Importing libraries

In [46]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import os
!pip install tqdm
from tqdm.notebook import tqdm
from keras.datasets import cifar10
from sklearn.model_selection import train_test_split
from sklearn.metrics import classification report, accuracy score
import torch
from google.colab import output
output.enable_custom_widget_manager()
import random
np.random.seed(42)
random.seed(42)
```

```
Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/
Requirement already satisfied: tqdm in /usr/local/lib/python3.7/dist-packages (4.64.0)
```

Train Validation Test Split

In [47]:

```
(x_train, y_train), (x_test, y_test) = cifar10.load_data()
images = np.append(x_train,x_test,axis=0)
labels = np.append(y_train,y_test)
x, x_test, y, y_test = train_test_split(images,labels,test_size=0.2,train_size=0.8)
x_train, x_val, y_train, y_val = train_test_split(x,y,test_size = 0.25,train_size =0.75
)
```

Nearest Neighbour Classification

In [48]:

```
def knn(inp,k):
    """
    kNN Classifier based on L2 Distance

Inputs:
    - inp: vector of input image
    - k: No.of neighours to consider before assigning class label prediction
    """

dist = []

for i in x_train:
    dist.append((np.sum((inp-i)**2)))

lst = [x for _, x in sorted(zip(dist, y_train))][:k]

return max(set(lst), key=lst.count) # Return maximally occuring class amongst k neare
st neighbours
```

In [49]:

```
In [50]:
```

for k in tqdm(range(1,10)):

```
print("For k = {}, accuracy is {} %".format(k,accuracy_score(y_val.flatten()[:10],k)
nn_predict(x_val[:10],k))*100))

For k = 1, accuracy is 30.0 %

For k = 2, accuracy is 30.0 %

For k = 3, accuracy is 30.0 %

For k = 4, accuracy is 40.0 %

For k = 5, accuracy is 20.0 %

For k = 6, accuracy is 30.0 %

For k = 7, accuracy is 20.0 %

For k = 8, accuracy is 20.0 %

For k = 9, accuracy is 20.0 %

In [60]:

print("For k = {}, test accuracy is {} %".format(4,accuracy_score(y_test.flatten()[:10],knn_predict(x_test[:10],4))*100))
```

For k = 4, test accuracy is 20.0 %

Results: k = 4 results in maximum validation accuracy of 40% and testing accuracy of 20%

NOTE: Only 10 images were selected during testing to minimize time taken to run.

Hinge loss

In [79]:

```
def hinge_loss(score,labels,idx,i,dW,loss):
 Implementation of Hinge Loss or SVM Loss
 Inputs:
   - score: Scoring function output
    - labels: List of training image labels
    - idx: Index of curre/nt image in input batch
    - i: 3D Image numpy array
    - dW: Empty gradient array
    - loss: Value of Loss
  for j in range(10): # 10 = No.of classes in Cifar-10
      if j != labels[idx]-1:
        hinge = score[j] - score[labels[idx]-1] + 1
        if hinge > 0:
          loss += hinge
          dW[:, labels[idx]] -= i.flatten()
          dW[:,j] += i.flatten()
  return dW, loss # Updated gradient and loss value
```

Softmax Loss

In [80]:

Model Training

```
In [81]:
```

```
def train(W,images,labels,reg,loss_function='softmax'):
  . . .
  Training function
 Inputs:
   - W: Weight matrix
   - images: Batch of training images
   - labels: Class labels for training images
    - reg = Regularization
    - loss_function: Type of loss function to use.
          2 options - 'softmax' or 'hinge'
 loss = 0
 dW = np.zeros((3072,10))
 for idx, i in enumerate(images):
    score = (np.dot(i.flatten().reshape(1,-1),W)).ravel()
    if loss_function == 'softmax':
      dW,loss = softmax_loss(score,labels,idx,i,dW,loss)
    else:
      dW,loss = hinge_loss(score,labels,idx,i,dW,loss)
 loss /= images.shape[0]
 dW = dW / images.shape[0]
 loss += reg * np.sum(W * W)
 dW = dW + reg * 2 * W
  return loss, dW # Updated loss value and gradient
```

Model Functions

```
def SVM(X,y,learning_rate,reg,epochs,X_val,y_val):
 Inputs:
   - X: Training images
   - y: Training labels
   - learning_rate: Learning rate (alpha) value
   - reg: Regularization value
   - epochs: No. of epochs to be trained for
   - X_val: Validation images
   - y_val: Validation labels
 W = 0.001 * np.random.rand(3072,10)
 loss_history = []
 loss_function = 'hinge'
 print('Loss function used:',loss_function)
 print("----")
 train_acc = 0
 val_acc = []
  for i in tqdm(range(epochs)):
   loss, grad = train(W,X,y,reg,loss_function)
   loss_history.append(loss)
   # learning_rate = lr_scheduler(learning_rate,i)
   W = W - learning_rate * grad
   train_preds = predict(W,X)
   val_preds = predict(W,X_val)
   train_acc = accuracy_score(y,train_preds)
   val_acc.append(accuracy_score(y_val,val_preds))
    print("EPOCH {}/{} | Training loss: {:.2f} | Training accuracy: {:.2f} | Validation
accuracy: {:.2f}".format(i,epochs,loss,train_acc,val_acc[-1]))
 print()
  plt.plot(loss_history)
 plt.xlabel('Epochs')
 plt.ylabel('Loss value')
 plt.show()
 return W, loss history, val acc # Model weights, list of loss value history and list
 of validation accuracies
```

```
def Softmax(X,y,learning_rate,reg,epochs,X_val,y_val):
 Inputs:
   - X: Training images
   - y: Training labels
   - learning_rate: Learning rate (alpha) value
   - reg: Regularization value
   - epochs: No. of epochs to be trained for
   - X_val: Validation images
    - y_val: Validation labels
 W = 0.001 * np.random.rand(3072,10)
 loss_history = []
 loss_function = 'softmax'
  print('Loss function used:',loss_function)
  print("-----")
 val_acc = []
  for i in tqdm(range(epochs)):
   loss, grad = train(W,X,y,reg,loss_function)
   loss_history.append(loss)
   W = W - learning_rate * grad
   train_preds = predict(W,X)
   val_preds = predict(W,X_val)
   train_acc = accuracy_score(y,train_preds)
   val_acc.append(accuracy_score(y_val,val_preds))
   print("EPOCH {}/{} | Training loss: {:.2f} | Training accuracy: {:.2f} | Validation
accuracy: {:.2f}".format(i,epochs,loss,train_acc,val_acc[-1]))
 print()
 plt.plot(loss_history)
 plt.xlabel('Epochs')
 plt.ylabel('Loss value')
 plt.show()
 return W, loss_history, val_acc # Model weights, list of loss value history and list
 of validation accuracies
```

Prediction Function

In [84]:

```
def predict(W,images):
    '''
    Inputs:
        - W: Weight matrix
        - images: Images to run prediction on
        '''
    preds = []
    for idx, i in enumerate(images):
        score = (np.dot(i.flatten().reshape(1,-1),W)).ravel()
        preds.append(np.argmax(score))

    return preds # List of prediction labels
```

LR Scheduler

```
In [85]:
```

Model Training

In [68]:

Lo	S	S		fı	ur	١c	t	i	O	n		u	S	e	d	:		h	i	n	g	e									
	_	_	_				_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_

```
EPOCH 0/500 | Training loss: 14.07 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 1/500 | Training loss: 14.07 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 2/500 | Training loss: 14.06 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 3/500 | Training loss: 14.06 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 4/500 | Training loss: 14.06 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 5/500 | Training loss: 14.05 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 6/500 | Training loss: 14.05 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 7/500 | Training loss: 14.05 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 8/500 | Training loss: 14.04 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 9/500 | Training loss: 14.04 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 10/500 | Training loss: 14.04 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 11/500 | Training loss: 14.03 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 12/500 | Training loss: 14.03 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 13/500 | Training loss: 14.03 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 14/500 | Training loss: 14.03 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 15/500 | Training loss: 14.02 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 16/500 | Training loss: 14.02 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 17/500 | Training loss: 14.02 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 18/500 | Training loss: 14.01 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 19/500 | Training loss: 14.01 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 20/500 | Training loss: 14.01 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 21/500 | Training loss: 14.00 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 22/500 | Training loss: 14.00 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 23/500 | Training loss: 14.00 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 24/500 | Training loss: 13.99 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 25/500 | Training loss: 13.99 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 26/500 | Training loss: 13.99 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 27/500 | Training loss: 13.98 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 28/500 | Training loss: 13.98 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 29/500 | Training loss: 13.98 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 30/500 | Training loss: 13.98 | Training accuracy: 0.07 | Validation
```

```
accuracy: 0.10
EPOCH 31/500 | Training loss: 13.97 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 32/500 | Training loss: 13.97 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 33/500 | Training loss: 13.97 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 34/500 | Training loss: 13.96 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 35/500 | Training loss: 13.96 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 36/500 | Training loss: 13.96 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 37/500 | Training loss: 13.95 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 38/500 | Training loss: 13.95 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 39/500 | Training loss: 13.95 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 40/500 | Training loss: 13.94 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 41/500 | Training loss: 13.94 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 42/500 | Training loss: 13.94 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 43/500 | Training loss: 13.93 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 44/500 | Training loss: 13.93 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 45/500 | Training loss: 13.93 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 46/500 | Training loss: 13.93 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 47/500 | Training loss: 13.92 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 48/500 | Training loss: 13.92 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 49/500 | Training loss: 13.92 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 50/500 | Training loss: 13.91 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 51/500 | Training loss: 13.91 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 52/500 | Training loss: 13.91 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 53/500 | Training loss: 13.90 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 54/500 | Training loss: 13.90 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 55/500 | Training loss: 13.90 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 56/500 | Training loss: 13.89 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 57/500 | Training loss: 13.89 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 58/500 | Training loss: 13.89 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 59/500 | Training loss: 13.89 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 60/500 | Training loss: 13.88 | Training accuracy: 0.06 | Validation
accuracy: 0.10
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EPOCH 61/500 | Training loss: 13.88 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 62/500 | Training loss: 13.88 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 63/500 | Training loss: 13.87 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 64/500 | Training loss: 13.87 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 65/500 | Training loss: 13.87 | Training accuracy: 0.06 | Validation
accuracy: 0.10
EPOCH 66/500 | Training loss: 13.86 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 67/500 | Training loss: 13.86 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 68/500 | Training loss: 13.86 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 69/500 | Training loss: 13.86 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 70/500 | Training loss: 13.85 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 71/500 | Training loss: 13.85 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 72/500 | Training loss: 13.85 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 73/500 | Training loss: 13.84 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 74/500 | Training loss: 13.84 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 75/500 | Training loss: 13.84 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 76/500 | Training loss: 13.83 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 77/500 | Training loss: 13.83 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 78/500 | Training loss: 13.83 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 79/500 | Training loss: 13.82 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 80/500 | Training loss: 13.82 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 81/500 | Training loss: 13.82 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 82/500 | Training loss: 13.82 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 83/500 | Training loss: 13.81 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 84/500 | Training loss: 13.81 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 85/500 | Training loss: 13.81 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 86/500 | Training loss: 13.80 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 87/500 | Training loss: 13.80 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 88/500 | Training loss: 13.80 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 89/500 | Training loss: 13.79 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 90/500 | Training loss: 13.79 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 91/500 | Training loss: 13.79 | Training accuracy: 0.07 | Validation
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```
accuracy: 0.10
EPOCH 92/500 | Training loss: 13.79 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 93/500 | Training loss: 13.78 | Training accuracy: 0.07 | Validation
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EPOCH 94/500 | Training loss: 13.78 | Training accuracy: 0.07 | Validation
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EPOCH 95/500 | Training loss: 13.78 | Training accuracy: 0.07 | Validation
accuracy: 0.10
EPOCH 96/500 | Training loss: 13.77 | Training accuracy: 0.07 | Validation
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EPOCH 97/500 | Training loss: 13.77 | Training accuracy: 0.07 | Validation
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EPOCH 98/500 | Training loss: 13.77 | Training accuracy: 0.07 | Validation
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EPOCH 99/500 | Training loss: 13.76 | Training accuracy: 0.07 | Validation
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EPOCH 100/500 | Training loss: 13.76 | Training accuracy: 0.07 | Validatio
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EPOCH 101/500 | Training loss: 13.76 | Training accuracy: 0.07 | Validatio
n accuracy: 0.10
EPOCH 102/500 | Training loss: 13.76 | Training accuracy: 0.07 | Validatio
n accuracy: 0.10
EPOCH 103/500 | Training loss: 13.75 | Training accuracy: 0.07 | Validatio
n accuracy: 0.10
EPOCH 104/500 | Training loss: 13.75 | Training accuracy: 0.07 | Validatio
n accuracy: 0.10
EPOCH 105/500 | Training loss: 13.75 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 106/500 | Training loss: 13.74 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 107/500 | Training loss: 13.74 | Training accuracy: 0.07 | Validatio
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EPOCH 108/500 | Training loss: 13.74 | Training accuracy: 0.07 | Validatio
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EPOCH 109/500 | Training loss: 13.73 | Training accuracy: 0.07 | Validatio
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EPOCH 110/500 | Training loss: 13.73 | Training accuracy: 0.07 | Validatio
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EPOCH 111/500 | Training loss: 13.73 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 112/500 | Training loss: 13.73 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 113/500 | Training loss: 13.72 | Training accuracy: 0.07 | Validatio
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EPOCH 114/500 | Training loss: 13.72 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 115/500 | Training loss: 13.72 | Training accuracy: 0.07 | Validatio
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EPOCH 116/500 | Training loss: 13.71 | Training accuracy: 0.07 | Validatio
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EPOCH 117/500 | Training loss: 13.71 | Training accuracy: 0.07 | Validatio
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EPOCH 118/500 | Training loss: 13.71 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 119/500 | Training loss: 13.71 | Training accuracy: 0.07 | Validatio
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EPOCH 120/500 | Training loss: 13.70 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 121/500 | Training loss: 13.70 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
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EPOCH 122/500 | Training loss: 13.70 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 123/500 | Training loss: 13.69 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 124/500 | Training loss: 13.69 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 125/500 | Training loss: 13.69 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 126/500 | Training loss: 13.68 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 127/500 | Training loss: 13.68 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 128/500 | Training loss: 13.68 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 129/500 | Training loss: 13.68 | Training accuracy: 0.07 | Validatio
n accuracy: 0.10
EPOCH 130/500 | Training loss: 13.67 | Training accuracy: 0.07 | Validatio
n accuracy: 0.10
EPOCH 131/500 | Training loss: 13.67 | Training accuracy: 0.07 | Validatio
n accuracy: 0.10
EPOCH 132/500 | Training loss: 13.67 | Training accuracy: 0.07 | Validatio
n accuracy: 0.10
EPOCH 133/500 | Training loss: 13.66 | Training accuracy: 0.07 | Validatio
n accuracy: 0.10
EPOCH 134/500 | Training loss: 13.66 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 135/500 | Training loss: 13.66 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 136/500 | Training loss: 13.66 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 137/500 | Training loss: 13.65 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 138/500 | Training loss: 13.65 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 139/500 | Training loss: 13.65 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 140/500 | Training loss: 13.64 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 141/500 | Training loss: 13.64 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 142/500 | Training loss: 13.64 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 143/500 | Training loss: 13.64 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 144/500 | Training loss: 13.63 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 145/500 | Training loss: 13.63 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 146/500 | Training loss: 13.63 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 147/500 | Training loss: 13.62 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 148/500 | Training loss: 13.62 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 149/500 | Training loss: 13.62 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 150/500 | Training loss: 13.62 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 151/500 | Training loss: 13.61 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 152/500 | Training loss: 13.61 | Training accuracy: 0.07 | Validatio
```

```
n accuracy: 0.09
EPOCH 153/500 | Training loss: 13.61 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 154/500 | Training loss: 13.60 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 155/500 | Training loss: 13.60 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 156/500 | Training loss: 13.60 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 157/500 | Training loss: 13.60 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 158/500 | Training loss: 13.59 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 159/500 | Training loss: 13.59 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 160/500 | Training loss: 13.59 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 161/500 | Training loss: 13.58 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 162/500 | Training loss: 13.58 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 163/500 | Training loss: 13.58 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 164/500 | Training loss: 13.57 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 165/500 | Training loss: 13.57 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 166/500 | Training loss: 13.57 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 167/500 | Training loss: 13.57 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 168/500 | Training loss: 13.56 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 169/500 | Training loss: 13.56 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 170/500 | Training loss: 13.56 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 171/500 | Training loss: 13.55 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 172/500 | Training loss: 13.55 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 173/500 | Training loss: 13.55 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 174/500 | Training loss: 13.55 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 175/500 | Training loss: 13.54 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 176/500 | Training loss: 13.54 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 177/500 | Training loss: 13.54 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 178/500 | Training loss: 13.53 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 179/500 | Training loss: 13.53 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 180/500 | Training loss: 13.53 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 181/500 | Training loss: 13.53 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 182/500 | Training loss: 13.52 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
```

```
EPOCH 183/500 | Training loss: 13.52 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 184/500 | Training loss: 13.52 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 185/500 | Training loss: 13.51 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 186/500 | Training loss: 13.51 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 187/500 | Training loss: 13.51 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 188/500 | Training loss: 13.51 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 189/500 | Training loss: 13.50 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 190/500 | Training loss: 13.50 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 191/500 | Training loss: 13.50 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 192/500 | Training loss: 13.50 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 193/500 | Training loss: 13.49 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 194/500 | Training loss: 13.49 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 195/500 | Training loss: 13.49 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 196/500 | Training loss: 13.48 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 197/500 | Training loss: 13.48 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 198/500 | Training loss: 13.48 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 199/500 | Training loss: 13.48 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 200/500 | Training loss: 13.47 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 201/500 | Training loss: 13.47 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 202/500 | Training loss: 13.47 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 203/500 | Training loss: 13.46 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 204/500 | Training loss: 13.46 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 205/500 | Training loss: 13.46 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 206/500 | Training loss: 13.46 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 207/500 | Training loss: 13.45 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 208/500 | Training loss: 13.45 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 209/500 | Training loss: 13.45 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 210/500 | Training loss: 13.44 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 211/500 | Training loss: 13.44 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 212/500 | Training loss: 13.44 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 213/500 | Training loss: 13.44 | Training accuracy: 0.07 | Validatio
```

```
n accuracy: 0.09
EPOCH 214/500 | Training loss: 13.43 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 215/500 | Training loss: 13.43 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 216/500 | Training loss: 13.43 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 217/500 | Training loss: 13.43 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 218/500 | Training loss: 13.42 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 219/500 | Training loss: 13.42 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 220/500 | Training loss: 13.42 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 221/500 | Training loss: 13.41 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 222/500 | Training loss: 13.41 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 223/500 | Training loss: 13.41 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 224/500 | Training loss: 13.41 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 225/500 | Training loss: 13.40 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 226/500 | Training loss: 13.40 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 227/500 | Training loss: 13.40 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 228/500 | Training loss: 13.40 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 229/500 | Training loss: 13.39 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 230/500 | Training loss: 13.39 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 231/500 | Training loss: 13.39 | Training accuracy: 0.07 | Validatio
n accuracy: 0.09
EPOCH 232/500 | Training loss: 13.38 | Training accuracy: 0.07 | Validatio
n accuracy: 0.08
EPOCH 233/500 | Training loss: 13.38 | Training accuracy: 0.07 | Validatio
n accuracy: 0.08
EPOCH 234/500 | Training loss: 13.38 | Training accuracy: 0.07 | Validatio
n accuracy: 0.08
EPOCH 235/500 | Training loss: 13.38 | Training accuracy: 0.07 | Validatio
n accuracy: 0.08
EPOCH 236/500 | Training loss: 13.37 | Training accuracy: 0.07 | Validatio
n accuracy: 0.08
EPOCH 237/500 | Training loss: 13.37 | Training accuracy: 0.07 | Validatio
n accuracy: 0.08
EPOCH 238/500 | Training loss: 13.37 | Training accuracy: 0.07 | Validatio
n accuracy: 0.08
EPOCH 239/500 | Training loss: 13.36 | Training accuracy: 0.07 | Validatio
n accuracy: 0.08
EPOCH 240/500 | Training loss: 13.36 | Training accuracy: 0.07 | Validatio
n accuracy: 0.08
EPOCH 241/500 | Training loss: 13.36 | Training accuracy: 0.07 | Validatio
n accuracy: 0.08
EPOCH 242/500 | Training loss: 13.36 | Training accuracy: 0.07 | Validatio
n accuracy: 0.08
EPOCH 243/500 | Training loss: 13.35 | Training accuracy: 0.07 | Validatio
n accuracy: 0.08
```

```
EPOCH 244/500 | Training loss: 13.35 | Training accuracy: 0.07 | Validatio
n accuracy: 0.08
EPOCH 245/500 | Training loss: 13.35 | Training accuracy: 0.07 | Validatio
n accuracy: 0.08
EPOCH 246/500 | Training loss: 13.35 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 247/500 | Training loss: 13.34 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 248/500 | Training loss: 13.34 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 249/500 | Training loss: 13.34 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 250/500 | Training loss: 13.33 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 251/500 | Training loss: 13.33 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 252/500 | Training loss: 13.33 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 253/500 | Training loss: 13.33 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 254/500 | Training loss: 13.32 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 255/500 | Training loss: 13.32 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 256/500 | Training loss: 13.32 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 257/500 | Training loss: 13.32 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 258/500 | Training loss: 13.31 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 259/500 | Training loss: 13.31 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 260/500 | Training loss: 13.31 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 261/500 | Training loss: 13.31 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 262/500 | Training loss: 13.30 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 263/500 | Training loss: 13.30 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 264/500 | Training loss: 13.30 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 265/500 | Training loss: 13.29 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 266/500 | Training loss: 13.29 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 267/500 | Training loss: 13.29 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 268/500 | Training loss: 13.29 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 269/500 | Training loss: 13.28 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 270/500 | Training loss: 13.28 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 271/500 | Training loss: 13.28 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 272/500 | Training loss: 13.28 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 273/500 | Training loss: 13.27 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 274/500 | Training loss: 13.27 | Training accuracy: 0.07 | Validatio
```

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n accuracy: 0.07
EPOCH 275/500 | Training loss: 13.27 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 276/500 | Training loss: 13.26 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 277/500 | Training loss: 13.26 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 278/500 | Training loss: 13.26 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 279/500 | Training loss: 13.26 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 280/500 | Training loss: 13.25 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 281/500 | Training loss: 13.25 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 282/500 | Training loss: 13.25 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 283/500 | Training loss: 13.25 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 284/500 | Training loss: 13.24 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 285/500 | Training loss: 13.24 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 286/500 | Training loss: 13.24 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 287/500 | Training loss: 13.23 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 288/500 | Training loss: 13.23 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 289/500 | Training loss: 13.23 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 290/500 | Training loss: 13.23 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 291/500 | Training loss: 13.22 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 292/500 | Training loss: 13.22 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 293/500 | Training loss: 13.22 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 294/500 | Training loss: 13.22 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 295/500 | Training loss: 13.21 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 296/500 | Training loss: 13.21 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 297/500 | Training loss: 13.21 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 298/500 | Training loss: 13.21 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 299/500 | Training loss: 13.20 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 300/500 | Training loss: 13.20 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 301/500 | Training loss: 13.20 | Training accuracy: 0.08 | Validatio
n accuracy: 0.07
EPOCH 302/500 | Training loss: 13.20 | Training accuracy: 0.08 | Validatio
n accuracy: 0.07
EPOCH 303/500 | Training loss: 13.19 | Training accuracy: 0.08 | Validatio
n accuracy: 0.07
EPOCH 304/500 | Training loss: 13.19 | Training accuracy: 0.08 | Validatio
n accuracy: 0.07
```

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EPOCH 305/500 | Training loss: 13.19 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 306/500 | Training loss: 13.18 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 307/500 | Training loss: 13.18 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 308/500 | Training loss: 13.18 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 309/500 | Training loss: 13.18 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 310/500 | Training loss: 13.17 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 311/500 | Training loss: 13.17 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 312/500 | Training loss: 13.17 | Training accuracy: 0.07 | Validatio
n accuracy: 0.07
EPOCH 313/500 | Training loss: 13.17 | Training accuracy: 0.07 | Validatio
n accuracy: 0.06
EPOCH 314/500 | Training loss: 13.16 | Training accuracy: 0.07 | Validatio
n accuracy: 0.06
EPOCH 315/500 | Training loss: 13.16 | Training accuracy: 0.07 | Validatio
n accuracy: 0.06
EPOCH 316/500 | Training loss: 13.16 | Training accuracy: 0.07 | Validatio
n accuracy: 0.06
EPOCH 317/500 | Training loss: 13.16 | Training accuracy: 0.07 | Validatio
n accuracy: 0.06
EPOCH 318/500 | Training loss: 13.15 | Training accuracy: 0.07 | Validatio
n accuracy: 0.06
EPOCH 319/500 | Training loss: 13.15 | Training accuracy: 0.07 | Validatio
n accuracy: 0.06
EPOCH 320/500 | Training loss: 13.15 | Training accuracy: 0.07 | Validatio
n accuracy: 0.06
EPOCH 321/500 | Training loss: 13.15 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 322/500 | Training loss: 13.14 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 323/500 | Training loss: 13.14 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 324/500 | Training loss: 13.14 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 325/500 | Training loss: 13.14 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 326/500 | Training loss: 13.13 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 327/500 | Training loss: 13.13 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 328/500 | Training loss: 13.13 | Training accuracy: 0.08 | Validatio
n accuracy: 0.05
EPOCH 329/500 | Training loss: 13.12 | Training accuracy: 0.08 | Validatio
n accuracy: 0.05
EPOCH 330/500 | Training loss: 13.12 | Training accuracy: 0.08 | Validatio
n accuracy: 0.05
EPOCH 331/500 | Training loss: 13.12 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 332/500 | Training loss: 13.12 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 333/500 | Training loss: 13.11 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 334/500 | Training loss: 13.11 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 335/500 | Training loss: 13.11 | Training accuracy: 0.08 | Validatio
```

```
n accuracy: 0.06
EPOCH 336/500 | Training loss: 13.11 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 337/500 | Training loss: 13.10 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 338/500 | Training loss: 13.10 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 339/500 | Training loss: 13.10 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 340/500 | Training loss: 13.10 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 341/500 | Training loss: 13.09 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 342/500 | Training loss: 13.09 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 343/500 | Training loss: 13.09 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 344/500 | Training loss: 13.09 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 345/500 | Training loss: 13.08 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 346/500 | Training loss: 13.08 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 347/500 | Training loss: 13.08 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 348/500 | Training loss: 13.08 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 349/500 | Training loss: 13.07 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 350/500 | Training loss: 13.07 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 351/500 | Training loss: 13.07 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 352/500 | Training loss: 13.07 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 353/500 | Training loss: 13.06 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 354/500 | Training loss: 13.06 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 355/500 | Training loss: 13.06 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 356/500 | Training loss: 13.06 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 357/500 | Training loss: 13.05 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 358/500 | Training loss: 13.05 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 359/500 | Training loss: 13.05 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 360/500 | Training loss: 13.05 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 361/500 | Training loss: 13.04 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 362/500 | Training loss: 13.04 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 363/500 | Training loss: 13.04 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 364/500 | Training loss: 13.03 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 365/500 | Training loss: 13.03 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
```

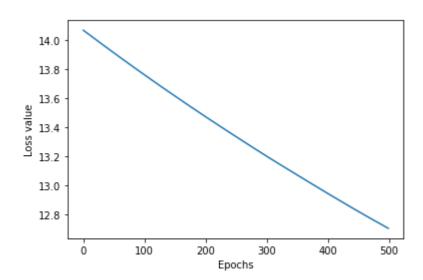
```
EPOCH 366/500 | Training loss: 13.03 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 367/500 | Training loss: 13.03 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 368/500 | Training loss: 13.02 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 369/500 | Training loss: 13.02 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 370/500 | Training loss: 13.02 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 371/500 | Training loss: 13.02 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 372/500 | Training loss: 13.01 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 373/500 | Training loss: 13.01 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 374/500 | Training loss: 13.01 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 375/500 | Training loss: 13.01 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 376/500 | Training loss: 13.00 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 377/500 | Training loss: 13.00 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 378/500 | Training loss: 13.00 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 379/500 | Training loss: 13.00 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 380/500 | Training loss: 12.99 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 381/500 | Training loss: 12.99 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 382/500 | Training loss: 12.99 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 383/500 | Training loss: 12.99 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 384/500 | Training loss: 12.98 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 385/500 | Training loss: 12.98 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 386/500 | Training loss: 12.98 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 387/500 | Training loss: 12.98 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 388/500 | Training loss: 12.97 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 389/500 | Training loss: 12.97 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 390/500 | Training loss: 12.97 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 391/500 | Training loss: 12.97 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 392/500 | Training loss: 12.96 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 393/500 | Training loss: 12.96 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 394/500 | Training loss: 12.96 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 395/500 | Training loss: 12.96 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 396/500 | Training loss: 12.95 | Training accuracy: 0.08 | Validatio
```

```
n accuracy: 0.06
EPOCH 397/500 | Training loss: 12.95 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 398/500 | Training loss: 12.95 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 399/500 | Training loss: 12.95 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 400/500 | Training loss: 12.94 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 401/500 | Training loss: 12.94 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 402/500 | Training loss: 12.94 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 403/500 | Training loss: 12.94 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 404/500 | Training loss: 12.93 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 405/500 | Training loss: 12.93 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 406/500 | Training loss: 12.93 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 407/500 | Training loss: 12.93 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 408/500 | Training loss: 12.92 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 409/500 | Training loss: 12.92 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 410/500 | Training loss: 12.92 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 411/500 | Training loss: 12.92 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 412/500 | Training loss: 12.91 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 413/500 | Training loss: 12.91 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 414/500 | Training loss: 12.91 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 415/500 | Training loss: 12.91 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 416/500 | Training loss: 12.90 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 417/500 | Training loss: 12.90 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 418/500 | Training loss: 12.90 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 419/500 | Training loss: 12.90 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 420/500 | Training loss: 12.89 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 421/500 | Training loss: 12.89 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 422/500 | Training loss: 12.89 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 423/500 | Training loss: 12.89 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 424/500 | Training loss: 12.88 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 425/500 | Training loss: 12.88 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 426/500 | Training loss: 12.88 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
```

```
EPOCH 427/500 | Training loss: 12.88 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 428/500 | Training loss: 12.87 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 429/500 | Training loss: 12.87 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 430/500 | Training loss: 12.87 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 431/500 | Training loss: 12.87 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 432/500 | Training loss: 12.86 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 433/500 | Training loss: 12.86 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 434/500 | Training loss: 12.86 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 435/500 | Training loss: 12.86 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 436/500 | Training loss: 12.85 | Training accuracy: 0.08 | Validatio
n accuracy: 0.06
EPOCH 437/500 | Training loss: 12.85 | Training accuracy: 0.09 | Validatio
n accuracy: 0.06
EPOCH 438/500 | Training loss: 12.85 | Training accuracy: 0.09 | Validatio
n accuracy: 0.06
EPOCH 439/500 | Training loss: 12.85 | Training accuracy: 0.09 | Validatio
n accuracy: 0.06
EPOCH 440/500 | Training loss: 12.84 | Training accuracy: 0.09 | Validatio
n accuracy: 0.06
EPOCH 441/500 | Training loss: 12.84 | Training accuracy: 0.09 | Validatio
n accuracy: 0.06
EPOCH 442/500 | Training loss: 12.84 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 443/500 | Training loss: 12.84 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 444/500 | Training loss: 12.83 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 445/500 | Training loss: 12.83 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 446/500 | Training loss: 12.83 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 447/500 | Training loss: 12.83 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 448/500 | Training loss: 12.82 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 449/500 | Training loss: 12.82 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 450/500 | Training loss: 12.82 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 451/500 | Training loss: 12.82 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 452/500 | Training loss: 12.81 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 453/500 | Training loss: 12.81 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 454/500 | Training loss: 12.81 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 455/500 | Training loss: 12.81 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 456/500 | Training loss: 12.80 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 457/500 | Training loss: 12.80 | Training accuracy: 0.09 | Validatio
```

```
n accuracy: 0.07
EPOCH 458/500 | Training loss: 12.80 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 459/500 | Training loss: 12.80 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 460/500 | Training loss: 12.80 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 461/500 | Training loss: 12.79 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 462/500 | Training loss: 12.79 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 463/500 | Training loss: 12.79 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 464/500 | Training loss: 12.79 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 465/500 | Training loss: 12.78 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 466/500 | Training loss: 12.78 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 467/500 | Training loss: 12.78 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 468/500 | Training loss: 12.78 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 469/500 | Training loss: 12.77 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 470/500 | Training loss: 12.77 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 471/500 | Training loss: 12.77 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 472/500 | Training loss: 12.77 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 473/500 | Training loss: 12.76 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 474/500 | Training loss: 12.76 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 475/500 | Training loss: 12.76 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 476/500 | Training loss: 12.76 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 477/500 | Training loss: 12.75 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 478/500 | Training loss: 12.75 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 479/500 | Training loss: 12.75 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 480/500 | Training loss: 12.75 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 481/500 | Training loss: 12.75 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 482/500 | Training loss: 12.74 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 483/500 | Training loss: 12.74 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 484/500 | Training loss: 12.74 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 485/500 | Training loss: 12.74 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 486/500 | Training loss: 12.73 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
EPOCH 487/500 | Training loss: 12.73 | Training accuracy: 0.09 | Validatio
n accuracy: 0.07
```

EPOCH 488/500 | Training loss: 12.73 | Training accuracy: 0.09 | Validatio n accuracy: 0.07 EPOCH 489/500 | Training loss: 12.73 | Training accuracy: 0.09 | Validatio n accuracy: 0.07 EPOCH 490/500 | Training loss: 12.72 | Training accuracy: 0.09 | Validatio n accuracy: 0.07 EPOCH 491/500 | Training loss: 12.72 | Training accuracy: 0.09 | Validatio n accuracy: 0.07 EPOCH 492/500 | Training loss: 12.72 | Training accuracy: 0.09 | Validatio n accuracy: 0.07 EPOCH 493/500 | Training loss: 12.72 | Training accuracy: 0.09 | Validatio n accuracy: 0.07 EPOCH 494/500 | Training loss: 12.71 | Training accuracy: 0.09 | Validatio n accuracy: 0.07 EPOCH 495/500 | Training loss: 12.71 | Training accuracy: 0.09 | Validatio n accuracy: 0.08 EPOCH 496/500 | Training loss: 12.71 | Training accuracy: 0.09 | Validatio n accuracy: 0.08 EPOCH 497/500 | Training loss: 12.71 | Training accuracy: 0.09 | Validatio n accuracy: 0.08 EPOCH 498/500 | Training loss: 12.71 | Training accuracy: 0.09 | Validatio n accuracy: 0.08 EPOCH 499/500 | Training loss: 12.70 | Training accuracy: 0.09 | Validatio n accuracy: 0.08



In [69]:

 $softmax,sft_loss, softmax_val_acc = Softmax(x_train[:1000],y_train[:1000],1e-7,0,500,x_val[:100],y_val[:100])$

Lo	S	s		f	u	n	C.	t	i	o	n		u	s	e	d	:		S	0	f.	t	m	a:	X							
	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_

```
EPOCH 0/500 | Training loss: 3.80 | Training accuracy: 0.11 | Validation a
ccuracy: 0.10
EPOCH 1/500 | Training loss: 3.12 | Training accuracy: 0.11 | Validation a
ccuracy: 0.08
EPOCH 2/500 | Training loss: 2.77 | Training accuracy: 0.12 | Validation a
ccuracy: 0.14
EPOCH 3/500 | Training loss: 2.60 | Training accuracy: 0.13 | Validation a
ccuracy: 0.14
EPOCH 4/500 | Training loss: 2.52 | Training accuracy: 0.12 | Validation a
ccuracy: 0.14
EPOCH 5/500 | Training loss: 2.47 | Training accuracy: 0.14 | Validation a
ccuracy: 0.14
EPOCH 6/500 | Training loss: 2.45 | Training accuracy: 0.14 | Validation a
ccuracy: 0.15
EPOCH 7/500 | Training loss: 2.43 | Training accuracy: 0.14 | Validation a
ccuracy: 0.15
EPOCH 8/500 | Training loss: 2.42 | Training accuracy: 0.14 | Validation a
ccuracy: 0.15
EPOCH 9/500 | Training loss: 2.41 | Training accuracy: 0.14 | Validation a
ccuracy: 0.17
EPOCH 10/500 | Training loss: 2.41 | Training accuracy: 0.15 | Validation
accuracy: 0.17
EPOCH 11/500 | Training loss: 2.40 | Training accuracy: 0.15 | Validation
accuracy: 0.17
EPOCH 12/500 | Training loss: 2.40 | Training accuracy: 0.15 | Validation
accuracy: 0.17
EPOCH 13/500 | Training loss: 2.39 | Training accuracy: 0.15 | Validation
accuracy: 0.17
EPOCH 14/500 | Training loss: 2.39 | Training accuracy: 0.15 | Validation
accuracy: 0.17
EPOCH 15/500 | Training loss: 2.38 | Training accuracy: 0.16 | Validation
accuracy: 0.17
EPOCH 16/500 | Training loss: 2.37 | Training accuracy: 0.16 | Validation
accuracy: 0.17
EPOCH 17/500 | Training loss: 2.37 | Training accuracy: 0.16 | Validation
accuracy: 0.17
EPOCH 18/500 | Training loss: 2.37 | Training accuracy: 0.16 | Validation
accuracy: 0.17
EPOCH 19/500 | Training loss: 2.36 | Training accuracy: 0.16 | Validation
accuracy: 0.17
EPOCH 20/500 | Training loss: 2.36 | Training accuracy: 0.16 | Validation
accuracy: 0.17
EPOCH 21/500 | Training loss: 2.35 | Training accuracy: 0.16 | Validation
accuracy: 0.17
EPOCH 22/500 | Training loss: 2.35 | Training accuracy: 0.16 | Validation
accuracy: 0.17
EPOCH 23/500 | Training loss: 2.34 | Training accuracy: 0.16 | Validation
accuracy: 0.17
EPOCH 24/500 | Training loss: 2.34 | Training accuracy: 0.16 | Validation
accuracy: 0.17
EPOCH 25/500 | Training loss: 2.33 | Training accuracy: 0.17 | Validation
accuracy: 0.17
EPOCH 26/500 | Training loss: 2.33 | Training accuracy: 0.17 | Validation
accuracy: 0.17
EPOCH 27/500 | Training loss: 2.32 | Training accuracy: 0.17 | Validation
accuracy: 0.17
EPOCH 28/500 | Training loss: 2.32 | Training accuracy: 0.17 | Validation
accuracy: 0.17
EPOCH 29/500 | Training loss: 2.32 | Training accuracy: 0.17 | Validation
accuracy: 0.16
EPOCH 30/500 | Training loss: 2.31 | Training accuracy: 0.17 | Validation
```

```
accuracy: 0.16
EPOCH 31/500 | Training loss: 2.31 | Training accuracy: 0.17 | Validation
accuracy: 0.16
EPOCH 32/500 | Training loss: 2.30 | Training accuracy: 0.18 | Validation
accuracy: 0.16
EPOCH 33/500 | Training loss: 2.30 | Training accuracy: 0.18 | Validation
accuracy: 0.16
EPOCH 34/500 | Training loss: 2.30 | Training accuracy: 0.18 | Validation
accuracy: 0.17
EPOCH 35/500 | Training loss: 2.29 | Training accuracy: 0.18 | Validation
accuracy: 0.17
EPOCH 36/500 | Training loss: 2.29 | Training accuracy: 0.18 | Validation
accuracy: 0.17
EPOCH 37/500 | Training loss: 2.28 | Training accuracy: 0.19 | Validation
accuracy: 0.18
EPOCH 38/500 | Training loss: 2.28 | Training accuracy: 0.19 | Validation
accuracy: 0.18
EPOCH 39/500 | Training loss: 2.28 | Training accuracy: 0.19 | Validation
accuracy: 0.19
EPOCH 40/500 | Training loss: 2.27 | Training accuracy: 0.19 | Validation
accuracy: 0.18
EPOCH 41/500 | Training loss: 2.27 | Training accuracy: 0.19 | Validation
accuracy: 0.18
EPOCH 42/500 | Training loss: 2.27 | Training accuracy: 0.19 | Validation
accuracy: 0.18
EPOCH 43/500 | Training loss: 2.26 | Training accuracy: 0.19 | Validation
accuracy: 0.18
EPOCH 44/500 | Training loss: 2.26 | Training accuracy: 0.19 | Validation
accuracy: 0.18
EPOCH 45/500 | Training loss: 2.26 | Training accuracy: 0.19 | Validation
accuracy: 0.18
EPOCH 46/500 | Training loss: 2.25 | Training accuracy: 0.19 | Validation
accuracy: 0.18
EPOCH 47/500 | Training loss: 2.25 | Training accuracy: 0.19 | Validation
accuracy: 0.18
EPOCH 48/500 | Training loss: 2.25 | Training accuracy: 0.19 | Validation
accuracy: 0.18
EPOCH 49/500 | Training loss: 2.24 | Training accuracy: 0.20 | Validation
accuracy: 0.18
EPOCH 50/500 | Training loss: 2.24 | Training accuracy: 0.20 | Validation
accuracy: 0.18
EPOCH 51/500 | Training loss: 2.24 | Training accuracy: 0.20 | Validation
accuracy: 0.18
EPOCH 52/500 | Training loss: 2.23 | Training accuracy: 0.20 | Validation
accuracy: 0.18
EPOCH 53/500 | Training loss: 2.23 | Training accuracy: 0.20 | Validation
accuracy: 0.19
EPOCH 54/500 | Training loss: 2.23 | Training accuracy: 0.20 | Validation
accuracy: 0.19
EPOCH 55/500 | Training loss: 2.22 | Training accuracy: 0.20 | Validation
accuracy: 0.20
EPOCH 56/500 | Training loss: 2.22 | Training accuracy: 0.20 | Validation
accuracy: 0.20
EPOCH 57/500 | Training loss: 2.22 | Training accuracy: 0.20 | Validation
accuracy: 0.20
EPOCH 58/500 | Training loss: 2.22 | Training accuracy: 0.20 | Validation
accuracy: 0.20
EPOCH 59/500 | Training loss: 2.21 | Training accuracy: 0.20 | Validation
accuracy: 0.20
EPOCH 60/500 | Training loss: 2.21 | Training accuracy: 0.21 | Validation
accuracy: 0.20
```

```
EPOCH 61/500 | Training loss: 2.21 | Training accuracy: 0.21 | Validation
accuracy: 0.20
EPOCH 62/500 | Training loss: 2.20 | Training accuracy: 0.21 | Validation
accuracy: 0.20
EPOCH 63/500 | Training loss: 2.20 | Training accuracy: 0.21 | Validation
accuracy: 0.20
EPOCH 64/500 | Training loss: 2.20 | Training accuracy: 0.21 | Validation
accuracy: 0.20
EPOCH 65/500 | Training loss: 2.20 | Training accuracy: 0.21 | Validation
accuracy: 0.20
EPOCH 66/500 | Training loss: 2.19 | Training accuracy: 0.21 | Validation
accuracy: 0.21
EPOCH 67/500 | Training loss: 2.19 | Training accuracy: 0.21 | Validation
accuracy: 0.21
EPOCH 68/500 | Training loss: 2.19 | Training accuracy: 0.22 | Validation
accuracy: 0.21
EPOCH 69/500 | Training loss: 2.19 | Training accuracy: 0.22 | Validation
accuracy: 0.21
EPOCH 70/500 | Training loss: 2.18 | Training accuracy: 0.22 | Validation
accuracy: 0.22
EPOCH 71/500 | Training loss: 2.18 | Training accuracy: 0.22 | Validation
accuracy: 0.22
EPOCH 72/500 | Training loss: 2.18 | Training accuracy: 0.22 | Validation
accuracy: 0.22
EPOCH 73/500 | Training loss: 2.18 | Training accuracy: 0.22 | Validation
accuracy: 0.22
EPOCH 74/500 | Training loss: 2.17 | Training accuracy: 0.22 | Validation
accuracy: 0.22
EPOCH 75/500 | Training loss: 2.17 | Training accuracy: 0.22 | Validation
accuracy: 0.22
EPOCH 76/500 | Training loss: 2.17 | Training accuracy: 0.22 | Validation
accuracy: 0.22
EPOCH 77/500 | Training loss: 2.17 | Training accuracy: 0.22 | Validation
accuracy: 0.22
EPOCH 78/500 | Training loss: 2.16 | Training accuracy: 0.22 | Validation
accuracy: 0.22
EPOCH 79/500 | Training loss: 2.16 | Training accuracy: 0.22 | Validation
accuracy: 0.22
EPOCH 80/500 | Training loss: 2.16 | Training accuracy: 0.22 | Validation
accuracy: 0.22
EPOCH 81/500 | Training loss: 2.16 | Training accuracy: 0.22 | Validation
accuracy: 0.23
EPOCH 82/500 | Training loss: 2.16 | Training accuracy: 0.22 | Validation
accuracy: 0.23
EPOCH 83/500 | Training loss: 2.15 | Training accuracy: 0.23 | Validation
accuracy: 0.23
EPOCH 84/500 | Training loss: 2.15 | Training accuracy: 0.23 | Validation
accuracy: 0.23
EPOCH 85/500 | Training loss: 2.15 | Training accuracy: 0.23 | Validation
accuracy: 0.23
EPOCH 86/500 | Training loss: 2.15 | Training accuracy: 0.23 | Validation
accuracy: 0.23
EPOCH 87/500 | Training loss: 2.15 | Training accuracy: 0.23 | Validation
accuracy: 0.23
EPOCH 88/500 | Training loss: 2.14 | Training accuracy: 0.23 | Validation
accuracy: 0.23
EPOCH 89/500 | Training loss: 2.14 | Training accuracy: 0.23 | Validation
accuracy: 0.23
EPOCH 90/500 | Training loss: 2.14 | Training accuracy: 0.23 | Validation
accuracy: 0.23
EPOCH 91/500 | Training loss: 2.14 | Training accuracy: 0.23 | Validation
```

```
accuracy: 0.23
EPOCH 92/500 | Training loss: 2.13 | Training accuracy: 0.23 | Validation
accuracy: 0.23
EPOCH 93/500 | Training loss: 2.13 | Training accuracy: 0.23 | Validation
accuracy: 0.23
EPOCH 94/500 | Training loss: 2.13 | Training accuracy: 0.23 | Validation
accuracy: 0.23
EPOCH 95/500 | Training loss: 2.13 | Training accuracy: 0.23 | Validation
accuracy: 0.24
EPOCH 96/500 | Training loss: 2.13 | Training accuracy: 0.23 | Validation
accuracy: 0.24
EPOCH 97/500 | Training loss: 2.12 | Training accuracy: 0.23 | Validation
accuracy: 0.24
EPOCH 98/500 | Training loss: 2.12 | Training accuracy: 0.23 | Validation
accuracy: 0.24
EPOCH 99/500 | Training loss: 2.12 | Training accuracy: 0.23 | Validation
accuracy: 0.24
EPOCH 100/500 | Training loss: 2.12 | Training accuracy: 0.23 | Validation
accuracy: 0.23
EPOCH 101/500 | Training loss: 2.12 | Training accuracy: 0.23 | Validation
accuracy: 0.23
EPOCH 102/500 | Training loss: 2.12 | Training accuracy: 0.23 | Validation
accuracy: 0.23
EPOCH 103/500 | Training loss: 2.11 | Training accuracy: 0.23 | Validation
accuracy: 0.23
EPOCH 104/500 | Training loss: 2.11 | Training accuracy: 0.23 | Validation
accuracy: 0.23
EPOCH 105/500 | Training loss: 2.11 | Training accuracy: 0.23 | Validation
accuracy: 0.23
EPOCH 106/500 | Training loss: 2.11 | Training accuracy: 0.23 | Validation
accuracy: 0.23
EPOCH 107/500 | Training loss: 2.11 | Training accuracy: 0.23 | Validation
accuracy: 0.23
EPOCH 108/500 | Training loss: 2.10 | Training accuracy: 0.24 | Validation
accuracy: 0.23
EPOCH 109/500 | Training loss: 2.10 | Training accuracy: 0.24 | Validation
accuracy: 0.23
EPOCH 110/500 | Training loss: 2.10 | Training accuracy: 0.24 | Validation
accuracy: 0.23
EPOCH 111/500 | Training loss: 2.10 | Training accuracy: 0.24 | Validation
accuracy: 0.23
EPOCH 112/500 | Training loss: 2.10 | Training accuracy: 0.24 | Validation
accuracy: 0.23
EPOCH 113/500 | Training loss: 2.10 | Training accuracy: 0.24 | Validation
accuracy: 0.23
EPOCH 114/500 | Training loss: 2.09 | Training accuracy: 0.24 | Validation
accuracy: 0.23
EPOCH 115/500 | Training loss: 2.09 | Training accuracy: 0.24 | Validation
accuracy: 0.23
EPOCH 116/500 | Training loss: 2.09 | Training accuracy: 0.24 | Validation
accuracy: 0.23
EPOCH 117/500 | Training loss: 2.09 | Training accuracy: 0.24 | Validation
accuracy: 0.23
EPOCH 118/500 | Training loss: 2.09 | Training accuracy: 0.24 | Validation
accuracy: 0.23
EPOCH 119/500 | Training loss: 2.09 | Training accuracy: 0.24 | Validation
accuracy: 0.23
EPOCH 120/500 | Training loss: 2.08 | Training accuracy: 0.24 | Validation
accuracy: 0.23
EPOCH 121/500 | Training loss: 2.08 | Training accuracy: 0.24 | Validation
accuracy: 0.23
```

```
EPOCH 122/500 | Training loss: 2.08 | Training accuracy: 0.25 | Validation
accuracy: 0.23
EPOCH 123/500 | Training loss: 2.08 | Training accuracy: 0.25 | Validation
accuracy: 0.23
EPOCH 124/500 | Training loss: 2.08 | Training accuracy: 0.25 | Validation
accuracy: 0.23
EPOCH 125/500 | Training loss: 2.08 | Training accuracy: 0.25 | Validation
accuracy: 0.23
EPOCH 126/500 | Training loss: 2.07 | Training accuracy: 0.25 | Validation
accuracy: 0.23
EPOCH 127/500 | Training loss: 2.07 | Training accuracy: 0.25 | Validation
accuracy: 0.23
EPOCH 128/500 | Training loss: 2.07 | Training accuracy: 0.25 | Validation
accuracy: 0.23
EPOCH 129/500 | Training loss: 2.07 | Training accuracy: 0.25 | Validation
accuracy: 0.24
EPOCH 130/500 | Training loss: 2.07 | Training accuracy: 0.26 | Validation
accuracy: 0.24
EPOCH 131/500 | Training loss: 2.07 | Training accuracy: 0.26 | Validation
accuracy: 0.24
EPOCH 132/500 | Training loss: 2.06 | Training accuracy: 0.26 | Validation
accuracy: 0.24
EPOCH 133/500 | Training loss: 2.06 | Training accuracy: 0.26 | Validation
accuracy: 0.24
EPOCH 134/500 | Training loss: 2.06 | Training accuracy: 0.26 | Validation
accuracy: 0.24
EPOCH 135/500 | Training loss: 2.06 | Training accuracy: 0.26 | Validation
accuracy: 0.25
EPOCH 136/500 | Training loss: 2.06 | Training accuracy: 0.26 | Validation
accuracy: 0.25
EPOCH 137/500 | Training loss: 2.06 | Training accuracy: 0.26 | Validation
accuracy: 0.25
EPOCH 138/500 | Training loss: 2.06 | Training accuracy: 0.26 | Validation
accuracy: 0.25
EPOCH 139/500 | Training loss: 2.05 | Training accuracy: 0.26 | Validation
accuracy: 0.25
EPOCH 140/500 | Training loss: 2.05 | Training accuracy: 0.26 | Validation
accuracy: 0.25
EPOCH 141/500 | Training loss: 2.05 | Training accuracy: 0.26 | Validation
accuracy: 0.25
EPOCH 142/500 | Training loss: 2.05 | Training accuracy: 0.26 | Validation
accuracy: 0.25
EPOCH 143/500 | Training loss: 2.05 | Training accuracy: 0.26 | Validation
accuracy: 0.25
EPOCH 144/500 | Training loss: 2.05 | Training accuracy: 0.27 | Validation
accuracy: 0.25
EPOCH 145/500 | Training loss: 2.05 | Training accuracy: 0.27 | Validation
accuracy: 0.25
EPOCH 146/500 | Training loss: 2.04 | Training accuracy: 0.27 | Validation
accuracy: 0.25
EPOCH 147/500 | Training loss: 2.04 | Training accuracy: 0.27 | Validation
accuracy: 0.26
EPOCH 148/500 | Training loss: 2.04 | Training accuracy: 0.27 | Validation
accuracy: 0.26
EPOCH 149/500 | Training loss: 2.04 | Training accuracy: 0.27 | Validation
accuracy: 0.26
EPOCH 150/500 | Training loss: 2.04 | Training accuracy: 0.27 | Validation
accuracy: 0.26
EPOCH 151/500 | Training loss: 2.04 | Training accuracy: 0.27 | Validation
accuracy: 0.26
EPOCH 152/500 | Training loss: 2.04 | Training accuracy: 0.27 | Validation
```

```
accuracy: 0.26
EPOCH 153/500 | Training loss: 2.03 | Training accuracy: 0.27 | Validation
accuracy: 0.26
EPOCH 154/500 | Training loss: 2.03 | Training accuracy: 0.27 | Validation
accuracy: 0.26
EPOCH 155/500 | Training loss: 2.03 | Training accuracy: 0.27 | Validation
accuracy: 0.26
EPOCH 156/500 | Training loss: 2.03 | Training accuracy: 0.27 | Validation
accuracy: 0.27
EPOCH 157/500 | Training loss: 2.03 | Training accuracy: 0.27 | Validation
accuracy: 0.27
EPOCH 158/500 | Training loss: 2.03 | Training accuracy: 0.27 | Validation
accuracy: 0.27
EPOCH 159/500 | Training loss: 2.03 | Training accuracy: 0.27 | Validation
accuracy: 0.27
EPOCH 160/500 | Training loss: 2.03 | Training accuracy: 0.27 | Validation
accuracy: 0.27
EPOCH 161/500 | Training loss: 2.02 | Training accuracy: 0.27 | Validation
accuracy: 0.27
EPOCH 162/500 | Training loss: 2.02 | Training accuracy: 0.27 | Validation
accuracy: 0.27
EPOCH 163/500 | Training loss: 2.02 | Training accuracy: 0.27 | Validation
accuracy: 0.27
EPOCH 164/500 | Training loss: 2.02 | Training accuracy: 0.27 | Validation
accuracy: 0.27
EPOCH 165/500 | Training loss: 2.02 | Training accuracy: 0.27 | Validation
accuracy: 0.27
EPOCH 166/500 | Training loss: 2.02 | Training accuracy: 0.27 | Validation
accuracy: 0.27
EPOCH 167/500 | Training loss: 2.02 | Training accuracy: 0.27 | Validation
accuracy: 0.27
EPOCH 168/500 | Training loss: 2.02 | Training accuracy: 0.27 | Validation
accuracy: 0.27
EPOCH 169/500 | Training loss: 2.01 | Training accuracy: 0.27 | Validation
accuracy: 0.27
EPOCH 170/500 | Training loss: 2.01 | Training accuracy: 0.27 | Validation
accuracy: 0.27
EPOCH 171/500 | Training loss: 2.01 | Training accuracy: 0.28 | Validation
accuracy: 0.27
EPOCH 172/500 | Training loss: 2.01 | Training accuracy: 0.28 | Validation
accuracy: 0.27
EPOCH 173/500 | Training loss: 2.01 | Training accuracy: 0.28 | Validation
accuracy: 0.27
EPOCH 174/500 | Training loss: 2.01 | Training accuracy: 0.28 | Validation
accuracy: 0.27
EPOCH 175/500 | Training loss: 2.01 | Training accuracy: 0.28 | Validation
accuracy: 0.27
EPOCH 176/500 | Training loss: 2.01 | Training accuracy: 0.28 | Validation
accuracy: 0.26
EPOCH 177/500 | Training loss: 2.00 | Training accuracy: 0.28 | Validation
accuracy: 0.26
EPOCH 178/500 | Training loss: 2.00 | Training accuracy: 0.28 | Validation
accuracy: 0.26
EPOCH 179/500 | Training loss: 2.00 | Training accuracy: 0.28 | Validation
accuracy: 0.26
EPOCH 180/500 | Training loss: 2.00 | Training accuracy: 0.28 | Validation
accuracy: 0.26
EPOCH 181/500 | Training loss: 2.00 | Training accuracy: 0.28 | Validation
accuracy: 0.26
EPOCH 182/500 | Training loss: 2.00 | Training accuracy: 0.28 | Validation
accuracy: 0.26
```

```
EPOCH 183/500 | Training loss: 2.00 | Training accuracy: 0.28 | Validation
accuracy: 0.26
EPOCH 184/500 | Training loss: 2.00 | Training accuracy: 0.28 | Validation
accuracy: 0.26
EPOCH 185/500 | Training loss: 2.00 | Training accuracy: 0.28 | Validation
accuracy: 0.26
EPOCH 186/500 | Training loss: 1.99 | Training accuracy: 0.28 | Validation
accuracy: 0.27
EPOCH 187/500 | Training loss: 1.99 | Training accuracy: 0.28 | Validation
accuracy: 0.27
EPOCH 188/500 | Training loss: 1.99 | Training accuracy: 0.28 | Validation
accuracy: 0.27
EPOCH 189/500 | Training loss: 1.99 | Training accuracy: 0.28 | Validation
accuracy: 0.27
EPOCH 190/500 | Training loss: 1.99 | Training accuracy: 0.28 | Validation
accuracy: 0.27
EPOCH 191/500 | Training loss: 1.99 | Training accuracy: 0.28 | Validation
accuracy: 0.27
EPOCH 192/500 | Training loss: 1.99 | Training accuracy: 0.28 | Validation
accuracy: 0.27
EPOCH 193/500 | Training loss: 1.99 | Training accuracy: 0.28 | Validation
accuracy: 0.27
EPOCH 194/500 | Training loss: 1.99 | Training accuracy: 0.28 | Validation
accuracy: 0.27
EPOCH 195/500 | Training loss: 1.98 | Training accuracy: 0.28 | Validation
accuracy: 0.27
EPOCH 196/500 | Training loss: 1.98 | Training accuracy: 0.28 | Validation
accuracy: 0.27
EPOCH 197/500 | Training loss: 1.98 | Training accuracy: 0.28 | Validation
accuracy: 0.27
EPOCH 198/500 | Training loss: 1.98 | Training accuracy: 0.28 | Validation
accuracy: 0.27
EPOCH 199/500 | Training loss: 1.98 | Training accuracy: 0.28 | Validation
accuracy: 0.27
EPOCH 200/500 | Training loss: 1.98 | Training accuracy: 0.29 | Validation
accuracy: 0.27
EPOCH 201/500 | Training loss: 1.98 | Training accuracy: 0.29 | Validation
accuracy: 0.27
EPOCH 202/500 | Training loss: 1.98 | Training accuracy: 0.29 | Validation
accuracy: 0.27
EPOCH 203/500 | Training loss: 1.98 | Training accuracy: 0.29 | Validation
accuracy: 0.27
EPOCH 204/500 | Training loss: 1.97 | Training accuracy: 0.29 | Validation
accuracy: 0.27
EPOCH 205/500 | Training loss: 1.97 | Training accuracy: 0.29 | Validation
accuracy: 0.27
EPOCH 206/500 | Training loss: 1.97 | Training accuracy: 0.29 | Validation
accuracy: 0.27
EPOCH 207/500 | Training loss: 1.97 | Training accuracy: 0.29 | Validation
accuracy: 0.27
EPOCH 208/500 | Training loss: 1.97 | Training accuracy: 0.29 | Validation
accuracy: 0.27
EPOCH 209/500 | Training loss: 1.97 | Training accuracy: 0.29 | Validation
accuracy: 0.27
EPOCH 210/500 | Training loss: 1.97 | Training accuracy: 0.29 | Validation
accuracy: 0.27
EPOCH 211/500 | Training loss: 1.97 | Training accuracy: 0.29 | Validation
accuracy: 0.27
EPOCH 212/500 | Training loss: 1.97 | Training accuracy: 0.29 | Validation
accuracy: 0.27
EPOCH 213/500 | Training loss: 1.97 | Training accuracy: 0.29 | Validation
```

```
accuracy: 0.27
EPOCH 214/500 | Training loss: 1.96 | Training accuracy: 0.29 | Validation
accuracy: 0.27
EPOCH 215/500 | Training loss: 1.96 | Training accuracy: 0.29 | Validation
accuracy: 0.27
EPOCH 216/500 | Training loss: 1.96 | Training accuracy: 0.29 | Validation
accuracy: 0.27
EPOCH 217/500 | Training loss: 1.96 | Training accuracy: 0.29 | Validation
accuracy: 0.27
EPOCH 218/500 | Training loss: 1.96 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 219/500 | Training loss: 1.96 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 220/500 | Training loss: 1.96 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 221/500 | Training loss: 1.96 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 222/500 | Training loss: 1.96 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 223/500 | Training loss: 1.96 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 224/500 | Training loss: 1.95 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 225/500 | Training loss: 1.95 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 226/500 | Training loss: 1.95 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 227/500 | Training loss: 1.95 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 228/500 | Training loss: 1.95 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 229/500 | Training loss: 1.95 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 230/500 | Training loss: 1.95 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 231/500 | Training loss: 1.95 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 232/500 | Training loss: 1.95 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 233/500 | Training loss: 1.95 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 234/500 | Training loss: 1.94 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 235/500 | Training loss: 1.94 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 236/500 | Training loss: 1.94 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 237/500 | Training loss: 1.94 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 238/500 | Training loss: 1.94 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 239/500 | Training loss: 1.94 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 240/500 | Training loss: 1.94 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 241/500 | Training loss: 1.94 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 242/500 | Training loss: 1.94 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 243/500 | Training loss: 1.94 | Training accuracy: 0.30 | Validation
accuracy: 0.27
```

```
EPOCH 244/500 | Training loss: 1.94 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 245/500 | Training loss: 1.93 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 246/500 | Training loss: 1.93 | Training accuracy: 0.30 | Validation
accuracy: 0.27
EPOCH 247/500 | Training loss: 1.93 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 248/500 | Training loss: 1.93 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 249/500 | Training loss: 1.93 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 250/500 | Training loss: 1.93 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 251/500 | Training loss: 1.93 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 252/500 | Training loss: 1.93 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 253/500 | Training loss: 1.93 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 254/500 | Training loss: 1.93 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 255/500 | Training loss: 1.93 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 256/500 | Training loss: 1.93 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 257/500 | Training loss: 1.92 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 258/500 | Training loss: 1.92 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 259/500 | Training loss: 1.92 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 260/500 | Training loss: 1.92 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 261/500 | Training loss: 1.92 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 262/500 | Training loss: 1.92 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 263/500 | Training loss: 1.92 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 264/500 | Training loss: 1.92 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 265/500 | Training loss: 1.92 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 266/500 | Training loss: 1.92 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 267/500 | Training loss: 1.92 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 268/500 | Training loss: 1.91 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 269/500 | Training loss: 1.91 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 270/500 | Training loss: 1.91 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 271/500 | Training loss: 1.91 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 272/500 | Training loss: 1.91 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 273/500 | Training loss: 1.91 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 274/500 | Training loss: 1.91 | Training accuracy: 0.31 | Validation
```

```
accuracy: 0.27
EPOCH 275/500 | Training loss: 1.91 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 276/500 | Training loss: 1.91 | Training accuracy: 0.31 | Validation
accuracy: 0.27
EPOCH 277/500 | Training loss: 1.91 | Training accuracy: 0.32 | Validation
accuracy: 0.27
EPOCH 278/500 | Training loss: 1.91 | Training accuracy: 0.32 | Validation
accuracy: 0.27
EPOCH 279/500 | Training loss: 1.91 | Training accuracy: 0.32 | Validation
accuracy: 0.27
EPOCH 280/500 | Training loss: 1.91 | Training accuracy: 0.32 | Validation
accuracy: 0.27
EPOCH 281/500 | Training loss: 1.90 | Training accuracy: 0.32 | Validation
accuracy: 0.27
EPOCH 282/500 | Training loss: 1.90 | Training accuracy: 0.32 | Validation
accuracy: 0.27
EPOCH 283/500 | Training loss: 1.90 | Training accuracy: 0.32 | Validation
accuracy: 0.27
EPOCH 284/500 | Training loss: 1.90 | Training accuracy: 0.32 | Validation
accuracy: 0.27
EPOCH 285/500 | Training loss: 1.90 | Training accuracy: 0.32 | Validation
accuracy: 0.27
EPOCH 286/500 | Training loss: 1.90 | Training accuracy: 0.32 | Validation
accuracy: 0.28
EPOCH 287/500 | Training loss: 1.90 | Training accuracy: 0.32 | Validation
accuracy: 0.28
EPOCH 288/500 | Training loss: 1.90 | Training accuracy: 0.32 | Validation
accuracy: 0.28
EPOCH 289/500 | Training loss: 1.90 | Training accuracy: 0.32 | Validation
accuracy: 0.28
EPOCH 290/500 | Training loss: 1.90 | Training accuracy: 0.32 | Validation
accuracy: 0.28
EPOCH 291/500 | Training loss: 1.90 | Training accuracy: 0.32 | Validation
accuracy: 0.28
EPOCH 292/500 | Training loss: 1.90 | Training accuracy: 0.32 | Validation
accuracy: 0.28
EPOCH 293/500 | Training loss: 1.89 | Training accuracy: 0.32 | Validation
accuracy: 0.28
EPOCH 294/500 | Training loss: 1.89 | Training accuracy: 0.32 | Validation
accuracy: 0.28
EPOCH 295/500 | Training loss: 1.89 | Training accuracy: 0.32 | Validation
accuracy: 0.28
EPOCH 296/500 | Training loss: 1.89 | Training accuracy: 0.32 | Validation
accuracy: 0.28
EPOCH 297/500 | Training loss: 1.89 | Training accuracy: 0.32 | Validation
accuracy: 0.28
EPOCH 298/500 | Training loss: 1.89 | Training accuracy: 0.32 | Validation
accuracy: 0.28
EPOCH 299/500 | Training loss: 1.89 | Training accuracy: 0.32 | Validation
accuracy: 0.28
EPOCH 300/500 | Training loss: 1.89 | Training accuracy: 0.32 | Validation
accuracy: 0.28
EPOCH 301/500 | Training loss: 1.89 | Training accuracy: 0.32 | Validation
accuracy: 0.28
EPOCH 302/500 | Training loss: 1.89 | Training accuracy: 0.32 | Validation
accuracy: 0.28
EPOCH 303/500 | Training loss: 1.89 | Training accuracy: 0.33 | Validation
accuracy: 0.28
EPOCH 304/500 | Training loss: 1.89 | Training accuracy: 0.32 | Validation
accuracy: 0.28
```

