accuracy:
0.8571
38/96 [=====>...] - ETA: 0s - loss: 0.6303 - accuracy:
0.8584
42/96 [=====>...] - ETA: 0s - loss: 0.6409 - accuracy:
0.8571
47/96 [=====>...] - ETA: 0s - loss: 0.6482 - accuracy:
0.8541
52/96 [=====>...] - ETA: 0s - loss: 0.6621 - accuracy:
0.8498
56/96 [=====>...] - ETA: 0s - loss: 0.6622 - accuracy:
0.8486

61/96 [=====>...] - ETA: 0s - loss: 0.6615 - accuracy:
0.8454
66/96 [=====>...] - ETA: 0s - loss: 0.6586 - accuracy:
0.8478
71/96 [=====>...] - ETA: 0s - loss: 0.6708 - accuracy:
0.8410
75/96 [=====>...] - ETA: 0s - loss: 0.6733 - accuracy:
0.8413
79/96 [=====>...] - ETA: 0s - loss: 0.6721 - accuracy:
0.8433
84/96 [=====>...] - ETA: 0s - loss: 0.6683 - accuracy:
0.8452
89/96 [=====>...] - ETA: 0s - loss: 0.6811 - accuracy:
0.8411
94/96 [=====>.] - ETA: 0s - loss: 0.6779 - accuracy:
0.8419
96/96 [=====] - 1s 15ms/step - loss: 0.6805 - accuracy:
0.8401 - val_loss: 1.5028 - val_accuracy: 0.6277

Epoch 9/30

1/96 [...] - ETA: 2s - loss: 0.6941 - accuracy:
0.8095
6/96 [>...] - ETA: 1s - loss: 0.5388 - accuracy:
0.8651
11/96 [==>...] - ETA: 0s - loss: 0.5711 - accuracy:
0.8485
16/96 [====>...] - ETA: 0s - loss: 0.5646 - accuracy:
0.8542
20/96 [=====>...] - ETA: 0s - loss: 0.5563 - accuracy:
0.8548
24/96 [=====>...] - ETA: 0s - loss: 0.5497 - accuracy:
0.8631
29/96 [=====>...] - ETA: 0s - loss: 0.5420 - accuracy:
0.8686
32/96 [=====>...] - ETA: 0s - loss: 0.5518 - accuracy:
0.8676
36/96 [=====>...] - ETA: 0s - loss: 0.5707 - accuracy:
0.8624
40/96 [=====>...] - ETA: 0s - loss: 0.5626 - accuracy:
0.8679
43/96 [=====>...] - ETA: 0s - loss: 0.5616 - accuracy:
0.8693
46/96 [=====>...] - ETA: 0s - loss: 0.5591 - accuracy:
0.8716
49/96 [=====>...] - ETA: 0s - loss: 0.5539 - accuracy:
0.8746
52/96 [=====>...] - ETA: 0s - loss: 0.5678 - accuracy:

0.8727
55/96 [=====>...] - ETA: 0s - loss: 0.5797 - accuracy:
0.8684
58/96 [=====>...] - ETA: 0s - loss: 0.5692 - accuracy:
0.8719
62/96 [=====>...] - ETA: 0s - loss: 0.5750 - accuracy:
0.8702
66/96 [=====>...] - ETA: 0s - loss: 0.5768 - accuracy:
0.8701
69/96 [=====>...] - ETA: 0s - loss: 0.5774 - accuracy:
0.8703
72/96 [=====>...] - ETA: 0s - loss: 0.5747 - accuracy:
0.8704
76/96 [=====>...] - ETA: 0s - loss: 0.5740 - accuracy:
0.8690
79/96 [=====>...] - ETA: 0s - loss: 0.5800 - accuracy:
0.8662
83/96 [=====>...] - ETA: 0s - loss: 0.5835 - accuracy:
0.8629
86/96 [=====>...] - ETA: 0s - loss: 0.5774 - accuracy:
0.8654
89/96 [=====>...] - ETA: 0s - loss: 0.5798 - accuracy:
0.8646
92/96 [=====>..] - ETA: 0s - loss: 0.5816 - accuracy:
0.8628
95/96 [=====>.] - ETA: 0s - loss: 0.5882 - accuracy:
0.8602
96/96 [=====] - 2s 19ms/step - loss: 0.5886 - accuracy:
0.8596 - val_loss: 1.3935 - val_accuracy: 0.6516

Epoch 10/30

1/96 [...] - ETA: 2s - loss: 0.3345 - accuracy:
0.8571
4/96 [>...] - ETA: 1s - loss: 0.4014 - accuracy:
0.9048
8/96 [=>...] - ETA: 1s - loss: 0.5715 - accuracy:
0.8571
11/96 [==>...] - ETA: 1s - loss: 0.5390 - accuracy:
0.8701
14/96 [===>...] - ETA: 1s - loss: 0.5490 - accuracy:
0.8707
18/96 [====>...] - ETA: 1s - loss: 0.5253 - accuracy:
0.8836
22/96 [=====>...] - ETA: 1s - loss: 0.5413 - accuracy:
0.8788
26/96 [=====>...] - ETA: 1s - loss: 0.5502 - accuracy:
0.8773

30/96 [=====>...] - ETA: 1s - loss: 0.5346 - accuracy:
0.8825
34/96 [=====>...] - ETA: 0s - loss: 0.5355 - accuracy:
0.8838
37/96 [=====>...] - ETA: 0s - loss: 0.5335 - accuracy:
0.8842
40/96 [=====>...] - ETA: 0s - loss: 0.5394 - accuracy:
0.8821
43/96 [=====>...] - ETA: 0s - loss: 0.5484 - accuracy:
0.8826
46/96 [=====>...] - ETA: 0s - loss: 0.5485 - accuracy:
0.8820
49/96 [=====>...] - ETA: 0s - loss: 0.5432 - accuracy:
0.8814
52/96 [=====>...] - ETA: 0s - loss: 0.5464 - accuracy:
0.8791
56/96 [=====>...] - ETA: 0s - loss: 0.5471 - accuracy:
0.8776
58/96 [=====>...] - ETA: 0s - loss: 0.5457 - accuracy:
0.8768
62/96 [=====>...] - ETA: 0s - loss: 0.5450 - accuracy:
0.8740
65/96 [=====>...] - ETA: 0s - loss: 0.5513 - accuracy:
0.8718
68/96 [=====>...] - ETA: 0s - loss: 0.5535 - accuracy:
0.8690
72/96 [=====>...] - ETA: 0s - loss: 0.5502 - accuracy:
0.8704
75/96 [=====>...] - ETA: 0s - loss: 0.5436 - accuracy:
0.8724
79/96 [=====>...] - ETA: 0s - loss: 0.5504 - accuracy:
0.8722
83/96 [=====>...] - ETA: 0s - loss: 0.5549 - accuracy:
0.8698
87/96 [=====>...] - ETA: 0s - loss: 0.5524 - accuracy:
0.8692
91/96 [=====>..] - ETA: 0s - loss: 0.5606 - accuracy:
0.8676
95/96 [=====>.] - ETA: 0s - loss: 0.5597 - accuracy:
0.8682
96/96 [=====] - 2s 20ms/step - loss: 0.5633 - accuracy:
0.8676 - val_loss: 1.4281 - val_accuracy: 0.6490

Epoch 11/30

1/96 [...] - ETA: 3s - loss: 0.3437 - accuracy:
0.9048
4/96 [>...] - ETA: 1s - loss: 0.5351 - accuracy:

0.8452
 8/96 [=>...] - ETA: 1s - loss: 0.6316 - accuracy:
 0.8036
 11/96 [==>...] - ETA: 1s - loss: 0.6076 - accuracy:
 0.8225
 15/96 [===>...] - ETA: 1s - loss: 0.5730 - accuracy:
 0.8317
 20/96 [=====>...] - ETA: 1s - loss: 0.5354 - accuracy:
 0.8476
 24/96 [=====>...] - ETA: 1s - loss: 0.5292 - accuracy:
 0.8512
 28/96 [=====>...] - ETA: 0s - loss: 0.5206 - accuracy:
 0.8554
 32/96 [=====>...] - ETA: 0s - loss: 0.5162 - accuracy:
 0.8616
 37/96 [=====>...] - ETA: 0s - loss: 0.5050 - accuracy:
 0.8674
 40/96 [=====>...] - ETA: 0s - loss: 0.5010 - accuracy:
 0.8690
 44/96 [=====>...] - ETA: 0s - loss: 0.4957 - accuracy:
 0.8723
 48/96 [=====>...] - ETA: 0s - loss: 0.4855 - accuracy:
 0.8770
 52/96 [=====>...] - ETA: 0s - loss: 0.4809 - accuracy:
 0.8773
 56/96 [=====>...] - ETA: 0s - loss: 0.4895 - accuracy:
 0.8741
 60/96 [=====>...] - ETA: 0s - loss: 0.4918 - accuracy:
 0.8746
 63/96 [=====>...] - ETA: 0s - loss: 0.4926 - accuracy:
 0.8760
 67/96 [=====>...] - ETA: 0s - loss: 0.4887 - accuracy:
 0.8763
 72/96 [=====>...] - ETA: 0s - loss: 0.4885 - accuracy:
 0.8783
 77/96 [=====>...] - ETA: 0s - loss: 0.5024 - accuracy:
 0.8726
 82/96 [=====>...] - ETA: 0s - loss: 0.5043 - accuracy:
 0.8746
 86/96 [=====>...] - ETA: 0s - loss: 0.5080 - accuracy:
 0.8743
 90/96 [=====>..] - ETA: 0s - loss: 0.5062 - accuracy:
 0.8767
 94/96 [=====>.] - ETA: 0s - loss: 0.5069 - accuracy:
 0.8749
 96/96 [=====] - 2s 17ms/step - loss: 0.5093 - accuracy:
 0.8741 - val_loss: 1.5376 - val_accuracy: 0.5764

Epoch 12/30

1/96 [...] - ETA: 2s - loss: 0.7687 - accuracy:
0.8095
4/96 [>...] - ETA: 1s - loss: 0.4949 - accuracy:
0.8571
8/96 [=>...] - ETA: 1s - loss: 0.4447 - accuracy:
0.8929
13/96 [===>...] - ETA: 1s - loss: 0.4514 - accuracy:
0.9011
16/96 [====>...] - ETA: 1s - loss: 0.4530 - accuracy:
0.9018
21/96 [=====>...] - ETA: 1s - loss: 0.4774 - accuracy:
0.8866
26/96 [=====>...] - ETA: 0s - loss: 0.4811 - accuracy:
0.8864
30/96 [=====>...] - ETA: 0s - loss: 0.4803 - accuracy:
0.8841
35/96 [=====>...] - ETA: 0s - loss: 0.4701 - accuracy:
0.8871
40/96 [=====>...] - ETA: 0s - loss: 0.4627 - accuracy:
0.8905
44/96 [=====>...] - ETA: 0s - loss: 0.4555 - accuracy:
0.8929
48/96 [=====>...] - ETA: 0s - loss: 0.4593 - accuracy:
0.8909
53/96 [=====>...] - ETA: 0s - loss: 0.4717 - accuracy:
0.8859
58/96 [=====>...] - ETA: 0s - loss: 0.4806 - accuracy:
0.8826
63/96 [=====>...] - ETA: 0s - loss: 0.4810 - accuracy:
0.8836
68/96 [=====>...] - ETA: 0s - loss: 0.4694 - accuracy:
0.8887
73/96 [=====>...] - ETA: 0s - loss: 0.4666 - accuracy:
0.8904
77/96 [=====>...] - ETA: 0s - loss: 0.4657 - accuracy:
0.8893
81/96 [=====>...] - ETA: 0s - loss: 0.4679 - accuracy:
0.8877
86/96 [=====>...] - ETA: 0s - loss: 0.4678 - accuracy:
0.8865
90/96 [=====>..] - ETA: 0s - loss: 0.4743 - accuracy:
0.8841
95/96 [=====>.] - ETA: 0s - loss: 0.4757 - accuracy:
0.8842
96/96 [=====] - 2s 16ms/step - loss: 0.4754 - accuracy:
0.8841 - val_loss: 1.4914 - val_accuracy: 0.6405

Epoch 13/30

1/96 [...] - ETA: 2s - loss: 0.5967 - accuracy:
0.8571
4/96 [>...] - ETA: 1s - loss: 0.4349 - accuracy:
0.8929
8/96 [=>...] - ETA: 1s - loss: 0.4365 - accuracy:
0.8810
13/96 [===>...] - ETA: 1s - loss: 0.4369 - accuracy:
0.8901
18/96 [====>...] - ETA: 1s - loss: 0.4190 - accuracy:
0.8942
23/96 [=====>...] - ETA: 0s - loss: 0.4135 - accuracy:
0.9006
27/96 [=====>...] - ETA: 0s - loss: 0.4127 - accuracy:
0.8995
31/96 [=====>...] - ETA: 0s - loss: 0.4140 - accuracy:
0.9002
35/96 [=====>...] - ETA: 0s - loss: 0.4119 - accuracy:
0.8993
39/96 [=====>...] - ETA: 0s - loss: 0.4079 - accuracy:
0.9023
44/96 [=====>...] - ETA: 0s - loss: 0.4086 - accuracy:
0.9026
47/96 [=====>...] - ETA: 0s - loss: 0.4104 - accuracy:
0.9027
51/96 [=====>...] - ETA: 0s - loss: 0.4009 - accuracy:
0.9066
56/96 [=====>...] - ETA: 0s - loss: 0.4075 - accuracy:
0.9065
61/96 [=====>...] - ETA: 0s - loss: 0.4126 - accuracy:
0.9055
66/96 [=====>...] - ETA: 0s - loss: 0.4062 - accuracy:
0.9091
70/96 [=====>...] - ETA: 0s - loss: 0.4025 - accuracy:
0.9095
74/96 [=====>...] - ETA: 0s - loss: 0.4020 - accuracy:
0.9086
79/96 [=====>...] - ETA: 0s - loss: 0.4097 - accuracy:
0.9036
83/96 [=====>...] - ETA: 0s - loss: 0.4068 - accuracy:
0.9042
87/96 [=====>...] - ETA: 0s - loss: 0.4072 - accuracy:
0.9031
91/96 [=====>..] - ETA: 0s - loss: 0.4094 - accuracy:
0.9037
95/96 [=====>.] - ETA: 0s - loss: 0.4119 - accuracy:

0.9013
96/96 [=====] - 2s 16ms/step - loss: 0.4134 - accuracy:
0.9010 - val_loss: 1.4376 - val_accuracy: 0.6465

Epoch 14/30

1/96 [...] - ETA: 2s - loss: 0.3227 - accuracy:
0.9048
4/96 [>...] - ETA: 1s - loss: 0.3076 - accuracy:
0.9286
8/96 [=>...] - ETA: 1s - loss: 0.3086 - accuracy:
0.9464
12/96 [==>...] - ETA: 1s - loss: 0.3275 - accuracy:
0.9365
15/96 [===>...] - ETA: 1s - loss: 0.3330 - accuracy:
0.9365
18/96 [====>...] - ETA: 1s - loss: 0.3238 - accuracy:
0.9418
23/96 [=====>...] - ETA: 1s - loss: 0.3213 - accuracy:
0.9358
27/96 [=====>...] - ETA: 0s - loss: 0.3362 - accuracy:
0.9312
31/96 [=====>...] - ETA: 0s - loss: 0.3353 - accuracy:
0.9339
36/96 [=====>...] - ETA: 0s - loss: 0.3351 - accuracy:
0.9339
40/96 [=====>...] - ETA: 0s - loss: 0.3412 - accuracy:
0.9298
44/96 [=====>...] - ETA: 0s - loss: 0.3365 - accuracy:
0.9318
48/96 [=====>...] - ETA: 0s - loss: 0.3441 - accuracy:
0.9306
52/96 [=====>...] - ETA: 0s - loss: 0.3376 - accuracy:
0.9332
56/96 [=====>...] - ETA: 0s - loss: 0.3372 - accuracy:
0.9362
60/96 [=====>...] - ETA: 0s - loss: 0.3383 - accuracy:
0.9349
64/96 [=====>...] - ETA: 0s - loss: 0.3433 - accuracy:
0.9315
69/96 [=====>...] - ETA: 0s - loss: 0.3626 - accuracy:
0.9255
74/96 [=====>...] - ETA: 0s - loss: 0.3668 - accuracy:
0.9228
79/96 [=====>...] - ETA: 0s - loss: 0.3695 - accuracy:
0.9210
83/96 [=====>...] - ETA: 0s - loss: 0.3844 - accuracy:
0.9162


```

87/96 [=====>...] - ETA: 0s - loss: 0.3880 - accuracy:
0.9152
92/96 [=====>..] - ETA: 0s - loss: 0.3915 - accuracy:
0.9136
96/96 [=====] - 2s 16ms/step - loss: 0.3947 - accuracy:
0.9120 - val_loss: 1.5834 - val_accuracy: 0.6072

```

```

100%|      | 20/20 [14:19<00:00, 42.99s/trial, best loss:
-0.716481626033783]
{'num_filters': 128, 'num_layers': 4}

```

The Bayesian optimization gives us the best hyperparameters for the advanced model as: `* num_layers: 4 * num_filters: 256`

Overall, the accuracy of the advanced model is about as similar as Model Averaging at 0.72. This does not seem to find the best parameters as indicated by the increased accuracy of Random Search. This can be due to overtraining the model leading to a overfitted model.

Task 5: Data Augmentation, Model Validation of Personal Voice Recordings, and Transfer Learning First we record our own voice for about 10 times in two classes ‘yes’ and ‘no’. We also ensure that the recordings are of the same length as the dataset recordings, which is of 1s each.

We augment the data by adding random noise to the recordings to generate more data. We randomly add 5% noise to the recordings.

```
[14]: !unzip /content/personalRecordings.zip
```

```

Archive: /content/personalRecordings.zip
  creating: personalRecordings/
  creating: personalRecordings/no/
 inflating: personalRecordings/no/0.wav
 inflating: personalRecordings/no/1.wav
 inflating: personalRecordings/no/2.wav
 inflating: personalRecordings/no/3.wav
 inflating: personalRecordings/no/4.wav
 inflating: personalRecordings/no/5.wav
 inflating: personalRecordings/no/6.wav
 inflating: personalRecordings/no/7.wav
 inflating: personalRecordings/no/8.wav
 inflating: personalRecordings/no/9.wav
 inflating: personalRecordings/no/0_with_noise_0.wav
 inflating: personalRecordings/no/0_with_noise_1.wav
 inflating: personalRecordings/no/1_with_noise_0.wav
 inflating: personalRecordings/no/1_with_noise_1.wav
 inflating: personalRecordings/no/2_with_noise_0.wav
 inflating: personalRecordings/no/2_with_noise_1.wav
 inflating: personalRecordings/no/3_with_noise_0.wav
 inflating: personalRecordings/no/3_with_noise_1.wav

```

```
inflating: personalRecordings/no/4_with_noise_0.wav
inflating: personalRecordings/no/4_with_noise_1.wav
inflating: personalRecordings/no/5_with_noise_0.wav
inflating: personalRecordings/no/5_with_noise_1.wav
inflating: personalRecordings/no/6_with_noise_0.wav
inflating: personalRecordings/no/6_with_noise_1.wav
inflating: personalRecordings/no/7_with_noise_0.wav
inflating: personalRecordings/no/7_with_noise_1.wav
inflating: personalRecordings/no/8_with_noise_0.wav
inflating: personalRecordings/no/8_with_noise_1.wav
inflating: personalRecordings/no/9_with_noise_0.wav
inflating: personalRecordings/no/9_with_noise_1.wav
  creating: personalRecordings/yes/
inflating: personalRecordings/yes/0.wav
inflating: personalRecordings/yes/1.wav
inflating: personalRecordings/yes/2.wav
inflating: personalRecordings/yes/3.wav
inflating: personalRecordings/yes/4.wav
inflating: personalRecordings/yes/5.wav
inflating: personalRecordings/yes/6.wav
inflating: personalRecordings/yes/7.wav
inflating: personalRecordings/yes/8.wav
inflating: personalRecordings/yes/9.wav
inflating: personalRecordings/yes/0_with_noise_0.wav
inflating: personalRecordings/yes/0_with_noise_1.wav
inflating: personalRecordings/yes/1_with_noise_0.wav
inflating: personalRecordings/yes/1_with_noise_1.wav
inflating: personalRecordings/yes/2_with_noise_0.wav
inflating: personalRecordings/yes/2_with_noise_1.wav
inflating: personalRecordings/yes/3_with_noise_0.wav
inflating: personalRecordings/yes/3_with_noise_1.wav
inflating: personalRecordings/yes/4_with_noise_0.wav
inflating: personalRecordings/yes/4_with_noise_1.wav
inflating: personalRecordings/yes/5_with_noise_0.wav
inflating: personalRecordings/yes/5_with_noise_1.wav
inflating: personalRecordings/yes/6_with_noise_0.wav
inflating: personalRecordings/yes/6_with_noise_1.wav
inflating: personalRecordings/yes/7_with_noise_0.wav
inflating: personalRecordings/yes/7_with_noise_1.wav
inflating: personalRecordings/yes/8_with_noise_0.wav
inflating: personalRecordings/yes/8_with_noise_1.wav
inflating: personalRecordings/yes/9_with_noise_0.wav
inflating: personalRecordings/yes/9_with_noise_1.wav
```

```
[20]: recorded_classes = ['no', 'yes']
      num_recordings = 10
      num_synthetic_recordings = 2
```

```

noise_percentage = 0.01

viewing_label = True

for word in recorded_classes:
    for i in range(num_recordings):
        sound_path = f'personalRecordings/{word}/{i}.wav'

        # trim the audio file to 1 second
        sound = AudioSegment.from_file(sound_path)
        sound = sound[:1000]
        sound.export(sound_path, format="wav")

        # capture the signal and sample rate
        signal, sr = librosa.load(sound_path, sr=8000)

        for j in range(num_synthetic_recordings):
            # add noise to the signal to only a part of the signal
            random_index = random.randint(0, len(signal) - 1)
            noise = np.random.normal(0, noise_percentage, random_index)
            signal_with_noise = signal.copy()
            signal_with_noise[random_index] += noise

            signal_noise = signal_with_noise - signal

            # export the signal with noise
            sound_with_noise_path = f'personalRecordings/{word}/
↳{i}_with_noise_{j}.wav'
            sf.write(sound_with_noise_path, signal_with_noise, sr)

        if viewing_label:
            viewing_label = False
            # use subplots to plot the original signal, signal with noise and
↳noise
            fig, axs = plt.subplots(3, figsize=(8, 12))
            fig.suptitle(f'Original Signal, Signal with Noise, and Noise -
↳{word}')

            # set x-axis and y-axis limits
            axs[0].set_xlim(0, len(signal))
            axs[0].set_ylim(-1, 1)

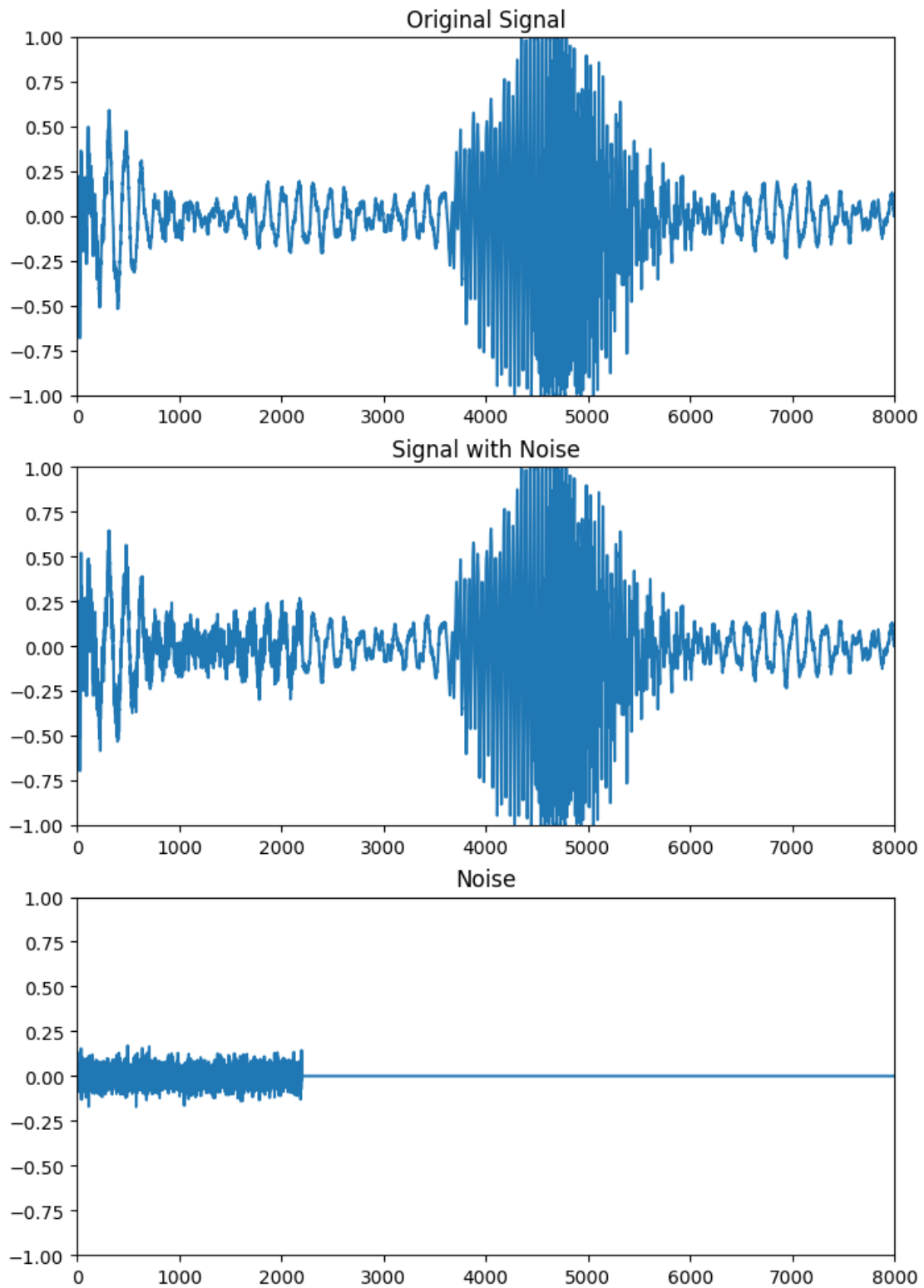
            axs[1].set_xlim(0, len(signal))
            axs[1].set_ylim(-1, 1)

            axs[2].set_xlim(0, len(signal))
            axs[2].set_ylim(-1, 1)

```

```
axs[0].plot(signal)
axs[0].set_title('Original Signal')
axs[1].plot(signal_with_noise)
axs[1].set_title('Signal with Noise')
axs[2].plot(signal_noise)
axs[2].set_title('Noise')
plt.show()
```

Original Signal, Signal with Noise, and Noise - no



As you can see, random indices are chosen to add noise to the recordings. So, for every iteration, the noise added to the recordings is different.

We now convert the recordings to spectrograms and use the advanced model to predict the classes of the recordings. This is done by the helper script provided in MATLAB.

First let's analyze the confusion matrix of the model on the personal recordings.

T5.1 Analysis of Confusion matrix on 'yes' and 'no' classes on Advanced Model: We now use the random search model hyperparameters to baseoff our personal recordings against.

```
[46]: task5_model = t1_model(len([2, 3, 4, 5]), [128, 128, 128, 128],
    ↳ passthrough=True)
task5_model.summary()
```

Model: "sequential_38"

Layer (type)	Output Shape	Param #
conv2d_146 (Conv2D)	(None, 98, 50, 32)	320
batch_normalization_146 (BatchNormalization)	(None, 98, 50, 32)	128
conv2d_147 (Conv2D)	(None, 98, 50, 128)	36992
batch_normalization_147 (BatchNormalization)	(None, 98, 50, 128)	512
max_pooling2d_167 (MaxPooling2D)	(None, 49, 25, 128)	0
conv2d_148 (Conv2D)	(None, 49, 25, 128)	147584
batch_normalization_148 (BatchNormalization)	(None, 49, 25, 128)	512
max_pooling2d_168 (MaxPooling2D)	(None, 25, 13, 128)	0
conv2d_149 (Conv2D)	(None, 25, 13, 128)	147584
batch_normalization_149 (BatchNormalization)	(None, 25, 13, 128)	512
max_pooling2d_169 (MaxPooling2D)	(None, 13, 7, 128)	0

```

ing2D)

conv2d_150 (Conv2D)          (None, 13, 7, 128)          147584

batch_normalization_150 (B   (None, 13, 7, 128)          512
atchNormalization)

max_pooling2d_170 (MaxPool   (None, 7, 4, 128)          0
ing2D)

max_pooling2d_171 (MaxPool   (None, 1, 4, 128)          0
ing2D)

flatten_38 (Flatten)         (None, 512)                  0

dense_76 (Dense)              (None, 1024)                 525312

dropout_38 (Dropout)          (None, 1024)                 0

dense_77 (Dense)              (None, 12)                   12300

```

```

=====
Total params: 1019852 (3.89 MB)
Trainable params: 1018764 (3.89 MB)
Non-trainable params: 1088 (4.25 KB)
-----

```

```

[48]: task5_history = task5_model.fit(x_train, y_train, batch_size=BATCH_SIZE,
    ↪ epochs=30, validation_data=(x_val, y_val))

# summarize history for accuracy
plt.plot(task5_history.history['accuracy'])
plt.plot(task5_history.history['val_accuracy'])
plt.title('T5 - model accuracy')
plt.ylabel('accuracy')
plt.xlabel('epoch')
plt.legend(['train', 'val'], loc='upper left')
plt.show()

# summarize history for loss
plt.plot(task5_history.history['loss'])
plt.plot(task5_history.history['val_loss'])
plt.title('T5 - model loss')
plt.ylabel('loss')
plt.xlabel('epoch')
plt.legend(['train', 'val'], loc='upper left')
plt.show()

```

```

# Print accuracy
score = task5_model.evaluate(x_val, y_val, verbose=0)
print('T5 - validation accuracy:', score[1])

# Print confusion matrix
y_pred = task5_model.predict(x_val)
y_pred = np.argmax(y_pred, axis=1)
y_true = np.argmax(y_val, axis=1)
class_labels = list(val_ds.class_names)
confusion_mtx = confusion_matrix(y_true, y_pred)
plt.figure(figsize=(10, 8))
sns.heatmap(confusion_mtx, xticklabels=class_labels, yticklabels=class_labels,
            annot=True, fmt='d')
plt.xlabel('Prediction')
plt.ylabel('Label')
plt.title('T5 - Confusion Matrix')
plt.show()

```

Epoch 1/30

16/16 [=====] - 2s 136ms/step - loss: 5.5834 -
accuracy: 0.5892 - val_loss: 10.4304 - val_accuracy: 0.1126

Epoch 2/30

16/16 [=====] - 2s 130ms/step - loss: 4.7417 -
accuracy: 0.7014 - val_loss: 8.3976 - val_accuracy: 0.1135

Epoch 3/30

16/16 [=====] - 2s 134ms/step - loss: 4.0281 -
accuracy: 0.7934 - val_loss: 5.3865 - val_accuracy: 0.2049

Epoch 4/30

16/16 [=====] - 2s 131ms/step - loss: 3.4725 -
accuracy: 0.8492 - val_loss: 4.5652 - val_accuracy: 0.3920

Epoch 5/30

16/16 [=====] - 2s 133ms/step - loss: 3.0350 -
accuracy: 0.8927 - val_loss: 4.2441 - val_accuracy: 0.4809

Epoch 6/30

16/16 [=====] - 2s 133ms/step - loss: 2.6832 -
accuracy: 0.9155 - val_loss: 3.6706 - val_accuracy: 0.5893

Epoch 7/30

16/16 [=====] - 2s 133ms/step - loss: 2.3489 -
accuracy: 0.9496 - val_loss: 3.2630 - val_accuracy: 0.6367

Epoch 8/30

16/16 [=====] - 2s 132ms/step - loss: 2.0744 -
accuracy: 0.9614 - val_loss: 2.9644 - val_accuracy: 0.6630

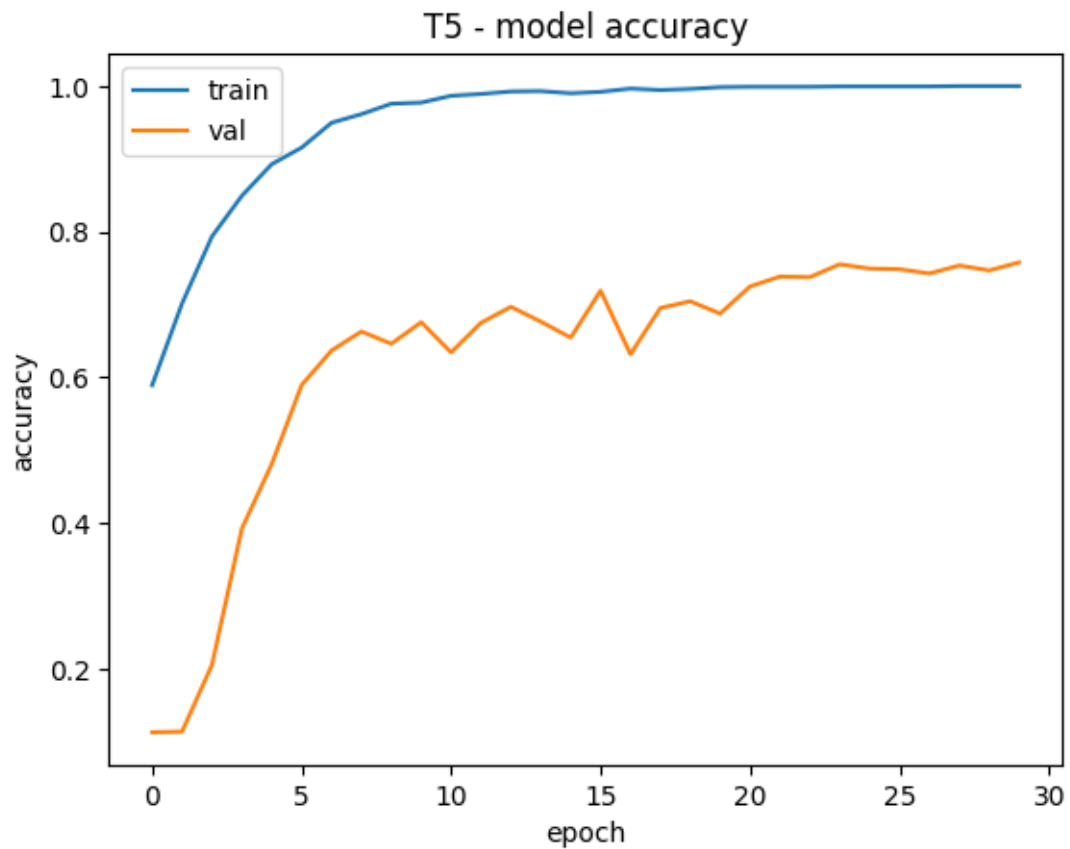
Epoch 9/30

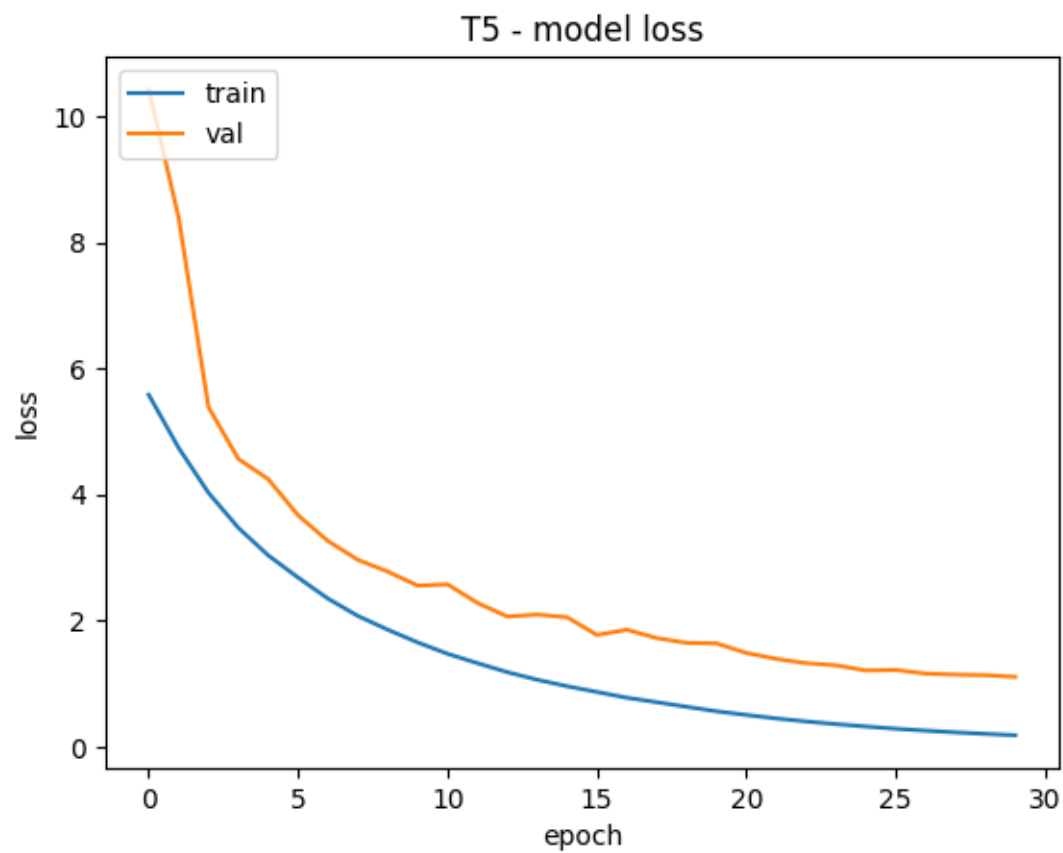
16/16 [=====] - 2s 134ms/step - loss: 1.8564 -
accuracy: 0.9758 - val_loss: 2.7778 - val_accuracy: 0.6461

Epoch 10/30

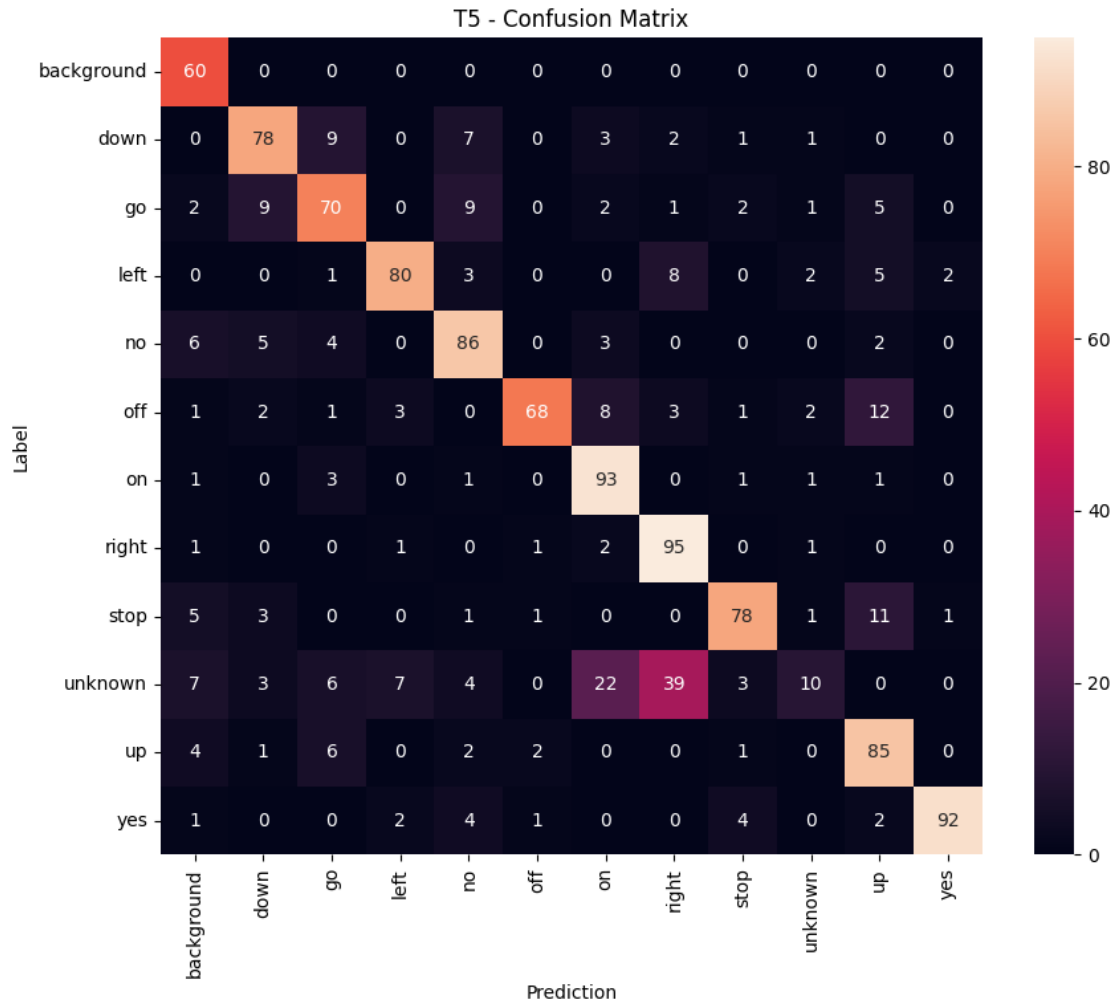
16/16 [=====] - 2s 132ms/step - loss: 1.6546 -
accuracy: 0.9773 - val_loss: 2.5560 - val_accuracy: 0.6757
Epoch 11/30
16/16 [=====] - 2s 134ms/step - loss: 1.4741 -
accuracy: 0.9867 - val_loss: 2.5759 - val_accuracy: 0.6342
Epoch 12/30
16/16 [=====] - 2s 132ms/step - loss: 1.3260 -
accuracy: 0.9891 - val_loss: 2.2815 - val_accuracy: 0.6749
Epoch 13/30
16/16 [=====] - 2s 135ms/step - loss: 1.1829 -
accuracy: 0.9926 - val_loss: 2.0652 - val_accuracy: 0.6969
Epoch 14/30
16/16 [=====] - 2s 134ms/step - loss: 1.0626 -
accuracy: 0.9931 - val_loss: 2.0963 - val_accuracy: 0.6765
Epoch 15/30
16/16 [=====] - 2s 139ms/step - loss: 0.9600 -
accuracy: 0.9901 - val_loss: 2.0541 - val_accuracy: 0.6545
Epoch 16/30
16/16 [=====] - 2s 136ms/step - loss: 0.8689 -
accuracy: 0.9921 - val_loss: 1.7727 - val_accuracy: 0.7189
Epoch 17/30
16/16 [=====] - 2s 134ms/step - loss: 0.7771 -
accuracy: 0.9965 - val_loss: 1.8559 - val_accuracy: 0.6317
Epoch 18/30
16/16 [=====] - 2s 133ms/step - loss: 0.7064 -
accuracy: 0.9946 - val_loss: 1.7239 - val_accuracy: 0.6952
Epoch 19/30
16/16 [=====] - 2s 135ms/step - loss: 0.6335 -
accuracy: 0.9960 - val_loss: 1.6473 - val_accuracy: 0.7045
Epoch 20/30
16/16 [=====] - 2s 136ms/step - loss: 0.5626 -
accuracy: 0.9985 - val_loss: 1.6394 - val_accuracy: 0.6876
Epoch 21/30
16/16 [=====] - 2s 134ms/step - loss: 0.5045 -
accuracy: 0.9990 - val_loss: 1.4870 - val_accuracy: 0.7248
Epoch 22/30
16/16 [=====] - 2s 136ms/step - loss: 0.4489 -
accuracy: 0.9990 - val_loss: 1.3935 - val_accuracy: 0.7384
Epoch 23/30
16/16 [=====] - 2s 133ms/step - loss: 0.4014 -
accuracy: 0.9990 - val_loss: 1.3256 - val_accuracy: 0.7375
Epoch 24/30
16/16 [=====] - 2s 134ms/step - loss: 0.3589 -
accuracy: 0.9995 - val_loss: 1.2920 - val_accuracy: 0.7553
Epoch 25/30
16/16 [=====] - 2s 136ms/step - loss: 0.3210 -
accuracy: 0.9995 - val_loss: 1.2090 - val_accuracy: 0.7494
Epoch 26/30

16/16 [=====] - 2s 139ms/step - loss: 0.2857 -
accuracy: 0.9995 - val_loss: 1.2182 - val_accuracy: 0.7485
Epoch 27/30
16/16 [=====] - 2s 136ms/step - loss: 0.2555 -
accuracy: 0.9995 - val_loss: 1.1598 - val_accuracy: 0.7426
Epoch 28/30
16/16 [=====] - 2s 134ms/step - loss: 0.2281 -
accuracy: 1.0000 - val_loss: 1.1438 - val_accuracy: 0.7536
Epoch 29/30
16/16 [=====] - 2s 134ms/step - loss: 0.2041 -
accuracy: 1.0000 - val_loss: 1.1352 - val_accuracy: 0.7468
Epoch 30/30
16/16 [=====] - 2s 136ms/step - loss: 0.1827 -
accuracy: 1.0000 - val_loss: 1.1089 - val_accuracy: 0.7578





T5 - validation accuracy: 0.7578323483467102
37/37 [=====] - 0s 8ms/step



As, we can observe: * The model is able to predict the 'yes' class with an accuracy of 0.8. * The model is able to predict the 'no' class with an accuracy of 0.6.

T5.2 Training the Advanced Model on the Personal Recordings: We now move the spectrograms to the training and validation directories and train the advanced model on the personal recordings.

```
[49]: recrd_train_imgs = 12
      recrd_val_imgs = 6

      no_src_path = 'spectrogramImages/no'
      yes_src_path = 'spectrogramImages/yes'

      for i in range(1, recrd_train_imgs):
          shutil.copy(no_src_path + f'/{i}.png', f'speechImageData/TrainData/no/
          ↳image_train_{1661 + i}.png')
```

```

        shutil.copy(yes_src_path + f'/{i + 12}.png', f'speechImageData/TrainData/
↪yes/image_train_{1672 + i}.png')

for i in range(1, recrd_val_imgs):
    shutil.copy(no_src_path + f'/{i + 12}.png', f'speechImageData/ValData/no/
↪image_val_{1111 + i}.png')
    shutil.copy(yes_src_path + f'/{i + 24}.png', f'speechImageData/ValData/yes/
↪image_val_{1116 + i}.png')

```

We create new instance of x_train, y_train, x_val, y_val and train the advanced model on the personal recordings.

```

[50]: # Load the data

train_ds = tf.keras.utils.image_dataset_from_directory(
    directory='speechImageData/TrainData',
    labels='inferred',
    color_mode="grayscale",
    label_mode='categorical',
    batch_size=BATCH_SIZE,
    image_size=IMG_SIZE
)

val_ds = tf.keras.utils.image_dataset_from_directory(
    directory='speechImageData/ValData',
    labels='inferred',
    color_mode="grayscale",
    label_mode='categorical',
    batch_size=BATCH_SIZE,
    image_size=IMG_SIZE
)

# Extract the training input images and output class labels
x_train = []
y_train = []
for images, labels in train_ds.take(-1):
    x_train.append(images.numpy())
    y_train.append(labels.numpy())

x_train_recrd = np.concatenate(x_train, axis=0)
y_train_recrd = np.concatenate(y_train, axis=0)

print(y_train_recrd)

# Extract the validation input images and output class labels
x_val = []
y_val = []

```

```

for images, labels in val_ds.take(-1):
    x_val.append(images.numpy())
    y_val.append(labels.numpy())

x_val_recrd = np.concatenate(x_val, axis=0)
y_val_recrd = np.concatenate(y_val, axis=0)

print(y_val_recrd)

```

Found 2023 files belonging to 12 classes.

Found 1181 files belonging to 12 classes.

```

[[0. 0. 0. ... 1. 0. 0.]
 [1. 0. 0. ... 0. 0. 0.]
 [0. 0. 0. ... 0. 0. 1.]
 ...
 [0. 0. 0. ... 1. 0. 0.]
 [1. 0. 0. ... 0. 0. 0.]
 [1. 0. 0. ... 0. 0. 0.]]
[[0. 0. 0. ... 0. 0. 0.]
 [1. 0. 0. ... 0. 0. 0.]
 [0. 0. 0. ... 0. 0. 0.]
 ...
 [0. 0. 0. ... 0. 0. 0.]
 [0. 1. 0. ... 0. 0. 0.]
 [0. 0. 0. ... 0. 0. 0.]]

```

We now plot the training history and confusion matrix of the advanced model on the personal recordings.

```

[51]: task5_history = task5_model.fit(x_train_recrd, y_train_recrd,
    ↪ batch_size=BATCH_SIZE, epochs=30, validation_data=(x_val_recrd, y_val_recrd))

# summarize history for accuracy
plt.plot(task5_history.history['accuracy'])
plt.plot(task5_history.history['val_accuracy'])
plt.title('T5 - model accuracy')
plt.ylabel('accuracy')
plt.xlabel('epoch')
plt.legend(['train', 'val'], loc='upper left')
plt.show()

# summarize history for loss
plt.plot(task5_history.history['loss'])
plt.plot(task5_history.history['val_loss'])
plt.title('T5 - model loss')
plt.ylabel('loss')
plt.xlabel('epoch')
plt.legend(['train', 'val'], loc='upper left')

```

```

plt.show()

# Print accuracy
score = task5_model.evaluate(x_val_recrd, y_val_recrd, verbose=0)
print('T5 - validation accuracy:', score[1])

# Print confusion matrix
y_pred = task5_model.predict(x_val_recrd)
y_pred = np.argmax(y_pred, axis=1)
y_true = np.argmax(y_val_recrd, axis=1)
class_labels = list(val_ds.class_names)
confusion_mtx = confusion_matrix(y_true, y_pred)
plt.figure(figsize=(10, 8))
sns.heatmap(confusion_mtx, xticklabels=class_labels, yticklabels=class_labels,
            annot=True, fmt='d')
plt.xlabel('Prediction')
plt.ylabel('Label')
plt.title('T1 - Confusion Matrix')
plt.show()

```

```

Epoch 1/30
16/16 [=====] - 2s 140ms/step - loss: 0.1636 -
accuracy: 1.0000 - val_loss: 1.1288 - val_accuracy: 0.7502
Epoch 2/30
16/16 [=====] - 2s 135ms/step - loss: 0.1466 -
accuracy: 1.0000 - val_loss: 1.0800 - val_accuracy: 0.7511
Epoch 3/30
16/16 [=====] - 2s 134ms/step - loss: 0.1313 -
accuracy: 1.0000 - val_loss: 1.0681 - val_accuracy: 0.7621
Epoch 4/30
16/16 [=====] - 2s 134ms/step - loss: 0.1177 -
accuracy: 1.0000 - val_loss: 1.0858 - val_accuracy: 0.7511
Epoch 5/30
16/16 [=====] - 2s 131ms/step - loss: 0.1064 -
accuracy: 1.0000 - val_loss: 1.0604 - val_accuracy: 0.7426
Epoch 6/30
16/16 [=====] - 2s 134ms/step - loss: 0.0960 -
accuracy: 1.0000 - val_loss: 1.0253 - val_accuracy: 0.7451
Epoch 7/30
16/16 [=====] - 2s 132ms/step - loss: 0.0859 -
accuracy: 1.0000 - val_loss: 1.0414 - val_accuracy: 0.7519
Epoch 8/30
16/16 [=====] - 2s 134ms/step - loss: 0.0769 -
accuracy: 1.0000 - val_loss: 1.0206 - val_accuracy: 0.7544
Epoch 9/30
16/16 [=====] - 2s 136ms/step - loss: 0.0690 -
accuracy: 1.0000 - val_loss: 1.0563 - val_accuracy: 0.7443

```

Epoch 10/30
16/16 [=====] - 2s 133ms/step - loss: 0.0619 -
accuracy: 1.0000 - val_loss: 1.0029 - val_accuracy: 0.7553
Epoch 11/30
16/16 [=====] - 2s 133ms/step - loss: 0.0558 -
accuracy: 1.0000 - val_loss: 0.9511 - val_accuracy: 0.7544
Epoch 12/30
16/16 [=====] - 2s 135ms/step - loss: 0.0504 -
accuracy: 1.0000 - val_loss: 1.0081 - val_accuracy: 0.7519
Epoch 13/30
16/16 [=====] - 2s 133ms/step - loss: 0.0454 -
accuracy: 1.0000 - val_loss: 1.0225 - val_accuracy: 0.7468
Epoch 14/30
16/16 [=====] - 2s 136ms/step - loss: 0.0411 -
accuracy: 1.0000 - val_loss: 1.0156 - val_accuracy: 0.7417
Epoch 15/30
16/16 [=====] - 2s 137ms/step - loss: 0.0373 -
accuracy: 1.0000 - val_loss: 0.9640 - val_accuracy: 0.7477
Epoch 16/30
16/16 [=====] - 2s 136ms/step - loss: 0.0338 -
accuracy: 1.0000 - val_loss: 0.9882 - val_accuracy: 0.7426
Epoch 17/30
16/16 [=====] - 2s 134ms/step - loss: 0.0310 -
accuracy: 1.0000 - val_loss: 0.9784 - val_accuracy: 0.7494
Epoch 18/30
16/16 [=====] - 2s 133ms/step - loss: 0.0287 -
accuracy: 1.0000 - val_loss: 0.9575 - val_accuracy: 0.7587
Epoch 19/30
16/16 [=====] - 2s 136ms/step - loss: 0.0261 -
accuracy: 1.0000 - val_loss: 0.9750 - val_accuracy: 0.7434
Epoch 20/30
16/16 [=====] - 2s 138ms/step - loss: 0.0238 -
accuracy: 1.0000 - val_loss: 0.9649 - val_accuracy: 0.7460
Epoch 21/30
16/16 [=====] - 2s 137ms/step - loss: 0.0216 -
accuracy: 1.0000 - val_loss: 0.9750 - val_accuracy: 0.7477
Epoch 22/30
16/16 [=====] - 2s 137ms/step - loss: 0.0198 -
accuracy: 1.0000 - val_loss: 0.9816 - val_accuracy: 0.7460
Epoch 23/30
16/16 [=====] - 2s 135ms/step - loss: 0.0181 -
accuracy: 1.0000 - val_loss: 1.0001 - val_accuracy: 0.7409
Epoch 24/30
16/16 [=====] - 2s 135ms/step - loss: 0.0167 -
accuracy: 1.0000 - val_loss: 0.9689 - val_accuracy: 0.7417
Epoch 25/30
16/16 [=====] - 2s 138ms/step - loss: 0.0154 -
accuracy: 1.0000 - val_loss: 0.9849 - val_accuracy: 0.7434

Epoch 26/30

16/16 [=====] - 2s 136ms/step - loss: 0.0144 - accuracy: 1.0000 - val_loss: 0.9912 - val_accuracy: 0.7434

Epoch 27/30

16/16 [=====] - 2s 135ms/step - loss: 0.0134 - accuracy: 1.0000 - val_loss: 0.9981 - val_accuracy: 0.7409

Epoch 28/30

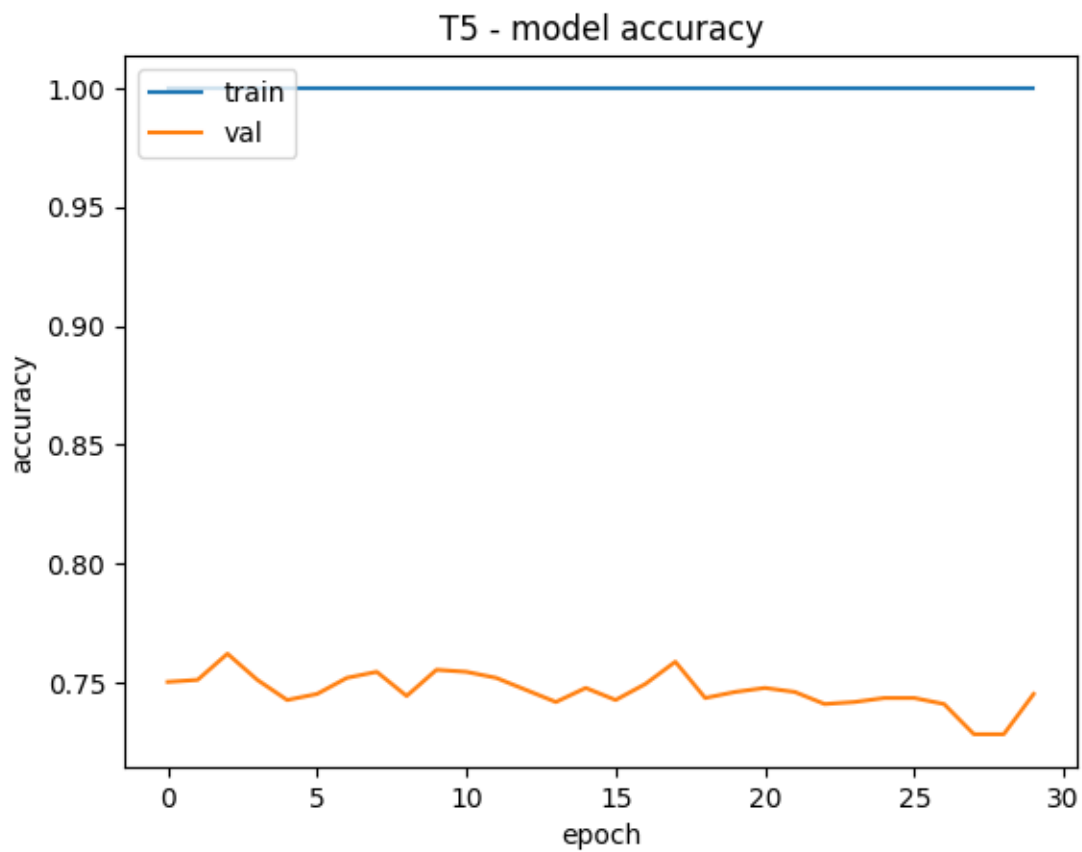
16/16 [=====] - 2s 137ms/step - loss: 0.0124 - accuracy: 1.0000 - val_loss: 1.0189 - val_accuracy: 0.7282

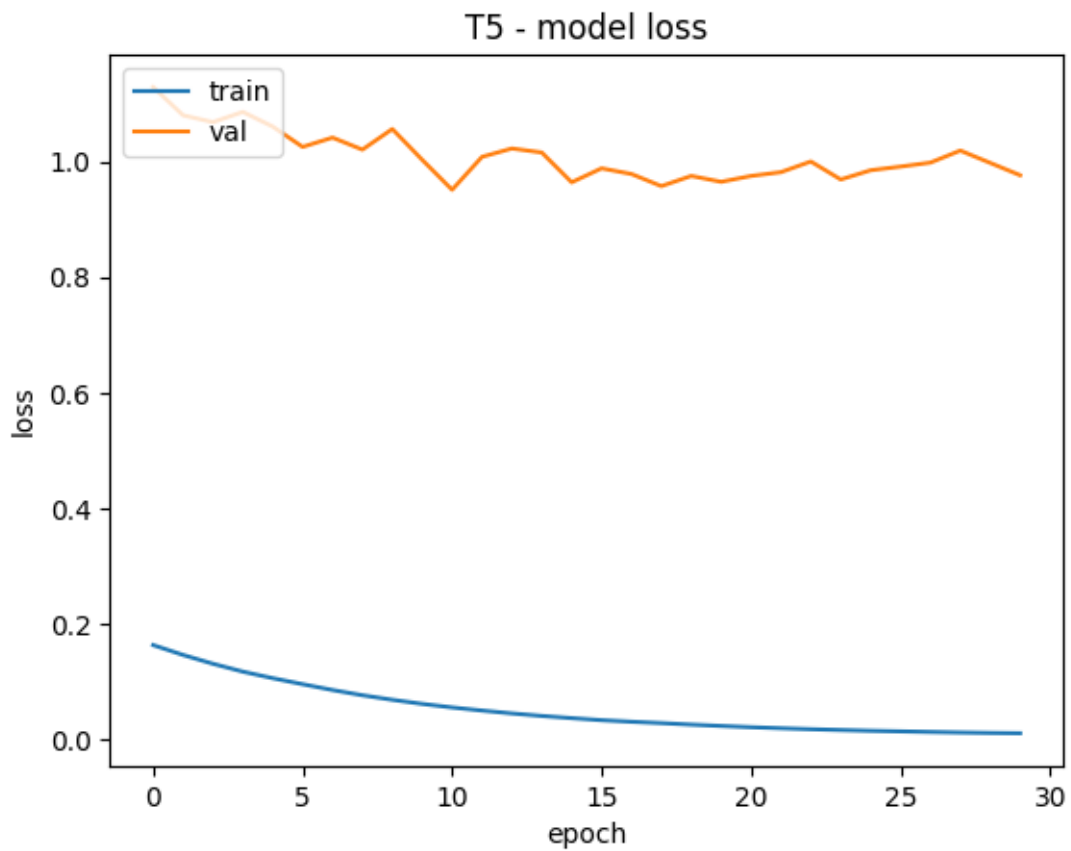
Epoch 29/30

16/16 [=====] - 2s 138ms/step - loss: 0.0117 - accuracy: 1.0000 - val_loss: 0.9976 - val_accuracy: 0.7282

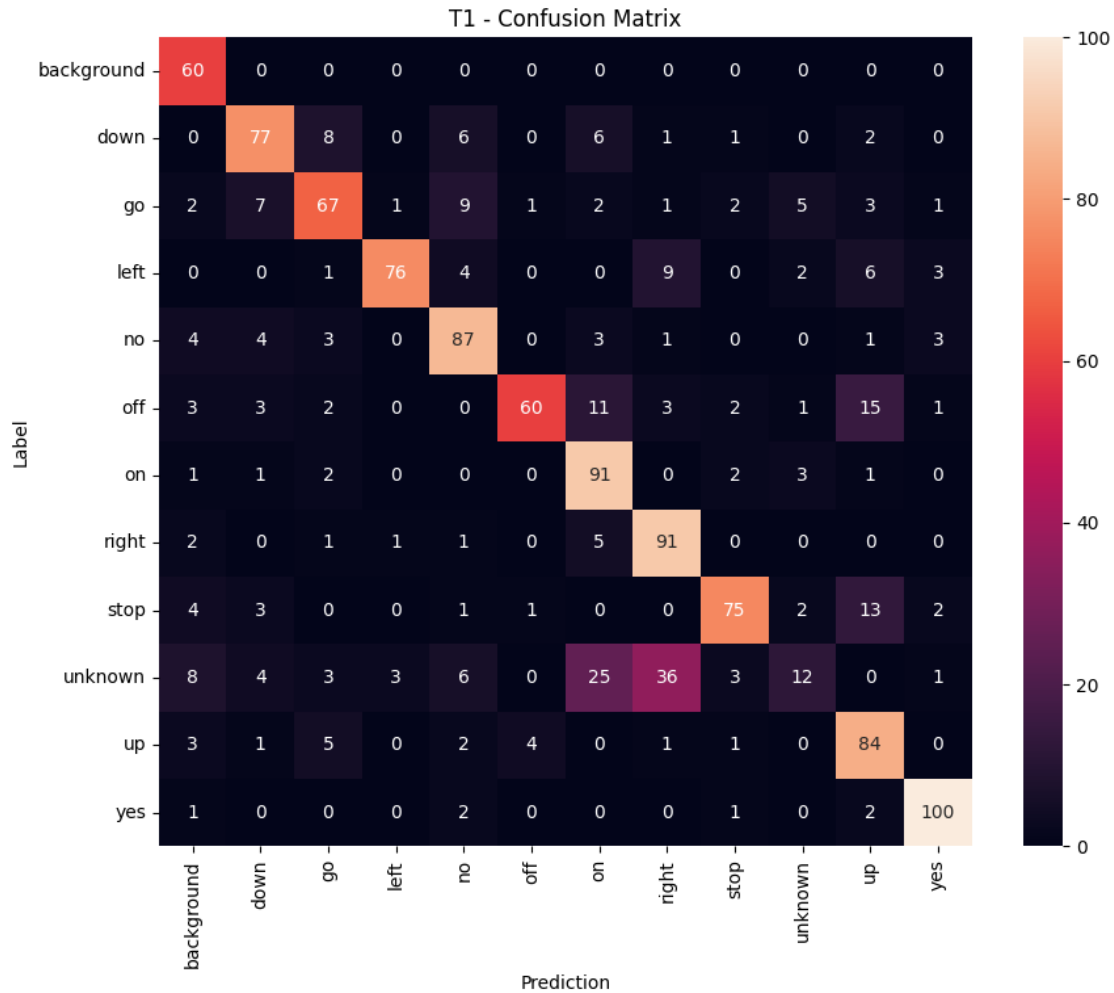
Epoch 30/30

16/16 [=====] - 2s 137ms/step - loss: 0.0112 - accuracy: 1.0000 - val_loss: 0.9763 - val_accuracy: 0.7451





T5 - validation accuracy: 0.745131254196167
37/37 [=====] - 0s 8ms/step



As observed, there is an increased match in both the classes, ‘yes’ and ‘no’ with the model’s predictions. There is no dramatic drop of accuracy in these classes, and hence the data augmentation has helped in improving the model’s performance.

T5.3 Transfer Learning using the Advanced Model We now use the popular model mobilenetv2 to perform transfer learning on the advanced model. Since the model requires the image size to be either 96x96, 128x128, 224x224, we resize the images to 96x96, since our original image size is 98x50.

We also reimport our training and validation data as three channeled rgb images instead of grayscale.

```
[55]: # Load the data

train_ds = tf.keras.utils.image_dataset_from_directory(
    directory='speechImageData/TrainData',
    labels='inferred',
```

```

        color_mode="rgb",
        label_mode='categorical',
        batch_size=BATCH_SIZE,
        image_size=IMG_SIZE
    )

val_ds = tf.keras.utils.image_dataset_from_directory(
    directory='speechImageData/ValData',
    labels='inferred',
    color_mode="rgb",
    label_mode='categorical',
    batch_size=BATCH_SIZE,
    image_size=IMG_SIZE
)

# Extract the training input images and output class labels
x_train = []
y_train = []
for images, labels in train_ds.take(-1):
    x_train.append(images.numpy())
    y_train.append(labels.numpy())

x_train_recrd = np.concatenate(x_train, axis=0)
y_train_recrd = np.concatenate(y_train, axis=0)

print(y_train_recrd)

# Extract the validation input images and output class labels
x_val = []
y_val = []
for images, labels in val_ds.take(-1):
    x_val.append(images.numpy())
    y_val.append(labels.numpy())

x_val_recrd = np.concatenate(x_val, axis=0)
y_val_recrd = np.concatenate(y_val, axis=0)

print(y_val_recrd)

```

Found 2023 files belonging to 12 classes.

Found 1181 files belonging to 12 classes.

```

[[0. 0. 0. ... 0. 1. 0.]
 [0. 0. 1. ... 0. 0. 0.]
 [0. 0. 0. ... 1. 0. 0.]
 ...
 [0. 0. 0. ... 0. 0. 1.]
 [1. 0. 0. ... 0. 0. 0.]

```

```

[1. 0. 0. ... 0. 0. 0.]]
[[0. 0. 0. ... 0. 0. 0.]
[0. 0. 0. ... 1. 0. 0.]
[0. 0. 0. ... 0. 0. 1.]
...
[0. 0. 0. ... 0. 1. 0.]
[0. 0. 0. ... 0. 0. 0.]
[0. 0. 0. ... 0. 0. 0.]]

```

```

[56]: # mobilenet image size
MOBILENET_IMG_SIZE = (96, 96)

# resize the images
x_train_recrd = tf.image.resize(x_train_recrd, (MOBILENET_IMG_SIZE[0],
↪MOBILENET_IMG_SIZE[1]))
x_val_recrd = tf.image.resize(x_val_recrd, (MOBILENET_IMG_SIZE[0],
↪MOBILENET_IMG_SIZE[1]))

base_model = MobileNetV2(input_shape=(MOBILENET_IMG_SIZE[0],
↪MOBILENET_IMG_SIZE[1], 3), include_top=False, weights='imagenet')

x_train_recrd = preprocess_input(x_train_recrd)
x_val_recrd = preprocess_input(x_val_recrd)

# extract features
train_features = base_model.predict(x_train_recrd)
val_features = base_model.predict(x_val_recrd)

```

```

64/64 [=====] - 2s 12ms/step
37/37 [=====] - 0s 11ms/step

```

We now define the base model for training. We just append the fully connected layer to the base model and output layer to the model.

```

[62]: mobilenet_model = Sequential()
mobilenet_model.add(Flatten(input_shape=train_features.shape[1:]))
mobilenet_model.add(Dense(1024, kernel_regularizer=regularizers.l2(0.1),
↪activation='relu'))
mobilenet_model.add(Dropout(0.2))
mobilenet_model.add(Dense(NUM_CLASSES, activation='softmax'))
mobilenet_model.compile(optimizer=optimizers.Adam(learning_rate=0.0001),
↪loss='categorical_crossentropy', metrics=['accuracy'])
mobilenet_model.summary()

```

Model: "sequential_40"

Layer (type)	Output Shape	Param #
=====		

flatten_40 (Flatten)	(None, 11520)	0
dense_80 (Dense)	(None, 1024)	11797504
dropout_40 (Dropout)	(None, 1024)	0
dense_81 (Dense)	(None, 12)	12300

```

=====
Total params: 11809804 (45.05 MB)
Trainable params: 11809804 (45.05 MB)
Non-trainable params: 0 (0.00 Byte)
-----

```

T5.A - Model Training Now, we proceed to train the model with the training and validation features extracted by the base model.

```
[63]: mobilenet_model.history = mobilenet_model.fit(train_features, y_train_recrd,
    ↪batch_size=BATCH_SIZE, epochs=100, validation_data=(val_features,
    ↪y_val_recrd))
```

```

Epoch 1/100
16/16 [=====] - 1s 33ms/step - loss: 176.4016 -
accuracy: 0.3381 - val_loss: 160.5809 - val_accuracy: 0.3404
Epoch 2/100
16/16 [=====] - 0s 15ms/step - loss: 147.2709 -
accuracy: 0.5971 - val_loss: 134.0095 - val_accuracy: 0.3903
Epoch 3/100
16/16 [=====] - 0s 15ms/step - loss: 122.2296 -
accuracy: 0.6945 - val_loss: 111.3102 - val_accuracy: 0.4039
Epoch 4/100
16/16 [=====] - 0s 14ms/step - loss: 100.9884 -
accuracy: 0.7904 - val_loss: 92.1280 - val_accuracy: 0.4479
Epoch 5/100
16/16 [=====] - 0s 15ms/step - loss: 83.2079 -
accuracy: 0.8492 - val_loss: 76.0616 - val_accuracy: 0.4335
Epoch 6/100
16/16 [=====] - 0s 13ms/step - loss: 68.3979 -
accuracy: 0.8962 - val_loss: 62.7798 - val_accuracy: 0.4403
Epoch 7/100
16/16 [=====] - 0s 15ms/step - loss: 56.1458 -
accuracy: 0.9288 - val_loss: 51.8201 - val_accuracy: 0.4505
Epoch 8/100
16/16 [=====] - 0s 14ms/step - loss: 46.0271 -
accuracy: 0.9545 - val_loss: 42.7247 - val_accuracy: 0.4640
Epoch 9/100
16/16 [=====] - 0s 13ms/step - loss: 37.7221 -
accuracy: 0.9619 - val_loss: 35.2867 - val_accuracy: 0.4555

```

Epoch 10/100
16/16 [=====] - 0s 14ms/step - loss: 30.8999 - accuracy: 0.9758 - val_loss: 29.2539 - val_accuracy: 0.4589

Epoch 11/100
16/16 [=====] - 0s 13ms/step - loss: 25.3526 - accuracy: 0.9698 - val_loss: 24.2336 - val_accuracy: 0.4835

Epoch 12/100
16/16 [=====] - 0s 14ms/step - loss: 20.8133 - accuracy: 0.9778 - val_loss: 20.1942 - val_accuracy: 0.4666

Epoch 13/100
16/16 [=====] - 0s 13ms/step - loss: 17.1327 - accuracy: 0.9748 - val_loss: 16.9831 - val_accuracy: 0.4488

Epoch 14/100
16/16 [=====] - 0s 14ms/step - loss: 14.1435 - accuracy: 0.9797 - val_loss: 14.2950 - val_accuracy: 0.4742

Epoch 15/100
16/16 [=====] - 0s 13ms/step - loss: 11.7245 - accuracy: 0.9842 - val_loss: 12.1549 - val_accuracy: 0.4818

Epoch 16/100
16/16 [=====] - 0s 13ms/step - loss: 9.7620 - accuracy: 0.9832 - val_loss: 10.4383 - val_accuracy: 0.4564

Epoch 17/100
16/16 [=====] - 0s 14ms/step - loss: 8.1859 - accuracy: 0.9847 - val_loss: 9.0073 - val_accuracy: 0.4733

Epoch 18/100
16/16 [=====] - 0s 13ms/step - loss: 6.8754 - accuracy: 0.9871 - val_loss: 7.8104 - val_accuracy: 0.4801

Epoch 19/100
16/16 [=====] - 0s 13ms/step - loss: 5.8249 - accuracy: 0.9827 - val_loss: 6.8671 - val_accuracy: 0.4970

Epoch 20/100
16/16 [=====] - 0s 13ms/step - loss: 4.9839 - accuracy: 0.9797 - val_loss: 6.1881 - val_accuracy: 0.4970

Epoch 21/100
16/16 [=====] - 0s 14ms/step - loss: 4.2837 - accuracy: 0.9842 - val_loss: 5.6243 - val_accuracy: 0.4843

Epoch 22/100
16/16 [=====] - 0s 14ms/step - loss: 3.7086 - accuracy: 0.9807 - val_loss: 5.0497 - val_accuracy: 0.5224

Epoch 23/100
16/16 [=====] - 0s 13ms/step - loss: 3.2243 - accuracy: 0.9876 - val_loss: 4.6097 - val_accuracy: 0.4953

Epoch 24/100
16/16 [=====] - 0s 13ms/step - loss: 2.8151 - accuracy: 0.9891 - val_loss: 4.2320 - val_accuracy: 0.4843

Epoch 25/100
16/16 [=====] - 0s 15ms/step - loss: 2.5015 - accuracy: 0.9862 - val_loss: 3.9228 - val_accuracy: 0.4903

Epoch 26/100
16/16 [=====] - 0s 14ms/step - loss: 2.2095 - accuracy:
0.9921 - val_loss: 3.7327 - val_accuracy: 0.5038
Epoch 27/100
16/16 [=====] - 0s 14ms/step - loss: 1.9744 - accuracy:
0.9871 - val_loss: 3.6404 - val_accuracy: 0.4581
Epoch 28/100
16/16 [=====] - 0s 16ms/step - loss: 1.7973 - accuracy:
0.9748 - val_loss: 3.2967 - val_accuracy: 0.4936
Epoch 29/100
16/16 [=====] - 0s 16ms/step - loss: 1.6434 - accuracy:
0.9713 - val_loss: 3.1933 - val_accuracy: 0.4784
Epoch 30/100
16/16 [=====] - 0s 17ms/step - loss: 1.5158 - accuracy:
0.9728 - val_loss: 3.0982 - val_accuracy: 0.4894
Epoch 31/100
16/16 [=====] - 0s 18ms/step - loss: 1.3894 - accuracy:
0.9758 - val_loss: 3.1291 - val_accuracy: 0.4530
Epoch 32/100
16/16 [=====] - 0s 16ms/step - loss: 1.2606 - accuracy:
0.9812 - val_loss: 2.9828 - val_accuracy: 0.4632
Epoch 33/100
16/16 [=====] - 0s 24ms/step - loss: 1.1535 - accuracy:
0.9857 - val_loss: 2.8020 - val_accuracy: 0.4852
Epoch 34/100
16/16 [=====] - 0s 18ms/step - loss: 1.0554 - accuracy:
0.9916 - val_loss: 2.6798 - val_accuracy: 0.5004
Epoch 35/100
16/16 [=====] - 0s 17ms/step - loss: 0.9742 - accuracy:
0.9886 - val_loss: 2.7112 - val_accuracy: 0.4860
Epoch 36/100
16/16 [=====] - 0s 14ms/step - loss: 0.9195 - accuracy:
0.9867 - val_loss: 2.6424 - val_accuracy: 0.4699
Epoch 37/100
16/16 [=====] - 0s 14ms/step - loss: 0.8703 - accuracy:
0.9857 - val_loss: 2.5473 - val_accuracy: 0.5021
Epoch 38/100
16/16 [=====] - 0s 14ms/step - loss: 0.8369 - accuracy:
0.9842 - val_loss: 2.5702 - val_accuracy: 0.4632
Epoch 39/100
16/16 [=====] - 0s 15ms/step - loss: 0.8044 - accuracy:
0.9743 - val_loss: 2.5593 - val_accuracy: 0.4843
Epoch 40/100
16/16 [=====] - 0s 14ms/step - loss: 0.7630 - accuracy:
0.9812 - val_loss: 2.5418 - val_accuracy: 0.4488
Epoch 41/100
16/16 [=====] - 0s 13ms/step - loss: 0.7808 - accuracy:
0.9639 - val_loss: 2.6410 - val_accuracy: 0.4767

Epoch 42/100
16/16 [=====] - 0s 13ms/step - loss: 0.7993 - accuracy: 0.9481 - val_loss: 2.7536 - val_accuracy: 0.4615
Epoch 43/100
16/16 [=====] - 0s 13ms/step - loss: 0.7760 - accuracy: 0.9565 - val_loss: 2.7792 - val_accuracy: 0.4742
Epoch 44/100
16/16 [=====] - 0s 14ms/step - loss: 0.7214 - accuracy: 0.9664 - val_loss: 2.5656 - val_accuracy: 0.4809
Epoch 45/100
16/16 [=====] - 0s 14ms/step - loss: 0.6748 - accuracy: 0.9763 - val_loss: 2.4344 - val_accuracy: 0.4860
Epoch 46/100
16/16 [=====] - 0s 13ms/step - loss: 0.6151 - accuracy: 0.9857 - val_loss: 2.4452 - val_accuracy: 0.4860
Epoch 47/100
16/16 [=====] - 0s 13ms/step - loss: 0.5920 - accuracy: 0.9827 - val_loss: 2.4310 - val_accuracy: 0.4860
Epoch 48/100
16/16 [=====] - 0s 14ms/step - loss: 0.5895 - accuracy: 0.9797 - val_loss: 2.3777 - val_accuracy: 0.4632
Epoch 49/100
16/16 [=====] - 0s 13ms/step - loss: 0.5943 - accuracy: 0.9669 - val_loss: 2.4848 - val_accuracy: 0.4716
Epoch 50/100
16/16 [=====] - 0s 14ms/step - loss: 0.6172 - accuracy: 0.9600 - val_loss: 2.4090 - val_accuracy: 0.4835
Epoch 51/100
16/16 [=====] - 0s 13ms/step - loss: 0.5877 - accuracy: 0.9689 - val_loss: 2.6146 - val_accuracy: 0.4750
Epoch 52/100
16/16 [=====] - 0s 15ms/step - loss: 0.5909 - accuracy: 0.9679 - val_loss: 2.3782 - val_accuracy: 0.4852
Epoch 53/100
16/16 [=====] - 0s 13ms/step - loss: 0.5746 - accuracy: 0.9718 - val_loss: 2.4317 - val_accuracy: 0.4623
Epoch 54/100
16/16 [=====] - 0s 14ms/step - loss: 0.5561 - accuracy: 0.9713 - val_loss: 2.4058 - val_accuracy: 0.4818
Epoch 55/100
16/16 [=====] - 0s 13ms/step - loss: 0.5338 - accuracy: 0.9708 - val_loss: 2.3547 - val_accuracy: 0.4776
Epoch 56/100
16/16 [=====] - 0s 13ms/step - loss: 0.5390 - accuracy: 0.9689 - val_loss: 2.3681 - val_accuracy: 0.4640
Epoch 57/100
16/16 [=====] - 0s 13ms/step - loss: 0.5425 - accuracy: 0.9664 - val_loss: 2.3271 - val_accuracy: 0.4843

Epoch 58/100
16/16 [=====] - 0s 14ms/step - loss: 0.5344 - accuracy: 0.9664 - val_loss: 2.3809 - val_accuracy: 0.4767
Epoch 59/100
16/16 [=====] - 0s 14ms/step - loss: 0.5187 - accuracy: 0.9733 - val_loss: 2.5178 - val_accuracy: 0.4843
Epoch 60/100
16/16 [=====] - 0s 13ms/step - loss: 0.5273 - accuracy: 0.9664 - val_loss: 2.4543 - val_accuracy: 0.4649
Epoch 61/100
16/16 [=====] - 0s 13ms/step - loss: 0.5268 - accuracy: 0.9674 - val_loss: 2.3922 - val_accuracy: 0.4809
Epoch 62/100
16/16 [=====] - 0s 14ms/step - loss: 0.5156 - accuracy: 0.9708 - val_loss: 2.4112 - val_accuracy: 0.4835
Epoch 63/100
16/16 [=====] - 0s 14ms/step - loss: 0.5285 - accuracy: 0.9654 - val_loss: 2.4383 - val_accuracy: 0.4496
Epoch 64/100
16/16 [=====] - 0s 13ms/step - loss: 0.5370 - accuracy: 0.9585 - val_loss: 2.4447 - val_accuracy: 0.4996
Epoch 65/100
16/16 [=====] - 0s 13ms/step - loss: 0.5416 - accuracy: 0.9609 - val_loss: 2.5964 - val_accuracy: 0.4649
Epoch 66/100
16/16 [=====] - 0s 15ms/step - loss: 0.5701 - accuracy: 0.9511 - val_loss: 2.5188 - val_accuracy: 0.4674
Epoch 67/100
16/16 [=====] - 0s 13ms/step - loss: 0.5355 - accuracy: 0.9654 - val_loss: 2.3874 - val_accuracy: 0.5055
Epoch 68/100
16/16 [=====] - 0s 13ms/step - loss: 0.4868 - accuracy: 0.9862 - val_loss: 2.4060 - val_accuracy: 0.4615
Epoch 69/100
16/16 [=====] - 0s 14ms/step - loss: 0.4839 - accuracy: 0.9733 - val_loss: 2.4249 - val_accuracy: 0.4632
Epoch 70/100
16/16 [=====] - 0s 14ms/step - loss: 0.5025 - accuracy: 0.9605 - val_loss: 2.3747 - val_accuracy: 0.4682
Epoch 71/100
16/16 [=====] - 0s 13ms/step - loss: 0.5146 - accuracy: 0.9649 - val_loss: 2.4551 - val_accuracy: 0.4801
Epoch 72/100
16/16 [=====] - 0s 14ms/step - loss: 0.5095 - accuracy: 0.9694 - val_loss: 2.3764 - val_accuracy: 0.4860
Epoch 73/100
16/16 [=====] - 0s 14ms/step - loss: 0.4658 - accuracy: 0.9787 - val_loss: 2.2814 - val_accuracy: 0.5080

Epoch 74/100
16/16 [=====] - 0s 13ms/step - loss: 0.4535 - accuracy: 0.9787 - val_loss: 2.2893 - val_accuracy: 0.4869

Epoch 75/100
16/16 [=====] - 0s 13ms/step - loss: 0.4942 - accuracy: 0.9609 - val_loss: 2.3356 - val_accuracy: 0.4877

Epoch 76/100
16/16 [=====] - 0s 14ms/step - loss: 0.5002 - accuracy: 0.9639 - val_loss: 2.2954 - val_accuracy: 0.4776

Epoch 77/100
16/16 [=====] - 0s 13ms/step - loss: 0.5091 - accuracy: 0.9525 - val_loss: 2.4062 - val_accuracy: 0.4691

Epoch 78/100
16/16 [=====] - 0s 14ms/step - loss: 0.5115 - accuracy: 0.9605 - val_loss: 2.3608 - val_accuracy: 0.4877

Epoch 79/100
16/16 [=====] - 0s 13ms/step - loss: 0.4858 - accuracy: 0.9664 - val_loss: 2.2733 - val_accuracy: 0.4801

Epoch 80/100
16/16 [=====] - 0s 16ms/step - loss: 0.4769 - accuracy: 0.9753 - val_loss: 2.3907 - val_accuracy: 0.4649

Epoch 81/100
16/16 [=====] - 0s 17ms/step - loss: 0.4811 - accuracy: 0.9713 - val_loss: 2.4049 - val_accuracy: 0.4733

Epoch 82/100
16/16 [=====] - 0s 16ms/step - loss: 0.4673 - accuracy: 0.9718 - val_loss: 2.3584 - val_accuracy: 0.4649

Epoch 83/100
16/16 [=====] - 0s 17ms/step - loss: 0.4798 - accuracy: 0.9664 - val_loss: 2.4860 - val_accuracy: 0.4809

Epoch 84/100
16/16 [=====] - 0s 17ms/step - loss: 0.4653 - accuracy: 0.9773 - val_loss: 2.3721 - val_accuracy: 0.4564

Epoch 85/100
16/16 [=====] - 0s 17ms/step - loss: 0.4561 - accuracy: 0.9783 - val_loss: 2.3558 - val_accuracy: 0.4530

Epoch 86/100
16/16 [=====] - 0s 17ms/step - loss: 0.5222 - accuracy: 0.9456 - val_loss: 2.5672 - val_accuracy: 0.4623

Epoch 87/100
16/16 [=====] - 0s 18ms/step - loss: 0.5253 - accuracy: 0.9471 - val_loss: 2.4081 - val_accuracy: 0.4776

Epoch 88/100
16/16 [=====] - 0s 16ms/step - loss: 0.5174 - accuracy: 0.9614 - val_loss: 2.3689 - val_accuracy: 0.4674

Epoch 89/100
16/16 [=====] - 0s 13ms/step - loss: 0.4801 - accuracy: 0.9718 - val_loss: 2.4201 - val_accuracy: 0.5021

```

Epoch 90/100
16/16 [=====] - 0s 14ms/step - loss: 0.4615 - accuracy:
0.9773 - val_loss: 2.3257 - val_accuracy: 0.4598
Epoch 91/100
16/16 [=====] - 0s 13ms/step - loss: 0.4473 - accuracy:
0.9773 - val_loss: 2.3323 - val_accuracy: 0.4716
Epoch 92/100
16/16 [=====] - 0s 14ms/step - loss: 0.4390 - accuracy:
0.9812 - val_loss: 2.2895 - val_accuracy: 0.4682
Epoch 93/100
16/16 [=====] - 0s 15ms/step - loss: 0.4203 - accuracy:
0.9832 - val_loss: 2.2334 - val_accuracy: 0.4877
Epoch 94/100
16/16 [=====] - 0s 13ms/step - loss: 0.4111 - accuracy:
0.9842 - val_loss: 2.3693 - val_accuracy: 0.4522
Epoch 95/100
16/16 [=====] - 0s 15ms/step - loss: 0.4371 - accuracy:
0.9743 - val_loss: 2.3085 - val_accuracy: 0.4936
Epoch 96/100
16/16 [=====] - 0s 15ms/step - loss: 0.4407 - accuracy:
0.9738 - val_loss: 2.4025 - val_accuracy: 0.4826
Epoch 97/100
16/16 [=====] - 0s 13ms/step - loss: 0.4512 - accuracy:
0.9703 - val_loss: 2.2379 - val_accuracy: 0.4640
Epoch 98/100
16/16 [=====] - 0s 13ms/step - loss: 0.4471 - accuracy:
0.9723 - val_loss: 2.2590 - val_accuracy: 0.4615
Epoch 99/100
16/16 [=====] - 0s 13ms/step - loss: 0.4262 - accuracy:
0.9847 - val_loss: 2.3434 - val_accuracy: 0.4606
Epoch 100/100
16/16 [=====] - 0s 14ms/step - loss: 0.4310 - accuracy:
0.9792 - val_loss: 2.2964 - val_accuracy: 0.4979

```

T5.B - Plot Training History and Confusion Matrix Here, we plot the training history and confusion matrix of the advanced model with transfer learning.

```

[64]: # summarize history for accuracy
plt.plot(mobilenet_model.history.history['accuracy'])
plt.plot(mobilenet_model.history.history['val_accuracy'])
plt.title('MobileNet - model accuracy')
plt.ylabel('accuracy')
plt.xlabel('epoch')
plt.legend(['train', 'val'], loc='upper left')
plt.show()

# summarize history for loss

```

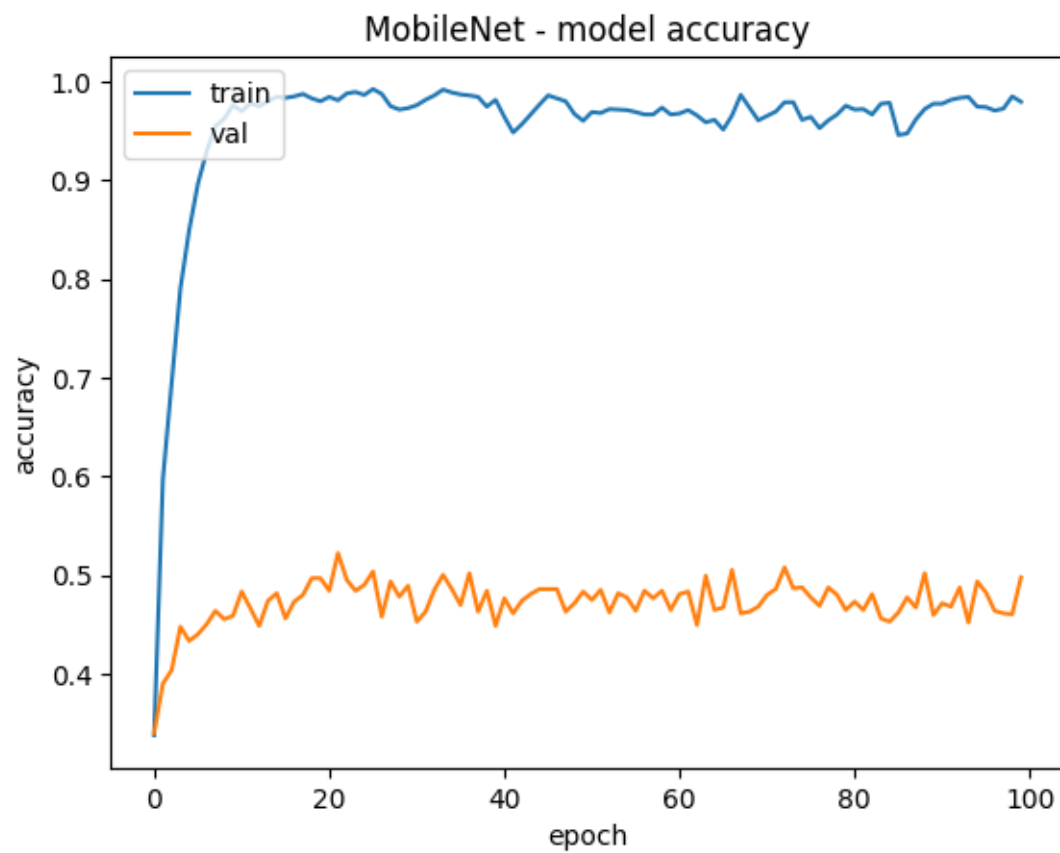
```

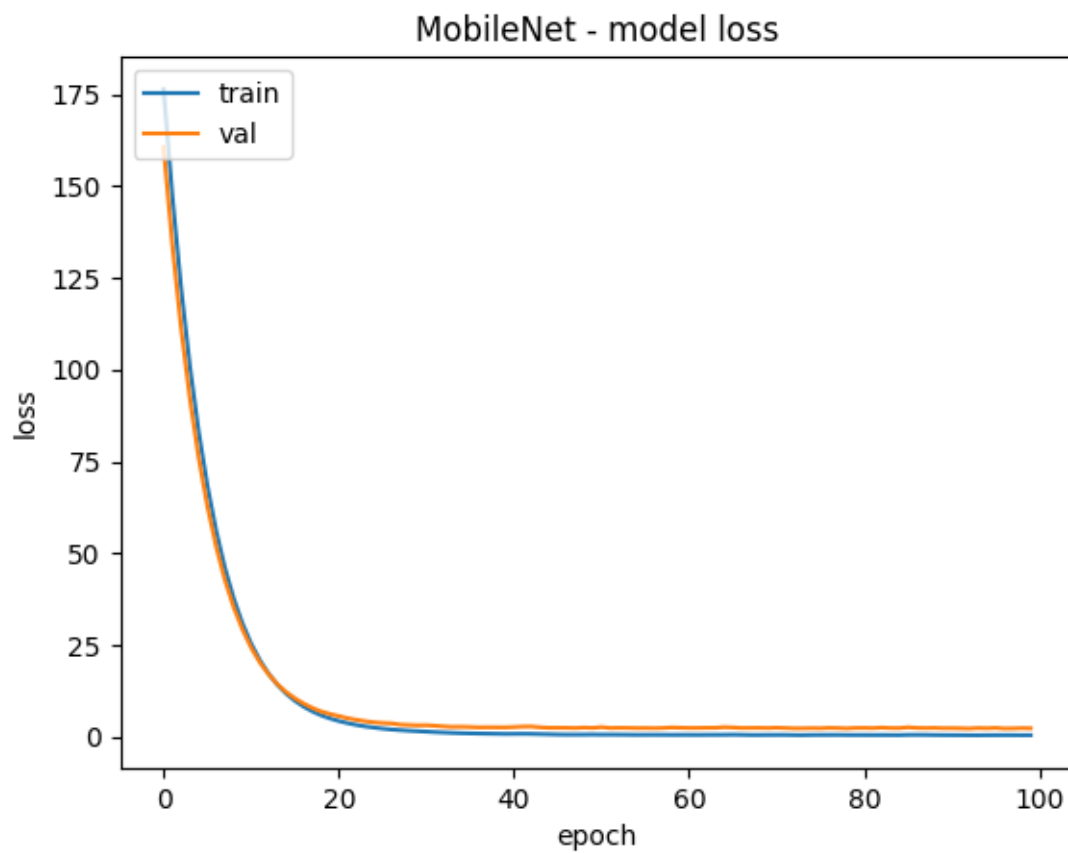
plt.plot(mobilenet_model.history.history['loss'])
plt.plot(mobilenet_model.history.history['val_loss'])
plt.title('MobileNet - model loss')
plt.ylabel('loss')
plt.xlabel('epoch')
plt.legend(['train', 'val'], loc='upper left')
plt.show()

# Print accuracy
score = mobilenet_model.evaluate(val_features, y_val_recrd, verbose=0)
print('MobileNet - validation accuracy:', score[1])

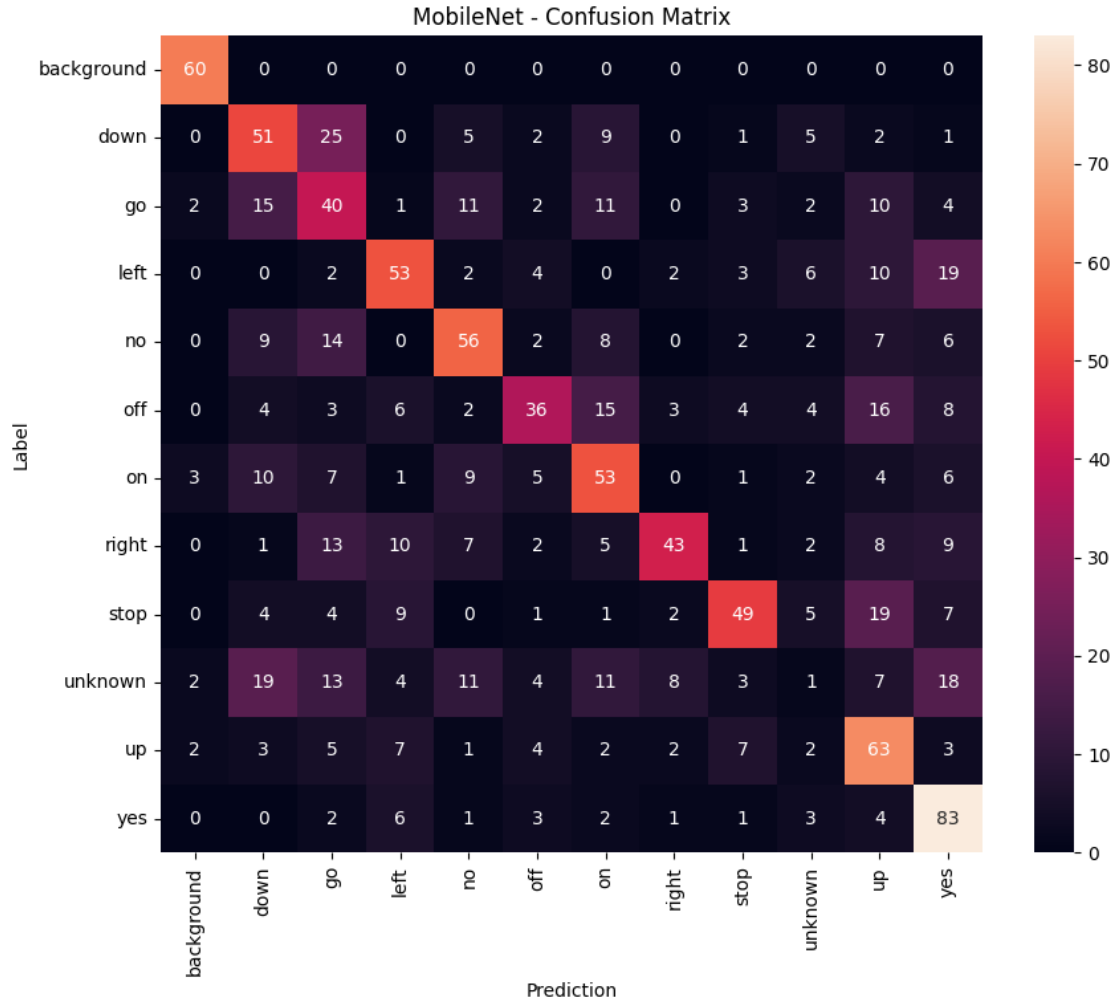
# Print confusion matrix
y_pred = mobilenet_model.predict(val_features)
y_pred = np.argmax(y_pred, axis=1)
y_true = np.argmax(y_val_recrd, axis=1)
class_labels = list(val_ds.class_names)
confusion_mtx = confusion_matrix(y_true, y_pred)
plt.figure(figsize=(10, 8))
sns.heatmap(confusion_mtx, xticklabels=class_labels, yticklabels=class_labels,
            annot=True, fmt='d')
plt.xlabel('Prediction')
plt.ylabel('Label')
plt.title('MobileNet - Confusion Matrix')
plt.show()

```





MobileNet - validation accuracy: 0.497883141040802
37/37 [=====] - 0s 3ms/step



T5.C - Conclusion The transfer learning model has a poor accuracy of about 0.5. This is because the model is not able to learn the features of the personal recordings well due to the resizing constraint of the model. The resizing jump from 98x50 to 96x96 has caused the model to lose the features of the spectrograms, and hence the model is not able to predict the classes well.

Future steps to improve the model would be taking inspiration of the model's architecture in the transfer learning model and training a new model with the same architecture as the base model without the resizing constraint.

0.2 Overall Conclusion

The advanced model has an accuracy of about 0.84, which is better than the baseline model's accuracy of 0.6. The advanced model is able to predict the classes of the personal recordings with an accuracy of 0.8 for the 'yes' class and 0.6 for the 'no' class.

Additionally, the transfer learning model has a poor accuracy of about 0.5. This is because the model is not able to learn the features of the personal recordings well due to the resizing constraint

of the model.