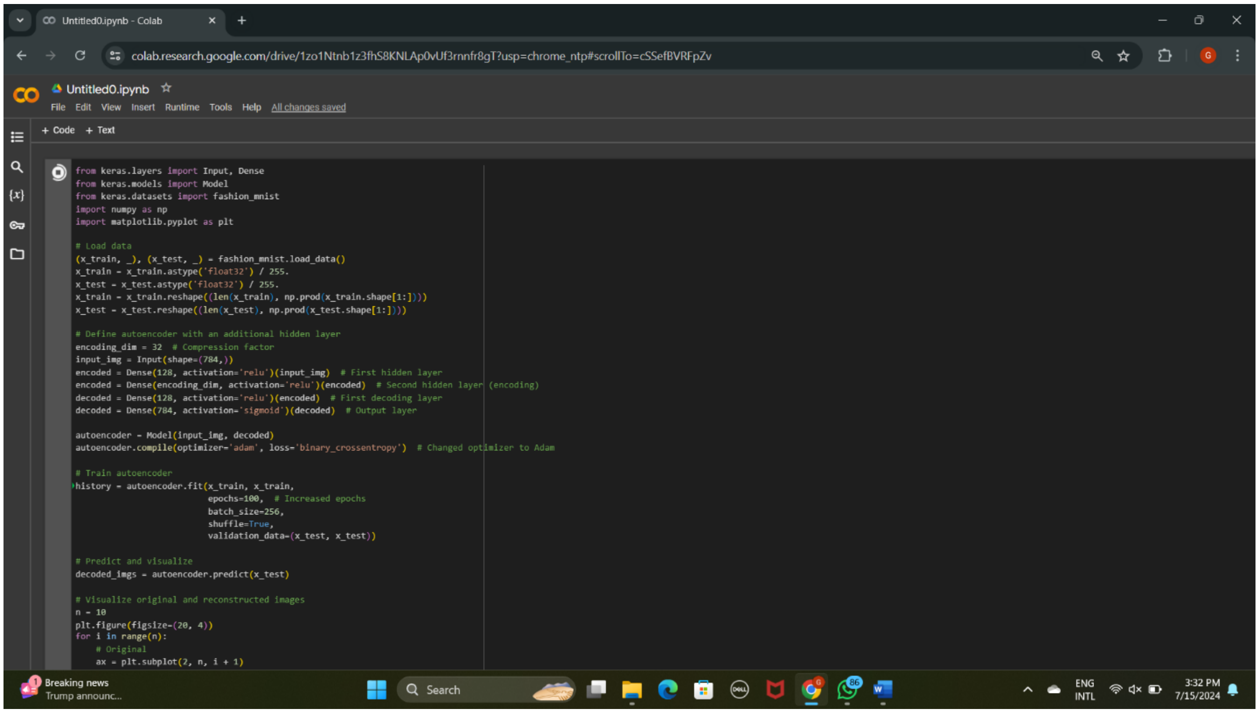
NAME:GANESH KUMAR KORRA

STUDENT ID:700761716

Github Link: GaneshKumarKorra/ICP-5 (github.com)


Untitled0.ipynb - Colab
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```
from keras.layers import Input, Dense
from keras.models import Model
from keras.datasets import fashion_mnist
import numpy as np
import matplotlib.pyplot as plt

# Load data
(x_train, _), (x_test, _) = fashion_mnist.load_data()
x_train = x_train.astype('float32') / 255.
x_test = x_test.astype('float32') / 255.
x_train = x_train.reshape((len(x_train), np.prod(x_train.shape[1:])))
x_test = x_test.reshape((len(x_test), np.prod(x_test.shape[1:])))

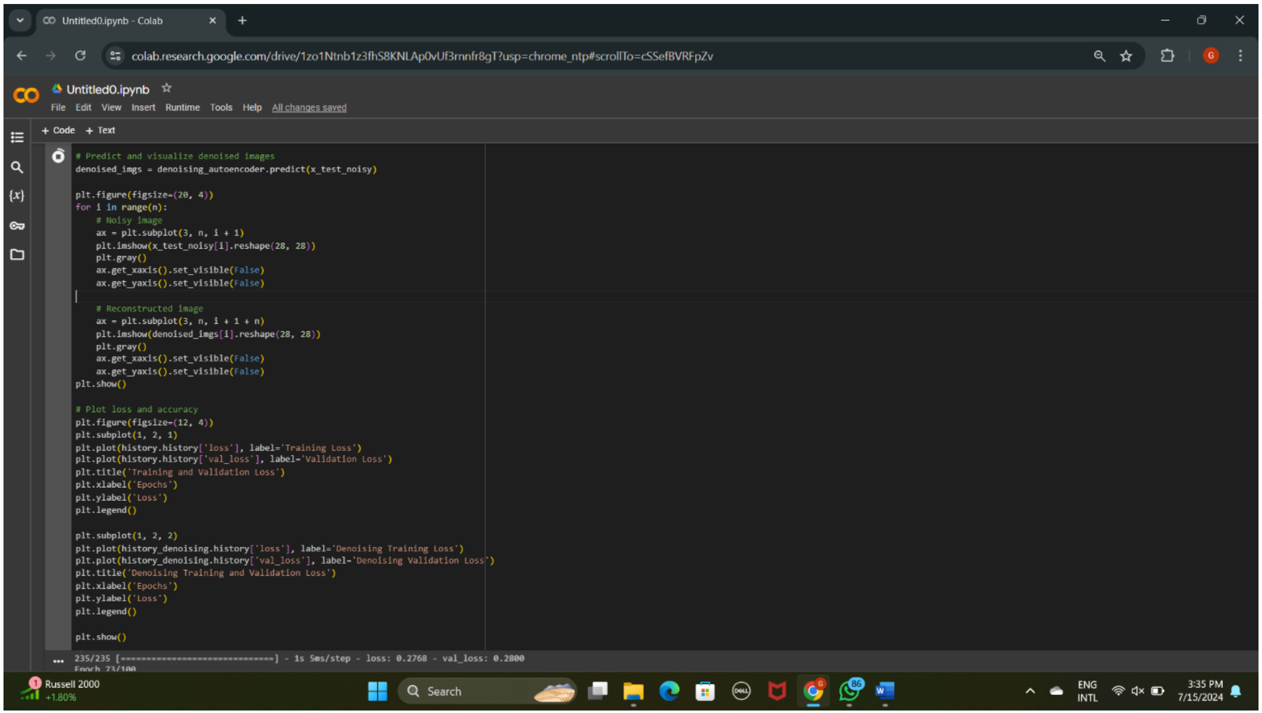
# Define autoencoder with an additional hidden layer
encoding_dim = 32  # Compression factor
input_img = Input(shape=(784,))
encoded = Dense(128, activation='relu')(input_img)  # First hidden layer
encoded = Dense(encoding_dim, activation='relu')(encoded)  # Second hidden layer (encoding)
decoded = Dense(128, activation='relu')(encoded)  # First decoding layer
decoded = Dense(784, activation='sigmoid')(decoded)  # Output layer

autoencoder = Model(input_img, decoded)
autoencoder.compile(optimizer='adam', loss='binary_crossentropy')  # Changed optimizer to Adam

# Train autoencoder
history = autoencoder.fit(x_train, x_train,
                          epochs=100,  # Increased epochs
                          batch_size=256,
                          shuffle=True,
                          validation_data=(x_test, x_test))

# Predict and visualize
decoded_imgs = autoencoder.predict(x_test)

# Visualize original and reconstructed images
n = 10
plt.figure(figsize=(20, 4))
for i in range(n):
    # Original
    ax = plt.subplot(2, n, i + 1)
```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```
# Predict and visualize denoised images
denoised_imgs = denoising_autoencoder.predict(x_test_noisy)

plt.figure(figsize=(20, 4))
for i in range(n):
    # Noisy image
    ax = plt.subplot(3, n, i + 1)
    plt.imshow(x_test_noisy[i].reshape(28, 28))
    plt.gray()
    ax.get_xaxis().set_visible(False)
    ax.get_yaxis().set_visible(False)

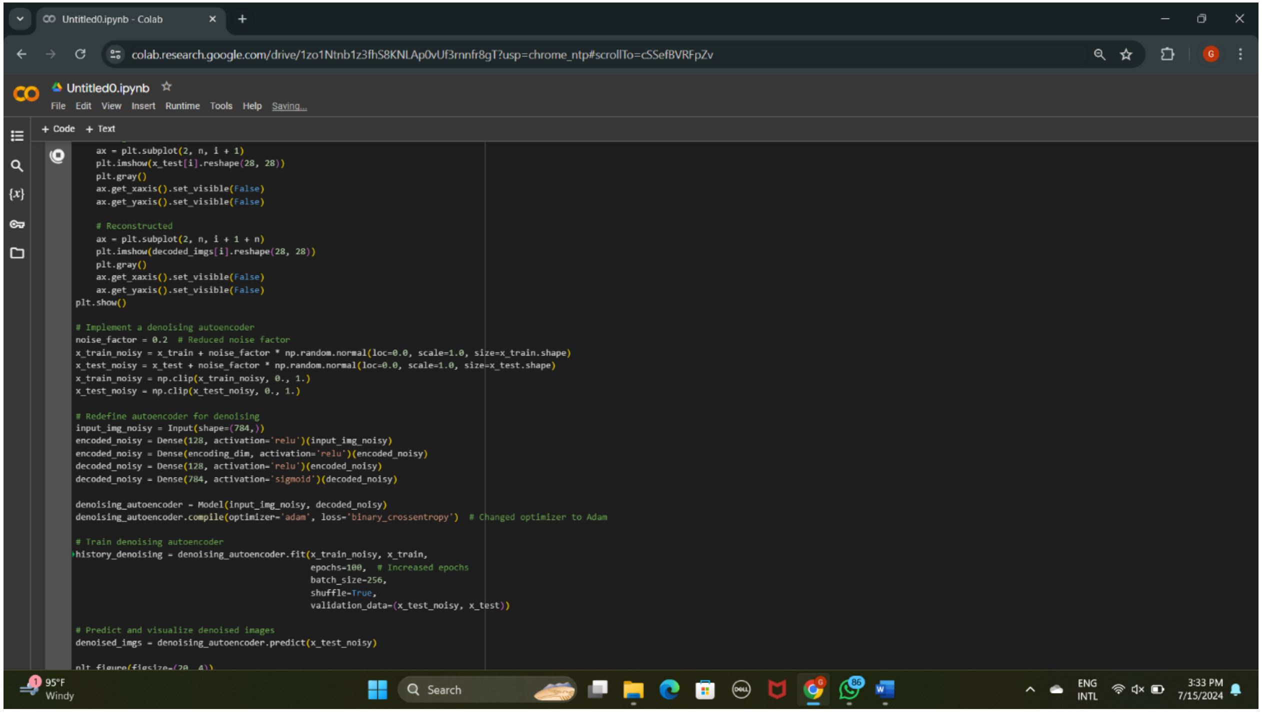
    # Reconstructed image
    ax = plt.subplot(3, n, i + 1 + n)
    plt.imshow(denoised_imgs[i].reshape(28, 28))
    plt.gray()
    ax.get_xaxis().set_visible(False)
    ax.get_yaxis().set_visible(False)
plt.show()

# Plot loss and accuracy
plt.figure(figsize=(12, 4))
plt.subplot(1, 2, 1)
plt.plot(history.history['loss'], label='Training Loss')
plt.plot(history.history['val_loss'], label='Validation Loss')
plt.title('Training and Validation Loss')
plt.xlabel('Epochs')
plt.ylabel('Loss')
plt.legend()

plt.subplot(1, 2, 2)
plt.plot(history_denoising.history['loss'], label='Denoising Training Loss')
plt.plot(history_denoising.history['val_loss'], label='Denoising Validation Loss')
plt.title('Denoising Training and Validation Loss')
plt.xlabel('Epochs')
plt.ylabel('Loss')
plt.legend()

plt.show()
```

```
235/235 [==============================] - 1s 5ms/step - loss: 0.2768 - val_loss: 0.2800
Epoch 73/100
```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```
    ax = plt.subplot(2, n, i + 1)
    plt.imshow(x_test[i].reshape(28, 28))
    plt.gray()
    ax.get_xaxis().set_visible(False)
    ax.get_yaxis().set_visible(False)

    # Reconstructed
    ax = plt.subplot(2, n, i + 1 + n)
    plt.imshow(decoded_imgs[i].reshape(28, 28))
    plt.gray()
    ax.get_xaxis().set_visible(False)
    ax.get_yaxis().set_visible(False)
plt.show()

# Implement a denoising autoencoder
noise_factor = 0.2  # Reduced noise factor
x_train_noisy = x_train + noise_factor * np.random.normal(loc=0.0, scale=1.0, size=x_train.shape)
x_test_noisy = x_test + noise_factor * np.random.normal(loc=0.0, scale=1.0, size=x_test.shape)
x_train_noisy = np.clip(x_train_noisy, 0., 1.)
x_test_noisy = np.clip(x_test_noisy, 0., 1.)

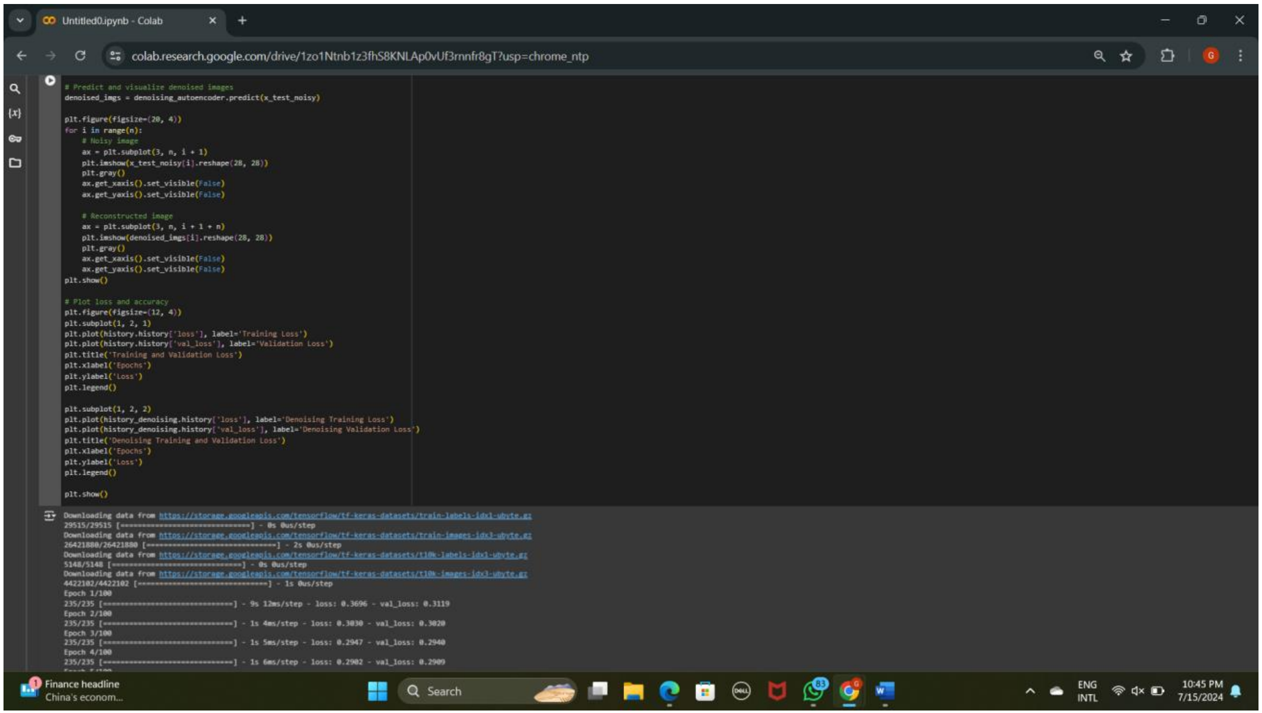
# Redefine autoencoder for denoising
input_img_noisy = Input(shape=(784,))
encoded_noisy = Dense(128, activation='relu')(input_img_noisy)
encoded_noisy = Dense(encoding_dim, activation='relu')(encoded_noisy)
decoded_noisy = Dense(128, activation='relu')(encoded_noisy)
decoded_noisy = Dense(784, activation='sigmoid')(decoded_noisy)

denoising_autoencoder = Model(input_img_noisy, decoded_noisy)
denoising_autoencoder.compile(optimizer='adam', loss='binary_crossentropy')  # Changed optimizer to Adam

# Train denoising autoencoder
history_denoising = denoising_autoencoder.fit(x_train_noisy, x_train,
                                              epochs=100,  # Increased epochs
                                              batch_size=256,
                                              shuffle=True,
                                              validation_data=(x_test_noisy, x_test))

# Predict and visualize denoised images
denoised_imgs = denoising_autoencoder.predict(x_test_noisy)

plt.figure(figsize=(20, 4))
```



```
# Predict and visualize denoised images
denoised_imgs = denoising_autoencoder.predict(x_test_noisy)

plt.figure(figsize=(20, 4))
for i in range(n):
    # Noisy image
    ax = plt.subplot(3, n, i + 1)
    plt.imshow(x_test_noisy[i].reshape(28, 28))
    plt.gray()
    ax.get_xaxis().set_visible(False)
    ax.get_yaxis().set_visible(False)

    # Reconstructed image
    ax = plt.subplot(3, n, i + 1 + n)
    plt.imshow(denoised_imgs[i].reshape(28, 28))
    plt.gray()
    ax.get_xaxis().set_visible(False)
    ax.get_yaxis().set_visible(False)
plt.show()

# Plot loss and accuracy
plt.figure(figsize=(12, 4))
plt.subplot(1, 2, 1)
plt.plot(history.history['loss'], label='Training Loss')
plt.plot(history.history['val_loss'], label='Validation Loss')
plt.title('Training and Validation Loss')
plt.xlabel('Epochs')
plt.ylabel('Loss')
plt.legend()

plt.subplot(1, 2, 2)
plt.plot(history_denoising.history['loss'], label='Denoising Training Loss')
plt.plot(history_denoising.history['val_loss'], label='Denoising Validation Loss')
plt.title('Denoising Training and Validation Loss')
plt.xlabel('Epochs')
plt.ylabel('Loss')
plt.legend()

plt.show()
```

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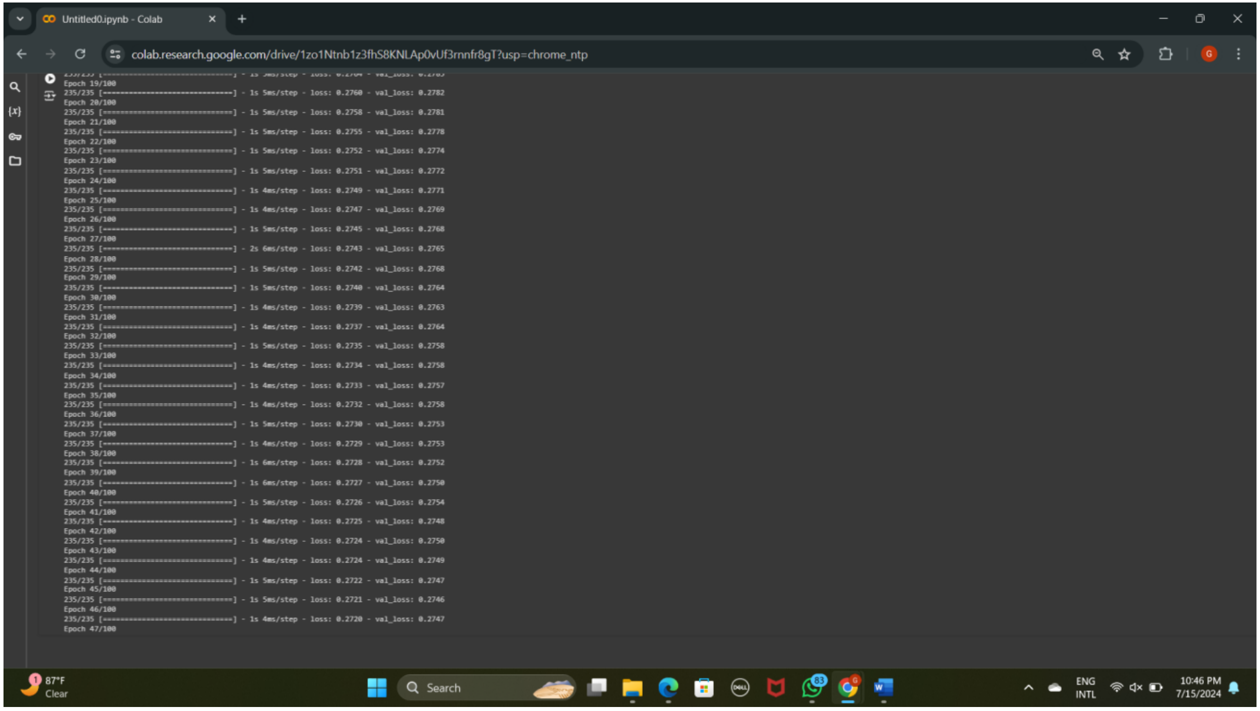
Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datasets/train-labels-idx1-ubyte.gz
29515/29515 [==============================] - 0s 0us/step
Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datasets/train-images-idx3-ubyte.gz
26421880/26421880 [==============================] - 2s 0us/step
Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datasets/t10k-labels-idx1-ubyte.gz
5148/5148 [==============================] - 0s 0us/step
Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datasets/t10k-images-idx3-ubyte.gz
4422102/4422102 [==============================] - 1s 0us/step
Epoch 1/100
235/235 [==============================] - 9s 12ms/step - loss: 0.3696 - val_loss: 0.3119
Epoch 2/100
235/235 [==============================] - 1s 4ms/step - loss: 0.3030 - val_loss: 0.3020
Epoch 3/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2947 - val_loss: 0.2940
Epoch 4/100
235/235 [==============================] - 1s 6ms/step - loss: 0.2902 - val_loss: 0.2909
```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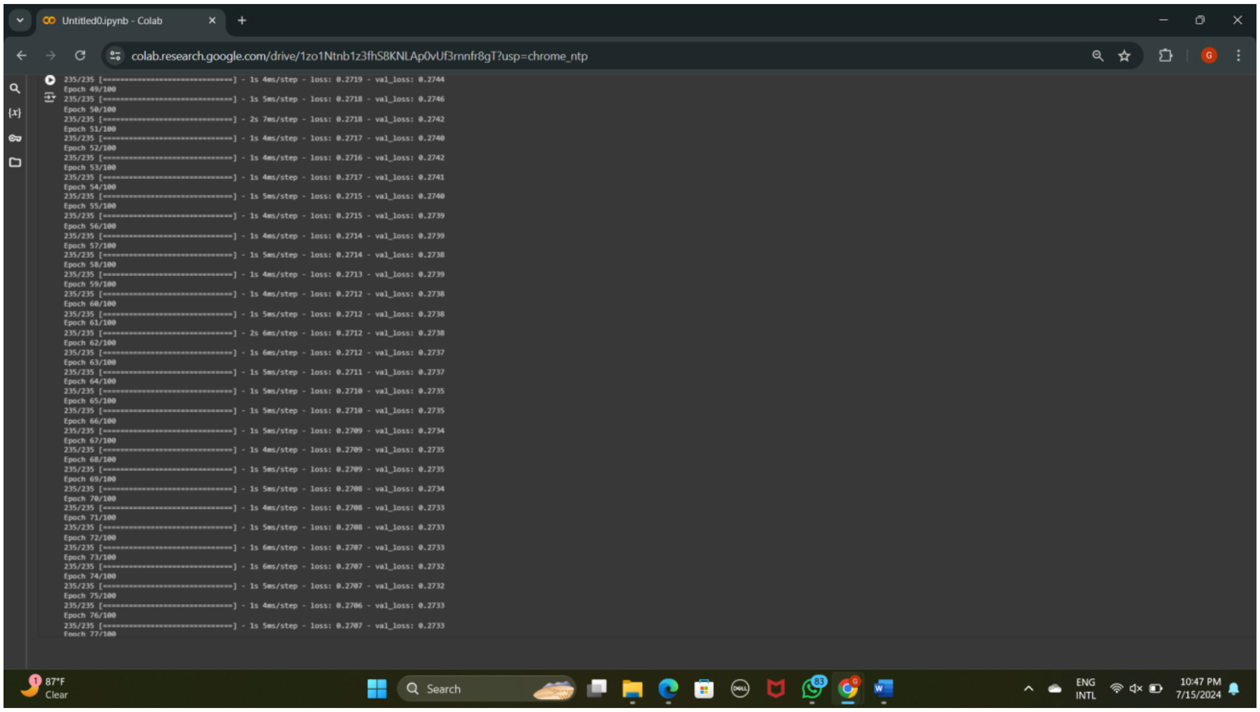
```
Epoch 19/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2760 - val_loss: 0.2782
Epoch 20/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2758 - val_loss: 0.2781
Epoch 21/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2755 - val_loss: 0.2778
Epoch 22/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2752 - val_loss: 0.2774
Epoch 23/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2751 - val_loss: 0.2772
Epoch 24/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2749 - val_loss: 0.2771
Epoch 25/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2747 - val_loss: 0.2769
Epoch 26/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2745 - val_loss: 0.2768
Epoch 27/100
235/235 [==============================] - 2s 6ms/step - loss: 0.2743 - val_loss: 0.2765
Epoch 28/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2742 - val_loss: 0.2768
Epoch 29/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2740 - val_loss: 0.2764
Epoch 30/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2739 - val_loss: 0.2763
Epoch 31/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2737 - val_loss: 0.2764
Epoch 32/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2735 - val_loss: 0.2758
Epoch 33/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2734 - val_loss: 0.2758
Epoch 34/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2733 - val_loss: 0.2757
Epoch 35/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2732 - val_loss: 0.2758
Epoch 36/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2730 - val_loss: 0.2753
Epoch 37/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2729 - val_loss: 0.2753
Epoch 38/100
235/235 [==============================] - 1s 6ms/step - loss: 0.2728 - val_loss: 0.2752
Epoch 39/100
235/235 [==============================] - 1s 6ms/step - loss: 0.2727 - val_loss: 0.2750
Epoch 40/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2726 - val_loss: 0.2754
Epoch 41/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2725 - val_loss: 0.2748
Epoch 42/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2724 - val_loss: 0.2750
Epoch 43/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2724 - val_loss: 0.2749
Epoch 44/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2722 - val_loss: 0.2747
Epoch 45/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2721 - val_loss: 0.2746
Epoch 46/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2720 - val_loss: 0.2747
Epoch 47/100
```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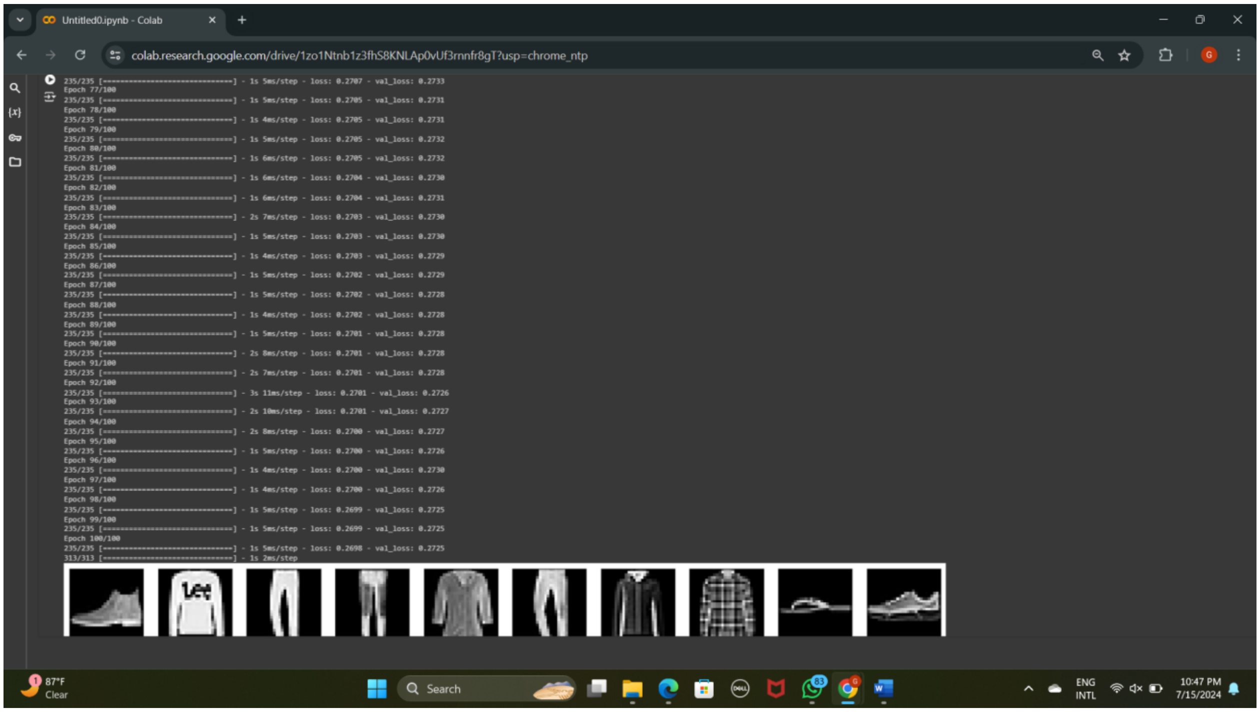
235/235 [==============================] - 1s 4ms/step - loss: 0.2719 - val_loss: 0.2744
Epoch 49/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2718 - val_loss: 0.2746
Epoch 50/100
235/235 [==============================] - 2s 7ms/step - loss: 0.2718 - val_loss: 0.2742
Epoch 51/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2717 - val_loss: 0.2740
Epoch 52/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2716 - val_loss: 0.2742
Epoch 53/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2717 - val_loss: 0.2741
Epoch 54/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2715 - val_loss: 0.2740
Epoch 55/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2715 - val_loss: 0.2739
Epoch 56/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2714 - val_loss: 0.2739
Epoch 57/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2714 - val_loss: 0.2738
Epoch 58/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2713 - val_loss: 0.2739
Epoch 59/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2712 - val_loss: 0.2738
Epoch 60/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2712 - val_loss: 0.2738
Epoch 61/100
235/235 [==============================] - 2s 6ms/step - loss: 0.2712 - val_loss: 0.2738
Epoch 62/100
235/235 [==============================] - 1s 6ms/step - loss: 0.2712 - val_loss: 0.2737
Epoch 63/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2711 - val_loss: 0.2737
Epoch 64/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2710 - val_loss: 0.2735
Epoch 65/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2710 - val_loss: 0.2735
Epoch 66/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2709 - val_loss: 0.2734
Epoch 67/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2709 - val_loss: 0.2735
Epoch 68/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2709 - val_loss: 0.2735
Epoch 69/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2708 - val_loss: 0.2734
Epoch 70/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2708 - val_loss: 0.2733
Epoch 71/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2708 - val_loss: 0.2733
Epoch 72/100
235/235 [==============================] - 1s 6ms/step - loss: 0.2707 - val_loss: 0.2733
Epoch 73/100
235/235 [==============================] - 1s 6ms/step - loss: 0.2707 - val_loss: 0.2732
Epoch 74/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2707 - val_loss: 0.2732
Epoch 75/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2706 - val_loss: 0.2733
Epoch 76/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2707 - val_loss: 0.2733
Epoch 77/100
```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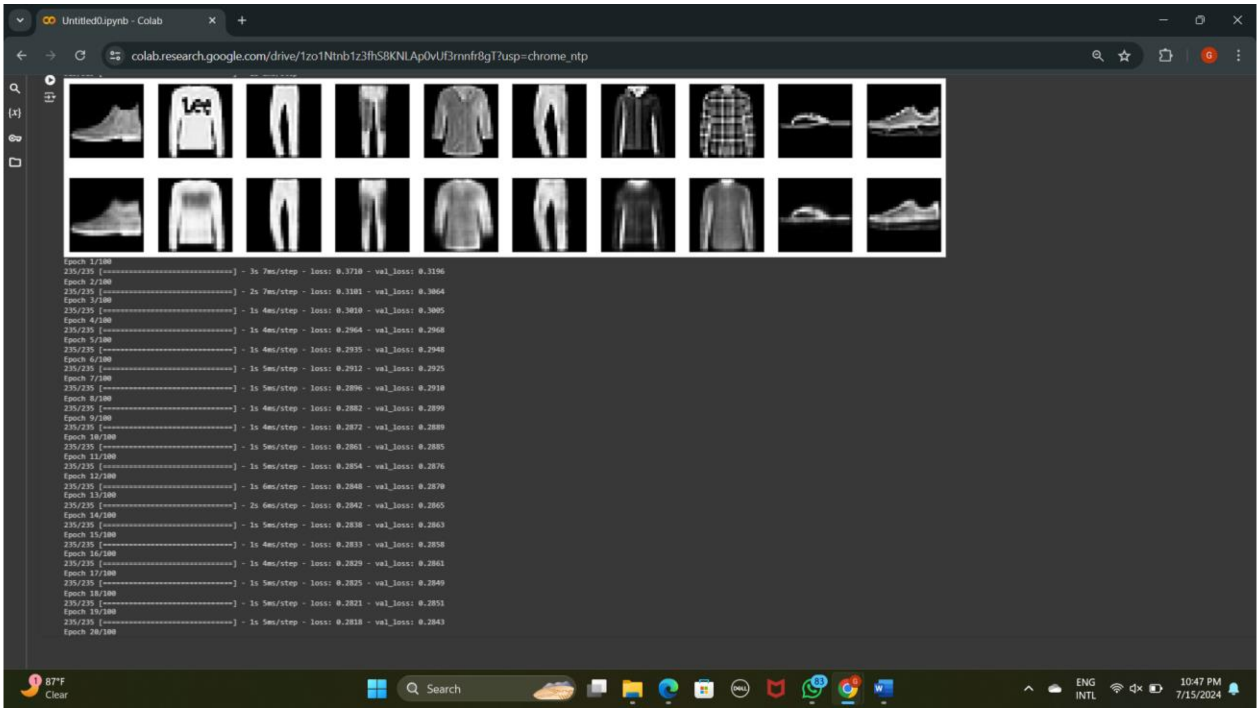
235/235 [==============================] - 1s 5ms/step - loss: 0.2707 - val_loss: 0.2733
Epoch 77/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2705 - val_loss: 0.2731
Epoch 78/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2705 - val_loss: 0.2731
Epoch 79/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2705 - val_loss: 0.2732
Epoch 80/100
235/235 [==============================] - 1s 6ms/step - loss: 0.2705 - val_loss: 0.2732
Epoch 81/100
235/235 [==============================] - 1s 6ms/step - loss: 0.2704 - val_loss: 0.2730
Epoch 82/100
235/235 [==============================] - 1s 6ms/step - loss: 0.2704 - val_loss: 0.2731
Epoch 83/100
235/235 [==============================] - 2s 7ms/step - loss: 0.2703 - val_loss: 0.2730
Epoch 84/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2703 - val_loss: 0.2730
Epoch 85/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2703 - val_loss: 0.2729
Epoch 86/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2702 - val_loss: 0.2729
Epoch 87/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2702 - val_loss: 0.2728
Epoch 88/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2702 - val_loss: 0.2728
Epoch 89/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2701 - val_loss: 0.2728
Epoch 90/100
235/235 [==============================] - 2s 8ms/step - loss: 0.2701 - val_loss: 0.2728
Epoch 91/100
235/235 [==============================] - 2s 7ms/step - loss: 0.2701 - val_loss: 0.2728
Epoch 92/100
235/235 [==============================] - 3s 11ms/step - loss: 0.2701 - val_loss: 0.2726
Epoch 93/100
235/235 [==============================] - 2s 10ms/step - loss: 0.2701 - val_loss: 0.2727
Epoch 94/100
235/235 [==============================] - 2s 8ms/step - loss: 0.2700 - val_loss: 0.2727
Epoch 95/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2700 - val_loss: 0.2726
Epoch 96/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2700 - val_loss: 0.2730
Epoch 97/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2700 - val_loss: 0.2726
Epoch 98/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2699 - val_loss: 0.2725
Epoch 99/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2699 - val_loss: 0.2725
Epoch 100/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2698 - val_loss: 0.2725
313/313 [==============================] - 1s 2ms/step
```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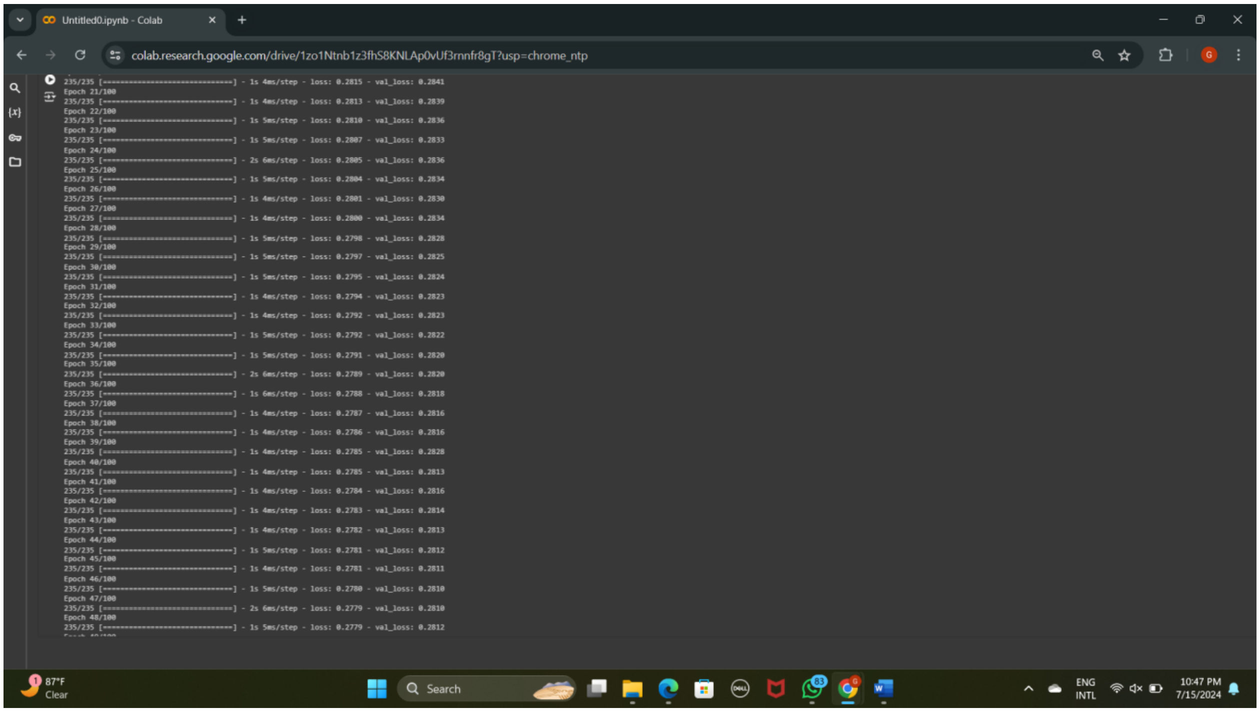
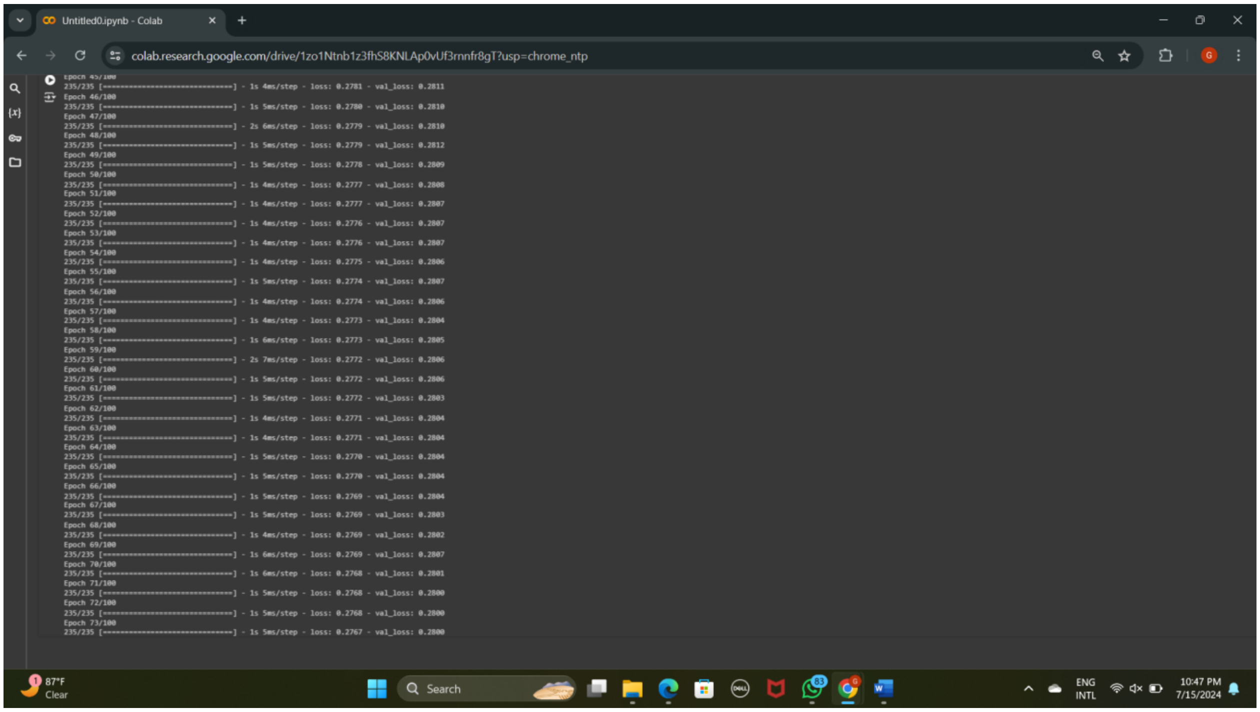
```
Epoch 1/100
235/235 [==============================] - 3s 7ms/step - loss: 0.3710 - val_loss: 0.3196
Epoch 2/100
235/235 [==============================] - 2s 7ms/step - loss: 0.3101 - val_loss: 0.3064
Epoch 3/100
235/235 [==============================] - 1s 4ms/step - loss: 0.3010 - val_loss: 0.3005
Epoch 4/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2964 - val_loss: 0.2968
Epoch 5/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2935 - val_loss: 0.2948
Epoch 6/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2912 - val_loss: 0.2925
Epoch 7/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2896 - val_loss: 0.2910
Epoch 8/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2882 - val_loss: 0.2899
Epoch 9/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2872 - val_loss: 0.2889
Epoch 10/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2861 - val_loss: 0.2885
Epoch 11/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2854 - val_loss: 0.2876
Epoch 12/100
235/235 [==============================] - 1s 6ms/step - loss: 0.2848 - val_loss: 0.2870
Epoch 13/100
235/235 [==============================] - 2s 6ms/step - loss: 0.2842 - val_loss: 0.2865
Epoch 14/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2838 - val_loss: 0.2863
Epoch 15/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2833 - val_loss: 0.2858
Epoch 16/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2829 - val_loss: 0.2861
Epoch 17/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2825 - val_loss: 0.2849
Epoch 18/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2821 - val_loss: 0.2851
Epoch 19/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2818 - val_loss: 0.2843
Epoch 20/100
```

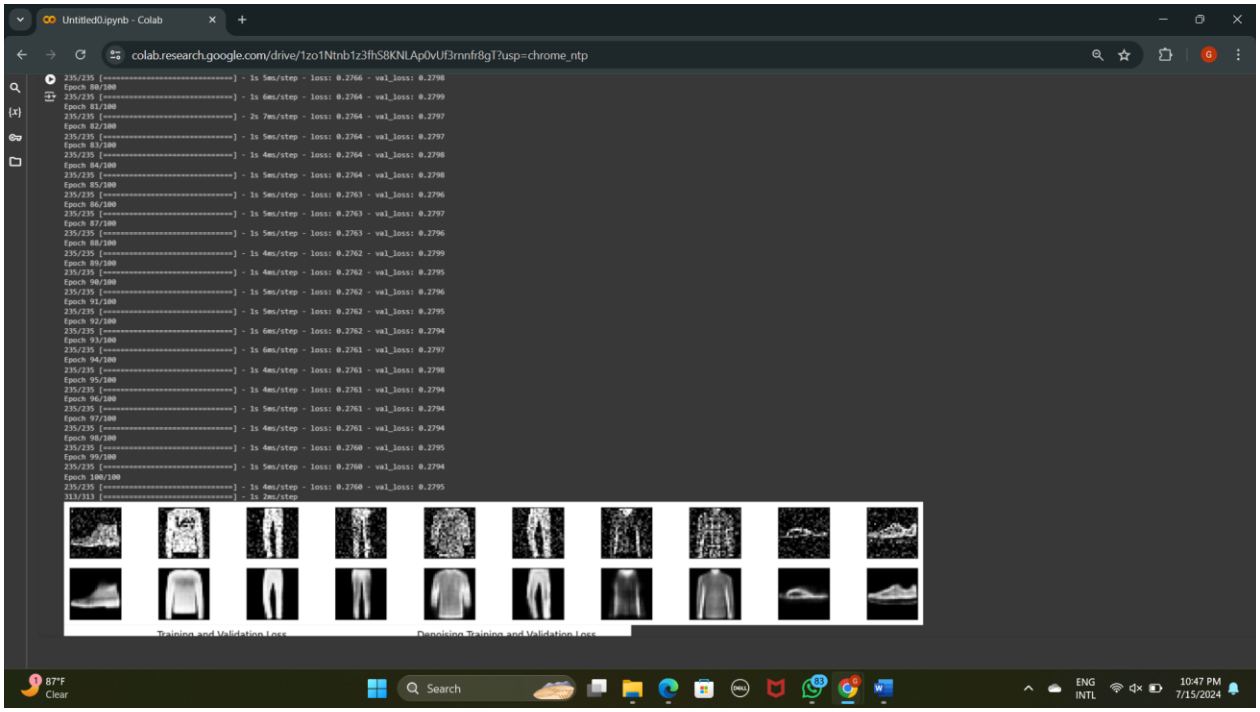

Untitled0.ipynb - Colab
colab.research.google.com/drive/1zo1Ntnb1z3fhS8KNLAp0vUf3rnnfr8gT?usp=chrome_ntp
87°F
Clear
Search
ENG
INTL
10:47 PM
7/15/2024

```
235/235 [==============================] - 1s 4ms/step - loss: 0.2815 - val_loss: 0.2841
Epoch 21/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2813 - val_loss: 0.2839
Epoch 22/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2810 - val_loss: 0.2836
Epoch 23/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2807 - val_loss: 0.2833
Epoch 24/100
235/235 [==============================] - 2s 6ms/step - loss: 0.2805 - val_loss: 0.2836
Epoch 25/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2804 - val_loss: 0.2834
Epoch 26/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2801 - val_loss: 0.2830
Epoch 27/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2800 - val_loss: 0.2834
Epoch 28/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2798 - val_loss: 0.2828
Epoch 29/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2797 - val_loss: 0.2825
Epoch 30/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2795 - val_loss: 0.2824
Epoch 31/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2794 - val_loss: 0.2823
Epoch 32/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2792 - val_loss: 0.2823
Epoch 33/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2792 - val_loss: 0.2822
Epoch 34/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2791 - val_loss: 0.2820
Epoch 35/100
235/235 [==============================] - 2s 6ms/step - loss: 0.2789 - val_loss: 0.2820
Epoch 36/100
235/235 [==============================] - 1s 6ms/step - loss: 0.2788 - val_loss: 0.2818
Epoch 37/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2787 - val_loss: 0.2816
Epoch 38/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2786 - val_loss: 0.2816
Epoch 39/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2785 - val_loss: 0.2828
Epoch 40/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2785 - val_loss: 0.2813
Epoch 41/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2784 - val_loss: 0.2816
Epoch 42/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2783 - val_loss: 0.2814
Epoch 43/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2782 - val_loss: 0.2813
Epoch 44/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2781 - val_loss: 0.2812
Epoch 45/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2781 - val_loss: 0.2811
Epoch 46/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2780 - val_loss: 0.2810
Epoch 47/100
235/235 [==============================] - 2s 6ms/step - loss: 0.2779 - val_loss: 0.2810
Epoch 48/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2779 - val_loss: 0.2812
Epoch 49/100
```



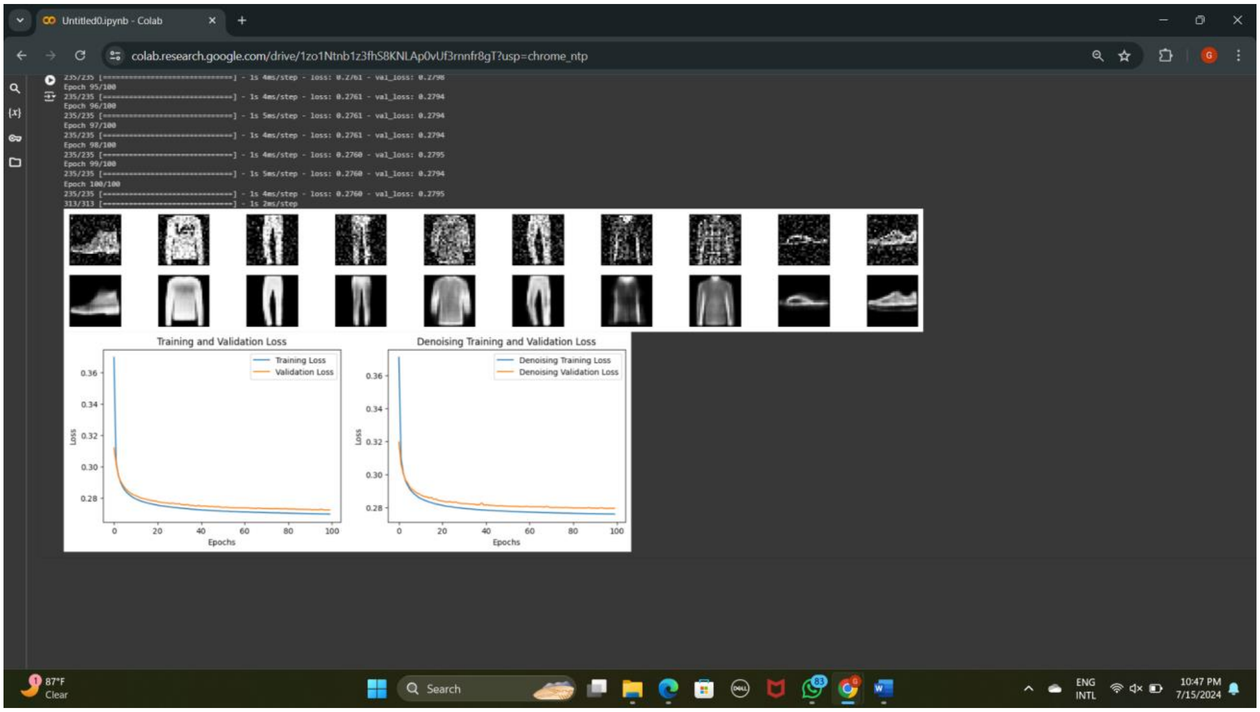
Untitled0.ipynb - Colab
colab.research.google.com/drive/1zo1Ntnb1z3fhS8KNLAp0vUf3rnnfr8gT?usp=chrome_ntp
87°F
Clear
Search
ENG
INTL
10:47 PM
7/15/2024

```
Epoch 45/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2781 - val_loss: 0.2811
Epoch 46/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2780 - val_loss: 0.2810
Epoch 47/100
235/235 [==============================] - 2s 6ms/step - loss: 0.2779 - val_loss: 0.2810
Epoch 48/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2779 - val_loss: 0.2812
Epoch 49/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2778 - val_loss: 0.2809
Epoch 50/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2777 - val_loss: 0.2808
Epoch 51/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2777 - val_loss: 0.2807
Epoch 52/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2776 - val_loss: 0.2807
Epoch 53/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2776 - val_loss: 0.2807
Epoch 54/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2775 - val_loss: 0.2806
Epoch 55/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2774 - val_loss: 0.2807
Epoch 56/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2774 - val_loss: 0.2806
Epoch 57/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2773 - val_loss: 0.2804
Epoch 58/100
235/235 [==============================] - 1s 6ms/step - loss: 0.2773 - val_loss: 0.2805
Epoch 59/100
235/235 [==============================] - 2s 7ms/step - loss: 0.2772 - val_loss: 0.2806
Epoch 60/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2772 - val_loss: 0.2806
Epoch 61/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2772 - val_loss: 0.2803
Epoch 62/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2771 - val_loss: 0.2804
Epoch 63/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2771 - val_loss: 0.2804
Epoch 64/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2770 - val_loss: 0.2804
Epoch 65/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2770 - val_loss: 0.2804
Epoch 66/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2769 - val_loss: 0.2804
Epoch 67/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2769 - val_loss: 0.2803
Epoch 68/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2769 - val_loss: 0.2802
Epoch 69/100
235/235 [==============================] - 1s 6ms/step - loss: 0.2769 - val_loss: 0.2807
Epoch 70/100
235/235 [==============================] - 1s 6ms/step - loss: 0.2768 - val_loss: 0.2801
Epoch 71/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2768 - val_loss: 0.2800
Epoch 72/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2768 - val_loss: 0.2800
Epoch 73/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2767 - val_loss: 0.2800
```



Untitled0.ipynb - Colab
colab.research.google.com/drive/1zo1Ntnb1z3fhS8KNLAp0vUf3rnnfr8gT?usp=chrome_ntp
Training and Validation Loss
Denoising Training and Validation Loss
87°F
Clear
Search
ENG
INTL
10:47 PM
7/15/2024

```
235/235 [==============================] - 1s 5ms/step - loss: 0.2766 - val_loss: 0.2798
Epoch 80/100
235/235 [==============================] - 1s 6ms/step - loss: 0.2764 - val_loss: 0.2799
Epoch 81/100
235/235 [==============================] - 2s 7ms/step - loss: 0.2764 - val_loss: 0.2797
Epoch 82/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2764 - val_loss: 0.2797
Epoch 83/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2764 - val_loss: 0.2798
Epoch 84/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2764 - val_loss: 0.2798
Epoch 85/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2763 - val_loss: 0.2796
Epoch 86/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2763 - val_loss: 0.2797
Epoch 87/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2763 - val_loss: 0.2796
Epoch 88/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2762 - val_loss: 0.2799
Epoch 89/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2762 - val_loss: 0.2795
Epoch 90/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2762 - val_loss: 0.2796
Epoch 91/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2762 - val_loss: 0.2795
Epoch 92/100
235/235 [==============================] - 1s 6ms/step - loss: 0.2762 - val_loss: 0.2794
Epoch 93/100
235/235 [==============================] - 1s 6ms/step - loss: 0.2761 - val_loss: 0.2797
Epoch 94/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2761 - val_loss: 0.2798
Epoch 95/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2761 - val_loss: 0.2794
Epoch 96/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2761 - val_loss: 0.2794
Epoch 97/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2761 - val_loss: 0.2794
Epoch 98/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2760 - val_loss: 0.2795
Epoch 99/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2760 - val_loss: 0.2794
Epoch 100/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2760 - val_loss: 0.2795
313/313 [==============================] - 1s 2ms/step
```



Untitled0.ipynb - Colab
colab.research.google.com/drive/1zo1Ntnb1z3fhS8KNLAp0vUf3rnnfr8gT?usp=chrome_ntp

```
235/235 [==============================] - 1s 4ms/step - loss: 0.2761 - val_loss: 0.2798
Epoch 95/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2761 - val_loss: 0.2794
Epoch 96/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2761 - val_loss: 0.2794
Epoch 97/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2761 - val_loss: 0.2794
Epoch 98/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2760 - val_loss: 0.2795
Epoch 99/100
235/235 [==============================] - 1s 5ms/step - loss: 0.2760 - val_loss: 0.2794
Epoch 100/100
235/235 [==============================] - 1s 4ms/step - loss: 0.2760 - val_loss: 0.2795
313/313 [==============================] - 1s 2ms/step
```