```
EPOCH 305/500 | Training loss: 1.89 | Training accuracy: 0.32 | Validation
accuracy: 0.28
EPOCH 306/500 | Training loss: 1.89 | Training accuracy: 0.32 | Validation
accuracy: 0.28
EPOCH 307/500 | Training loss: 1.88 | Training accuracy: 0.32 | Validation
accuracy: 0.28
EPOCH 308/500 | Training loss: 1.88 | Training accuracy: 0.32 | Validation
accuracy: 0.28
EPOCH 309/500 | Training loss: 1.88 | Training accuracy: 0.32 | Validation
accuracy: 0.28
EPOCH 310/500 | Training loss: 1.88 | Training accuracy: 0.33 | Validation
accuracy: 0.28
EPOCH 311/500 | Training loss: 1.88 | Training accuracy: 0.33 | Validation
accuracy: 0.28
EPOCH 312/500 | Training loss: 1.88 | Training accuracy: 0.33 | Validation
accuracy: 0.28
EPOCH 313/500 | Training loss: 1.88 | Training accuracy: 0.33 | Validation
accuracy: 0.28
EPOCH 314/500 | Training loss: 1.88 | Training accuracy: 0.33 | Validation
accuracy: 0.28
EPOCH 315/500 | Training loss: 1.88 | Training accuracy: 0.33 | Validation
accuracy: 0.28
EPOCH 316/500 | Training loss: 1.88 | Training accuracy: 0.33 | Validation
accuracy: 0.28
EPOCH 317/500 | Training loss: 1.88 | Training accuracy: 0.33 | Validation
accuracy: 0.28
EPOCH 318/500 | Training loss: 1.88 | Training accuracy: 0.33 | Validation
accuracy: 0.28
EPOCH 319/500 | Training loss: 1.88 | Training accuracy: 0.33 | Validation
accuracy: 0.29
EPOCH 320/500 | Training loss: 1.87 | Training accuracy: 0.33 | Validation
accuracy: 0.29
EPOCH 321/500 | Training loss: 1.87 | Training accuracy: 0.33 | Validation
accuracy: 0.29
EPOCH 322/500 | Training loss: 1.87 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 323/500 | Training loss: 1.87 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 324/500 | Training loss: 1.87 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 325/500 | Training loss: 1.87 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 326/500 | Training loss: 1.87 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 327/500 | Training loss: 1.87 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 328/500 | Training loss: 1.87 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 329/500 | Training loss: 1.87 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 330/500 | Training loss: 1.87 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 331/500 | Training loss: 1.87 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 332/500 | Training loss: 1.87 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 333/500 | Training loss: 1.87 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 334/500 | Training loss: 1.87 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 335/500 | Training loss: 1.86 | Training accuracy: 0.33 | Validation
```

```
accuracy: 0.31
EPOCH 336/500 | Training loss: 1.86 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 337/500 | Training loss: 1.86 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 338/500 | Training loss: 1.86 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 339/500 | Training loss: 1.86 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 340/500 | Training loss: 1.86 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 341/500 | Training loss: 1.86 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 342/500 | Training loss: 1.86 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 343/500 | Training loss: 1.86 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 344/500 | Training loss: 1.86 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 345/500 | Training loss: 1.86 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 346/500 | Training loss: 1.86 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 347/500 | Training loss: 1.86 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 348/500 | Training loss: 1.86 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 349/500 | Training loss: 1.85 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 350/500 | Training loss: 1.85 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 351/500 | Training loss: 1.85 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 352/500 | Training loss: 1.85 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 353/500 | Training loss: 1.85 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 354/500 | Training loss: 1.85 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 355/500 | Training loss: 1.85 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 356/500 | Training loss: 1.85 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 357/500 | Training loss: 1.85 | Training accuracy: 0.33 | Validation
accuracy: 0.31
EPOCH 358/500 | Training loss: 1.85 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 359/500 | Training loss: 1.85 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 360/500 | Training loss: 1.85 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 361/500 | Training loss: 1.85 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 362/500 | Training loss: 1.85 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 363/500 | Training loss: 1.85 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 364/500 | Training loss: 1.85 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 365/500 | Training loss: 1.84 | Training accuracy: 0.34 | Validation
accuracy: 0.31
```

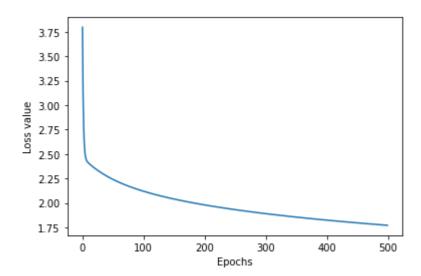
```
EPOCH 366/500 | Training loss: 1.84 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 367/500 | Training loss: 1.84 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 368/500 | Training loss: 1.84 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 369/500 | Training loss: 1.84 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 370/500 | Training loss: 1.84 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 371/500 | Training loss: 1.84 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 372/500 | Training loss: 1.84 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 373/500 | Training loss: 1.84 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 374/500 | Training loss: 1.84 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 375/500 | Training loss: 1.84 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 376/500 | Training loss: 1.84 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 377/500 | Training loss: 1.84 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 378/500 | Training loss: 1.84 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 379/500 | Training loss: 1.84 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 380/500 | Training loss: 1.84 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 381/500 | Training loss: 1.83 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 382/500 | Training loss: 1.83 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 383/500 | Training loss: 1.83 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 384/500 | Training loss: 1.83 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 385/500 | Training loss: 1.83 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 386/500 | Training loss: 1.83 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 387/500 | Training loss: 1.83 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 388/500 | Training loss: 1.83 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 389/500 | Training loss: 1.83 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 390/500 | Training loss: 1.83 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 391/500 | Training loss: 1.83 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 392/500 | Training loss: 1.83 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 393/500 | Training loss: 1.83 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 394/500 | Training loss: 1.83 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 395/500 | Training loss: 1.83 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 396/500 | Training loss: 1.83 | Training accuracy: 0.34 | Validation
```

```
accuracy: 0.31
EPOCH 397/500 | Training loss: 1.82 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 398/500 | Training loss: 1.82 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 399/500 | Training loss: 1.82 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 400/500 | Training loss: 1.82 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 401/500 | Training loss: 1.82 | Training accuracy: 0.34 | Validation
accuracy: 0.31
EPOCH 402/500 | Training loss: 1.82 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 403/500 | Training loss: 1.82 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 404/500 | Training loss: 1.82 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 405/500 | Training loss: 1.82 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 406/500 | Training loss: 1.82 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 407/500 | Training loss: 1.82 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 408/500 | Training loss: 1.82 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 409/500 | Training loss: 1.82 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 410/500 | Training loss: 1.82 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 411/500 | Training loss: 1.82 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 412/500 | Training loss: 1.82 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 413/500 | Training loss: 1.82 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 414/500 | Training loss: 1.81 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 415/500 | Training loss: 1.81 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 416/500 | Training loss: 1.81 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 417/500 | Training loss: 1.81 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 418/500 | Training loss: 1.81 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 419/500 | Training loss: 1.81 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 420/500 | Training loss: 1.81 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 421/500 | Training loss: 1.81 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 422/500 | Training loss: 1.81 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 423/500 | Training loss: 1.81 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 424/500 | Training loss: 1.81 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 425/500 | Training loss: 1.81 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 426/500 | Training loss: 1.81 | Training accuracy: 0.35 | Validation
accuracy: 0.31
```

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EPOCH 427/500 | Training loss: 1.81 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 428/500 | Training loss: 1.81 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 429/500 | Training loss: 1.81 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 430/500 | Training loss: 1.81 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 431/500 | Training loss: 1.81 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 432/500 | Training loss: 1.80 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 433/500 | Training loss: 1.80 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 434/500 | Training loss: 1.80 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 435/500 | Training loss: 1.80 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 436/500 | Training loss: 1.80 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 437/500 | Training loss: 1.80 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 438/500 | Training loss: 1.80 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 439/500 | Training loss: 1.80 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 440/500 | Training loss: 1.80 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 441/500 | Training loss: 1.80 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 442/500 | Training loss: 1.80 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 443/500 | Training loss: 1.80 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 444/500 | Training loss: 1.80 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 445/500 | Training loss: 1.80 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 446/500 | Training loss: 1.80 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 447/500 | Training loss: 1.80 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 448/500 | Training loss: 1.80 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 449/500 | Training loss: 1.80 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 450/500 | Training loss: 1.80 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 451/500 | Training loss: 1.79 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 452/500 | Training loss: 1.79 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 453/500 | Training loss: 1.79 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 454/500 | Training loss: 1.79 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 455/500 | Training loss: 1.79 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 456/500 | Training loss: 1.79 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 457/500 | Training loss: 1.79 | Training accuracy: 0.35 | Validation
```

```
accuracy: 0.31
EPOCH 458/500 | Training loss: 1.79 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 459/500 | Training loss: 1.79 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 460/500 | Training loss: 1.79 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 461/500 | Training loss: 1.79 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 462/500 | Training loss: 1.79 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 463/500 | Training loss: 1.79 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 464/500 | Training loss: 1.79 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 465/500 | Training loss: 1.79 | Training accuracy: 0.36 | Validation
accuracy: 0.31
EPOCH 466/500 | Training loss: 1.79 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 467/500 | Training loss: 1.79 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 468/500 | Training loss: 1.79 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 469/500 | Training loss: 1.79 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 470/500 | Training loss: 1.78 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 471/500 | Training loss: 1.78 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 472/500 | Training loss: 1.78 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 473/500 | Training loss: 1.78 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 474/500 | Training loss: 1.78 | Training accuracy: 0.35 | Validation
accuracy: 0.31
EPOCH 475/500 | Training loss: 1.78 | Training accuracy: 0.36 | Validation
accuracy: 0.31
EPOCH 476/500 | Training loss: 1.78 | Training accuracy: 0.36 | Validation
accuracy: 0.31
EPOCH 477/500 | Training loss: 1.78 | Training accuracy: 0.36 | Validation
accuracy: 0.31
EPOCH 478/500 | Training loss: 1.78 | Training accuracy: 0.36 | Validation
accuracy: 0.31
EPOCH 479/500 | Training loss: 1.78 | Training accuracy: 0.36 | Validation
accuracy: 0.31
EPOCH 480/500 | Training loss: 1.78 | Training accuracy: 0.36 | Validation
accuracy: 0.31
EPOCH 481/500 | Training loss: 1.78 | Training accuracy: 0.36 | Validation
accuracy: 0.31
EPOCH 482/500 | Training loss: 1.78 | Training accuracy: 0.36 | Validation
accuracy: 0.31
EPOCH 483/500 | Training loss: 1.78 | Training accuracy: 0.36 | Validation
accuracy: 0.31
EPOCH 484/500 | Training loss: 1.78 | Training accuracy: 0.36 | Validation
accuracy: 0.31
EPOCH 485/500 | Training loss: 1.78 | Training accuracy: 0.36 | Validation
accuracy: 0.31
EPOCH 486/500 | Training loss: 1.78 | Training accuracy: 0.36 | Validation
accuracy: 0.31
EPOCH 487/500 | Training loss: 1.78 | Training accuracy: 0.36 | Validation
accuracy: 0.31
```

```
EPOCH 488/500 | Training loss: 1.78 | Training accuracy: 0.36 | Validation
accuracy: 0.31
EPOCH 489/500 | Training loss: 1.78 | Training accuracy: 0.36 | Validation
accuracy: 0.31
EPOCH 490/500 | Training loss: 1.77 | Training accuracy: 0.36 | Validation
accuracy: 0.31
EPOCH 491/500 | Training loss: 1.77 | Training accuracy: 0.36 | Validation
accuracy: 0.31
EPOCH 492/500 | Training loss: 1.77 | Training accuracy: 0.36 | Validation
accuracy: 0.31
EPOCH 493/500 | Training loss: 1.77 | Training accuracy: 0.36 | Validation
accuracy: 0.31
EPOCH 494/500 | Training loss: 1.77 | Training accuracy: 0.36 | Validation
accuracy: 0.31
EPOCH 495/500 | Training loss: 1.77 | Training accuracy: 0.36 | Validation
accuracy: 0.31
EPOCH 496/500 | Training loss: 1.77 | Training accuracy: 0.36 | Validation
accuracy: 0.31
EPOCH 497/500 | Training loss: 1.77 | Training accuracy: 0.36 | Validation
accuracy: 0.31
EPOCH 498/500 | Training loss: 1.77 | Training accuracy: 0.36 | Validation
accuracy: 0.31
EPOCH 499/500 | Training loss: 1.77 | Training accuracy: 0.36 | Validation
accuracy: 0.31
```



Test Function

In [70]:

In [71]:

model_test(svm)

	precision	recall	f1-score	support
0	0.25	0.01	0.01	1181
1	0.18	0.05	0.08	1188
2	0.08	0.04	0.05	1232
3	0.15	0.01	0.02	1274
4	0.04	0.00	0.00	1179
5	0.07	0.00	0.00	1230
6	0.10	0.51	0.17	1123
7	0.00	0.00	0.00	1217
8	0.09	0.16	0.11	1189
9	0.06	0.15	0.08	1187
accuracy			0.09	12000
macro avg	0.10	0.09	0.05	12000
weighted avg	0.10	0.09	0.05	12000

In [72]:

model_test(softmax)

	precision	recall	f1-score	support
0	0.32	0.44	0.37	1181
1	0.29	0.35	0.32	1188
2	0.17	0.15	0.16	1232
3	0.19	0.12	0.15	1274
4	0.21	0.17	0.19	1179
5	0.27	0.32	0.29	1230
6	0.27	0.29	0.28	1123
7	0.25	0.24	0.24	1217
8	0.35	0.35	0.35	1189
9	0.33	0.32	0.33	1187
accuracy			0.27	12000
macro avg	0.27	0.27	0.27	12000
weighted avg	0.26	0.27	0.27	12000

Grid Search

In [77]:

```
def grid_search(model='softmax'):
 Grid search function to find best learning rate and regularization coefficient based
on Validation accuracy
 Inputs:
   - model: Model to grid search on.
          2 options - 'softmax' or 'hinge'
  111
 history = []
 for alpha in [1e-5,1e-6,1e-7,1e-8,1e-9,1e-10]:
    for reg in [1e1,1e2,1e3,1e4,1e5]:
      if model == 'softmax':
        softmax,softmax_loss, val_acc = Softmax(x_train[:100],y_train[:100],alpha,reg,1
0,x_val[:100],y_val[:100])
        print()
      else:
        svm, svm_loss, val_acc = SVM(x_train[:100],y_train[:100],alpha,reg,10,x_val[:10
0],y_val[:100])
        print()
      print("Learning Rate: {} | Regularization: {} | Maximum Validation Accuracy: {}".
format(alpha,reg,max(val_acc)))
      print()
      history.append((alpha,reg,max(val_acc)))
 best = max(history,key=lambda item:item[2])
 print('Best Hyperparameters: Learning Rate {} | Regularization: {}'.format(best[0],be
st[1]))
 print()
  return history # List of tuples with elements (Learning Rate, Regularization, Validat
ion Accuracy)
```

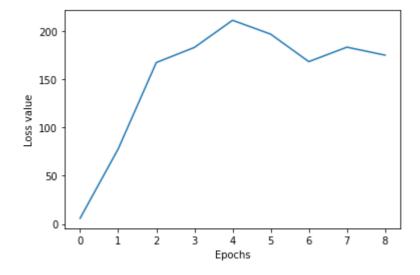
In [86]:

hist_softmax = grid_search('softmax')

```
EPOCH 0/10 | Training loss: 5.91 | Training accuracy: 0.20 | Validation ac
curacy: 0.08
EPOCH 1/10 | Training loss: 77.71 | Training accuracy: 0.14 | Validation a
ccuracy: 0.10
EPOCH 2/10 | Training loss: 167.11 | Training accuracy: 0.13 | Validation
accuracy: 0.14
EPOCH 3/10 | Training loss: 182.73 | Training accuracy: 0.09 | Validation
accuracy: 0.09
EPOCH 4/10 | Training loss: 210.83 | Training accuracy: 0.10 | Validation
accuracy: 0.07
EPOCH 5/10 | Training loss: 196.47 | Training accuracy: 0.11 | Validation
accuracy: 0.07
EPOCH 6/10 | Training loss: 168.03 | Training accuracy: 0.23 | Validation
accuracy: 0.10
EPOCH 7/10 | Training loss: 183.01 | Training accuracy: 0.06 | Validation
accuracy: 0.14
EPOCH 8/10 | Training loss: 174.76 | Training accuracy: 0.14 | Validation
accuracy: 0.10
EPOCH 9/10 | Training loss: nan | Training accuracy: 0.14 | Validation acc
uracy: 0.10
```

/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:14: RuntimeWa rning: overflow encountered in exp

/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:14: RuntimeWa rning: invalid value encountered in true_divide



Learning Rate: 1e-05 | Regularization: 10.0 | Maximum Validation Accuracy: 0.14

EPOCH 0/10 | Training loss: 5.77 | Training accuracy: 0.20 | Validation accuracy: 0.08
EPOCH 1/10 | Training loss: 75.83 | Training accuracy: 0.22 | Validation accuracy: 0.09
EPOCH 2/10 | Training loss: 135.84 | Training accuracy: 0.10 | Validation accuracy: 0.07
EPOCH 3/10 | Training loss: 135.21 | Training accuracy: 0.08 | Validation accuracy: 0.08
EPOCH 4/10 | Training loss: 122.51 | Training accuracy: 0.11 | Validation accuracy: 0.15
EPOCH 5/10 | Training loss: 98.33 | Training accuracy: 0.23 | Validation accuracy: 0.15
EPOCH 6/10 | Training loss: inf | Training accuracy: 0.13 | Validation accuracy: 0.14

/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:15: RuntimeWarning: divide by zero encountered in log

from ipykernel import kernelapp as app

/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:15: RuntimeWarning: divide by zero encountered in log

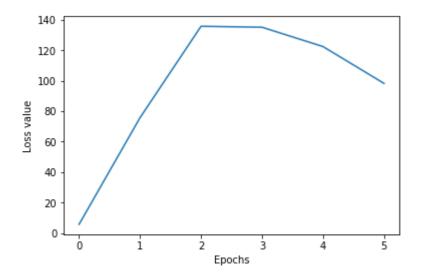
from ipykernel import kernelapp as app

/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:14: RuntimeWarning: overflow encountered in exp

/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:14: RuntimeWarning: invalid value encountered in true_divide

/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:15: RuntimeWa
rning: divide by zero encountered in log
 from ipykernel import kernelapp as app

EPOCH 7/10 | Training loss: inf | Training accuracy: 0.22 | Validation accuracy: 0.08
EPOCH 8/10 | Training loss: inf | Training accuracy: 0.20 | Validation accuracy: 0.08
EPOCH 9/10 | Training loss: nan | Training accuracy: 0.14 | Validation accuracy: 0.10



Learning Rate: 1e-05 | Regularization: 100.0 | Maximum Validation Accuracy: 0.15

EPOCH 0/10 | Training loss: 14.70 | Training accuracy: 0.20 | Validation a ccuracy: 0.08

EPOCH 1/10 | Training loss: 77.86 | Training accuracy: 0.14 | Validation a ccuracy: 0.10

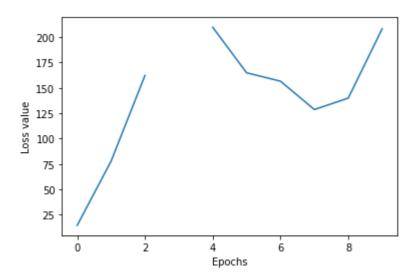
EPOCH 2/10 | Training loss: 162.33 | Training accuracy: 0.13 | Validation accuracy: 0.14

EPOCH 3/10 | Training loss: inf | Training accuracy: 0.09 | Validation accuracy: 0.09

EPOCH 4/10 | Training loss: 209.71 | Training accuracy: 0.09 | Validation accuracy: 0.08

/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:15: RuntimeWa rning: divide by zero encountered in log from ipykernel import kernelapp as app

EPOCH 5/10 | Training loss: 164.88 | Training accuracy: 0.25 | Validation accuracy: 0.13
EPOCH 6/10 | Training loss: 156.63 | Training accuracy: 0.17 | Validation accuracy: 0.17
EPOCH 7/10 | Training loss: 128.69 | Training accuracy: 0.22 | Validation accuracy: 0.09
EPOCH 8/10 | Training loss: 139.96 | Training accuracy: 0.14 | Validation accuracy: 0.10
EPOCH 9/10 | Training loss: 208.21 | Training accuracy: 0.11 | Validation



Learning Rate: 1e-05 | Regularization: 1000.0 | Maximum Validation Accuracy: 0.17

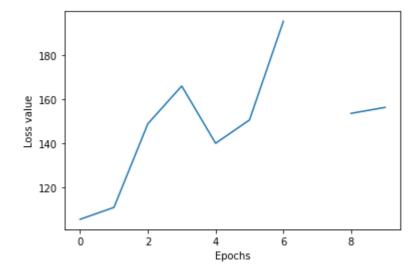
Loss function used: softmax

accuracy: 0.07

EPOCH 0/10 | Training loss: 105.43 | Training accuracy: 0.22 | Validation accuracy: 0.11 EPOCH 1/10 | Training loss: 110.84 | Training accuracy: 0.13 | Validation accuracy: 0.14 EPOCH 2/10 | Training loss: 148.79 | Training accuracy: 0.18 | Validation accuracy: 0.11 EPOCH 3/10 | Training loss: 165.93 | Training accuracy: 0.15 | Validation accuracy: 0.08 EPOCH 4/10 | Training loss: 139.93 | Training accuracy: 0.20 | Validation accuracy: 0.08 EPOCH 5/10 | Training loss: 150.51 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 6/10 | Training loss: 195.30 | Training accuracy: 0.09 | Validation accuracy: 0.09 EPOCH 7/10 | Training loss: inf | Training accuracy: 0.09 | Validation acc uracy: 0.10 EPOCH 8/10 | Training loss: 153.51 | Training accuracy: 0.27 | Validation accuracy: 0.19

/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:15: RuntimeWa rning: divide by zero encountered in log from ipykernel import kernelapp as app

EPOCH 9/10 | Training loss: 156.21 | Training accuracy: 0.10 | Validation accuracy: 0.07



Learning Rate: 1e-05 | Regularization: 10000.0 | Maximum Validation Accuracy: 0.19

Loss function used: softmax

EPOCH 0/10 | Training loss: 1029.26 | Training accuracy: 0.20 | Validation accuracy: 0.08
EPOCH 1/10 | Training loss: 1182.88 | Training accuracy: 0.08 | Validation accuracy: 0.08
EPOCH 2/10 | Training loss: inf | Training accuracy: 0.20 | Validation accuracy: 0.08
EPOCH 3/10 | Training loss: inf | Training accuracy: 0.08 | Validation accuracy: 0.08

/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:15: RuntimeWa

rning: divide by zero encountered in log

from ipykernel import kernelapp as app

/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:15: RuntimeWa

rning: divide by zero encountered in log

from ipykernel import kernelapp as app

/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:14: RuntimeWa

rning: overflow encountered in exp

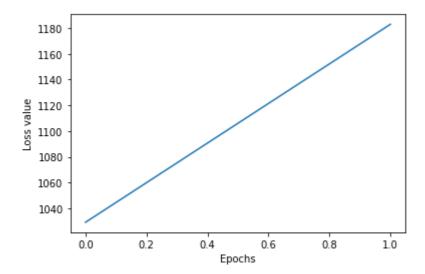
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:14: RuntimeWarning: invalid value encountered in true_divide

/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:15: RuntimeWa
rning: divide by zero encountered in log
 from ipykernel import kernelapp as app

EPOCH 4/10 | Training loss: nan | Training accuracy: 0.08 | Validation accuracy: 0.08 | EPOCH 5/10 | Training loss: nan | Training accuracy: 0.14 | Validation accuracy: 0.10 | EPOCH 6/10 | Training loss: nan | Training accuracy: 0.14 | Validation accuracy: 0.10

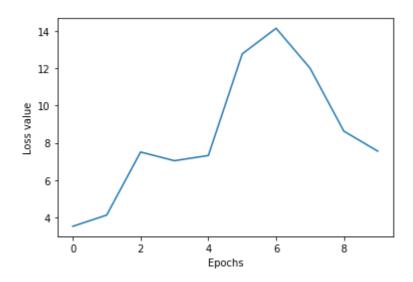
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:14: RuntimeWarning: overflow encountered in exp

EPOCH 7/10 | Training loss: nan | Training accuracy: 0.14 | Validation accuracy: 0.10
EPOCH 8/10 | Training loss: nan | Training accuracy: 0.14 | Validation accuracy: 0.10
EPOCH 9/10 | Training loss: nan | Training accuracy: 0.14 | Validation accuracy: 0.10



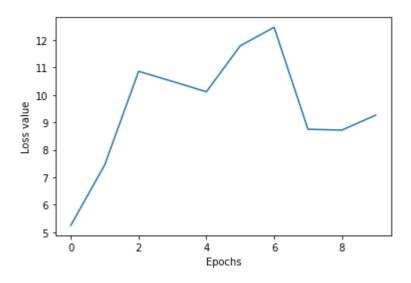
Learning Rate: 1e-05 | Regularization: 100000.0 | Maximum Validation Accuracy: 0.1

EPOCH 0/10 | Training loss: 3.52 | Training accuracy: 0.23 | Validation ac curacy: 0.08 EPOCH 1/10 | Training loss: 4.13 | Training accuracy: 0.14 | Validation ac curacy: 0.15 EPOCH 2/10 | Training loss: 7.51 | Training accuracy: 0.14 | Validation ac curacy: 0.08 EPOCH 3/10 | Training loss: 7.04 | Training accuracy: 0.14 | Validation ac curacy: 0.10 EPOCH 4/10 | Training loss: 7.32 | Training accuracy: 0.21 | Validation ac curacy: 0.08 EPOCH 5/10 | Training loss: 12.77 | Training accuracy: 0.13 | Validation a ccuracy: 0.09 EPOCH 6/10 | Training loss: 14.15 | Training accuracy: 0.15 | Validation a ccuracy: 0.14 EPOCH 7/10 | Training loss: 12.01 | Training accuracy: 0.16 | Validation a ccuracy: 0.11 EPOCH 8/10 | Training loss: 8.63 | Training accuracy: 0.27 | Validation ac curacy: 0.11 EPOCH 9/10 | Training loss: 7.55 | Training accuracy: 0.14 | Validation ac curacy: 0.11



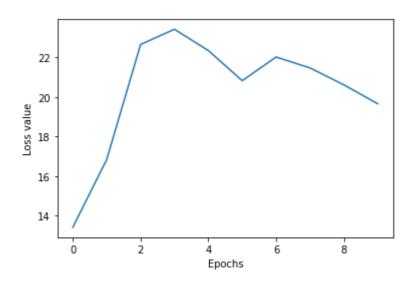
Learning Rate: 1e-06 | Regularization: 10.0 | Maximum Validation Accuracy: 0.15

EPOCH 0/10 | Training loss: 5.25 | Training accuracy: 0.19 | Validation ac curacy: 0.09 EPOCH 1/10 | Training loss: 7.45 | Training accuracy: 0.11 | Validation ac curacy: 0.10 EPOCH 2/10 | Training loss: 10.86 | Training accuracy: 0.14 | Validation a ccuracy: 0.10 EPOCH 3/10 | Training loss: 10.49 | Training accuracy: 0.11 | Validation a ccuracy: 0.06 EPOCH 4/10 | Training loss: 10.11 | Training accuracy: 0.20 | Validation a ccuracy: 0.08 EPOCH 5/10 | Training loss: 11.79 | Training accuracy: 0.08 | Validation a ccuracy: 0.09 EPOCH 6/10 | Training loss: 12.47 | Training accuracy: 0.12 | Validation a ccuracy: 0.14 EPOCH 7/10 | Training loss: 8.75 | Training accuracy: 0.14 | Validation ac curacy: 0.11 EPOCH 8/10 | Training loss: 8.72 | Training accuracy: 0.24 | Validation ac curacy: 0.12 EPOCH 9/10 | Training loss: 9.26 | Training accuracy: 0.17 | Validation ac curacy: 0.13



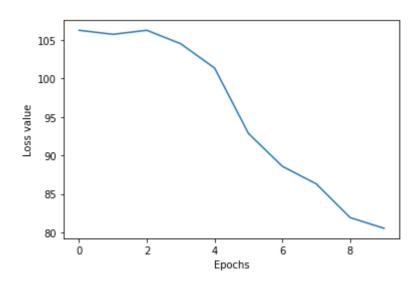
Learning Rate: 1e-06 | Regularization: 100.0 | Maximum Validation Accuracy: 0.14

EPOCH 0/10 | Training loss: 13.40 | Training accuracy: 0.20 | Validation a ccuracy: 0.08 EPOCH 1/10 | Training loss: 16.83 | Training accuracy: 0.15 | Validation a ccuracy: 0.10 EPOCH 2/10 | Training loss: 22.65 | Training accuracy: 0.11 | Validation a ccuracy: 0.11 EPOCH 3/10 | Training loss: 23.42 | Training accuracy: 0.12 | Validation a ccuracy: 0.13 EPOCH 4/10 | Training loss: 22.34 | Training accuracy: 0.16 | Validation a ccuracy: 0.14 EPOCH 5/10 | Training loss: 20.82 | Training accuracy: 0.23 | Validation a ccuracy: 0.10 EPOCH 6/10 | Training loss: 22.02 | Training accuracy: 0.12 | Validation a ccuracy: 0.13 EPOCH 7/10 | Training loss: 21.47 | Training accuracy: 0.15 | Validation a ccuracy: 0.10 EPOCH 8/10 | Training loss: 20.61 | Training accuracy: 0.16 | Validation a ccuracy: 0.13 EPOCH 9/10 | Training loss: 19.65 | Training accuracy: 0.24 | Validation a ccuracy: 0.09



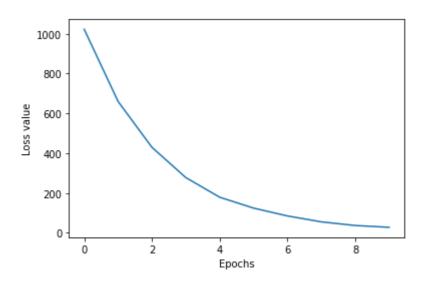
Learning Rate: 1e-06 | Regularization: 1000.0 | Maximum Validation Accuracy: 0.14

EPOCH 0/10 | Training loss: 106.26 | Training accuracy: 0.20 | Validation accuracy: 0.08 EPOCH 1/10 | Training loss: 105.74 | Training accuracy: 0.13 | Validation accuracy: 0.14 EPOCH 2/10 | Training loss: 106.27 | Training accuracy: 0.15 | Validation accuracy: 0.10 EPOCH 3/10 | Training loss: 104.52 | Training accuracy: 0.13 | Validation accuracy: 0.08 EPOCH 4/10 | Training loss: 101.36 | Training accuracy: 0.09 | Validation accuracy: 0.11 EPOCH 5/10 | Training loss: 92.86 | Training accuracy: 0.28 | Validation a ccuracy: 0.08 EPOCH 6/10 | Training loss: 88.59 | Training accuracy: 0.16 | Validation a ccuracy: 0.12 EPOCH 7/10 | Training loss: 86.31 | Training accuracy: 0.14 | Validation a ccuracy: 0.10 EPOCH 8/10 | Training loss: 81.93 | Training accuracy: 0.13 | Validation a ccuracy: 0.15 EPOCH 9/10 | Training loss: 80.53 | Training accuracy: 0.27 | Validation a ccuracy: 0.08



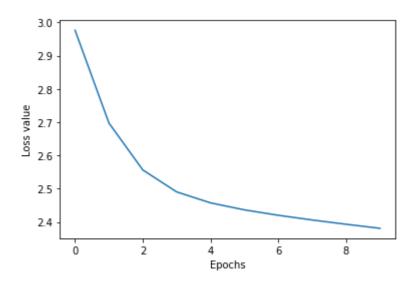
Learning Rate: 1e-06 | Regularization: 10000.0 | Maximum Validation Accura cy: 0.15

EPOCH 0/10 | Training loss: 1022.28 | Training accuracy: 0.20 | Validation accuracy: 0.08 EPOCH 1/10 | Training loss: 659.65 | Training accuracy: 0.14 | Validation accuracy: 0.14 EPOCH 2/10 | Training loss: 429.30 | Training accuracy: 0.13 | Validation accuracy: 0.08 EPOCH 3/10 | Training loss: 277.29 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 4/10 | Training loss: 178.69 | Training accuracy: 0.20 | Validation accuracy: 0.08 EPOCH 5/10 | Training loss: 124.11 | Training accuracy: 0.13 | Validation accuracy: 0.13 EPOCH 6/10 | Training loss: 84.75 | Training accuracy: 0.13 | Validation a ccuracy: 0.14 EPOCH 7/10 | Training loss: 55.07 | Training accuracy: 0.27 | Validation a ccuracy: 0.09 EPOCH 8/10 | Training loss: 36.82 | Training accuracy: 0.20 | Validation a ccuracy: 0.08 EPOCH 9/10 | Training loss: 27.68 | Training accuracy: 0.14 | Validation a ccuracy: 0.10



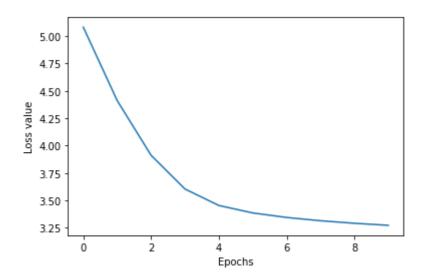
Learning Rate: 1e-06 | Regularization: 100000.0 | Maximum Validation Accuracy: 0.14

EPOCH 0/10 | Training loss: 2.98 | Training accuracy: 0.21 | Validation ac curacy: 0.08 EPOCH 1/10 | Training loss: 2.70 | Training accuracy: 0.23 | Validation ac curacy: 0.15 EPOCH 2/10 | Training loss: 2.56 | Training accuracy: 0.22 | Validation ac curacy: 0.13 EPOCH 3/10 | Training loss: 2.49 | Training accuracy: 0.22 | Validation ac curacy: 0.13 EPOCH 4/10 | Training loss: 2.46 | Training accuracy: 0.22 | Validation ac curacy: 0.16 EPOCH 5/10 | Training loss: 2.44 | Training accuracy: 0.22 | Validation ac curacy: 0.16 EPOCH 6/10 | Training loss: 2.42 | Training accuracy: 0.23 | Validation ac curacy: 0.17 EPOCH 7/10 | Training loss: 2.41 | Training accuracy: 0.23 | Validation ac curacy: 0.18 EPOCH 8/10 | Training loss: 2.39 | Training accuracy: 0.23 | Validation ac curacy: 0.17 EPOCH 9/10 | Training loss: 2.38 | Training accuracy: 0.23 | Validation ac curacy: 0.17



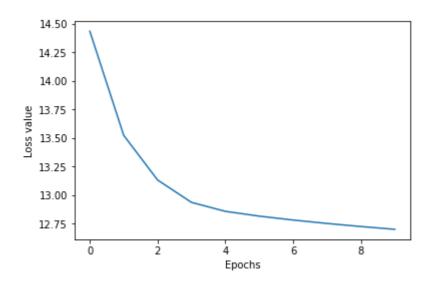
Learning Rate: 1e-07 | Regularization: 10.0 | Maximum Validation Accuracy: 0.18

EPOCH 0/10 | Training loss: 5.08 | Training accuracy: 0.12 | Validation ac curacy: 0.15 EPOCH 1/10 | Training loss: 4.41 | Training accuracy: 0.13 | Validation ac curacy: 0.16 EPOCH 2/10 | Training loss: 3.91 | Training accuracy: 0.20 | Validation ac curacy: 0.15 EPOCH 3/10 | Training loss: 3.60 | Training accuracy: 0.20 | Validation ac curacy: 0.16 EPOCH 4/10 | Training loss: 3.45 | Training accuracy: 0.21 | Validation ac curacy: 0.16 EPOCH 5/10 | Training loss: 3.39 | Training accuracy: 0.21 | Validation ac curacy: 0.15 EPOCH 6/10 | Training loss: 3.35 | Training accuracy: 0.21 | Validation ac curacy: 0.14 EPOCH 7/10 | Training loss: 3.32 | Training accuracy: 0.20 | Validation ac curacy: 0.13 EPOCH 8/10 | Training loss: 3.29 | Training accuracy: 0.20 | Validation ac curacy: 0.13 EPOCH 9/10 | Training loss: 3.27 | Training accuracy: 0.20 | Validation ac curacy: 0.15



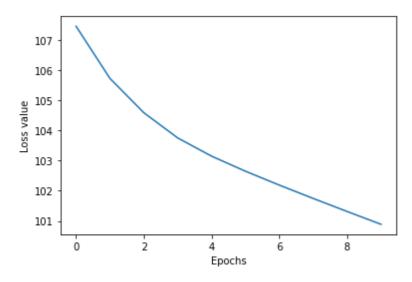
Learning Rate: 1e-07 | Regularization: 100.0 | Maximum Validation Accuracy: 0.16

EPOCH 0/10 | Training loss: 14.43 | Training accuracy: 0.09 | Validation a ccuracy: 0.09 EPOCH 1/10 | Training loss: 13.52 | Training accuracy: 0.09 | Validation a ccuracy: 0.07 EPOCH 2/10 | Training loss: 13.13 | Training accuracy: 0.13 | Validation a ccuracy: 0.08 EPOCH 3/10 | Training loss: 12.93 | Training accuracy: 0.15 | Validation a ccuracy: 0.10 EPOCH 4/10 | Training loss: 12.86 | Training accuracy: 0.17 | Validation a ccuracy: 0.09 EPOCH 5/10 | Training loss: 12.81 | Training accuracy: 0.18 | Validation a ccuracy: 0.09 EPOCH 6/10 | Training loss: 12.78 | Training accuracy: 0.21 | Validation a ccuracy: 0.09 EPOCH 7/10 | Training loss: 12.75 | Training accuracy: 0.22 | Validation a ccuracy: 0.09 EPOCH 8/10 | Training loss: 12.72 | Training accuracy: 0.23 | Validation a ccuracy: 0.09 EPOCH 9/10 | Training loss: 12.70 | Training accuracy: 0.23 | Validation a ccuracy: 0.09



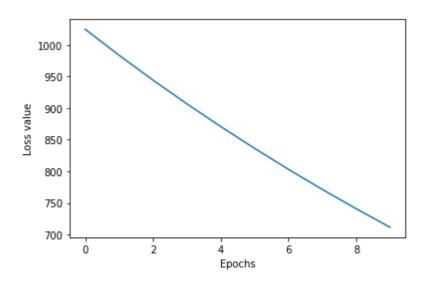
Learning Rate: 1e-07 | Regularization: 1000.0 | Maximum Validation Accuracy: 0.1

EPOCH 0/10 | Training loss: 107.45 | Training accuracy: 0.08 | Validation accuracy: 0.11 EPOCH 1/10 | Training loss: 105.72 | Training accuracy: 0.06 | Validation accuracy: 0.11 EPOCH 2/10 | Training loss: 104.59 | Training accuracy: 0.10 | Validation accuracy: 0.09 EPOCH 3/10 | Training loss: 103.75 | Training accuracy: 0.12 | Validation accuracy: 0.06 EPOCH 4/10 | Training loss: 103.15 | Training accuracy: 0.14 | Validation accuracy: 0.07 EPOCH 5/10 | Training loss: 102.65 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 6/10 | Training loss: 102.19 | Training accuracy: 0.14 | Validation accuracy: 0.11 EPOCH 7/10 | Training loss: 101.74 | Training accuracy: 0.18 | Validation accuracy: 0.11 EPOCH 8/10 | Training loss: 101.31 | Training accuracy: 0.18 | Validation accuracy: 0.11 EPOCH 9/10 | Training loss: 100.89 | Training accuracy: 0.18 | Validation accuracy: 0.11



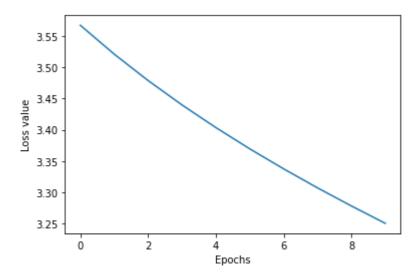
Learning Rate: 1e-07 | Regularization: 10000.0 | Maximum Validation Accura cy: 0.11

EPOCH 0/10 | Training loss: 1024.54 | Training accuracy: 0.06 | Validation accuracy: 0.06 EPOCH 1/10 | Training loss: 983.42 | Training accuracy: 0.09 | Validation accuracy: 0.06 EPOCH 2/10 | Training loss: 944.21 | Training accuracy: 0.08 | Validation accuracy: 0.09 EPOCH 3/10 | Training loss: 906.68 | Training accuracy: 0.05 | Validation accuracy: 0.09 EPOCH 4/10 | Training loss: 870.72 | Training accuracy: 0.08 | Validation accuracy: 0.08 EPOCH 5/10 | Training loss: 836.20 | Training accuracy: 0.09 | Validation accuracy: 0.09 EPOCH 6/10 | Training loss: 803.08 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 7/10 | Training loss: 771.29 | Training accuracy: 0.15 | Validation accuracy: 0.13 EPOCH 8/10 | Training loss: 740.77 | Training accuracy: 0.16 | Validation accuracy: 0.14 EPOCH 9/10 | Training loss: 711.48 | Training accuracy: 0.18 | Validation accuracy: 0.14



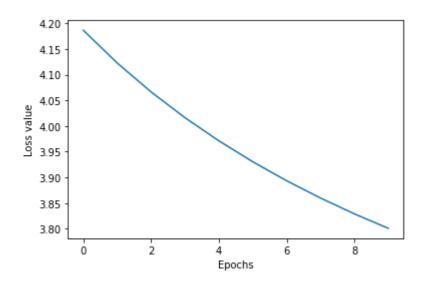
Learning Rate: 1e-07 | Regularization: 100000.0 | Maximum Validation Accuracy: 0.14

EPOCH 0/10 | Training loss: 3.57 | Training accuracy: 0.14 | Validation ac curacy: 0.07 EPOCH 1/10 | Training loss: 3.52 | Training accuracy: 0.16 | Validation ac curacy: 0.07 EPOCH 2/10 | Training loss: 3.48 | Training accuracy: 0.20 | Validation ac curacy: 0.07 EPOCH 3/10 | Training loss: 3.44 | Training accuracy: 0.20 | Validation ac curacy: 0.07 EPOCH 4/10 | Training loss: 3.40 | Training accuracy: 0.20 | Validation ac curacy: 0.07 EPOCH 5/10 | Training loss: 3.37 | Training accuracy: 0.20 | Validation ac curacy: 0.07 EPOCH 6/10 | Training loss: 3.34 | Training accuracy: 0.20 | Validation ac curacy: 0.07 EPOCH 7/10 | Training loss: 3.31 | Training accuracy: 0.20 | Validation ac curacy: 0.06 EPOCH 8/10 | Training loss: 3.28 | Training accuracy: 0.20 | Validation ac curacy: 0.07 EPOCH 9/10 | Training loss: 3.25 | Training accuracy: 0.20 | Validation ac curacy: 0.07



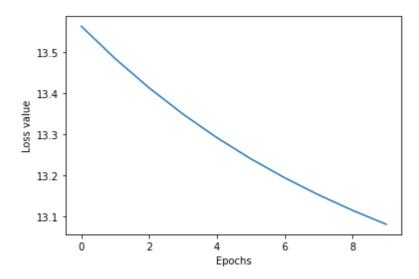
Learning Rate: 1e-08 | Regularization: 10.0 | Maximum Validation Accuracy: 0.07

EPOCH 0/10 | Training loss: 4.19 | Training accuracy: 0.10 | Validation ac curacy: 0.10 EPOCH 1/10 | Training loss: 4.12 | Training accuracy: 0.08 | Validation ac curacy: 0.12 EPOCH 2/10 | Training loss: 4.07 | Training accuracy: 0.09 | Validation ac curacy: 0.13 EPOCH 3/10 | Training loss: 4.02 | Training accuracy: 0.10 | Validation ac curacy: 0.13 EPOCH 4/10 | Training loss: 3.97 | Training accuracy: 0.12 | Validation ac curacy: 0.14 EPOCH 5/10 | Training loss: 3.93 | Training accuracy: 0.12 | Validation ac curacy: 0.14 EPOCH 6/10 | Training loss: 3.89 | Training accuracy: 0.12 | Validation ac curacy: 0.15 EPOCH 7/10 | Training loss: 3.86 | Training accuracy: 0.12 | Validation ac curacy: 0.14 EPOCH 8/10 | Training loss: 3.83 | Training accuracy: 0.12 | Validation ac curacy: 0.15 EPOCH 9/10 | Training loss: 3.80 | Training accuracy: 0.12 | Validation ac curacy: 0.14



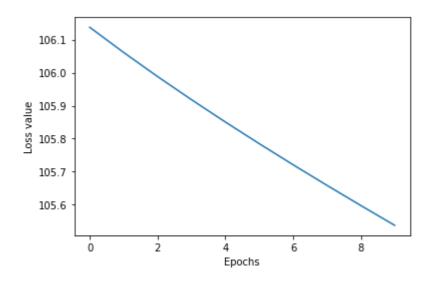
Learning Rate: 1e-08 | Regularization: 100.0 | Maximum Validation Accurac y: 0.15

EPOCH 0/10 | Training loss: 13.56 | Training accuracy: 0.12 | Validation a ccuracy: 0.14 EPOCH 1/10 | Training loss: 13.48 | Training accuracy: 0.13 | Validation a ccuracy: 0.14 EPOCH 2/10 | Training loss: 13.41 | Training accuracy: 0.13 | Validation a ccuracy: 0.13 EPOCH 3/10 | Training loss: 13.35 | Training accuracy: 0.14 | Validation a ccuracy: 0.12 EPOCH 4/10 | Training loss: 13.29 | Training accuracy: 0.13 | Validation a ccuracy: 0.12 EPOCH 5/10 | Training loss: 13.24 | Training accuracy: 0.15 | Validation a ccuracy: 0.12 EPOCH 6/10 | Training loss: 13.19 | Training accuracy: 0.16 | Validation a ccuracy: 0.13 EPOCH 7/10 | Training loss: 13.15 | Training accuracy: 0.16 | Validation a ccuracy: 0.12 EPOCH 8/10 | Training loss: 13.12 | Training accuracy: 0.16 | Validation a ccuracy: 0.13 EPOCH 9/10 | Training loss: 13.08 | Training accuracy: 0.15 | Validation a ccuracy: 0.12



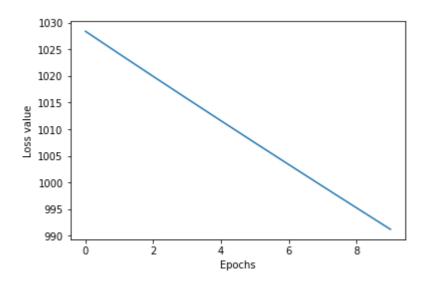
Learning Rate: 1e-08 | Regularization: 1000.0 | Maximum Validation Accuracy: 0.14

EPOCH 0/10 | Training loss: 106.14 | Training accuracy: 0.17 | Validation accuracy: 0.10 EPOCH 1/10 | Training loss: 106.06 | Training accuracy: 0.16 | Validation accuracy: 0.10 EPOCH 2/10 | Training loss: 105.99 | Training accuracy: 0.16 | Validation accuracy: 0.10 EPOCH 3/10 | Training loss: 105.92 | Training accuracy: 0.15 | Validation accuracy: 0.11 EPOCH 4/10 | Training loss: 105.85 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 5/10 | Training loss: 105.79 | Training accuracy: 0.14 | Validation accuracy: 0.09 EPOCH 6/10 | Training loss: 105.72 | Training accuracy: 0.15 | Validation accuracy: 0.07 EPOCH 7/10 | Training loss: 105.66 | Training accuracy: 0.16 | Validation accuracy: 0.08 EPOCH 8/10 | Training loss: 105.60 | Training accuracy: 0.16 | Validation accuracy: 0.08 EPOCH 9/10 | Training loss: 105.54 | Training accuracy: 0.17 | Validation accuracy: 0.09



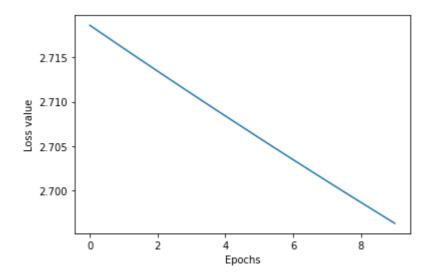
Learning Rate: 1e-08 | Regularization: 10000.0 | Maximum Validation Accura cy: 0.11

EPOCH 0/10 | Training loss: 1028.40 | Training accuracy: 0.09 | Validation accuracy: 0.08 EPOCH 1/10 | Training loss: 1024.14 | Training accuracy: 0.06 | Validation accuracy: 0.08 EPOCH 2/10 | Training loss: 1019.93 | Training accuracy: 0.05 | Validation accuracy: 0.07 EPOCH 3/10 | Training loss: 1015.75 | Training accuracy: 0.05 | Validation accuracy: 0.07 EPOCH 4/10 | Training loss: 1011.59 | Training accuracy: 0.05 | Validation accuracy: 0.07 EPOCH 5/10 | Training loss: 1007.47 | Training accuracy: 0.05 | Validation accuracy: 0.07 EPOCH 6/10 | Training loss: 1003.37 | Training accuracy: 0.04 | Validation accuracy: 0.07 EPOCH 7/10 | Training loss: 999.30 | Training accuracy: 0.04 | Validation accuracy: 0.07 EPOCH 8/10 | Training loss: 995.25 | Training accuracy: 0.05 | Validation accuracy: 0.08 EPOCH 9/10 | Training loss: 991.22 | Training accuracy: 0.06 | Validation accuracy: 0.09



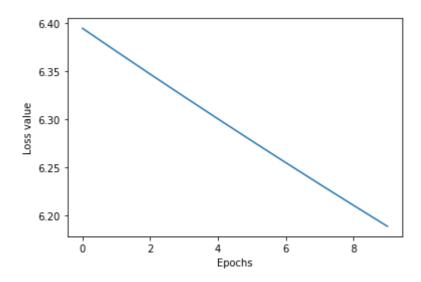
Learning Rate: 1e-08 | Regularization: 100000.0 | Maximum Validation Accuracy: 0.09

EPOCH 0/10 | Training loss: 2.72 | Training accuracy: 0.16 | Validation ac curacy: 0.07 EPOCH 1/10 | Training loss: 2.72 | Training accuracy: 0.16 | Validation ac curacy: 0.07 EPOCH 2/10 | Training loss: 2.71 | Training accuracy: 0.16 | Validation ac curacy: 0.07 EPOCH 3/10 | Training loss: 2.71 | Training accuracy: 0.16 | Validation ac curacy: 0.07 EPOCH 4/10 | Training loss: 2.71 | Training accuracy: 0.16 | Validation ac curacy: 0.07 EPOCH 5/10 | Training loss: 2.71 | Training accuracy: 0.16 | Validation ac curacy: 0.07 EPOCH 6/10 | Training loss: 2.70 | Training accuracy: 0.16 | Validation ac curacy: 0.06 EPOCH 7/10 | Training loss: 2.70 | Training accuracy: 0.16 | Validation ac curacy: 0.06 EPOCH 8/10 | Training loss: 2.70 | Training accuracy: 0.16 | Validation ac curacy: 0.06 EPOCH 9/10 | Training loss: 2.70 | Training accuracy: 0.16 | Validation ac curacy: 0.06



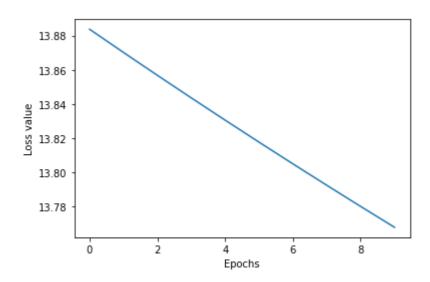
Learning Rate: 1e-09 | Regularization: 10.0 | Maximum Validation Accuracy: 0.07

EPOCH 0/10 | Training loss: 6.39 | Training accuracy: 0.04 | Validation ac curacy: 0.09 EPOCH 1/10 | Training loss: 6.37 | Training accuracy: 0.04 | Validation ac curacy: 0.09 EPOCH 2/10 | Training loss: 6.35 | Training accuracy: 0.05 | Validation ac curacy: 0.09 EPOCH 3/10 | Training loss: 6.32 | Training accuracy: 0.05 | Validation ac curacy: 0.10 EPOCH 4/10 | Training loss: 6.30 | Training accuracy: 0.05 | Validation ac curacy: 0.10 EPOCH 5/10 | Training loss: 6.28 | Training accuracy: 0.05 | Validation ac curacy: 0.10 EPOCH 6/10 | Training loss: 6.25 | Training accuracy: 0.05 | Validation ac curacy: 0.10 EPOCH 7/10 | Training loss: 6.23 | Training accuracy: 0.05 | Validation ac curacy: 0.10 EPOCH 8/10 | Training loss: 6.21 | Training accuracy: 0.05 | Validation ac curacy: 0.10 EPOCH 9/10 | Training loss: 6.19 | Training accuracy: 0.05 | Validation ac curacy: 0.10



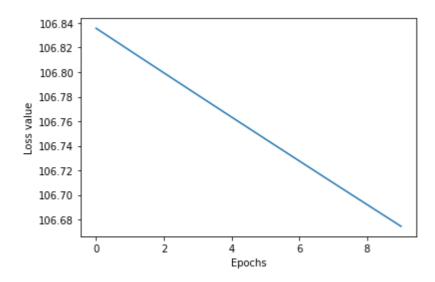
Learning Rate: 1e-09 | Regularization: 100.0 | Maximum Validation Accuracy: 0.1

EPOCH 0/10 | Training loss: 13.88 | Training accuracy: 0.11 | Validation a ccuracy: 0.08 EPOCH 1/10 | Training loss: 13.87 | Training accuracy: 0.11 | Validation a ccuracy: 0.08 EPOCH 2/10 | Training loss: 13.86 | Training accuracy: 0.11 | Validation a ccuracy: 0.08 EPOCH 3/10 | Training loss: 13.84 | Training accuracy: 0.12 | Validation a ccuracy: 0.08 EPOCH 4/10 | Training loss: 13.83 | Training accuracy: 0.12 | Validation a ccuracy: 0.08 EPOCH 5/10 | Training loss: 13.82 | Training accuracy: 0.12 | Validation a ccuracy: 0.08 EPOCH 6/10 | Training loss: 13.81 | Training accuracy: 0.12 | Validation a ccuracy: 0.08 EPOCH 7/10 | Training loss: 13.79 | Training accuracy: 0.12 | Validation a ccuracy: 0.08 EPOCH 8/10 | Training loss: 13.78 | Training accuracy: 0.11 | Validation a ccuracy: 0.08 EPOCH 9/10 | Training loss: 13.77 | Training accuracy: 0.11 | Validation a ccuracy: 0.08



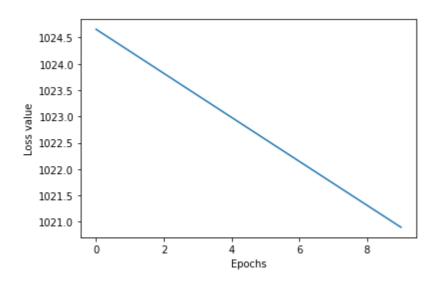
Learning Rate: 1e-09 | Regularization: 1000.0 | Maximum Validation Accuracy: 0.08

EPOCH 0/10 | Training loss: 106.84 | Training accuracy: 0.06 | Validation accuracy: 0.13 EPOCH 1/10 | Training loss: 106.82 | Training accuracy: 0.06 | Validation accuracy: 0.13 EPOCH 2/10 | Training loss: 106.80 | Training accuracy: 0.06 | Validation accuracy: 0.13 EPOCH 3/10 | Training loss: 106.78 | Training accuracy: 0.06 | Validation accuracy: 0.13 EPOCH 4/10 | Training loss: 106.76 | Training accuracy: 0.06 | Validation accuracy: 0.13 EPOCH 5/10 | Training loss: 106.75 | Training accuracy: 0.06 | Validation accuracy: 0.13 EPOCH 6/10 | Training loss: 106.73 | Training accuracy: 0.06 | Validation accuracy: 0.13 EPOCH 7/10 | Training loss: 106.71 | Training accuracy: 0.06 | Validation accuracy: 0.13 EPOCH 8/10 | Training loss: 106.69 | Training accuracy: 0.06 | Validation accuracy: 0.13 EPOCH 9/10 | Training loss: 106.67 | Training accuracy: 0.06 | Validation accuracy: 0.13



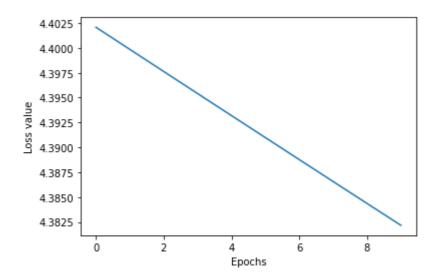
Learning Rate: 1e-09 | Regularization: 10000.0 | Maximum Validation Accura cy: 0.13

EPOCH 0/10 | Training loss: 1024.66 | Training accuracy: 0.15 | Validation accuracy: 0.15 EPOCH 1/10 | Training loss: 1024.24 | Training accuracy: 0.15 | Validation accuracy: 0.15 EPOCH 2/10 | Training loss: 1023.82 | Training accuracy: 0.15 | Validation accuracy: 0.15 EPOCH 3/10 | Training loss: 1023.40 | Training accuracy: 0.15 | Validation accuracy: 0.15 EPOCH 4/10 | Training loss: 1022.98 | Training accuracy: 0.15 | Validation accuracy: 0.15 EPOCH 5/10 | Training loss: 1022.56 | Training accuracy: 0.15 | Validation accuracy: 0.15 EPOCH 6/10 | Training loss: 1022.15 | Training accuracy: 0.15 | Validation accuracy: 0.15 EPOCH 7/10 | Training loss: 1021.73 | Training accuracy: 0.15 | Validation accuracy: 0.15 EPOCH 8/10 | Training loss: 1021.31 | Training accuracy: 0.15 | Validation accuracy: 0.14 EPOCH 9/10 | Training loss: 1020.89 | Training accuracy: 0.15 | Validation accuracy: 0.14



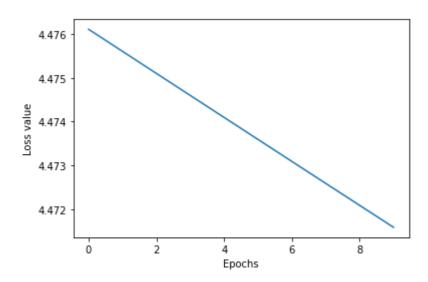
Learning Rate: 1e-09 | Regularization: 100000.0 | Maximum Validation Accuracy: 0.15

EPOCH 0/10 | Training loss: 4.40 | Training accuracy: 0.07 | Validation ac curacy: 0.09 EPOCH 1/10 | Training loss: 4.40 | Training accuracy: 0.07 | Validation ac curacy: 0.09 EPOCH 2/10 | Training loss: 4.40 | Training accuracy: 0.07 | Validation ac curacy: 0.09 EPOCH 3/10 | Training loss: 4.40 | Training accuracy: 0.07 | Validation ac curacy: 0.09 EPOCH 4/10 | Training loss: 4.39 | Training accuracy: 0.07 | Validation ac curacy: 0.09 EPOCH 5/10 | Training loss: 4.39 | Training accuracy: 0.07 | Validation ac curacy: 0.09 EPOCH 6/10 | Training loss: 4.39 | Training accuracy: 0.07 | Validation ac curacy: 0.09 EPOCH 7/10 | Training loss: 4.39 | Training accuracy: 0.07 | Validation ac curacy: 0.09 EPOCH 8/10 | Training loss: 4.38 | Training accuracy: 0.07 | Validation ac curacy: 0.09 EPOCH 9/10 | Training loss: 4.38 | Training accuracy: 0.07 | Validation ac curacy: 0.09



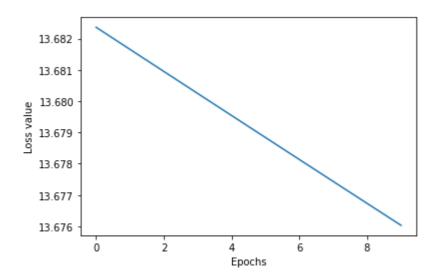
Learning Rate: 1e-10 | Regularization: 10.0 | Maximum Validation Accuracy: 0.09

EPOCH 0/10 | Training loss: 4.48 | Training accuracy: 0.09 | Validation ac curacy: 0.07 EPOCH 1/10 | Training loss: 4.48 | Training accuracy: 0.09 | Validation ac curacy: 0.07 EPOCH 2/10 | Training loss: 4.48 | Training accuracy: 0.09 | Validation ac curacy: 0.07 EPOCH 3/10 | Training loss: 4.47 | Training accuracy: 0.09 | Validation ac curacy: 0.07 EPOCH 4/10 | Training loss: 4.47 | Training accuracy: 0.09 | Validation ac curacy: 0.07 EPOCH 5/10 | Training loss: 4.47 | Training accuracy: 0.09 | Validation ac curacy: 0.07 EPOCH 6/10 | Training loss: 4.47 | Training accuracy: 0.09 | Validation ac curacy: 0.07 EPOCH 7/10 | Training loss: 4.47 | Training accuracy: 0.09 | Validation ac curacy: 0.07 EPOCH 8/10 | Training loss: 4.47 | Training accuracy: 0.09 | Validation ac curacy: 0.07 EPOCH 9/10 | Training loss: 4.47 | Training accuracy: 0.09 | Validation ac curacy: 0.07



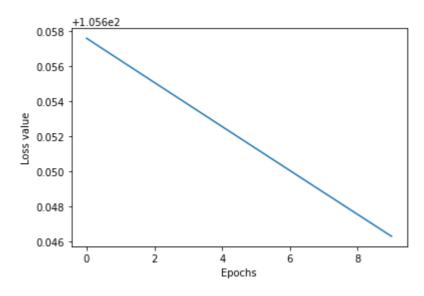
Learning Rate: 1e-10 | Regularization: 100.0 | Maximum Validation Accuracy: 0.07

EPOCH 0/10 | Training loss: 13.68 | Training accuracy: 0.13 | Validation a ccuracy: 0.05 EPOCH 1/10 | Training loss: 13.68 | Training accuracy: 0.13 | Validation a ccuracy: 0.05 EPOCH 2/10 | Training loss: 13.68 | Training accuracy: 0.13 | Validation a ccuracy: 0.05 EPOCH 3/10 | Training loss: 13.68 | Training accuracy: 0.13 | Validation a ccuracy: 0.05 EPOCH 4/10 | Training loss: 13.68 | Training accuracy: 0.13 | Validation a ccuracy: 0.05 EPOCH 5/10 | Training loss: 13.68 | Training accuracy: 0.13 | Validation a ccuracy: 0.05 EPOCH 6/10 | Training loss: 13.68 | Training accuracy: 0.13 | Validation a ccuracy: 0.05 EPOCH 7/10 | Training loss: 13.68 | Training accuracy: 0.13 | Validation a ccuracy: 0.05 EPOCH 8/10 | Training loss: 13.68 | Training accuracy: 0.13 | Validation a ccuracy: 0.05 EPOCH 9/10 | Training loss: 13.68 | Training accuracy: 0.13 | Validation a ccuracy: 0.05



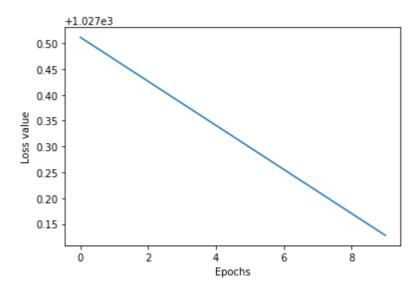
Learning Rate: 1e-10 | Regularization: 1000.0 | Maximum Validation Accuracy: 0.05

EPOCH 0/10 | Training loss: 105.66 | Training accuracy: 0.09 | Validation accuracy: 0.12 EPOCH 1/10 | Training loss: 105.66 | Training accuracy: 0.09 | Validation accuracy: 0.12 EPOCH 2/10 | Training loss: 105.66 | Training accuracy: 0.09 | Validation accuracy: 0.12 EPOCH 3/10 | Training loss: 105.65 | Training accuracy: 0.09 | Validation accuracy: 0.12 EPOCH 4/10 | Training loss: 105.65 | Training accuracy: 0.09 | Validation accuracy: 0.12 EPOCH 5/10 | Training loss: 105.65 | Training accuracy: 0.09 | Validation accuracy: 0.12 EPOCH 6/10 | Training loss: 105.65 | Training accuracy: 0.09 | Validation accuracy: 0.12 EPOCH 7/10 | Training loss: 105.65 | Training accuracy: 0.09 | Validation accuracy: 0.12 EPOCH 8/10 | Training loss: 105.65 | Training accuracy: 0.09 | Validation accuracy: 0.12 EPOCH 9/10 | Training loss: 105.65 | Training accuracy: 0.09 | Validation accuracy: 0.12



Learning Rate: 1e-10 | Regularization: 10000.0 | Maximum Validation Accura cy: 0.12

EPOCH 0/10 | Training loss: 1027.51 | Training accuracy: 0.11 | Validation accuracy: 0.11 EPOCH 1/10 | Training loss: 1027.47 | Training accuracy: 0.11 | Validation accuracy: 0.11 EPOCH 2/10 | Training loss: 1027.43 | Training accuracy: 0.11 | Validation accuracy: 0.11 EPOCH 3/10 | Training loss: 1027.38 | Training accuracy: 0.11 | Validation accuracy: 0.11 EPOCH 4/10 | Training loss: 1027.34 | Training accuracy: 0.11 | Validation accuracy: 0.11 EPOCH 5/10 | Training loss: 1027.30 | Training accuracy: 0.11 | Validation accuracy: 0.11 EPOCH 6/10 | Training loss: 1027.26 | Training accuracy: 0.11 | Validation accuracy: 0.11 EPOCH 7/10 | Training loss: 1027.21 | Training accuracy: 0.11 | Validation accuracy: 0.11 EPOCH 8/10 | Training loss: 1027.17 | Training accuracy: 0.11 | Validation accuracy: 0.11 EPOCH 9/10 | Training loss: 1027.13 | Training accuracy: 0.11 | Validation accuracy: 0.11



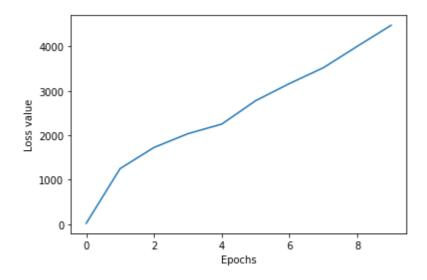
Learning Rate: 1e-10 | Regularization: 100000.0 | Maximum Validation Accuracy: 0.11

Best Hyperparameters: Learning Rate 1e-05 | Regularization: 10000.0

In [87]:

hist_svm = grid_search('svm')

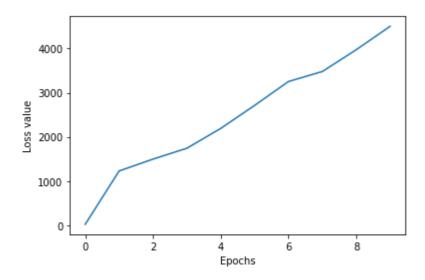
EPOCH 0/10 | Training loss: 19.87 | Training accuracy: 0.20 | Validation a ccuracy: 0.08 EPOCH 1/10 | Training loss: 1251.87 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 2/10 | Training loss: 1727.50 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 3/10 | Training loss: 2037.24 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 4/10 | Training loss: 2253.67 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 5/10 | Training loss: 2780.81 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 6/10 | Training loss: 3167.52 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 7/10 | Training loss: 3523.30 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 8/10 | Training loss: 4005.78 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 9/10 | Training loss: 4479.14 | Training accuracy: 0.14 | Validation accuracy: 0.10



Learning Rate: 1e-05 | Regularization: 10.0 | Maximum Validation Accuracy: 0.1

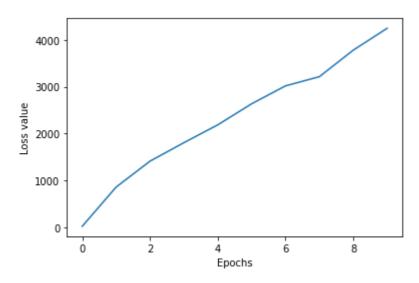
Loss function used: hinge

EPOCH 0/10 | Training loss: 20.43 | Training accuracy: 0.17 | Validation a ccuracy: 0.10 EPOCH 1/10 | Training loss: 1227.86 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 2/10 | Training loss: 1496.51 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 3/10 | Training loss: 1742.24 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 4/10 | Training loss: 2192.02 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 5/10 | Training loss: 2713.33 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 6/10 | Training loss: 3254.22 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 7/10 | Training loss: 3480.34 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 8/10 | Training loss: 3974.07 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 9/10 | Training loss: 4504.56 | Training accuracy: 0.14 | Validation accuracy: 0.10



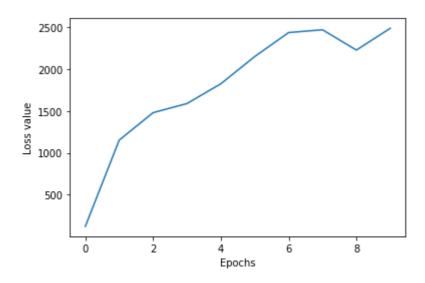
Learning Rate: 1e-05 | Regularization: 100.0 | Maximum Validation Accuracy: 0.1

EPOCH 0/10 | Training loss: 25.35 | Training accuracy: 0.14 | Validation a ccuracy: 0.10 EPOCH 1/10 | Training loss: 860.70 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 2/10 | Training loss: 1412.97 | Training accuracy: 0.23 | Validation accuracy: 0.07 EPOCH 3/10 | Training loss: 1806.78 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 4/10 | Training loss: 2186.75 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 5/10 | Training loss: 2635.79 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 6/10 | Training loss: 3017.75 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 7/10 | Training loss: 3213.50 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 8/10 | Training loss: 3779.02 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 9/10 | Training loss: 4244.99 | Training accuracy: 0.14 | Validation accuracy: 0.10



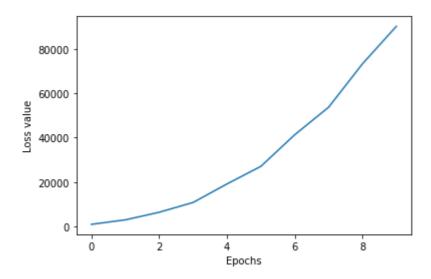
Learning Rate: 1e-05 | Regularization: 1000.0 | Maximum Validation Accuracy: 0.1

EPOCH 0/10 | Training loss: 121.59 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 1/10 | Training loss: 1151.85 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 2/10 | Training loss: 1480.12 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 3/10 | Training loss: 1588.95 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 4/10 | Training loss: 1825.55 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 5/10 | Training loss: 2151.10 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 6/10 | Training loss: 2437.65 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 7/10 | Training loss: 2470.70 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 8/10 | Training loss: 2228.38 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 9/10 | Training loss: 2488.76 | Training accuracy: 0.14 | Validation accuracy: 0.10



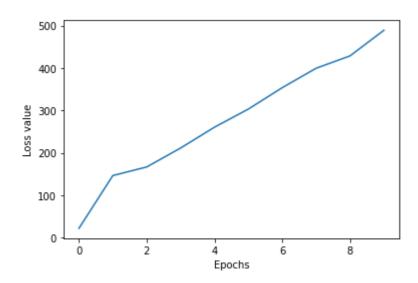
Learning Rate: 1e-05 | Regularization: 10000.0 | Maximum Validation Accura cy: 0.1

EPOCH 0/10 | Training loss: 1034.67 | Training accuracy: 0.09 | Validation accuracy: 0.09 EPOCH 1/10 | Training loss: 3044.55 | Training accuracy: 0.20 | Validation accuracy: 0.08 EPOCH 2/10 | Training loss: 6470.95 | Training accuracy: 0.09 | Validation accuracy: 0.09 EPOCH 3/10 | Training loss: 10871.05 | Training accuracy: 0.14 | Validatio n accuracy: 0.10 EPOCH 4/10 | Training loss: 19206.33 | Training accuracy: 0.09 | Validatio n accuracy: 0.09 EPOCH 5/10 | Training loss: 27118.83 | Training accuracy: 0.14 | Validatio n accuracy: 0.10 EPOCH 6/10 | Training loss: 41353.50 | Training accuracy: 0.09 | Validatio n accuracy: 0.09 EPOCH 7/10 | Training loss: 53736.10 | Training accuracy: 0.14 | Validatio n accuracy: 0.10 EPOCH 8/10 | Training loss: 73293.19 | Training accuracy: 0.09 | Validatio n accuracy: 0.09 EPOCH 9/10 | Training loss: 90164.48 | Training accuracy: 0.14 | Validatio n accuracy: 0.10



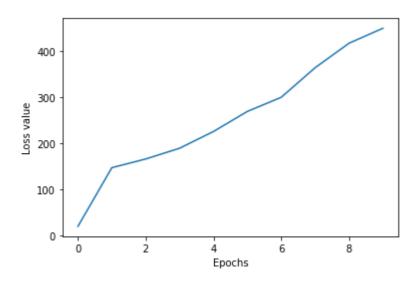
Learning Rate: 1e-05 | Regularization: 100000.0 | Maximum Validation Accuracy: 0.1

EPOCH 0/10 | Training loss: 21.98 | Training accuracy: 0.20 | Validation a ccuracy: 0.09 EPOCH 1/10 | Training loss: 146.41 | Training accuracy: 0.26 | Validation accuracy: 0.12 EPOCH 2/10 | Training loss: 166.66 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 3/10 | Training loss: 211.30 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 4/10 | Training loss: 260.49 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 5/10 | Training loss: 303.19 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 6/10 | Training loss: 353.69 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 7/10 | Training loss: 399.44 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 8/10 | Training loss: 428.59 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 9/10 | Training loss: 489.01 | Training accuracy: 0.14 | Validation accuracy: 0.10



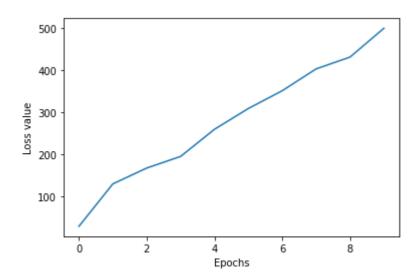
Learning Rate: 1e-06 | Regularization: 10.0 | Maximum Validation Accuracy: 0.12

EPOCH 0/10 | Training loss: 19.48 | Training accuracy: 0.20 | Validation a ccuracy: 0.08 EPOCH 1/10 | Training loss: 146.80 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 2/10 | Training loss: 165.66 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 3/10 | Training loss: 189.04 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 4/10 | Training loss: 225.40 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 5/10 | Training loss: 268.96 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 6/10 | Training loss: 299.69 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 7/10 | Training loss: 363.91 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 8/10 | Training loss: 417.05 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 9/10 | Training loss: 449.56 | Training accuracy: 0.14 | Validation accuracy: 0.10



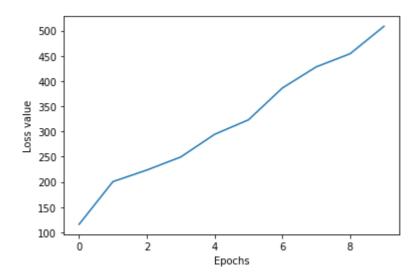
Learning Rate: 1e-06 | Regularization: 100.0 | Maximum Validation Accuracy: 0.1

EPOCH 0/10 | Training loss: 29.98 | Training accuracy: 0.20 | Validation a ccuracy: 0.08 EPOCH 1/10 | Training loss: 130.51 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 2/10 | Training loss: 168.02 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 3/10 | Training loss: 195.52 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 4/10 | Training loss: 259.87 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 5/10 | Training loss: 309.12 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 6/10 | Training loss: 351.28 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 7/10 | Training loss: 403.02 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 8/10 | Training loss: 430.96 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 9/10 | Training loss: 499.25 | Training accuracy: 0.14 | Validation accuracy: 0.10



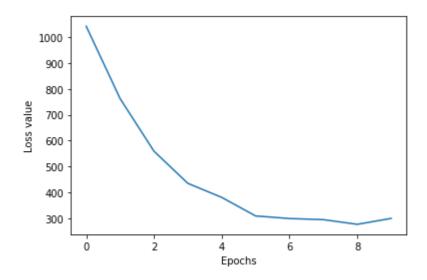
Learning Rate: 1e-06 | Regularization: 1000.0 | Maximum Validation Accuracy: 0.1

EPOCH 0/10 | Training loss: 115.77 | Training accuracy: 0.13 | Validation accuracy: 0.14 EPOCH 1/10 | Training loss: 200.48 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 2/10 | Training loss: 223.37 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 3/10 | Training loss: 249.26 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 4/10 | Training loss: 294.25 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 5/10 | Training loss: 323.00 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 6/10 | Training loss: 386.12 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 7/10 | Training loss: 428.08 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 8/10 | Training loss: 454.13 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 9/10 | Training loss: 508.55 | Training accuracy: 0.14 | Validation accuracy: 0.10



Learning Rate: 1e-06 | Regularization: 10000.0 | Maximum Validation Accura cy: 0.14

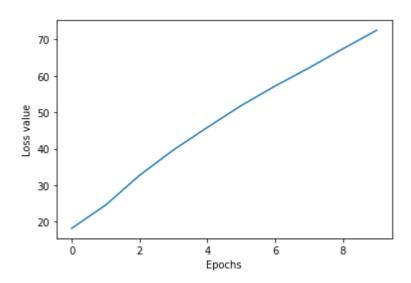
EPOCH 0/10 | Training loss: 1042.13 | Training accuracy: 0.20 | Validation accuracy: 0.08 EPOCH 1/10 | Training loss: 762.77 | Training accuracy: 0.19 | Validation accuracy: 0.10 EPOCH 2/10 | Training loss: 559.49 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 3/10 | Training loss: 435.30 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 4/10 | Training loss: 381.14 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 5/10 | Training loss: 309.41 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 6/10 | Training loss: 299.46 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 7/10 | Training loss: 295.15 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 8/10 | Training loss: 277.09 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 9/10 | Training loss: 299.96 | Training accuracy: 0.14 | Validation accuracy: 0.10



Learning Rate: 1e-06 | Regularization: 100000.0 | Maximum Validation Accuracy: 0.1

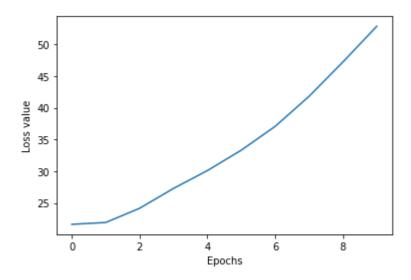
Loss function used: hinge

EPOCH 0/10 | Training loss: 18.16 | Training accuracy: 0.20 | Validation a ccuracy: 0.08 EPOCH 1/10 | Training loss: 24.53 | Training accuracy: 0.20 | Validation a ccuracy: 0.08 EPOCH 2/10 | Training loss: 32.68 | Training accuracy: 0.20 | Validation a ccuracy: 0.08 EPOCH 3/10 | Training loss: 39.65 | Training accuracy: 0.20 | Validation a ccuracy: 0.08 EPOCH 4/10 | Training loss: 45.83 | Training accuracy: 0.20 | Validation a ccuracy: 0.08 EPOCH 5/10 | Training loss: 51.83 | Training accuracy: 0.23 | Validation a ccuracy: 0.09 EPOCH 6/10 | Training loss: 57.20 | Training accuracy: 0.15 | Validation a ccuracy: 0.10 EPOCH 7/10 | Training loss: 62.18 | Training accuracy: 0.14 | Validation a ccuracy: 0.10 EPOCH 8/10 | Training loss: 67.42 | Training accuracy: 0.14 | Validation a ccuracy: 0.10 EPOCH 9/10 | Training loss: 72.53 | Training accuracy: 0.14 | Validation a ccuracy: 0.10



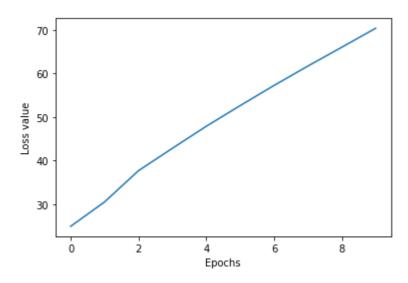
Learning Rate: 1e-07 | Regularization: 10.0 | Maximum Validation Accuracy: 0.1

EPOCH 0/10 | Training loss: 21.62 | Training accuracy: 0.20 | Validation a ccuracy: 0.08 EPOCH 1/10 | Training loss: 21.91 | Training accuracy: 0.21 | Validation a ccuracy: 0.06 EPOCH 2/10 | Training loss: 24.14 | Training accuracy: 0.14 | Validation a ccuracy: 0.10 EPOCH 3/10 | Training loss: 27.27 | Training accuracy: 0.14 | Validation a ccuracy: 0.10 EPOCH 4/10 | Training loss: 30.09 | Training accuracy: 0.14 | Validation a ccuracy: 0.10 EPOCH 5/10 | Training loss: 33.30 | Training accuracy: 0.14 | Validation a ccuracy: 0.10 EPOCH 6/10 | Training loss: 37.06 | Training accuracy: 0.14 | Validation a ccuracy: 0.10 EPOCH 7/10 | Training loss: 41.79 | Training accuracy: 0.14 | Validation a ccuracy: 0.10 EPOCH 8/10 | Training loss: 47.21 | Training accuracy: 0.14 | Validation a ccuracy: 0.10 EPOCH 9/10 | Training loss: 52.85 | Training accuracy: 0.14 | Validation a ccuracy: 0.10



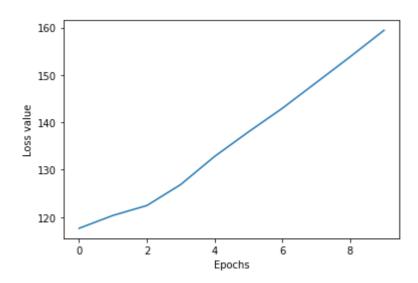
Learning Rate: 1e-07 | Regularization: 100.0 | Maximum Validation Accuracy: 0.1

EPOCH 0/10 | Training loss: 24.90 | Training accuracy: 0.17 | Validation a ccuracy: 0.09 EPOCH 1/10 | Training loss: 30.51 | Training accuracy: 0.17 | Validation a ccuracy: 0.12 EPOCH 2/10 | Training loss: 37.68 | Training accuracy: 0.14 | Validation a ccuracy: 0.10 EPOCH 3/10 | Training loss: 42.82 | Training accuracy: 0.14 | Validation a ccuracy: 0.10 EPOCH 4/10 | Training loss: 47.87 | Training accuracy: 0.14 | Validation a ccuracy: 0.10 EPOCH 5/10 | Training loss: 52.62 | Training accuracy: 0.14 | Validation a ccuracy: 0.10 EPOCH 6/10 | Training loss: 57.25 | Training accuracy: 0.14 | Validation a ccuracy: 0.10 EPOCH 7/10 | Training loss: 61.71 | Training accuracy: 0.14 | Validation a ccuracy: 0.10 EPOCH 8/10 | Training loss: 66.03 | Training accuracy: 0.14 | Validation a ccuracy: 0.10 EPOCH 9/10 | Training loss: 70.39 | Training accuracy: 0.14 | Validation a ccuracy: 0.10



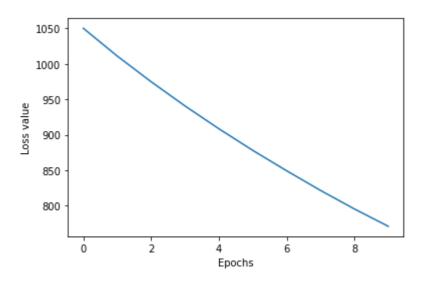
Learning Rate: 1e-07 | Regularization: 1000.0 | Maximum Validation Accuracy: 0.12

EPOCH 0/10 | Training loss: 117.63 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 1/10 | Training loss: 120.35 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 2/10 | Training loss: 122.44 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 3/10 | Training loss: 126.88 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 4/10 | Training loss: 132.81 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 5/10 | Training loss: 138.00 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 6/10 | Training loss: 142.98 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 7/10 | Training loss: 148.41 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 8/10 | Training loss: 153.85 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 9/10 | Training loss: 159.45 | Training accuracy: 0.14 | Validation accuracy: 0.10



Learning Rate: 1e-07 | Regularization: 10000.0 | Maximum Validation Accuracy: 0.1

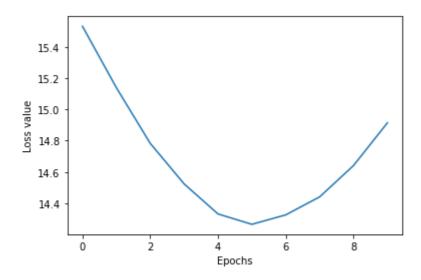
EPOCH 0/10 | Training loss: 1050.13 | Training accuracy: 0.17 | Validation accuracy: 0.13 EPOCH 1/10 | Training loss: 1011.00 | Training accuracy: 0.14 | Validation accuracy: 0.11 EPOCH 2/10 | Training loss: 974.87 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 3/10 | Training loss: 940.74 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 4/10 | Training loss: 908.60 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 5/10 | Training loss: 878.14 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 6/10 | Training loss: 849.41 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 7/10 | Training loss: 821.72 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 8/10 | Training loss: 795.61 | Training accuracy: 0.14 | Validation accuracy: 0.10 EPOCH 9/10 | Training loss: 771.15 | Training accuracy: 0.14 | Validation accuracy: 0.10



Learning Rate: 1e-07 | Regularization: 100000.0 | Maximum Validation Accuracy: 0.13

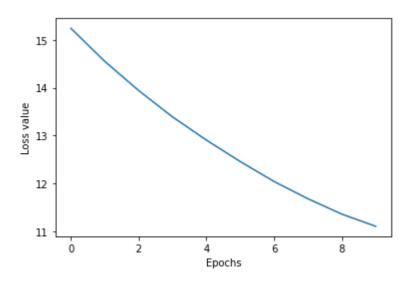
Loss function used: hinge

EPOCH 0/10 | Training loss: 15.53 | Training accuracy: 0.08 | Validation a ccuracy: 0.08 EPOCH 1/10 | Training loss: 15.14 | Training accuracy: 0.08 | Validation a ccuracy: 0.08 EPOCH 2/10 | Training loss: 14.78 | Training accuracy: 0.08 | Validation a ccuracy: 0.09 EPOCH 3/10 | Training loss: 14.52 | Training accuracy: 0.09 | Validation a ccuracy: 0.09 EPOCH 4/10 | Training loss: 14.33 | Training accuracy: 0.09 | Validation a ccuracy: 0.09 EPOCH 5/10 | Training loss: 14.27 | Training accuracy: 0.09 | Validation a ccuracy: 0.09 EPOCH 6/10 | Training loss: 14.33 | Training accuracy: 0.13 | Validation a ccuracy: 0.09 EPOCH 7/10 | Training loss: 14.44 | Training accuracy: 0.15 | Validation a ccuracy: 0.08 EPOCH 8/10 | Training loss: 14.64 | Training accuracy: 0.16 | Validation a ccuracy: 0.07 EPOCH 9/10 | Training loss: 14.91 | Training accuracy: 0.19 | Validation a ccuracy: 0.05



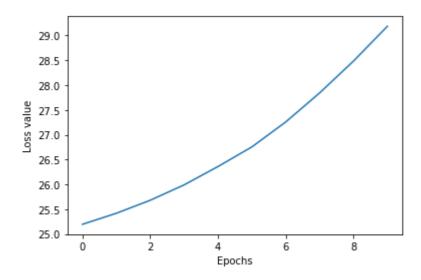
Learning Rate: 1e-08 | Regularization: 10.0 | Maximum Validation Accuracy: 0.09

EPOCH 0/10 | Training loss: 15.24 | Training accuracy: 0.05 | Validation a ccuracy: 0.13 EPOCH 1/10 | Training loss: 14.55 | Training accuracy: 0.05 | Validation a ccuracy: 0.13 EPOCH 2/10 | Training loss: 13.94 | Training accuracy: 0.04 | Validation a ccuracy: 0.13 EPOCH 3/10 | Training loss: 13.39 | Training accuracy: 0.05 | Validation a ccuracy: 0.13 EPOCH 4/10 | Training loss: 12.91 | Training accuracy: 0.04 | Validation a ccuracy: 0.13 EPOCH 5/10 | Training loss: 12.46 | Training accuracy: 0.04 | Validation a ccuracy: 0.12 EPOCH 6/10 | Training loss: 12.04 | Training accuracy: 0.05 | Validation a ccuracy: 0.12 EPOCH 7/10 | Training loss: 11.68 | Training accuracy: 0.06 | Validation a ccuracy: 0.09 EPOCH 8/10 | Training loss: 11.36 | Training accuracy: 0.09 | Validation a ccuracy: 0.10 EPOCH 9/10 | Training loss: 11.10 | Training accuracy: 0.09 | Validation a ccuracy: 0.08



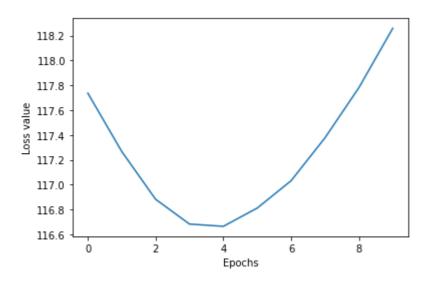
Learning Rate: 1e-08 | Regularization: 100.0 | Maximum Validation Accuracy: 0.13

EPOCH 0/10 | Training loss: 25.20 | Training accuracy: 0.10 | Validation a ccuracy: 0.14 EPOCH 1/10 | Training loss: 25.42 | Training accuracy: 0.09 | Validation a ccuracy: 0.12 EPOCH 2/10 | Training loss: 25.68 | Training accuracy: 0.10 | Validation a ccuracy: 0.12 EPOCH 3/10 | Training loss: 25.99 | Training accuracy: 0.10 | Validation a ccuracy: 0.11 EPOCH 4/10 | Training loss: 26.36 | Training accuracy: 0.09 | Validation a ccuracy: 0.11 EPOCH 5/10 | Training loss: 26.76 | Training accuracy: 0.08 | Validation a ccuracy: 0.09 EPOCH 6/10 | Training loss: 27.26 | Training accuracy: 0.09 | Validation a ccuracy: 0.08 EPOCH 7/10 | Training loss: 27.84 | Training accuracy: 0.09 | Validation a ccuracy: 0.08 EPOCH 8/10 | Training loss: 28.49 | Training accuracy: 0.09 | Validation a ccuracy: 0.08 EPOCH 9/10 | Training loss: 29.19 | Training accuracy: 0.10 | Validation a ccuracy: 0.08



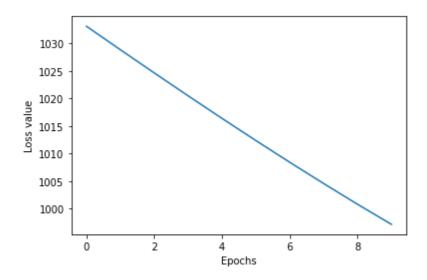
Learning Rate: 1e-08 | Regularization: 1000.0 | Maximum Validation Accuracy: 0.14

EPOCH 0/10 | Training loss: 117.74 | Training accuracy: 0.10 | Validation accuracy: 0.11 EPOCH 1/10 | Training loss: 117.27 | Training accuracy: 0.10 | Validation accuracy: 0.09 EPOCH 2/10 | Training loss: 116.88 | Training accuracy: 0.10 | Validation accuracy: 0.12 EPOCH 3/10 | Training loss: 116.68 | Training accuracy: 0.11 | Validation accuracy: 0.13 EPOCH 4/10 | Training loss: 116.67 | Training accuracy: 0.13 | Validation accuracy: 0.13 EPOCH 5/10 | Training loss: 116.81 | Training accuracy: 0.13 | Validation accuracy: 0.12 EPOCH 6/10 | Training loss: 117.03 | Training accuracy: 0.14 | Validation accuracy: 0.13 EPOCH 7/10 | Training loss: 117.38 | Training accuracy: 0.16 | Validation accuracy: 0.14 EPOCH 8/10 | Training loss: 117.78 | Training accuracy: 0.20 | Validation accuracy: 0.16 EPOCH 9/10 | Training loss: 118.26 | Training accuracy: 0.18 | Validation accuracy: 0.15



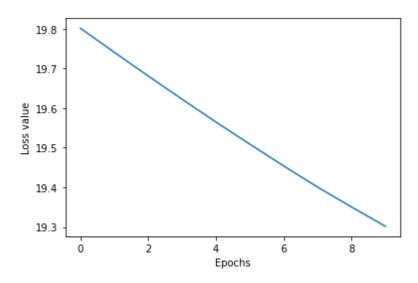
Learning Rate: 1e-08 | Regularization: 10000.0 | Maximum Validation Accura cy: 0.16

EPOCH 0/10 | Training loss: 1033.08 | Training accuracy: 0.13 | Validation accuracy: 0.06 EPOCH 1/10 | Training loss: 1028.82 | Training accuracy: 0.13 | Validation accuracy: 0.08 EPOCH 2/10 | Training loss: 1024.62 | Training accuracy: 0.10 | Validation accuracy: 0.11 EPOCH 3/10 | Training loss: 1020.46 | Training accuracy: 0.09 | Validation accuracy: 0.11 EPOCH 4/10 | Training loss: 1016.37 | Training accuracy: 0.10 | Validation accuracy: 0.12 EPOCH 5/10 | Training loss: 1012.34 | Training accuracy: 0.11 | Validation accuracy: 0.12 EPOCH 6/10 | Training loss: 1008.40 | Training accuracy: 0.14 | Validation accuracy: 0.11 EPOCH 7/10 | Training loss: 1004.55 | Training accuracy: 0.15 | Validation accuracy: 0.11 EPOCH 8/10 | Training loss: 1000.79 | Training accuracy: 0.14 | Validation accuracy: 0.11 EPOCH 9/10 | Training loss: 997.15 | Training accuracy: 0.15 | Validation accuracy: 0.11



Learning Rate: 1e-08 | Regularization: 100000.0 | Maximum Validation Accuracy: 0.12

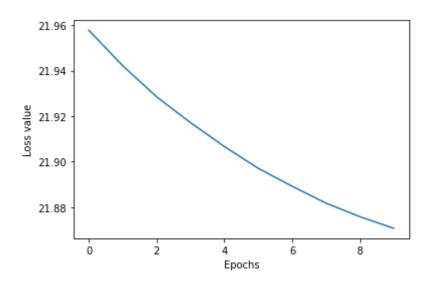
EPOCH 0/10 | Training loss: 19.80 | Training accuracy: 0.09 | Validation a ccuracy: 0.06 EPOCH 1/10 | Training loss: 19.74 | Training accuracy: 0.09 | Validation a ccuracy: 0.06 EPOCH 2/10 | Training loss: 19.68 | Training accuracy: 0.09 | Validation a ccuracy: 0.06 EPOCH 3/10 | Training loss: 19.62 | Training accuracy: 0.11 | Validation a ccuracy: 0.06 EPOCH 4/10 | Training loss: 19.56 | Training accuracy: 0.11 | Validation a ccuracy: 0.06 EPOCH 5/10 | Training loss: 19.51 | Training accuracy: 0.11 | Validation a ccuracy: 0.06 EPOCH 6/10 | Training loss: 19.45 | Training accuracy: 0.12 | Validation a ccuracy: 0.06 EPOCH 7/10 | Training loss: 19.40 | Training accuracy: 0.12 | Validation a ccuracy: 0.05 EPOCH 8/10 | Training loss: 19.35 | Training accuracy: 0.12 | Validation a ccuracy: 0.05 EPOCH 9/10 | Training loss: 19.30 | Training accuracy: 0.12 | Validation a ccuracy: 0.05



Learning Rate: 1e-09 | Regularization: 10.0 | Maximum Validation Accuracy: 0.06

Loss function used: hinge

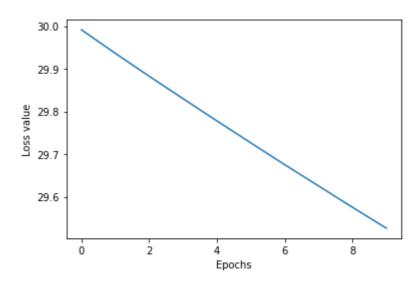
EPOCH 0/10 | Training loss: 21.96 | Training accuracy: 0.20 | Validation a ccuracy: 0.09 EPOCH 1/10 | Training loss: 21.94 | Training accuracy: 0.20 | Validation a ccuracy: 0.09 EPOCH 2/10 | Training loss: 21.93 | Training accuracy: 0.20 | Validation a ccuracy: 0.09 EPOCH 3/10 | Training loss: 21.92 | Training accuracy: 0.20 | Validation a ccuracy: 0.09 EPOCH 4/10 | Training loss: 21.91 | Training accuracy: 0.20 | Validation a ccuracy: 0.09 EPOCH 5/10 | Training loss: 21.90 | Training accuracy: 0.20 | Validation a ccuracy: 0.09 EPOCH 6/10 | Training loss: 21.89 | Training accuracy: 0.20 | Validation a ccuracy: 0.09 EPOCH 7/10 | Training loss: 21.88 | Training accuracy: 0.20 | Validation a ccuracy: 0.09 EPOCH 8/10 | Training loss: 21.88 | Training accuracy: 0.20 | Validation a ccuracy: 0.09 EPOCH 9/10 | Training loss: 21.87 | Training accuracy: 0.20 | Validation a ccuracy: 0.09



Learning Rate: 1e-09 | Regularization: 100.0 | Maximum Validation Accuracy: 0.09

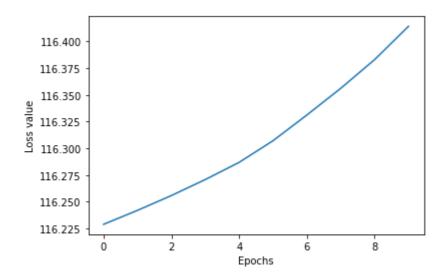
Loss function used: hinge

EPOCH 0/10 | Training loss: 29.99 | Training accuracy: 0.10 | Validation a ccuracy: 0.11 EPOCH 1/10 | Training loss: 29.94 | Training accuracy: 0.10 | Validation a ccuracy: 0.11 EPOCH 2/10 | Training loss: 29.88 | Training accuracy: 0.10 | Validation a ccuracy: 0.11 EPOCH 3/10 | Training loss: 29.83 | Training accuracy: 0.10 | Validation a ccuracy: 0.11 EPOCH 4/10 | Training loss: 29.78 | Training accuracy: 0.11 | Validation a ccuracy: 0.11 EPOCH 5/10 | Training loss: 29.73 | Training accuracy: 0.11 | Validation a ccuracy: 0.11 EPOCH 6/10 | Training loss: 29.68 | Training accuracy: 0.11 | Validation a ccuracy: 0.11 EPOCH 7/10 | Training loss: 29.63 | Training accuracy: 0.11 | Validation a ccuracy: 0.11 EPOCH 8/10 | Training loss: 29.58 | Training accuracy: 0.11 | Validation a ccuracy: 0.11 EPOCH 9/10 | Training loss: 29.53 | Training accuracy: 0.11 | Validation a ccuracy: 0.11



Learning Rate: 1e-09 | Regularization: 1000.0 | Maximum Validation Accuracy: 0.11

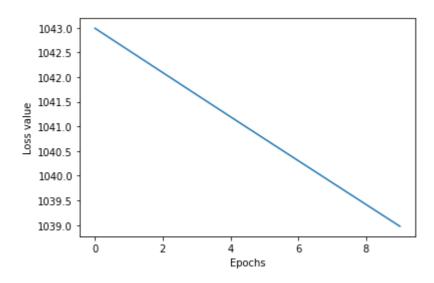
EPOCH 0/10 | Training loss: 116.23 | Training accuracy: 0.08 | Validation accuracy: 0.08 EPOCH 1/10 | Training loss: 116.24 | Training accuracy: 0.07 | Validation accuracy: 0.08 EPOCH 2/10 | Training loss: 116.26 | Training accuracy: 0.07 | Validation accuracy: 0.08 EPOCH 3/10 | Training loss: 116.27 | Training accuracy: 0.07 | Validation accuracy: 0.08 EPOCH 4/10 | Training loss: 116.29 | Training accuracy: 0.07 | Validation accuracy: 0.08 EPOCH 5/10 | Training loss: 116.31 | Training accuracy: 0.07 | Validation accuracy: 0.08 EPOCH 6/10 | Training loss: 116.33 | Training accuracy: 0.07 | Validation accuracy: 0.08 EPOCH 7/10 | Training loss: 116.36 | Training accuracy: 0.07 | Validation accuracy: 0.08 EPOCH 8/10 | Training loss: 116.38 | Training accuracy: 0.08 | Validation accuracy: 0.08 EPOCH 9/10 | Training loss: 116.41 | Training accuracy: 0.07 | Validation accuracy: 0.09



Learning Rate: 1e-09 | Regularization: 10000.0 | Maximum Validation Accuracy: 0.09

Loss function used: hinge

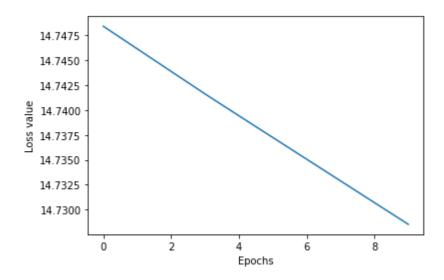
EPOCH 0/10 | Training loss: 1042.99 | Training accuracy: 0.05 | Validation accuracy: 0.14 EPOCH 1/10 | Training loss: 1042.54 | Training accuracy: 0.06 | Validation accuracy: 0.14 EPOCH 2/10 | Training loss: 1042.09 | Training accuracy: 0.06 | Validation accuracy: 0.14 EPOCH 3/10 | Training loss: 1041.64 | Training accuracy: 0.06 | Validation accuracy: 0.14 EPOCH 4/10 | Training loss: 1041.20 | Training accuracy: 0.06 | Validation accuracy: 0.14 EPOCH 5/10 | Training loss: 1040.75 | Training accuracy: 0.06 | Validation accuracy: 0.14 EPOCH 6/10 | Training loss: 1040.31 | Training accuracy: 0.08 | Validation accuracy: 0.14 EPOCH 7/10 | Training loss: 1039.86 | Training accuracy: 0.08 | Validation accuracy: 0.14 EPOCH 8/10 | Training loss: 1039.42 | Training accuracy: 0.08 | Validation accuracy: 0.14 EPOCH 9/10 | Training loss: 1038.98 | Training accuracy: 0.08 | Validation accuracy: 0.14



Learning Rate: 1e-09 | Regularization: 100000.0 | Maximum Validation Accuracy: 0.14

Loss function used: hinge

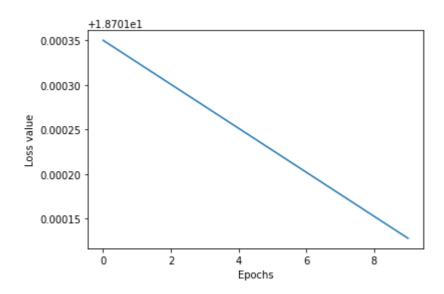
EPOCH 0/10 | Training loss: 14.75 | Training accuracy: 0.09 | Validation a ccuracy: 0.07 EPOCH 1/10 | Training loss: 14.75 | Training accuracy: 0.09 | Validation a ccuracy: 0.07 EPOCH 2/10 | Training loss: 14.74 | Training accuracy: 0.09 | Validation a ccuracy: 0.07 EPOCH 3/10 | Training loss: 14.74 | Training accuracy: 0.09 | Validation a ccuracy: 0.07 EPOCH 4/10 | Training loss: 14.74 | Training accuracy: 0.09 | Validation a ccuracy: 0.07 EPOCH 5/10 | Training loss: 14.74 | Training accuracy: 0.09 | Validation a ccuracy: 0.07 EPOCH 6/10 | Training loss: 14.74 | Training accuracy: 0.09 | Validation a ccuracy: 0.07 EPOCH 7/10 | Training loss: 14.73 | Training accuracy: 0.09 | Validation a ccuracy: 0.07 EPOCH 8/10 | Training loss: 14.73 | Training accuracy: 0.09 | Validation a ccuracy: 0.07 EPOCH 9/10 | Training loss: 14.73 | Training accuracy: 0.09 | Validation a ccuracy: 0.07



Learning Rate: 1e-10 | Regularization: 10.0 | Maximum Validation Accuracy: 0.07

Loss function used: hinge

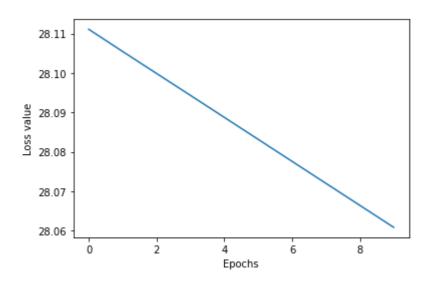
EPOCH 0/10 | Training loss: 18.70 | Training accuracy: 0.05 | Validation a ccuracy: 0.11 EPOCH 1/10 | Training loss: 18.70 | Training accuracy: 0.05 | Validation a ccuracy: 0.11 EPOCH 2/10 | Training loss: 18.70 | Training accuracy: 0.05 | Validation a ccuracy: 0.11 EPOCH 3/10 | Training loss: 18.70 | Training accuracy: 0.05 | Validation a ccuracy: 0.11 EPOCH 4/10 | Training loss: 18.70 | Training accuracy: 0.05 | Validation a ccuracy: 0.11 EPOCH 5/10 | Training loss: 18.70 | Training accuracy: 0.05 | Validation a ccuracy: 0.11 EPOCH 6/10 | Training loss: 18.70 | Training accuracy: 0.05 | Validation a ccuracy: 0.11 EPOCH 7/10 | Training loss: 18.70 | Training accuracy: 0.05 | Validation a ccuracy: 0.11 EPOCH 8/10 | Training loss: 18.70 | Training accuracy: 0.05 | Validation a ccuracy: 0.11 EPOCH 9/10 | Training loss: 18.70 | Training accuracy: 0.05 | Validation a ccuracy: 0.11



Learning Rate: 1e-10 | Regularization: 100.0 | Maximum Validation Accuracy: 0.11

Loss function used: hinge

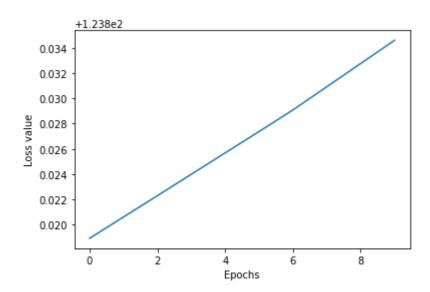
EPOCH 0/10 | Training loss: 28.11 | Training accuracy: 0.05 | Validation a ccuracy: 0.09 EPOCH 1/10 | Training loss: 28.11 | Training accuracy: 0.05 | Validation a ccuracy: 0.09 EPOCH 2/10 | Training loss: 28.10 | Training accuracy: 0.05 | Validation a ccuracy: 0.09 EPOCH 3/10 | Training loss: 28.09 | Training accuracy: 0.05 | Validation a ccuracy: 0.09 EPOCH 4/10 | Training loss: 28.09 | Training accuracy: 0.05 | Validation a ccuracy: 0.09 EPOCH 5/10 | Training loss: 28.08 | Training accuracy: 0.05 | Validation a ccuracy: 0.09 EPOCH 6/10 | Training loss: 28.08 | Training accuracy: 0.05 | Validation a ccuracy: 0.09 EPOCH 7/10 | Training loss: 28.07 | Training accuracy: 0.05 | Validation a ccuracy: 0.09 EPOCH 8/10 | Training loss: 28.07 | Training accuracy: 0.05 | Validation a ccuracy: 0.09 EPOCH 9/10 | Training loss: 28.06 | Training accuracy: 0.05 | Validation a ccuracy: 0.09



Learning Rate: 1e-10 | Regularization: 1000.0 | Maximum Validation Accuracy: 0.09

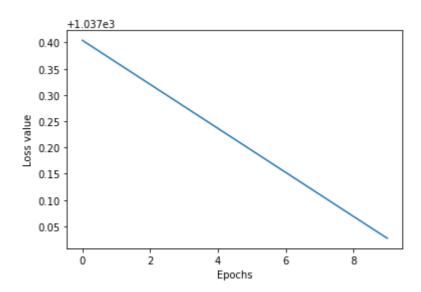
Loss function used: hinge

EPOCH 0/10 | Training loss: 123.82 | Training accuracy: 0.12 | Validation accuracy: 0.13 EPOCH 1/10 | Training loss: 123.82 | Training accuracy: 0.12 | Validation accuracy: 0.13 EPOCH 2/10 | Training loss: 123.82 | Training accuracy: 0.12 | Validation accuracy: 0.13 EPOCH 3/10 | Training loss: 123.82 | Training accuracy: 0.12 | Validation accuracy: 0.14 EPOCH 4/10 | Training loss: 123.83 | Training accuracy: 0.12 | Validation accuracy: 0.13 EPOCH 5/10 | Training loss: 123.83 | Training accuracy: 0.12 | Validation accuracy: 0.13 EPOCH 6/10 | Training loss: 123.83 | Training accuracy: 0.12 | Validation accuracy: 0.13 EPOCH 7/10 | Training loss: 123.83 | Training accuracy: 0.12 | Validation accuracy: 0.13 EPOCH 8/10 | Training loss: 123.83 | Training accuracy: 0.12 | Validation accuracy: 0.13 EPOCH 9/10 | Training loss: 123.83 | Training accuracy: 0.12 | Validation accuracy: 0.13



Learning Rate: 1e-10 | Regularization: 10000.0 | Maximum Validation Accura cy: 0.14

EPOCH 0/10 | Training loss: 1037.40 | Training accuracy: 0.08 | Validation accuracy: 0.10 EPOCH 1/10 | Training loss: 1037.36 | Training accuracy: 0.08 | Validation accuracy: 0.10 EPOCH 2/10 | Training loss: 1037.32 | Training accuracy: 0.08 | Validation accuracy: 0.10 EPOCH 3/10 | Training loss: 1037.28 | Training accuracy: 0.08 | Validation accuracy: 0.10 EPOCH 4/10 | Training loss: 1037.24 | Training accuracy: 0.08 | Validation accuracy: 0.10 EPOCH 5/10 | Training loss: 1037.19 | Training accuracy: 0.08 | Validation accuracy: 0.10 EPOCH 6/10 | Training loss: 1037.15 | Training accuracy: 0.08 | Validation accuracy: 0.10 EPOCH 7/10 | Training loss: 1037.11 | Training accuracy: 0.08 | Validation accuracy: 0.10 EPOCH 8/10 | Training loss: 1037.07 | Training accuracy: 0.08 | Validation accuracy: 0.10 EPOCH 9/10 | Training loss: 1037.03 | Training accuracy: 0.08 | Validation accuracy: 0.10



Learning Rate: 1e-10 | Regularization: 100000.0 | Maximum Validation Accuracy: 0.1

Best Hyperparameters: Learning Rate 1e-08 | Regularization: 10000.0

In []: