

HW1_Vanilla_nm3191_ksw352

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1 Fully connected Neural Network (Vanilla Code in Python)

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```
In [1]: import torch
import torchvision
import torchvision.transforms as transforms
from sklearn.metrics import accuracy_score
```

```
In [2]: transform = transforms.Compose([ transforms.ToTensor () ,
                                         transforms.Normalize ((0.5 , 0.5 , 0.5) , (0.5 , 0.5 , 0.5))
```

```
In [3]: trainset = torchvision.datasets.CIFAR10(root='./data', train=True,
                                                download=True, transform=transform)
        testset = torchvision.datasets.CIFAR10(root='./data', train=False,
                                                download=True, transform=transform)
```

Files already downloaded and verified

Files already downloaded and verified

```
In [4]: import pickle
import os
import numpy as np
```

Below are some functions mde to preprocess the data batches

```
In [29]: data_path = "./data/"
```

```
# Constants
```

```
# Image size
```

```
img_size = 32
```

```
# 3 channels: Red, Green, Blue.
```

```

channel_number = 3

oneimgsize = img_size * img_size
# Length of an flattened image array.
img_size_flat = oneimgsize * channel_number

# Number of classes.
num_classes = 10

# Constants used to allocate arrays

# Number of files for the training-set.
_images_per_file = 10000

train_num_files = int(50000 / _images_per_file)

# Total number of images in the training-set.
# This is used to pre-allocate arrays for efficiency.
total_images_train = int(train_num_files * _images_per_file)

In [30]: def get_path(filename=""):
        """
        Return the full path of a data-file for the data-set.
        If filename==" " then return the directory of the files.
        """

        return os.path.join(data_path, "cifar-10-batches-py/", filename)

In [31]: # Convert the data into a numpy array
def unpickle(filename):
    """
    Unpickle the given file and return the data.
    Note that the appropriate dir-name is prepended the filename.
    """

    # Create full path for the file.
    file_path = get_path(filename)

    print("Loading data: " + file_path)

    with open(file_path, mode='rb') as file:
        # In Python 3.X it is important to set the encoding, to prevent exception
        data = pickle.load(file, encoding='bytes')

    return data

In [32]: def converting(raw):
        raw_float = np.array(raw,dtype=float)/255

```

```

#raw_float = np.array(raw, dtype=float)
#Reshape the image into 4 dimension

images = raw_float.reshape([-1, channel_number, img_size, img_size])
images = images.transpose([0,2,3,1])
return images

```

```

In [33]: def one_hot_encoded(class_numbers, num_classes=None):
        """
        Generate the One-Hot encoded class-labels from an array of integers.
        This way, each class is represented by an array of integers, instead of a single
        """

        # Find the number of classes if None is provided.
        # Assumes the lowest class-number is zero.
        if num_classes is None:
            num_classes = np.max(class_numbers) + 1

        return np.eye(num_classes, dtype=float)[class_numbers]

```

```

In [34]: def data_loader(filename):
        """
        Load a pickled data-file from the CIFAR-10 data-set
        and return the converted imagesb and the class-number
        for each image.
        """

        # Load the pickled data-file.
        data = unpickle(filename)

        # Get the raw images.
        images = data[b'data']

        # Get the class-numbers for each image. Convert to numpy-array.
        classlabels = np.array(data[b'labels'])

        images = converting(images)

        return images, classlabels

```

```

In [35]: def load_class_names():
        """
        Load the names for the classes in the data-set.
        Returns a list with the names. Example: names[3] is the name
        associated with class-number 3.
        """

        # Load the class-names from the pickled file.

```

```

raw = unpickle(filename="batches.meta")[b'label_names']

# Convert from binary strings.
names = [x.decode('utf-8') for x in raw]

return names

```

```

In [36]: def load_training_data():
        """
        Load all the training-data for the data-set.
        The data-set is split into 5 data-files which are merged here.
        Returns the images, class-numbers and one-hot encoded class-labels.
        """

        # Pre-allocate the arrays for the images and class-numbers for efficiency.
        images = np.zeros(shape=[total_images_train, img_size, img_size, channel_number],
                           dtype=int)
        classlabel = np.zeros(shape=[total_images_train], dtype=int)

        # Begin-index for the current batch.
        begin = 0

        # For each data-file.
        for i in range(train_num_files):
            # Load the images and class-numbers from the data-file.
            images_batch, class_batch = data_loader(filename="data_batch_" + str(i + 1))

            # Number of images in this batch.
            num_images = len(images_batch)

            # End-index for the current batch.
            end = begin + num_images

            print(end)
            # Store the images into the array.
            images[begin:end, :] = images_batch

            # Store the class-numbers into the array.
            classlabel[begin:end] = class_batch

            # The begin-index for the next batch is the current end-index.
            begin = end

        return images, classlabel, one_hot_encoded(class_numbers = classlabel, num_classes=

```

```

In [37]: def load_test_data():
        """
        Load all the test-data for the CIFAR-10 data-set.

```

```
Returns the images, class-numbers and one-hot encoded class-labels.
"""
```

```
images, classlabel = data_loader(filename="test_batch")
```

```
return images, classlabel, one_hot_encoded(class_numbers = classlabel, num_classes)
```

```
In [38]: class_names = load_class_names()
class_names
```

```
Loading data: ./data/cifar-10-batches-py/batches.meta
```

```
Out[38]: ['airplane',
          'automobile',
          'bird',
          'cat',
          'deer',
          'dog',
          'frog',
          'horse',
          'ship',
          'truck']
```

```
In [39]: images_train, train_class, labels_train = load_training_data()
```

```
Loading data: ./data/cifar-10-batches-py/data_batch_1
```

```
10000
```

```
Loading data: ./data/cifar-10-batches-py/data_batch_2
```

```
20000
```

```
Loading data: ./data/cifar-10-batches-py/data_batch_3
```

```
30000
```

```
Loading data: ./data/cifar-10-batches-py/data_batch_4
```

```
40000
```

```
Loading data: ./data/cifar-10-batches-py/data_batch_5
```

```
50000
```

```
In [46]: images_test, test_class, labels_test = load_test_data()
```

```
Loading data: ./data/cifar-10-batches-py/test_batch
```

```
In [47]: print("Size of:")
print("Training-set:\t\t{}".format(len(images_train)))
print("Test-set:\t\t{}".format(len(images_test)))
```

```
Size of:
```

```
- Training-set:          50000
- Test-set:              10000
```

```
In [48]: print("Type of")
         print("-Training images:\t{}", shape {}).format(type(images_train),images_train.shape)
         print("-Test images:\t\t{}", shape {}).format(type(images_test),images_test.shape))
```

Type of

```
-Training images:      <class 'numpy.ndarray'>, shape (50000, 3072)
-Test images:         <class 'numpy.ndarray'>, shape (10000, 32, 32, 3)
```

Reshaping the images

```
In [49]: print('Original Dimenions..')
         print('Training data size- Data,Labels {},{}'.format(images_train.shape,train_class.shape))
         print('Test data size- Data,Labels {},{}'.format(images_test.shape,test_class.shape))
```

Original Dimenions..

Training data size- Data,Labels (50000, 3072),(50000, 1)

Test data size- Data,Labels (10000, 32, 32, 3),(10000,)

```
In [50]: images_train = images_train.reshape(50000,-1) # -1 indicates reshaping with the leftmost dimension
         train_class = train_class.reshape(50000,-1)
```

```
images_test = images_test.reshape(10000,-1)
```

```
test_class = test_class.reshape(10000,-1)
```

```
print('Post Reshaping Dimenions..')
```

```
print('Training data size- Data,Labels {},{}'.format(images_train.shape,train_class.shape))
```

```
print('Test data size- Data,Labels {},{}'.format(images_test.shape,test_class.shape))
```

Post Reshaping Dimenions..

Training data size- Data,Labels (50000, 3072),(50000, 1)

Test data size- Data,Labels (10000, 3072),(10000, 1)

Neural Network Implementation

```
In [51]: number_of_images = 10000;
```

```
images_train = images_train[:number_of_images].T
```

```
len(images_train)
```

```
labels_train = labels_train[:number_of_images]
```

```
len(labels_train)
```

```
images_train.shape
```

```
#labels_train.shape
```

```
Out[51]: (3072, 10000)
```

```
In [52]: """Each activation layer will indicate the number of features of one images i.e 1000
in the first hidden layer will have 1000 features per image. matrix would be 10000* n
Translating it to a different plane to yield linear models.
second would have 500 features per images

"""

#Parameters for the neural network
numberOfLayers = 3
neurons_layer_one = 250
neurons_layer_two = 100
neurons_output_layer = 10;

layer_dim = [images_train.shape[0],neurons_layer_one,neurons_layer_two,neurons_output]
parameters = {
}
```

1.4 Network training code here

```
In [53]: class NeuralNetwork:
```

```
    def __init__(self,dimensions):
        self.layer_dimensions = dimensions;
        np.random.seed(1);
        self.parameters = parameters;
        L = len(layer_dim)

        for i in range(0,L-1):
            a = str(i+1)
            parameters["W"+a] = (np.random.randn(dimensions[i+1],dimensions[i])*0.01)
            parameters["b"+a] = np.zeros((dimensions[i+1],1))

    def affineForward(self,A_prev,W,b):
        #print('Inside affineForward defn.....')
        Z_dot = np.dot(W,A_prev)
        Z = Z_dot+b

        cache = (A_prev,W,b)
        return Z,cache

    def activationForward(self, A,layer,activation_function="relu"):
        parameters = self.parameters
        a = str(layer)
        W = parameters["W"+a]
        b = parameters["b"+a]
```

```

Z,linear_cache = self.affineForward(A,W,b)

#linear_cache is for A,W,b
#activation_cache is the Z
#print("Layer,Size of the input,Weight,Bias,Z {}".format(layer,A,W,b,Z))
if(activation_function == "relu"):
    A,activation_cache = relu(Z)
elif (activation_function == "softmax"):
    A,activation_cache = _softmax(Z)

cache = (linear_cache,activation_cache)
return A,cache

def forwardPropagation(self,X):

    #print('.....Inside forwardPropagation.....')
    L = len(self.layer_dimensions)
    A = X
    caches = []
    #print('Dimension length..',L)

    for i in range(1,L-1):
        #print('.....Starting layer....',i)
        A_prev = A
        A,cache = self.activationForward(A_prev,i,"relu")
        caches.append(cache)

    A1,cache = self.activationForward(A,L-1,"softmax")
    caches.append(cache)
    #print('Post applying softmax function for layer,Y,Z..{}'.format(L-1,A1,Z))
    return A1,caches

def costFunction(self,A1,y):
    A1 = A1.T
    m = y.shape[0]
    cost = -(1/m)*((np.sum((y*np.log(A1)))+(1-y)*(np.log(1-A1))))
    # print('...Shape of cost function {}'.format(cost.shape))
    return cost

def affineBackward(self,dZ,linear_cache):
    #delta = g'(z) = dZ
    #dZ would represent the g'(z)
    #a=A_prev ; dw3= a.dZ

    A_prev,W,b = linear_cache
    m = A_prev.shape[1]

```



```

dW = (1/m)*np.dot(dZ,A_prev.T)
db = (1/m)*np.sum(dZ,axis=1,keepdims=True)

dA_prev = np.dot(W.T,dZ)

return dA_prev,dW,db

def activationBackward(self, dA, cache,activation_fn):
    linear_cache,activation_cache = cache;

    if activation_fn == "relu":
        dZ = relu_gradient(dA,activation_cache)
        dA_prev, dW,db = self.affineBackward(dZ,linear_cache)

    elif activation_fn == "_softmax":
        dZ = _softmax_gradient(dA,activation_cache)
        dA_prev, dW,db = self.affineBackward(dZ,linear_cache)

    return dA_prev, dW,db

def backwardPropagation(self,A1,y,caches):
    L = len(caches)
    #print('Length of cache...',L)
    grads ={}
    dA1 = np.divide(A1 - y.T, np.multiply(A1, 1 - A1))

    #Use different activation function at the last layer
    grads["dA"+str(L-1)],grads["dW"+str(L)],grads["db"+str(L)] = self.activationB

    for i in range(L-1,0,-1):
        current_cache = caches[i - 1]
        grads["dA"+str(i-1)],grads["dW"+str(i)],grads["db"+str(i)] = self.activat

    return grads

# define the function to update both weight matrices and bias vectors
def update_parameters(self, grads, learning_rate):
    #print(grads)
    parameters = self.parameters

    L = len(parameters)

```

```

    for l in range (1,4):
        a = str(l)
        parameters["W" + a] = parameters["W" + a] - learning_rate * grads["dW" + a]
        parameters["b" + a] = parameters["b" + a] - learning_rate * grads["db" + a]

    return parameters

def train(self, X,y, number_of_iterations,learning_rate,activation_fn):
    print('....Training the network for total iteration of of {}'.format(number_of_iterations))

    for i in range (1,number_of_iterations):
        print('....Starting Iteration {}.....'.format(i))
        A1,caches = self.forwardPropagation(X);
        Y_pred = A1

        print('.....Calculating the cost function.....')
        cost = self.costFunction(A1,y)
        if i % 5 == 0:
            print ("Cost: ", cost.mean())

        print('.....Calculating gradients.....')
        gradients = self.backwardPropagation(A1,y,caches)

        print('.....Updating paramaters.....')
        paramters = self.update_parameters(gradients,learning_rate)

        score = accuracy_score(train_class[:10000],np.argmax(Y_pred.T,axis=1),normalize=True)
        print('ACCURACY -----Training Data : {}'.format(score))

    print('....Training completed....')

    return Y_pred,paramters

def predict(self,X):
    y_pred,caches = self.forwardPropagation(X);
    return y_pred

```

In [54]: len(layer_dim)

Out[54]: 4

In [55]: *#Define activation function*

```

def relu(Z):
    A = np.maximum(0,Z)
    return A,Z

def leaky_relu(Z):
    A = np.maximum(0.1*Z,Z)
    return A,Z

def _softmax(Z):
    A = 1/(1+np.exp(-Z))
    return A,Z

def tanh(Z):
    A = (np.exp(Z)-np.exp(-Z))/(np.exp(Z)+np.exp(-Z))
    return A,Z

def softmax(Z):
    Z = Z.T
    A = (np.exp(Z))/float(sum(np.exp(Z)))
    return A,Z

```

In [56]: *# Derivative functions*

```

def _softmax_gradient(dA,Z):
    A,Z = _softmax(Z)
    dZ = dA * A * (1-A)
    return dZ

def tanh_gradient(dA, Z):
    A, Z = tanh(Z)
    dZ = dA * (1 - np.square(A))

    return dZ

def relu_gradient(dA, Z):
    A, Z = relu(Z)
    dZ = np.multiply(dA, np.int64(A > 0))

    return dZ

```

```

In [57]: model = NeuralNetwork(layer_dim)
print(model.parameters["W1"].shape,model.parameters["W2"].shape,model.parameters["W3"].shape)
print(model.parameters["b1"].shape,model.parameters["b2"].shape,model.parameters["b3"].shape)

```

```

(250, 3072) (100, 250) (10, 100)

```

(250, 1) (100, 1) (10, 1)

In [58]: images_train.shape

Out[58]: (3072, 10000)

Training the model

In []: Y_pred,paramters = model.train(images_train,labels_train,7000, 0.03,"relu")

...Training the network for total iteration of of 7000

...Starting Iteration 1...

...Calculating the cost function...

...Calculating gradients...

...Updating paramaters...

ACCURACY -----Training Data : 10.190000000000001%

...Starting Iteration 2...

...Calculating the cost function...

...Calculating gradients...

...Updating paramaters...

ACCURACY -----Training Data : 10.45%

...Starting Iteration 3...

...Calculating the cost function...

...Calculating gradients...

...Updating paramaters...

ACCURACY -----Training Data : 10.639999999999999%

...Starting Iteration 4...

...Calculating the cost function...

...Calculating gradients...

...Updating paramaters...

ACCURACY -----Training Data : 10.48%

...Starting Iteration 5...

...Calculating the cost function...

Cost: 0.7210892169583164

...Calculating gradients...

...Updating paramaters...

ACCURACY -----Training Data : 10.32%

...Starting Iteration 6...

...Calculating the cost function...

...Calculating gradients...

...Updating paramaters...

ACCURACY -----Training Data : 10.4%

...Starting Iteration 7...

...Calculating the cost function...

...Calculating gradients...

...Updating paramaters...

ACCURACY -----Training Data : 10.549999999999999%

...Starting Iteration 8...

```

...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.43%
...Starting Iteration 9...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.36%
...Starting Iteration 10...
...Calculating the cost function...
Cost: 0.777863283731977
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.299999999999999%
...Starting Iteration 11...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.25%
...Starting Iteration 12...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.209999999999999%
...Starting Iteration 13...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.23%
...Starting Iteration 14...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.65%
...Starting Iteration 15...
...Calculating the cost function...
Cost: 1.472378731045209
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.99%
...Starting Iteration 16...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.32%
...Starting Iteration 17...
...Calculating the cost function...

```

```

...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.25%
...Starting Iteration 18...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.25%
...Starting Iteration 19...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.99%
...Starting Iteration 20...
...Calculating the cost function...
Cost: 2.2799704347093512
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 21...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 22...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 23...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 24...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 25...
...Calculating the cost function...
Cost: 2.2804252690968347
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 26...
...Calculating the cost function...
...Calculating gradients...

```

```

...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 27...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 28...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 29...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 30...
...Calculating the cost function...
Cost: 2.28044320524501
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 31...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 32...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 33...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 34...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 35...
...Calculating the cost function...
Cost: 2.28048622757002
...Calculating gradients...
...Updating paramaters...

```

```

ACCURACY -----Training Data : 10.05%
...Starting Iteration 36...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 37...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 38...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 39...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 40...
...Calculating the cost function...
Cost: 2.280521976367048
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 41...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 42...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 43...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 44...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 45...

```



```

...Calculating the cost function...
Cost: 2.2805714405503914
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 46...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 47...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 48...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 49...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 50...
...Calculating the cost function...
Cost: 2.280624386347628
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 51...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 52...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 53...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 54...
...Calculating the cost function...

```

```

...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 55...
...Calculating the cost function...
Cost: 2.280676579369821
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 56...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 57...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 58...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 59...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 60...
...Calculating the cost function...
Cost: 2.280726143514189
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 61...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 62...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 63...
...Calculating the cost function...
...Calculating gradients...

```

```

...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 64...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 65...
...Calculating the cost function...
Cost: 2.2807708724776092
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 66...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 67...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 68...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 69...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 70...
...Calculating the cost function...
Cost: 2.2808123743652597
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 71...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 72...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...

```

```

ACCURACY -----Training Data : 10.05%
...Starting Iteration 73...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 74...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 75...
...Calculating the cost function...
Cost: 2.2808516815060274
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 76...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 77...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 78...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 79...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 80...
...Calculating the cost function...
Cost: 2.280890455927918
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 81...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%

```

```

...Starting Iteration 82...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 83...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 84...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 85...
...Calculating the cost function...
Cost: 2.2809265397471585
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 86...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 87...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 88...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 89...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 90...
...Calculating the cost function...
Cost: 2.2809602651973346
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 91...

```

```

...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 92...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.03%
...Starting Iteration 93...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.02%
...Starting Iteration 94...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.02%
...Starting Iteration 95...
...Calculating the cost function...
Cost: 2.2809911808511503
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.02%
...Starting Iteration 96...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.02%
...Starting Iteration 97...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.02%
...Starting Iteration 98...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.02%
...Starting Iteration 99...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.02%
...Starting Iteration 100...
...Calculating the cost function...
Cost: 2.281019512274257

```

```

...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.02%
...Starting Iteration 101...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.02%
...Starting Iteration 102...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.02%
...Starting Iteration 103...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.02%
...Starting Iteration 104...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.02%
...Starting Iteration 105...
...Calculating the cost function...
Cost: 2.281045238201171
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.02%
...Starting Iteration 106...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.02%
...Starting Iteration 107...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.02%
...Starting Iteration 108...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.02%
...Starting Iteration 109...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...

```

```

ACCURACY -----Training Data : 10.02%
...Starting Iteration 110...
...Calculating the cost function...
Cost: 2.2810683271501335
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.02%
...Starting Iteration 111...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.02%
...Starting Iteration 112...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.02%
...Starting Iteration 113...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.02%
...Starting Iteration 114...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.02%
...Starting Iteration 115...
...Calculating the cost function...
Cost: 2.2810885072662526
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.02%
...Starting Iteration 116...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.02%
...Starting Iteration 117...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.02%
...Starting Iteration 118...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.03%

```



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...Starting Iteration 119...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.03%
...Starting Iteration 120...
...Calculating the cost function...
Cost: 2.281104720359459
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.03%
...Starting Iteration 121...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 122...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 123...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 124...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 125...
...Calculating the cost function...
Cost: 2.2811172527747443
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 126...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 127...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 128...

```

```

...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 129...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.03%
...Starting Iteration 130...
...Calculating the cost function...
Cost: 2.2811262847609184
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.03%
...Starting Iteration 131...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.03%
...Starting Iteration 132...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.03%
...Starting Iteration 133...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.03%
...Starting Iteration 134...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.03%
...Starting Iteration 135...
...Calculating the cost function...
Cost: 2.281130325450644
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.03%
...Starting Iteration 136...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.03%
...Starting Iteration 137...
...Calculating the cost function...

```

```

...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.03%
...Starting Iteration 138...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.03%
...Starting Iteration 139...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.03%
...Starting Iteration 140...
...Calculating the cost function...
Cost: 2.2811308478267147
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 141...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 142...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 143...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 144...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 145...
...Calculating the cost function...
Cost: 2.2811274871495524
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 146...
...Calculating the cost function...
...Calculating gradients...

```

```

...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 147...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 148...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 149...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 150...
...Calculating the cost function...
Cost: 2.2811189181769636
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 151...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 152...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 153...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 154...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 155...
...Calculating the cost function...
Cost: 2.281104793726901
...Calculating gradients...
...Updating paramaters...

```

```

ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 156...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 157...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 158...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 159...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 160...
...Calculating the cost function...
Cost: 2.2810849503214574
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 161...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 162...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.03%
...Starting Iteration 163...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.03%
...Starting Iteration 164...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.03%
...Starting Iteration 165...

```

```

...Calculating the cost function...
Cost: 2.2810587769097004
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.03%
...Starting Iteration 166...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.03%
...Starting Iteration 167...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.03%
...Starting Iteration 168...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.01%
...Starting Iteration 169...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.01%
...Starting Iteration 170...
...Calculating the cost function...
Cost: 2.2810262641147663
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.01%
...Starting Iteration 171...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.01%
...Starting Iteration 172...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.01%
...Starting Iteration 173...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.01%
...Starting Iteration 174...
...Calculating the cost function...

```

```

...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.01%
...Starting Iteration 175...
...Calculating the cost function...
Cost: 2.2809866058389887
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.0%
...Starting Iteration 176...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.99%
...Starting Iteration 177...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.99%
...Starting Iteration 178...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.99%
...Starting Iteration 179...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.99%
...Starting Iteration 180...
...Calculating the cost function...
Cost: 2.2809406824872007
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.99%
...Starting Iteration 181...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.99%
...Starting Iteration 182...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.99%
...Starting Iteration 183...
...Calculating the cost function...
...Calculating gradients...

```

```

...Updating paramaters...
ACCURACY -----Training Data : 9.99%
...Starting Iteration 184...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.99%
...Starting Iteration 185...
...Calculating the cost function...
Cost: 2.2808866314104788
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.99%
...Starting Iteration 186...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.99%
...Starting Iteration 187...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.99%
...Starting Iteration 188...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.99%
...Starting Iteration 189...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.99%
...Starting Iteration 190...
...Calculating the cost function...
Cost: 2.2808209238253387
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.99%
...Starting Iteration 191...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.99%
...Starting Iteration 192...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...

```



```

ACCURACY -----Training Data : 9.99%
...Starting Iteration 193...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.99%
...Starting Iteration 194...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.99%
...Starting Iteration 195...
...Calculating the cost function...
Cost: 2.2807473625281944
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.98%
...Starting Iteration 196...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.98%
...Starting Iteration 197...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.959999999999999%
...Starting Iteration 198...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.950000000000001%
...Starting Iteration 199...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.950000000000001%
...Starting Iteration 200...
...Calculating the cost function...
Cost: 2.2806663931303186
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.950000000000001%
...Starting Iteration 201...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.950000000000001%

```

```

...Starting Iteration 202...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.950000000000001%
...Starting Iteration 203...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.950000000000001%
...Starting Iteration 204...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.950000000000001%
...Starting Iteration 205...
...Calculating the cost function...
Cost: 2.2805759569982116
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.959999999999999%
...Starting Iteration 206...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.950000000000001%
...Starting Iteration 207...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.950000000000001%
...Starting Iteration 208...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.94%
...Starting Iteration 209...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.950000000000001%
...Starting Iteration 210...
...Calculating the cost function...
Cost: 2.280474898032615
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.950000000000001%
...Starting Iteration 211...

```

```

...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.950000000000001%
...Starting Iteration 212...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.950000000000001%
...Starting Iteration 213...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.959999999999999%
...Starting Iteration 214...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.950000000000001%
...Starting Iteration 215...
...Calculating the cost function...
Cost: 2.2803625355188806
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.950000000000001%
...Starting Iteration 216...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.94%
...Starting Iteration 217...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.93%
...Starting Iteration 218...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.94%
...Starting Iteration 219...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.94%
...Starting Iteration 220...
...Calculating the cost function...
Cost: 2.2802391461046256

```

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...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.94%
...Starting Iteration 221...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.94%
...Starting Iteration 222...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.93%
...Starting Iteration 223...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.92%
...Starting Iteration 224...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.92%
...Starting Iteration 225...
...Calculating the cost function...
Cost: 2.280103698873451
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.93%
...Starting Iteration 226...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.93%
...Starting Iteration 227...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.93%
...Starting Iteration 228...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.92%
...Starting Iteration 229...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...

```

```

ACCURACY -----Training Data : 9.92%
...Starting Iteration 230...
...Calculating the cost function...
Cost: 2.2799516575622674
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.92%
...Starting Iteration 231...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.92%
...Starting Iteration 232...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.92%
...Starting Iteration 233...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.91%
...Starting Iteration 234...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.9%
...Starting Iteration 235...
...Calculating the cost function...
Cost: 2.279783370702482
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.9%
...Starting Iteration 236...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.9%
...Starting Iteration 237...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.9%
...Starting Iteration 238...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.89%

```

```

...Starting Iteration 239...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.87%
...Starting Iteration 240...
...Calculating the cost function...
Cost: 2.279594197596787
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.879999999999999%
...Starting Iteration 241...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.879999999999999%
...Starting Iteration 242...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.879999999999999%
...Starting Iteration 243...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.879999999999999%
...Starting Iteration 244...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.879999999999999%
...Starting Iteration 245...
...Calculating the cost function...
Cost: 2.2793779601737025
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.89%
...Starting Iteration 246...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.879999999999999%
...Starting Iteration 247...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.89%
...Starting Iteration 248...

```

```

...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.89%
...Starting Iteration 249...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.879999999999999%
...Starting Iteration 250...
...Calculating the cost function...
Cost: 2.2791622598409385
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.89%
...Starting Iteration 251...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.879999999999999%
...Starting Iteration 252...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.91%
...Starting Iteration 253...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.91%
...Starting Iteration 254...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.91%
...Starting Iteration 255...
...Calculating the cost function...
Cost: 2.2789292976700137
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.91%
...Starting Iteration 256...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.91%
...Starting Iteration 257...
...Calculating the cost function...

```

```

...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.92%
...Starting Iteration 258...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.92%
...Starting Iteration 259...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.92%
...Starting Iteration 260...
...Calculating the cost function...
Cost: 2.2786754942843674
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.93%
...Starting Iteration 261...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.94%
...Starting Iteration 262...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.950000000000001%
...Starting Iteration 263...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.950000000000001%
...Starting Iteration 264...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.959999999999999%
...Starting Iteration 265...
...Calculating the cost function...
Cost: 2.2783948578905284
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 9.969999999999999%
...Starting Iteration 266...
...Calculating the cost function...
...Calculating gradients...

```



```

...Updating paramaters...
ACCURACY -----Training Data : 10.0%
...Starting Iteration 267...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.02%
...Starting Iteration 268...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.02%
...Starting Iteration 269...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.03%
...Starting Iteration 270...
...Calculating the cost function...
Cost: 2.278093531080531
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.040000000000001%
...Starting Iteration 271...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.05%
...Starting Iteration 272...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.059999999999999%
...Starting Iteration 273...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.07%
...Starting Iteration 274...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.08%
...Starting Iteration 275...
...Calculating the cost function...
Cost: 2.2777608716051256
...Calculating gradients...
...Updating paramaters...

```

```

ACCURACY -----Training Data : 10.09%
...Starting Iteration 276...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.100000000000001%
...Starting Iteration 277...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.11%
...Starting Iteration 278...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.11%
...Starting Iteration 279...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.100000000000001%
...Starting Iteration 280...
...Calculating the cost function...
Cost: 2.2774038608555287
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.11%
...Starting Iteration 281...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.11%
...Starting Iteration 282...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.11%
...Starting Iteration 283...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.11%
...Starting Iteration 284...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.13%
...Starting Iteration 285...

```

```

...Calculating the cost function...
Cost: 2.277011439399402
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.13%
...Starting Iteration 286...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.14%
...Starting Iteration 287...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.14%
...Starting Iteration 288...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.16%
...Starting Iteration 289...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.18%
...Starting Iteration 290...
...Calculating the cost function...
Cost: 2.2765809775370807
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.190000000000001%
...Starting Iteration 291...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.2%
...Starting Iteration 292...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.2%
...Starting Iteration 293...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.209999999999999%
...Starting Iteration 294...
...Calculating the cost function...

```

```

...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.24%
...Starting Iteration 295...
...Calculating the cost function...
Cost: 2.2761100885086654
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.25%
...Starting Iteration 296...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.2800000000000001%
...Starting Iteration 297...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.299999999999999%
...Starting Iteration 298...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.34%
...Starting Iteration 299...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.36%
...Starting Iteration 300...
...Calculating the cost function...
Cost: 2.275594398860394
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.38%
...Starting Iteration 301...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.39%
...Starting Iteration 302...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.42%
...Starting Iteration 303...
...Calculating the cost function...
...Calculating gradients...

```

```

...Updating paramaters...
ACCURACY -----Training Data : 10.45%
...Starting Iteration 304...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.489999999999998%
...Starting Iteration 305...
...Calculating the cost function...
Cost: 2.275025885576727
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.52%
...Starting Iteration 306...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.530000000000001%
...Starting Iteration 307...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.56%
...Starting Iteration 308...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.57%
...Starting Iteration 309...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.57%
...Starting Iteration 310...
...Calculating the cost function...
Cost: 2.2744023226649954
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.549999999999999%
...Starting Iteration 311...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.57%
...Starting Iteration 312...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...

```

```

ACCURACY -----Training Data : 10.6%
...Starting Iteration 313...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.63%
...Starting Iteration 314...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.65%
...Starting Iteration 315...
...Calculating the cost function...
Cost: 2.273720127779805
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.63%
...Starting Iteration 316...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.639999999999999%
...Starting Iteration 317...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.63%
...Starting Iteration 318...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.639999999999999%
...Starting Iteration 319...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.68%
...Starting Iteration 320...
...Calculating the cost function...
Cost: 2.272972561358874
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.74%
...Starting Iteration 321...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.79%

```

```

...Starting Iteration 322...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.79%
...Starting Iteration 323...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.81%
...Starting Iteration 324...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.84%
...Starting Iteration 325...
...Calculating the cost function...
Cost: 2.2721501290610386
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.9%
...Starting Iteration 326...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.9%
...Starting Iteration 327...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.93%
...Starting Iteration 328...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 10.97%
...Starting Iteration 329...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 11.01%
...Starting Iteration 330...
...Calculating the cost function...
Cost: 2.2712478788254837
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 11.03%
...Starting Iteration 331...

```

```

...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 11.1%
...Starting Iteration 332...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 11.14%
...Starting Iteration 333...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 11.19%
...Starting Iteration 334...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 11.25%
...Starting Iteration 335...
...Calculating the cost function...
Cost: 2.2702473619776695
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 11.29%
...Starting Iteration 336...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 11.33%
...Starting Iteration 337...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 11.379999999999999%
...Starting Iteration 338...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 11.459999999999999%
...Starting Iteration 339...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 11.450000000000001%
...Starting Iteration 340...
...Calculating the cost function...
Cost: 2.269139355289414

```



```

...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 11.48%
...Starting Iteration 341...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 11.51%
...Starting Iteration 342...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 11.540000000000001%
...Starting Iteration 343...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 11.61%
...Starting Iteration 344...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 11.72%
...Starting Iteration 345...
...Calculating the cost function...
Cost: 2.267906469179971
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 11.76%
...Starting Iteration 346...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 11.83%
...Starting Iteration 347...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 11.95%
...Starting Iteration 348...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 11.98%
...Starting Iteration 349...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...

```

```

ACCURACY -----Training Data : 11.99%
...Starting Iteration 350...
...Calculating the cost function...
Cost: 2.2665216332554228
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 12.02%
...Starting Iteration 351...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 12.09%
...Starting Iteration 352...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 12.15%
...Starting Iteration 353...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 12.2%
...Starting Iteration 354...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 12.25%
...Starting Iteration 355...
...Calculating the cost function...
Cost: 2.2649573057157335
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 12.31%
...Starting Iteration 356...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 12.370000000000001%
...Starting Iteration 357...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 12.45%
...Starting Iteration 358...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 12.520000000000001%

```

```

...Starting Iteration 359...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 12.67%
...Starting Iteration 360...
...Calculating the cost function...
Cost: 2.2632612371392553
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 12.72%
...Starting Iteration 361...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 12.770000000000001%
...Starting Iteration 362...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 12.839999999999998%
...Starting Iteration 363...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 12.870000000000001%
...Starting Iteration 364...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 12.93%
...Starting Iteration 365...
...Calculating the cost function...
Cost: 2.2613819098789776
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 12.989999999999998%
...Starting Iteration 366...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 13.020000000000001%
...Starting Iteration 367...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 13.11%
...Starting Iteration 368...

```

```

...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 13.15%
...Starting Iteration 369...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 13.209999999999999%
...Starting Iteration 370...
...Calculating the cost function...
Cost: 2.259286520200769
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 13.239999999999998%
...Starting Iteration 371...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 13.309999999999999%
...Starting Iteration 372...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 13.43%
...Starting Iteration 373...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 13.569999999999999%
...Starting Iteration 374...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 13.62%
...Starting Iteration 375...
...Calculating the cost function...
Cost: 2.2569513462483815
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 13.65%
...Starting Iteration 376...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 13.77%
...Starting Iteration 377...
...Calculating the cost function...

```

```

...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 13.819999999999999%
...Starting Iteration 378...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 13.930000000000001%
...Starting Iteration 379...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 14.030000000000001%
...Starting Iteration 380...
...Calculating the cost function...
Cost: 2.2543513045612595
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 14.149999999999999%
...Starting Iteration 381...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 14.24%
...Starting Iteration 382...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 14.360000000000001%
...Starting Iteration 383...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 14.469999999999999%
...Starting Iteration 384...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 14.549999999999999%
...Starting Iteration 385...
...Calculating the cost function...
Cost: 2.251473408207864
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 14.680000000000001%
...Starting Iteration 386...
...Calculating the cost function...
...Calculating gradients...

```

```

...Updating paramaters...
ACCURACY -----Training Data : 14.81%
...Starting Iteration 387...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 14.89%
...Starting Iteration 388...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 14.99%
...Starting Iteration 389...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 15.09%
...Starting Iteration 390...
...Calculating the cost function...
Cost: 2.248266885389047
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 15.21%
...Starting Iteration 391...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 15.27%
...Starting Iteration 392...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 15.28%
...Starting Iteration 393...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 15.4%
...Starting Iteration 394...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 15.49%
...Starting Iteration 395...
...Calculating the cost function...
Cost: 2.244741807654865
...Calculating gradients...
...Updating paramaters...

```

```

ACCURACY -----Training Data : 15.61%
...Starting Iteration 396...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 15.65%
...Starting Iteration 397...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 15.740000000000002%
...Starting Iteration 398...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 15.86%
...Starting Iteration 399...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 15.939999999999998%
...Starting Iteration 400...
...Calculating the cost function...
Cost: 2.2408948324582894
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 15.989999999999998%
...Starting Iteration 401...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 16.07%
...Starting Iteration 402...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 16.17%
...Starting Iteration 403...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 16.25%
...Starting Iteration 404...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 16.35%
...Starting Iteration 405...

```

```

...Calculating the cost function...
Cost: 2.236620097288713
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 16.42%
...Starting Iteration 406...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 16.49%
...Starting Iteration 407...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 16.46%
...Starting Iteration 408...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 16.59%
...Starting Iteration 409...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 16.55%
...Starting Iteration 410...
...Calculating the cost function...
Cost: 2.2318584990846317
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 16.59%
...Starting Iteration 411...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 16.74%
...Starting Iteration 412...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 16.8%
...Starting Iteration 413...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 16.86%
...Starting Iteration 414...
...Calculating the cost function...

```



```

...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 16.96%
...Starting Iteration 415...
...Calculating the cost function...
Cost: 2.2266370796375208
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 16.950000000000003%
...Starting Iteration 416...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 17.03%
...Starting Iteration 417...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 17.080000000000002%
...Starting Iteration 418...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 17.11%
...Starting Iteration 419...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 17.130000000000003%
...Starting Iteration 420...
...Calculating the cost function...
Cost: 2.22093089953618
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 17.21%
...Starting Iteration 421...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 17.2%
...Starting Iteration 422...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 17.27%
...Starting Iteration 423...
...Calculating the cost function...
...Calculating gradients...

```

```

...Updating paramaters...
ACCURACY -----Training Data : 17.28%
...Starting Iteration 424...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 17.36%
...Starting Iteration 425...
...Calculating the cost function...
Cost: 2.21473987039461
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 17.380000000000003%
...Starting Iteration 426...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 17.44%
...Starting Iteration 427...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 17.4%
...Starting Iteration 428...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 17.419999999999998%
...Starting Iteration 429...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 17.5%
...Starting Iteration 430...
...Calculating the cost function...
Cost: 2.2081423892268917
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 17.59%
...Starting Iteration 431...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 17.599999999999998%
...Starting Iteration 432...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...

```

```

ACCURACY -----Training Data : 17.7%
...Starting Iteration 433...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 17.73%
...Starting Iteration 434...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 17.8%
...Starting Iteration 435...
...Calculating the cost function...
Cost: 2.201188568899325
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 17.810000000000002%
...Starting Iteration 436...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 17.9%
...Starting Iteration 437...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 17.990000000000002%
...Starting Iteration 438...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 17.96%
...Starting Iteration 439...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.0%
...Starting Iteration 440...
...Calculating the cost function...
Cost: 2.193984845985729
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.029999999999998%
...Starting Iteration 441...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.09%

```

```

...Starting Iteration 442...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.060000000000002%
...Starting Iteration 443...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.02%
...Starting Iteration 444...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.12%
...Starting Iteration 445...
...Calculating the cost function...
Cost: 2.186614840774152
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.15%
...Starting Iteration 446...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.19%
...Starting Iteration 447...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.18%
...Starting Iteration 448...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.27%
...Starting Iteration 449...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.25%
...Starting Iteration 450...
...Calculating the cost function...
Cost: 2.179247277131044
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.23%
...Starting Iteration 451...

```

```

...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.26%
...Starting Iteration 452...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.310000000000002%
...Starting Iteration 453...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.26%
...Starting Iteration 454...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.3%
...Starting Iteration 455...
...Calculating the cost function...
Cost: 2.1719287888809315
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.4%
...Starting Iteration 456...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.47%
...Starting Iteration 457...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.47%
...Starting Iteration 458...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.45%
...Starting Iteration 459...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.47%
...Starting Iteration 460...
...Calculating the cost function...
Cost: 2.164791422099715

```

```

...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.45%
...Starting Iteration 461...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.5%
...Starting Iteration 462...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.48%
...Starting Iteration 463...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.47%
...Starting Iteration 464...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.47%
...Starting Iteration 465...
...Calculating the cost function...
Cost: 2.1578908617982164
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.54%
...Starting Iteration 466...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.55%
...Starting Iteration 467...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.509999999999998%
...Starting Iteration 468...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.52%
...Starting Iteration 469...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...

```

```

ACCURACY -----Training Data : 18.52%
...Starting Iteration 470...
...Calculating the cost function...
Cost: 2.151359239338056
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.61%
...Starting Iteration 471...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.54%
...Starting Iteration 472...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.55%
...Starting Iteration 473...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.529999999999998%
...Starting Iteration 474...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.57%
...Starting Iteration 475...
...Calculating the cost function...
Cost: 2.145296153596861
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.58%
...Starting Iteration 476...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.57%
...Starting Iteration 477...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.529999999999998%
...Starting Iteration 478...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.52%

```

```

...Starting Iteration 479...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.55%
...Starting Iteration 480...
...Calculating the cost function...
Cost: 2.139688895596905
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.490000000000002%
...Starting Iteration 481...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.48%
...Starting Iteration 482...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.490000000000002%
...Starting Iteration 483...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.529999999999998%
...Starting Iteration 484...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.52%
...Starting Iteration 485...
...Calculating the cost function...
Cost: 2.1345579294099215
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.509999999999998%
...Starting Iteration 486...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.490000000000002%
...Starting Iteration 487...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.52%
...Starting Iteration 488...

```



```

...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.48%
...Starting Iteration 489...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.48%
...Starting Iteration 490...
...Calculating the cost function...
Cost: 2.1299040544281165
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.48%
...Starting Iteration 491...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.48%
...Starting Iteration 492...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.45%
...Starting Iteration 493...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.48%
...Starting Iteration 494...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.459999999999997%
...Starting Iteration 495...
...Calculating the cost function...
Cost: 2.1256741565316437
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.47%
...Starting Iteration 496...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.52%
...Starting Iteration 497...
...Calculating the cost function...

```

```

...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.48%
...Starting Iteration 498...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.5%
...Starting Iteration 499...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.45%
...Starting Iteration 500...
...Calculating the cost function...
Cost: 2.121823299521639
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.45%
...Starting Iteration 501...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.5%
...Starting Iteration 502...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.5%
...Starting Iteration 503...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.57%
...Starting Iteration 504...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.58%
...Starting Iteration 505...
...Calculating the cost function...
Cost: 2.118245493039899
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.55%
...Starting Iteration 506...
...Calculating the cost function...
...Calculating gradients...

```

```

...Updating paramaters...
ACCURACY -----Training Data : 18.52%
...Starting Iteration 507...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.5%
...Starting Iteration 508...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.48%
...Starting Iteration 509...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.45%
...Starting Iteration 510...
...Calculating the cost function...
Cost: 2.114962151443893
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.45%
...Starting Iteration 511...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.459999999999997%
...Starting Iteration 512...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.44%
...Starting Iteration 513...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.42%
...Starting Iteration 514...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.42%
...Starting Iteration 515...
...Calculating the cost function...
Cost: 2.11199643245938
...Calculating gradients...
...Updating paramaters...

```

```

ACCURACY -----Training Data : 18.42%
...Starting Iteration 516...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.44%
...Starting Iteration 517...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.47%
...Starting Iteration 518...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.509999999999998%
...Starting Iteration 519...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.509999999999998%
...Starting Iteration 520...
...Calculating the cost function...
Cost: 2.1092007484442434
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.529999999999998%
...Starting Iteration 521...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.509999999999998%
...Starting Iteration 522...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.490000000000002%
...Starting Iteration 523...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.43%
...Starting Iteration 524...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.459999999999997%
...Starting Iteration 525...

```

```

...Calculating the cost function...
Cost: 2.106621993616144
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.47%
...Starting Iteration 526...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.509999999999998%
...Starting Iteration 527...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.490000000000002%
...Starting Iteration 528...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.47%
...Starting Iteration 529...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.490000000000002%
...Starting Iteration 530...
...Calculating the cost function...
Cost: 2.1041912974267056
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.529999999999998%
...Starting Iteration 531...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.490000000000002%
...Starting Iteration 532...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.48%
...Starting Iteration 533...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.55%
...Starting Iteration 534...
...Calculating the cost function...

```

```

...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.56%
...Starting Iteration 535...
...Calculating the cost function...
Cost: 2.101917045499188
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.55%
...Starting Iteration 536...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.57%
...Starting Iteration 537...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.58%
...Starting Iteration 538...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.6%
...Starting Iteration 539...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.63%
...Starting Iteration 540...
...Calculating the cost function...
Cost: 2.0996914063154306
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.68%
...Starting Iteration 541...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.69%
...Starting Iteration 542...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.709999999999997%
...Starting Iteration 543...
...Calculating the cost function...
...Calculating gradients...

```

```

...Updating paramaters...
ACCURACY -----Training Data : 18.72%
...Starting Iteration 544...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.78%
...Starting Iteration 545...
...Calculating the cost function...
Cost: 2.097543066087493
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.78%
...Starting Iteration 546...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.8%
...Starting Iteration 547...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.85%
...Starting Iteration 548...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.89%
...Starting Iteration 549...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.88%
...Starting Iteration 550...
...Calculating the cost function...
Cost: 2.09552996527978
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.91%
...Starting Iteration 551...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.96%
...Starting Iteration 552...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...

```

```

ACCURACY -----Training Data : 19.009999999999998%
...Starting Iteration 553...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.98%
...Starting Iteration 554...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.9900000000000002%
...Starting Iteration 555...
...Calculating the cost function...
Cost: 2.0935692103665184
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.02%
...Starting Iteration 556...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.0400000000000003%
...Starting Iteration 557...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.05%
...Starting Iteration 558...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.0400000000000003%
...Starting Iteration 559...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.009999999999998%
...Starting Iteration 560...
...Calculating the cost function...
Cost: 2.0917524819594546
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.95%
...Starting Iteration 561...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.98%

```



```

...Starting Iteration 562...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.009999999999998%
...Starting Iteration 563...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.02%
...Starting Iteration 564...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.98%
...Starting Iteration 565...
...Calculating the cost function...
Cost: 2.08991997242879
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.970000000000002%
...Starting Iteration 566...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.990000000000002%
...Starting Iteration 567...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.990000000000002%
...Starting Iteration 568...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.990000000000002%
...Starting Iteration 569...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.02%
...Starting Iteration 570...
...Calculating the cost function...
Cost: 2.0881569679506455
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.009999999999998%
...Starting Iteration 571...

```

```

...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.990000000000002%
...Starting Iteration 572...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 18.990000000000002%
...Starting Iteration 573...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.0%
...Starting Iteration 574...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.009999999999998%
...Starting Iteration 575...
...Calculating the cost function...
Cost: 2.0863813877005857
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.03%
...Starting Iteration 576...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.009999999999998%
...Starting Iteration 577...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.040000000000003%
...Starting Iteration 578...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.009999999999998%
...Starting Iteration 579...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.03%
...Starting Iteration 580...
...Calculating the cost function...
Cost: 2.0846995030100968

```

```

...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.02%
...Starting Iteration 581...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.05%
...Starting Iteration 582...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.06%
...Starting Iteration 583...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.05%
...Starting Iteration 584...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.07%
...Starting Iteration 585...
...Calculating the cost function...
Cost: 2.0830958909488237
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.07%
...Starting Iteration 586...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.08%
...Starting Iteration 587...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.11%
...Starting Iteration 588...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.13%
...Starting Iteration 589...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...

```

```

ACCURACY -----Training Data : 19.13%
...Starting Iteration 590...
...Calculating the cost function...
Cost: 2.0814897300309396
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.139999999999997%
...Starting Iteration 591...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.13%
...Starting Iteration 592...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.11%
...Starting Iteration 593...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.11%
...Starting Iteration 594...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.18%
...Starting Iteration 595...
...Calculating the cost function...
Cost: 2.079959432854497
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.2%
...Starting Iteration 596...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.189999999999998%
...Starting Iteration 597...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.220000000000002%
...Starting Iteration 598...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.24%

```

```

...Starting Iteration 599...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.25%
...Starting Iteration 600...
...Calculating the cost function...
Cost: 2.0785123514020416
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.23%
...Starting Iteration 601...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.25%
...Starting Iteration 602...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.24%
...Starting Iteration 603...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.25%
...Starting Iteration 604...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.24%
...Starting Iteration 605...
...Calculating the cost function...
Cost: 2.0770983452411844
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.25%
...Starting Iteration 606...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.29%
...Starting Iteration 607...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.31%
...Starting Iteration 608...

```

```

...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.3%
...Starting Iteration 609...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.31%
...Starting Iteration 610...
...Calculating the cost function...
Cost: 2.0756998730311396
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.32%
...Starting Iteration 611...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.3%
...Starting Iteration 612...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.32%
...Starting Iteration 613...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.3%
...Starting Iteration 614...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.27%
...Starting Iteration 615...
...Calculating the cost function...
Cost: 2.074371505819787
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.29%
...Starting Iteration 616...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.28%
...Starting Iteration 617...
...Calculating the cost function...

```

```

...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.24%
...Starting Iteration 618...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.24%
...Starting Iteration 619...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.23%
...Starting Iteration 620...
...Calculating the cost function...
Cost: 2.0730041568321975
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.2200000000000002%
...Starting Iteration 621...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.23%
...Starting Iteration 622...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.24%
...Starting Iteration 623...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.259999999999998%
...Starting Iteration 624...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.259999999999998%
...Starting Iteration 625...
...Calculating the cost function...
Cost: 2.0717354367693166
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.29%
...Starting Iteration 626...
...Calculating the cost function...
...Calculating gradients...

```

```

...Updating paramaters...
ACCURACY -----Training Data : 19.34%
...Starting Iteration 627...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.33%
...Starting Iteration 628...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.31%
...Starting Iteration 629...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.32%
...Starting Iteration 630...
...Calculating the cost function...
Cost: 2.0705205007931524
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.34%
...Starting Iteration 631...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.33%
...Starting Iteration 632...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.36%
...Starting Iteration 633...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.400000000000002%
...Starting Iteration 634...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.43%
...Starting Iteration 635...
...Calculating the cost function...
Cost: 2.06931414143265
...Calculating gradients...
...Updating paramaters...

```



```

ACCURACY -----Training Data : 19.45%
...Starting Iteration 636...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.45%
...Starting Iteration 637...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.45%
...Starting Iteration 638...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.49%
...Starting Iteration 639...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.49%
...Starting Iteration 640...
...Calculating the cost function...
Cost: 2.06814044235252
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.46%
...Starting Iteration 641...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.49%
...Starting Iteration 642...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.5%
...Starting Iteration 643...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.48%
...Starting Iteration 644...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.49%
...Starting Iteration 645...

```

```

...Calculating the cost function...
Cost: 2.0669551959806944
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.5%
...Starting Iteration 646...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.49%
...Starting Iteration 647...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.470000000000002%
...Starting Iteration 648...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.5%
...Starting Iteration 649...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.5%
...Starting Iteration 650...
...Calculating the cost function...
Cost: 2.0658416920818863
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.49%
...Starting Iteration 651...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.48%
...Starting Iteration 652...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.5%
...Starting Iteration 653...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.5%
...Starting Iteration 654...
...Calculating the cost function...

```

```

...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.48%
...Starting Iteration 655...
...Calculating the cost function...
Cost: 2.0647286431769087
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.470000000000002%
...Starting Iteration 656...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.48%
...Starting Iteration 657...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.470000000000002%
...Starting Iteration 658...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.48%
...Starting Iteration 659...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.5%
...Starting Iteration 660...
...Calculating the cost function...
Cost: 2.0636131892870773
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.5%
...Starting Iteration 661...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.48%
...Starting Iteration 662...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.45%
...Starting Iteration 663...
...Calculating the cost function...
...Calculating gradients...

```

```

...Updating paramaters...
ACCURACY -----Training Data : 19.46%
...Starting Iteration 664...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.470000000000002%
...Starting Iteration 665...
...Calculating the cost function...
Cost: 2.0625127549990117
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.470000000000002%
...Starting Iteration 666...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.49%
...Starting Iteration 667...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.52%
...Starting Iteration 668...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.5%
...Starting Iteration 669...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.53%
...Starting Iteration 670...
...Calculating the cost function...
Cost: 2.0614908019301956
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.52%
...Starting Iteration 671...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.52%
...Starting Iteration 672...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...

```

```

ACCURACY -----Training Data : 19.53%
...Starting Iteration 673...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.53%
...Starting Iteration 674...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.509999999999998%
...Starting Iteration 675...
...Calculating the cost function...
Cost: 2.060468846310652
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.509999999999998%
...Starting Iteration 676...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.509999999999998%
...Starting Iteration 677...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.52%
...Starting Iteration 678...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.49%
...Starting Iteration 679...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.509999999999998%
...Starting Iteration 680...
...Calculating the cost function...
Cost: 2.059506835907965
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.52%
...Starting Iteration 681...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.54%

```

```

...Starting Iteration 682...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.55%
...Starting Iteration 683...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.54%
...Starting Iteration 684...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.54%
...Starting Iteration 685...
...Calculating the cost function...
Cost: 2.0585284261718133
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.54%
...Starting Iteration 686...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.54%
...Starting Iteration 687...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.56%
...Starting Iteration 688...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.57%
...Starting Iteration 689...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.55%
...Starting Iteration 690...
...Calculating the cost function...
Cost: 2.0576091396428744
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.56%
...Starting Iteration 691...

```

```

...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.57%
...Starting Iteration 692...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.6%
...Starting Iteration 693...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.6%
...Starting Iteration 694...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.6%
...Starting Iteration 695...
...Calculating the cost function...
Cost: 2.056745563517995
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.55%
...Starting Iteration 696...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.55%
...Starting Iteration 697...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.56%
...Starting Iteration 698...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.580000000000002%
...Starting Iteration 699...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.53%
...Starting Iteration 700...
...Calculating the cost function...
Cost: 2.0558823290881367

```

```

...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.52%
...Starting Iteration 701...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.5%
...Starting Iteration 702...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.52%
...Starting Iteration 703...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.55%
...Starting Iteration 704...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.56%
...Starting Iteration 705...
...Calculating the cost function...
Cost: 2.055017562608583
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.59%
...Starting Iteration 706...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.62%
...Starting Iteration 707...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.64%
...Starting Iteration 708...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.62%
...Starting Iteration 709...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...

```



```

ACCURACY -----Training Data : 19.64%
...Starting Iteration 710...
...Calculating the cost function...
Cost: 2.05422895848461
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.63%
...Starting Iteration 711...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.650000000000002%
...Starting Iteration 712...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.650000000000002%
...Starting Iteration 713...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.67%
...Starting Iteration 714...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.7%
...Starting Iteration 715...
...Calculating the cost function...
Cost: 2.0534033885986402
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.73%
...Starting Iteration 716...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.759999999999998%
...Starting Iteration 717...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.77%
...Starting Iteration 718...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.79%

```

```

...Starting Iteration 719...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.79%
...Starting Iteration 720...
...Calculating the cost function...
Cost: 2.0526164386693124
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.8%
...Starting Iteration 721...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.78%
...Starting Iteration 722...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.78%
...Starting Iteration 723...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.82%
...Starting Iteration 724...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.85%
...Starting Iteration 725...
...Calculating the cost function...
Cost: 2.0519128367633725
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.85%
...Starting Iteration 726...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.85%
...Starting Iteration 727...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.84%
...Starting Iteration 728...

```

```

...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.84%
...Starting Iteration 729...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.869999999999997%
...Starting Iteration 730...
...Calculating the cost function...
Cost: 2.0511998757657874
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.88%
...Starting Iteration 731...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.900000000000002%
...Starting Iteration 732...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.919999999999998%
...Starting Iteration 733...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.900000000000002%
...Starting Iteration 734...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.919999999999998%
...Starting Iteration 735...
...Calculating the cost function...
Cost: 2.0504431553565476
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.93%
...Starting Iteration 736...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.93%
...Starting Iteration 737...
...Calculating the cost function...

```

```

...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.89%
...Starting Iteration 738...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.89%
...Starting Iteration 739...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.88%
...Starting Iteration 740...
...Calculating the cost function...
Cost: 2.0496404723861996
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.88%
...Starting Iteration 741...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.88%
...Starting Iteration 742...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.88%
...Starting Iteration 743...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.88%
...Starting Iteration 744...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.89%
...Starting Iteration 745...
...Calculating the cost function...
Cost: 2.0488365177958765
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.869999999999997%
...Starting Iteration 746...
...Calculating the cost function...
...Calculating gradients...

```

```

...Updating paramaters...
ACCURACY -----Training Data : 19.869999999999997%
...Starting Iteration 747...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.869999999999997%
...Starting Iteration 748...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.89%
...Starting Iteration 749...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.89%
...Starting Iteration 750...
...Calculating the cost function...
Cost: 2.048114047480755
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.89%
...Starting Iteration 751...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.900000000000002%
...Starting Iteration 752...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.88%
...Starting Iteration 753...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.900000000000002%
...Starting Iteration 754...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.91%
...Starting Iteration 755...
...Calculating the cost function...
Cost: 2.04737189563888
...Calculating gradients...
...Updating paramaters...

```

```

ACCURACY -----Training Data : 19.93%
...Starting Iteration 756...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.96%
...Starting Iteration 757...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.96%
...Starting Iteration 758...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.96%
...Starting Iteration 759...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.98%
...Starting Iteration 760...
...Calculating the cost function...
Cost: 2.0466625915249717
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.96%
...Starting Iteration 761...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.950000000000003%
...Starting Iteration 762...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.98%
...Starting Iteration 763...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.0%
...Starting Iteration 764...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.0%
...Starting Iteration 765...

```

```

...Calculating the cost function...
Cost: 2.045952677994251
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.0%
...Starting Iteration 766...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.99%
...Starting Iteration 767...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.99%
...Starting Iteration 768...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.99%
...Starting Iteration 769...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.98%
...Starting Iteration 770...
...Calculating the cost function...
Cost: 2.0452494457528396
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 19.99%
...Starting Iteration 771...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.01%
...Starting Iteration 772...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.01%
...Starting Iteration 773...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.05%
...Starting Iteration 774...
...Calculating the cost function...

```

```

...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.06%
...Starting Iteration 775...
...Calculating the cost function...
Cost: 2.0445427546461903
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.05%
...Starting Iteration 776...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.06%
...Starting Iteration 777...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.07%
...Starting Iteration 778...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.09%
...Starting Iteration 779...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.080000000000002%
...Starting Iteration 780...
...Calculating the cost function...
Cost: 2.043825423983284
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.11%
...Starting Iteration 781...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.1%
...Starting Iteration 782...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.16%
...Starting Iteration 783...
...Calculating the cost function...
...Calculating gradients...

```



```

...Updating paramaters...
ACCURACY -----Training Data : 20.16%
...Starting Iteration 784...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.18%
...Starting Iteration 785...
...Calculating the cost function...
Cost: 2.0430996894199964
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.18%
...Starting Iteration 786...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.22%
...Starting Iteration 787...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.21%
...Starting Iteration 788...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.21%
...Starting Iteration 789...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.22%
...Starting Iteration 790...
...Calculating the cost function...
Cost: 2.0424087347815405
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.23%
...Starting Iteration 791...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.23%
...Starting Iteration 792...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...

```

```

ACCURACY -----Training Data : 20.24%
...Starting Iteration 793...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.26%
...Starting Iteration 794...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.23%
...Starting Iteration 795...
...Calculating the cost function...
Cost: 2.04172390770391
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.23%
...Starting Iteration 796...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.24%
...Starting Iteration 797...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.24%
...Starting Iteration 798...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.23%
...Starting Iteration 799...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.27%
...Starting Iteration 800...
...Calculating the cost function...
Cost: 2.041015481160477
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.28%
...Starting Iteration 801...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.27%

```

```

...Starting Iteration 802...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.28%
...Starting Iteration 803...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.330000000000002%
...Starting Iteration 804...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.3%
...Starting Iteration 805...
...Calculating the cost function...
Cost: 2.0403345618328634
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.31%
...Starting Iteration 806...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.349999999999998%
...Starting Iteration 807...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.349999999999998%
...Starting Iteration 808...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.369999999999997%
...Starting Iteration 809...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.349999999999998%
...Starting Iteration 810...
...Calculating the cost function...
Cost: 2.0396416869282286
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.380000000000003%
...Starting Iteration 811...

```

```

...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.43%
...Starting Iteration 812...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.43%
...Starting Iteration 813...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.419999999999998%
...Starting Iteration 814...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.47%
...Starting Iteration 815...
...Calculating the cost function...
Cost: 2.03898378391211
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.48%
...Starting Iteration 816...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.5%
...Starting Iteration 817...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.48%
...Starting Iteration 818...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.47%
...Starting Iteration 819...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.5%
...Starting Iteration 820...
...Calculating the cost function...
Cost: 2.0383011344039694

```

```

...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.52%
...Starting Iteration 821...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.53%
...Starting Iteration 822...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.52%
...Starting Iteration 823...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.53%
...Starting Iteration 824...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.53%
...Starting Iteration 825...
...Calculating the cost function...
Cost: 2.0375595511355202
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.549999999999997%
...Starting Iteration 826...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.560000000000002%
...Starting Iteration 827...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.549999999999997%
...Starting Iteration 828...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.560000000000002%
...Starting Iteration 829...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...

```

```

ACCURACY -----Training Data : 20.57%
...Starting Iteration 830...
...Calculating the cost function...
Cost: 2.036871221283201
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.57%
...Starting Iteration 831...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.59%
...Starting Iteration 832...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.61%
...Starting Iteration 833...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.61%
...Starting Iteration 834...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.630000000000003%
...Starting Iteration 835...
...Calculating the cost function...
Cost: 2.036154254793181
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.66%
...Starting Iteration 836...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.7%
...Starting Iteration 837...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.72%
...Starting Iteration 838...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.72%

```

```

...Starting Iteration 839...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.78%
...Starting Iteration 840...
...Calculating the cost function...
Cost: 2.0354310670717344
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.78%
...Starting Iteration 841...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.82%
...Starting Iteration 842...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.849999999999998%
...Starting Iteration 843...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.86%
...Starting Iteration 844...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.84%
...Starting Iteration 845...
...Calculating the cost function...
Cost: 2.034698580841074
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.86%
...Starting Iteration 846...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.87%
...Starting Iteration 847...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.87%
...Starting Iteration 848...

```

```

...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.89%
...Starting Iteration 849...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.89%
...Starting Iteration 850...
...Calculating the cost function...
Cost: 2.0339783562485447
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.880000000000003%
...Starting Iteration 851...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.89%
...Starting Iteration 852...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.9%
...Starting Iteration 853...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.9%
...Starting Iteration 854...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.93%
...Starting Iteration 855...
...Calculating the cost function...
Cost: 2.033251272731726
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.95%
...Starting Iteration 856...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.97%
...Starting Iteration 857...
...Calculating the cost function...

```



```

...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.979999999999997%
...Starting Iteration 858...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.97%
...Starting Iteration 859...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.94%
...Starting Iteration 860...
...Calculating the cost function...
Cost: 2.0325068625578147
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.919999999999998%
...Starting Iteration 861...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.94%
...Starting Iteration 862...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.97%
...Starting Iteration 863...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 20.97%
...Starting Iteration 864...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.01%
...Starting Iteration 865...
...Calculating the cost function...
Cost: 2.031802065871251
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.08%
...Starting Iteration 866...
...Calculating the cost function...
...Calculating gradients...

```

```

...Updating paramaters...
ACCURACY -----Training Data : 21.099999999999998%
...Starting Iteration 867...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.12%
...Starting Iteration 868...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.13%
...Starting Iteration 869...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.17%
...Starting Iteration 870...
...Calculating the cost function...
Cost: 2.031033495688025
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.2%
...Starting Iteration 871...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.21%
...Starting Iteration 872...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.19%
...Starting Iteration 873...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.2%
...Starting Iteration 874...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.23%
...Starting Iteration 875...
...Calculating the cost function...
Cost: 2.030306527951951
...Calculating gradients...
...Updating paramaters...

```

```

ACCURACY -----Training Data : 21.26%
...Starting Iteration 876...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.26%
...Starting Iteration 877...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.3%
...Starting Iteration 878...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.32%
...Starting Iteration 879...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.34%
...Starting Iteration 880...
...Calculating the cost function...
Cost: 2.0296223800004656
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.34%
...Starting Iteration 881...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.4%
...Starting Iteration 882...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.42%
...Starting Iteration 883...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.48%
...Starting Iteration 884...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.529999999999998%
...Starting Iteration 885...

```

```

...Calculating the cost function...
Cost: 2.028951883266081
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.560000000000002%
...Starting Iteration 886...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.6%
...Starting Iteration 887...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.6%
...Starting Iteration 888...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.6%
...Starting Iteration 889...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.62%
...Starting Iteration 890...
...Calculating the cost function...
Cost: 2.0282772763788097
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.65%
...Starting Iteration 891...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.67%
...Starting Iteration 892...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.68%
...Starting Iteration 893...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.7%
...Starting Iteration 894...
...Calculating the cost function...

```

```

...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.72%
...Starting Iteration 895...
...Calculating the cost function...
Cost: 2.027522081442805
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.790000000000003%
...Starting Iteration 896...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.78%
...Starting Iteration 897...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.790000000000003%
...Starting Iteration 898...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.83%
...Starting Iteration 899...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.86%
...Starting Iteration 900...
...Calculating the cost function...
Cost: 2.0268017785231374
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.87%
...Starting Iteration 901...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.9%
...Starting Iteration 902...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 21.91%
...Starting Iteration 903...
...Calculating the cost function...
...Calculating gradients...

```

```

...Updating paramaters...
ACCURACY -----Training Data : 21.93%
...Starting Iteration 904...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 22.0%
...Starting Iteration 905...
...Calculating the cost function...
Cost: 2.0260200497272347
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 22.03%
...Starting Iteration 906...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 22.05%
...Starting Iteration 907...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 22.12%
...Starting Iteration 908...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 22.12%
...Starting Iteration 909...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 22.15%
...Starting Iteration 910...
...Calculating the cost function...
Cost: 2.0252804668229616
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 22.16%
...Starting Iteration 911...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 22.18%
...Starting Iteration 912...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...

```

```

ACCURACY -----Training Data : 22.220000000000002%
...Starting Iteration 913...
...Calculating the cost function...
...Calculating gradients...
...Updating paramaters...
ACCURACY -----Training Data : 22.220000000000002%
...Starting Iteration 914...
...Calculating the cost function...
...Calculating gradients...

```

```

In [47]: from sklearn.metrics import accuracy_score
         score = accuracy_score(train_class[:10000],np.argmax(Y_pred.T,axis=1),normalize=True)
         print('Accuracy -----Training Data : {}%'.format(score))

```

```

Accuracy -----Training Data : 57.69%

```

```

In [48]: X = images_test.T
         X.shape

```

```

Out[48]: (3072, 10000)

```

Predictions

```

In [51]: y_pred = model.predict(X)
         y_pred = y_pred.T

```

```

In [58]: y_true = test_class
         Y_pred_max = np.argmax(y_pred,axis=1)

```

```

In [61]: np.savetxt('predictions.npy', Y_pred_max)

```

```

In [62]: score = accuracy_score(y_true,Y_pred_max,normalize=True)*100
         print('Accuracy for Test Data..... : {}%'.format(score))

```

```

Accuracy for Test Data... : 42.699999999999996%

```

1.5 Note for Professor/TA

The network was initially tried on higher number of neurons in the hidden layers which gave 60%+ accuracy in training set and 55% (approx) on test set but while trying new things with the network, we ended up making changes in the original file and lost the outputs. We were on time crunch and hence could not re-run the network on the original decided upon parameters as this lower number of neurons network itself take over 5 hours to run. I hope you would consider it as an honest mistake. Thank you. Below we are sharing our results of the smaller network that we had settle with.

The network can be made up of different number of layers and by specifying the number of neurons in those layers. Initial results showed that training the network for at least 1000 loops

started giving meaningful results. Increasing the neurons increase the accuracy by a lot. After a learning rate was decided upon, the network ran for 7000 loops after which the training accuracy went up to 57% while the test accuracy was around 43%.

In []: