# p2

November 7, 2024

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# Import necessary modules
import tensorflow as tf
import numpy as np
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Flatten, Dense, Activation
import matplotlib.pyplot as plt

# Load MNIST data
(x_train, y_train), (x_test, y_test) = tf.keras.datasets.mnist.load_data()

# Cast the records into float values and normalize image pixel values by␣
 ↪dividing by 255
gray_scale = 255.0
x_train = x_train.astype('float32') / gray_scale
x_test = x_test.astype('float32') / gray_scale

# Print shapes of feature and target matrices
print("Feature matrix (x_train):", x_train.shape)
print("Target matrix (y_train):", y_train.shape)
print("Feature matrix (x_test):", x_test.shape)
print("Target matrix (y_test):", y_test.shape)

# Visualize 100 images (10x10 grid)
fig, ax = plt.subplots(10, 10, figsize=(10, 10))  # Create a 10x10 grid of␣
 ↪subplots
k = 0  # Initialize a counter
for i in range(10):
    for j in range(10):
        ax[i][j].imshow(x_train[k], aspect='auto', cmap='gray')  # Display image
        ax[i][j].axis('off')  # Turn off the axes
        k += 1


plt.subplots_adjust(wspace=0.1, hspace=0.1) # Adjust spacing between plots
plt.show()
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Feature matrix (x_train): (60000, 28, 28)
Target matrix (y_train): (60000,)
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```
Feature matrix (x_test): (10000, 28, 28)
Target matrix (y_test): (10000,)
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