Experiment 1

Problem Statement:

To explore the basic features of Tensorflow and Keras packages.

Github & Google Colab Links:

GitHub Link: https://github.com/piyush-gambhir/ncu-lab-manual-and-end-semester-projects/blob/main/NCU-CSL312%20-%20DL%20-%20Lab%20Manual/Experiment%201/Experiment%201.ipynb

Google Colab Link:

Open in Colab

Installing Dependencies:

In [ ]:
```
! pip install tensorflow-cpu numpy matplotlib keras
```

Code

In [ ]:
```
import tensorflow as tf
import numpy as np
import matplotlib.pyplot as plt
from tensorflow import keras

# Constants and Variables
x = tf.constant([[1., 2., 3.], [4., 5., 6.]])
a = tf.constant([[1, 2], [3, 4]])
b = tf.constant([[1, 1], [1, 1]])
c = tf.constant([[4.0, 5.0], [10.0, 1.0]])

# Basic Tensor Operations
print(x)
print("Shape:", x.shape)
print("DType:", x.dtype)
print("Element-wise addition:", x + x)
print("Scalar multiplication:", 5 * x)

# Concatenation and Mathematical Operations
print("Concatenated:", tf.concat([x, x, x], axis=0))
print("Softmax:", tf.nn.softmax(x, axis=-1))
print("Sum:", tf.reduce_sum(x))

# Element-wise and Matrix Operations
print("Addition:\n", a + b)
print("Element-wise Multiplication:\n", a * b)
print("Matrix Multiplication:\n", tf.matmul(a, b))

# Advanced Operations
print("Max Value:", tf.reduce_max(c))
print("Argmax:", tf.math.argmax(c))
print("Softmax:\n", tf.nn.softmax(c))

# Variable operations and Gradient Computation
var = tf.Variable([0.0, 0.0, 0.0])
var.assign([1, 2, 3])
var.assign_add([1, 1, 1])

x_var = tf.Variable(1.0)
with tf.GradientTape() as tape:
    y = x_var**2 + 2 * x_var - 5
g_x = tape.gradient(y, x_var)
print("Gradient dy/dx:", g_x.numpy())

# tf.function for Graph Execution


@tf.function
def my_func(x):
    return tf.reduce_sum(x)
```

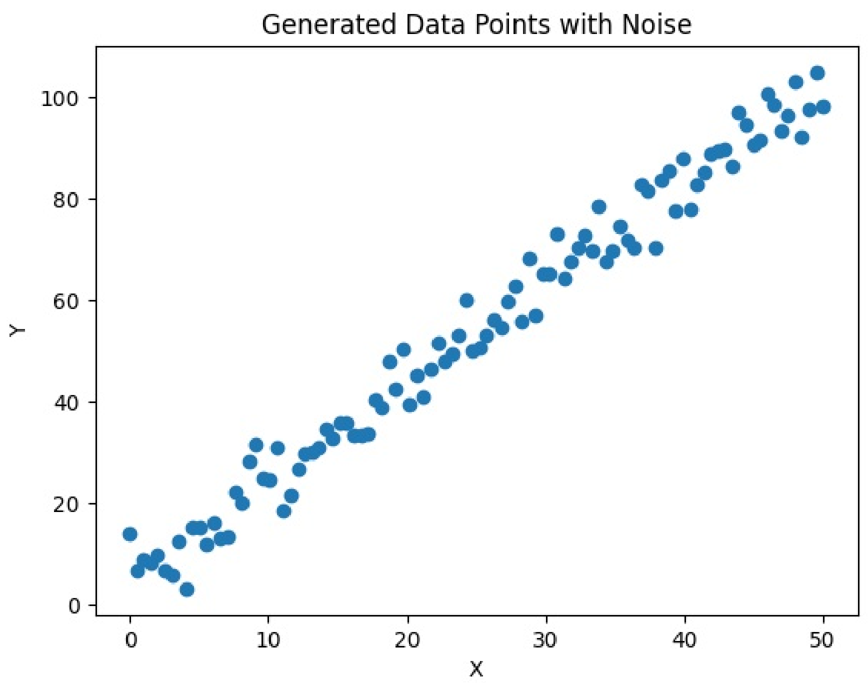
```python
print("tf.function example:", my_func(tf.constant([1, 2, 3])))

# TensorFlow Module


class MyModule(tf.Module):
    def __init__(self, value):
        super(MyModule, self).__init__()
        self.weight = tf.Variable(value)

    @tf.function
    def multiply(self, x):
        return x * self.weight


mod = MyModule(3)
print("Module example:", mod.multiply(tf.constant([1, 2, 3])))

# Simple Linear Model with Keras
model = keras.Sequential([
    keras.layers.Dense(units=1, input_shape=[1])
])
model.compile(optimizer='sgd', loss='mean_squared_error')
xs = np.array([-1.0, 0.0, 1.0, 2.0, 3.0, 4.0], dtype=float)
ys = np.array([-3.0, -1.0, 1.0, 3.0, 5.0, 7.0], dtype=float)
model.fit(xs, ys, epochs=1000, verbose=0)

# Convert the list [10.0] to a numpy array with shape (1, 1) for prediction
x_predict = np.array([10.0]).reshape(-1, 1)
predicted_value = model.predict(x_predict)
print("Model prediction for x=10.0:", predicted_value[0][0])
```

```
tf.Tensor(
[[1. 2. 3.]
 [4. 5. 6.]], shape=(2, 3), dtype=float32)
Shape: (2, 3)
DType: <dtype: 'float32'>
Element-wise addition: tf.Tensor(
[[ 2.  4.  6.]
 [ 8. 10. 12.]], shape=(2, 3), dtype=float32)
Scalar multiplication: tf.Tensor(
[[ 5. 10. 15.]
 [20. 25. 30.]], shape=(2, 3), dtype=float32)
Concatenated: tf.Tensor(
[[1. 2. 3.]
 [4. 5. 6.]
 [1. 2. 3.]
 [4. 5. 6.]
 [1. 2. 3.]
 [4. 5. 6.]], shape=(6, 3), dtype=float32)
Softmax: tf.Tensor(
[[0.09003057 0.24472848 0.6652409 ]
 [0.09003057 0.24472848 0.6652409 ]], shape=(2, 3), dtype=float32)
Sum: tf.Tensor(21.0, shape=(), dtype=float32)
Addition:
 tf.Tensor(
[[2 3]
 [4 5]], shape=(2, 2), dtype=int32)
Element-wise Multiplication:
 tf.Tensor(
[[1 2]
 [3 4]], shape=(2, 2), dtype=int32)
Matrix Multiplication:
 tf.Tensor(
[[3 3]
 [7 7]], shape=(2, 2), dtype=int32)
Max Value: tf.Tensor(10.0, shape=(), dtype=float32)
Argmax: tf.Tensor([1 0], shape=(2,), dtype=int64)
Softmax:
 tf.Tensor(
[[2.6894143e-01 7.3105854e-01]
 [9.9987662e-01 1.2339458e-04]], shape=(2, 2), dtype=float32)
Gradient dy/dx: 4.0
tf.function example: tf.Tensor(6, shape=(), dtype=int32)
Module example: tf.Tensor([3 6 9], shape=(3,), dtype=int32)
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 64ms/step
Model prediction for x=10.0: 18.999922
```

In [ ]:

```python
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
import seaborn as sns
import tensorflow as tf
```

```python
from tensorflow.keras.models import Sequential, load_model
from tensorflow.keras.layers import Dense
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import MinMaxScaler
from sklearn.metrics import mean_absolute_error, mean_squared_error

# Data Generation
np.random.seed(101)
x = np.linspace(0, 50, 100)
noise = np.random.normal(loc=0.0, scale=4.0, size=len(x))
y = 2 * x + 3 + noise  # y = mx + b + noise
plt.scatter(x, y)
plt.title('Generated Data Points with Noise')
plt.xlabel('X')
plt.ylabel('Y')
plt.show()

# Neural Network Model for Regression
model = Sequential([
    Dense(4, input_dim=1, activation='relu'),
    Dense(4, activation='relu'),
    Dense(1, activation='linear')
])
model.compile(loss='mse', optimizer='adam')
model.fit(x, y, epochs=500, verbose=1)
model.summary()

# Predictions and Evaluation
x_for_predictions = np.linspace(0, 50, 1000)
y_predicted = model.predict(x_for_predictions)
predictions = model.predict(x).flatten()

mse = mean_squared_error(y, predictions)
mae = mean_absolute_error(y, predictions)
print(f"Mean Squared Error: {mse}")
print(f"Mean Absolute Error: {mae}")

plt.scatter(x, y, label='Original Data')
plt.plot(x_for_predictions, y_predicted, 'r', label='Line of Best Fit')
plt.title('Original Data and Predicted Line of Best Fit')
plt.xlabel('X')
plt.ylabel('Y')
plt.legend()
plt.show()

# Data Loading and Preparation
df = pd.read_csv('fake_reg.csv')
sns.pairplot(df)
plt.show()

X = df[['feature1', 'feature2']].values
y = df['price'].values
X_train, X_test, y_train, y_test = train_test_split(
    X, y, test_size=0.3, random_state=42)

scaler = MinMaxScaler()
X_train_scaled = scaler.fit_transform(X_train)
X_test_scaled = scaler.transform(X_test)

# Model for Predicting Prices
price_model = Sequential([
    Dense(4, input_shape=[2], activation='relu'),
    Dense(4, activation='relu'),
    Dense(1)
])
price_model.compile(optimizer='rmsprop', loss='mse')

# Fit the model and capture the history
history = price_model.fit(X_train_scaled, y_train, epochs=250, verbose=0)

# Model Evaluation
train_loss = price_model.evaluate(X_train_scaled, y_train, verbose=0)
test_loss = price_model.evaluate(X_test_scaled, y_test, verbose=0)
print(f"Training Loss: {train_loss}")
print(f"Test Loss: {test_loss}")

# Plot Training Loss
loss = history.history['loss']
plt.plot(range(len(loss)), loss)
plt.title("Training Loss per Epoch")
plt.xlabel('Epochs')
plt.ylabel('Loss')
plt.show()
```




```
c:\Users\mainp\AppData\Local\Programs\Python\Python311\Lib\site-packages\keras\src\layers\core\dense.py:86: User
Warning: Do not pass an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer usin
g an `Input(shape)` object as the first layer in the model instead.
  super().__init__(activity_regularizer=activity_regularizer, **kwargs)
Epoch 1/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 2s 5ms/step - loss: 3816.8904
Epoch 2/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3675.2747
Epoch 3/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3616.0183
Epoch 4/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3786.6235
Epoch 5/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3614.7380
Epoch 6/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3600.3745
Epoch 7/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3731.9346
Epoch 8/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3544.4194
Epoch 9/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3867.9727
Epoch 10/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3819.0059
Epoch 11/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 4ms/step - loss: 3638.5342
Epoch 12/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3738.2158
Epoch 13/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3679.1357
Epoch 14/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3789.3955
Epoch 15/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3729.8909
Epoch 16/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3808.5630
Epoch 17/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3720.5808
Epoch 18/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3800.4888
Epoch 19/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3922.3398
Epoch 20/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3396.6860
Epoch 21/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3751.9087
Epoch 22/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3722.5664
Epoch 23/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3788.3835
Epoch 24/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3823.5667
Epoch 25/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3814.0737
Epoch 26/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3538.2739
```

```
Epoch 27/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 4052.5713
Epoch 28/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3775.7695
Epoch 29/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3720.6047
Epoch 30/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3863.3772
Epoch 31/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3772.0359
Epoch 32/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3683.1426
Epoch 33/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3871.5901
Epoch 34/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3788.1516
Epoch 35/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3814.4290
Epoch 36/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - loss: 3506.7356
Epoch 37/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3723.1694
Epoch 38/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3822.1555
Epoch 39/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3647.8518
Epoch 40/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3642.1448
Epoch 41/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3834.0903
Epoch 42/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3767.7690
Epoch 43/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3666.2305
Epoch 44/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - loss: 3787.4944
Epoch 45/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3585.8687
Epoch 46/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3544.5134
Epoch 47/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3781.7695
Epoch 48/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3680.3552
Epoch 49/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - loss: 3668.9290
Epoch 50/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3537.4807
Epoch 51/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3689.3765
Epoch 52/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3855.9463
Epoch 53/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3758.1865
Epoch 54/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3819.4304
Epoch 55/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3773.0984
Epoch 56/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3617.3213
Epoch 57/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3531.2065
Epoch 58/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3621.2222
Epoch 59/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3594.0544
Epoch 60/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3549.4194
Epoch 61/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3401.9023
Epoch 62/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3801.1130
Epoch 63/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3791.5771
Epoch 64/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3904.9458
Epoch 65/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3530.1377
Epoch 66/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3497.6643
Epoch 67/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3849.0090
Epoch 68/500
```

```
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3727.5684
Epoch 69/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3599.6113
Epoch 70/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3535.2051
Epoch 71/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3587.6843
Epoch 72/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3509.0911
Epoch 73/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3870.8784
Epoch 74/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3798.2300
Epoch 75/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3791.4351
Epoch 76/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3647.5059
Epoch 77/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3563.2153
Epoch 78/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3664.1831
Epoch 79/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3700.1953
Epoch 80/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3486.6387
Epoch 81/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3876.1418
Epoch 82/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3756.5974
Epoch 83/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3595.6028
Epoch 84/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3649.3088
Epoch 85/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3601.9756
Epoch 86/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3534.1589
Epoch 87/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3663.2859
Epoch 88/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - loss: 3457.1731
Epoch 89/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3707.9893
Epoch 90/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3850.4265
Epoch 91/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - loss: 3573.3037
Epoch 92/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3787.0315
Epoch 93/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3530.4341
Epoch 94/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3726.6323
Epoch 95/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3707.8538
Epoch 96/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3675.9597
Epoch 97/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3565.5083
Epoch 98/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3821.0054
Epoch 99/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3659.5000
Epoch 100/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 5ms/step - loss: 3803.7878
Epoch 101/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3683.3623
Epoch 102/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3575.9302
Epoch 103/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3881.7678
Epoch 104/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3521.8792
Epoch 105/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3663.3721
Epoch 106/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3762.2756
Epoch 107/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3466.2732
Epoch 108/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3778.4080
Epoch 109/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3865.4961
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Epoch 110/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3657.7354
Epoch 111/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3577.7549
Epoch 112/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3555.4988
Epoch 113/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3402.5037
Epoch 114/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3601.8081
Epoch 115/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3877.0283
Epoch 116/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3460.6855
Epoch 117/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3695.4744
Epoch 118/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3547.4724
Epoch 119/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3823.6931
Epoch 120/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 4ms/step - loss: 3749.3816
Epoch 121/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3551.9087
Epoch 122/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 4ms/step - loss: 3708.9658
Epoch 123/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 4ms/step - loss: 3624.6333
Epoch 124/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 4ms/step - loss: 3543.9485
Epoch 125/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3637.2446
Epoch 126/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3528.6948
Epoch 127/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3726.1416
Epoch 128/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3561.2117
Epoch 129/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3685.8352
Epoch 130/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3792.5557
Epoch 131/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3508.3396
Epoch 132/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3611.1714
Epoch 133/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3676.2795
Epoch 134/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3486.2947
Epoch 135/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3752.9761
Epoch 136/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3597.2219
Epoch 137/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3823.5085
Epoch 138/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3442.4275
Epoch 139/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 5ms/step - loss: 3827.8149
Epoch 140/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3535.0696
Epoch 141/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3582.6538
Epoch 142/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3740.8047
Epoch 143/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3583.7705
Epoch 144/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3692.0676
Epoch 145/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3339.5420
Epoch 146/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3575.7456
Epoch 147/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3555.1521
Epoch 148/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3795.9875
Epoch 149/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3550.7166
Epoch 150/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3612.2913
Epoch 151/500
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4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3668.6956
Epoch 152/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3428.4895
Epoch 153/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3717.8928
Epoch 154/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3665.3367
Epoch 155/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3798.4753
Epoch 156/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3694.0249
Epoch 157/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3592.8997
Epoch 158/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3570.4670
Epoch 159/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3610.2344
Epoch 160/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3646.8958
Epoch 161/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3790.3738
Epoch 162/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3686.1350
Epoch 163/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3595.1726
Epoch 164/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3685.2866
Epoch 165/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3610.4939
Epoch 166/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3759.0813
Epoch 167/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3503.3552
Epoch 168/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3902.9788
Epoch 169/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3749.9226
Epoch 170/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3570.8782
Epoch 171/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3676.9365
Epoch 172/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3787.3030
Epoch 173/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3285.4719
Epoch 174/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3738.2148
Epoch 175/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3722.9512
Epoch 176/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3859.4263
Epoch 177/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3531.3284
Epoch 178/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3542.4065
Epoch 179/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3951.8823
Epoch 180/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3601.0166
Epoch 181/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3665.3298
Epoch 182/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3785.4243
Epoch 183/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3615.0276
Epoch 184/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3578.2012
Epoch 185/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3547.1123
Epoch 186/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3948.3577
Epoch 187/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3787.9390
Epoch 188/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3595.8418
Epoch 189/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3734.6472
Epoch 190/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3612.0278
Epoch 191/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3693.4551
Epoch 192/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3711.5449
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Epoch 193/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3581.8889
Epoch 194/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 5ms/step - loss: 3506.9919
Epoch 195/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3611.2136
Epoch 196/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3627.6519
Epoch 197/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3451.8752
Epoch 198/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3718.3813
Epoch 199/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3618.7676
Epoch 200/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3684.1008
Epoch 201/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3488.1860
Epoch 202/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3566.0291
Epoch 203/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3641.5952
Epoch 204/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3890.7412
Epoch 205/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3665.7502
Epoch 206/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3487.6699
Epoch 207/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3779.0593
Epoch 208/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3736.5266
Epoch 209/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3628.9646
Epoch 210/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3792.7427
Epoch 211/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3514.5664
Epoch 212/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3654.5886
Epoch 213/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3823.3696
Epoch 214/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3664.6343
Epoch 215/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3659.7388
Epoch 216/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3665.6597
Epoch 217/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3681.1626
Epoch 218/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3714.9773
Epoch 219/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3735.9863
Epoch 220/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3583.6680
Epoch 221/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3386.2151
Epoch 222/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3663.6296
Epoch 223/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3582.3069
Epoch 224/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3695.7581
Epoch 225/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3746.1292
Epoch 226/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3752.8557
Epoch 227/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3622.3643
Epoch 228/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3698.0437
Epoch 229/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3506.3298
Epoch 230/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3529.7114
Epoch 231/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3594.5698
Epoch 232/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3718.9463
Epoch 233/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3647.6880
Epoch 234/500
```

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4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3669.1826
Epoch 235/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3814.9971
Epoch 236/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3625.0571
Epoch 237/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3615.2637
Epoch 238/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3697.3149
Epoch 239/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3550.8381
Epoch 240/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3699.4607
Epoch 241/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3607.7410
Epoch 242/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3568.6294
Epoch 243/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3595.2551
Epoch 244/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3672.4287
Epoch 245/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3741.0073
Epoch 246/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3550.4480
Epoch 247/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3858.6042
Epoch 248/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3607.4082
Epoch 249/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3713.8374
Epoch 250/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3493.0554
Epoch 251/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3716.6240
Epoch 252/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3494.5198
Epoch 253/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3503.6211
Epoch 254/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3549.8018
Epoch 255/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3619.2717
Epoch 256/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3425.4307
Epoch 257/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3591.0955
Epoch 258/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3617.0510
Epoch 259/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3730.2864
Epoch 260/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3760.6926
Epoch 261/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3480.3313
Epoch 262/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3680.2073
Epoch 263/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3577.4744
Epoch 264/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3598.9878
Epoch 265/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3557.6548
Epoch 266/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3580.0815
Epoch 267/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3443.1519
Epoch 268/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3607.0271
Epoch 269/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3751.3823
Epoch 270/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3598.9592
Epoch 271/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3370.8289
Epoch 272/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3749.4119
Epoch 273/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3765.1172
Epoch 274/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3753.7019
Epoch 275/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3530.5029
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Epoch 276/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3762.7134
Epoch 277/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3647.8623
Epoch 278/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3965.6323
Epoch 279/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3584.4011
Epoch 280/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3809.0718
Epoch 281/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3662.9648
Epoch 282/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3645.3472
Epoch 283/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3657.3889
Epoch 284/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3481.8865
Epoch 285/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3731.1421
Epoch 286/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3430.5081
Epoch 287/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3649.5869
Epoch 288/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3413.8455
Epoch 289/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3618.4810
Epoch 290/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3416.5496
Epoch 291/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3460.8340
Epoch 292/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3669.0669
Epoch 293/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3797.7305
Epoch 294/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3699.3115
Epoch 295/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3474.9795
Epoch 296/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3598.8396
Epoch 297/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3687.4304
Epoch 298/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3549.9939
Epoch 299/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3672.8447
Epoch 300/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3427.4580
Epoch 301/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3588.5837
Epoch 302/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3783.2983
Epoch 303/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3646.0210
Epoch 304/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3685.8931
Epoch 305/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3611.5291
Epoch 306/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3509.1682
Epoch 307/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3665.7490
Epoch 308/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3691.6858
Epoch 309/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3461.4661
Epoch 310/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3729.0508
Epoch 311/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3452.7273
Epoch 312/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3438.2395
Epoch 313/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3399.6455
Epoch 314/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3382.0073
Epoch 315/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3629.9778
Epoch 316/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3454.3887
Epoch 317/500
```

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4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3618.9810
Epoch 318/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3439.9214
Epoch 319/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3635.2361
Epoch 320/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3800.1772
Epoch 321/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3781.1365
Epoch 322/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3579.1440
Epoch 323/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3678.7109
Epoch 324/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3768.5339
Epoch 325/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3632.6880
Epoch 326/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3634.0393
Epoch 327/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3466.8225
Epoch 328/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3790.4399
Epoch 329/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3560.4646
Epoch 330/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3512.8240
Epoch 331/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3444.1353
Epoch 332/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3560.3945
Epoch 333/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3759.6860
Epoch 334/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3587.9236
Epoch 335/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3354.6216
Epoch 336/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3655.8999
Epoch 337/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3842.3271
Epoch 338/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3597.5894
Epoch 339/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3623.5762
Epoch 340/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3700.5781
Epoch 341/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3661.3533
Epoch 342/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3481.2271
Epoch 343/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3695.5081
Epoch 344/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3361.4939
Epoch 345/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3602.6375
Epoch 346/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3356.3799
Epoch 347/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3488.1899
Epoch 348/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3624.3035
Epoch 349/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3441.5093
Epoch 350/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3568.8315
Epoch 351/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3781.4521
Epoch 352/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3520.7346
Epoch 353/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3391.4167
Epoch 354/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3540.0449
Epoch 355/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3607.8835
Epoch 356/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3780.1013
Epoch 357/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3523.0718
Epoch 358/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3481.7930
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Epoch 359/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3504.8594
Epoch 360/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3634.7908
Epoch 361/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3379.5002
Epoch 362/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3667.7012
Epoch 363/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3579.1216
Epoch 364/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3443.5920
Epoch 365/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3610.8706
Epoch 366/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3620.2825
Epoch 367/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3428.5823
Epoch 368/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 4ms/step - loss: 3645.2622
Epoch 369/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3346.5510
Epoch 370/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3419.8677
Epoch 371/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3613.5229
Epoch 372/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3432.3372
Epoch 373/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3686.5540
Epoch 374/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3697.0808
Epoch 375/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3509.4854
Epoch 376/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3482.5789
Epoch 377/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3927.1260
Epoch 378/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3488.9758
Epoch 379/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3431.9539
Epoch 380/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3522.4609
Epoch 381/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3542.3809
Epoch 382/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3497.3472
Epoch 383/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3804.5195
Epoch 384/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3419.8145
Epoch 385/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 10ms/step - loss: 3566.4260
Epoch 386/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3688.1892
Epoch 387/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3496.9563
Epoch 388/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3615.3118
Epoch 389/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3472.7603
Epoch 390/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3523.1501
Epoch 391/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3315.7944
Epoch 392/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3538.7412
Epoch 393/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3736.2139
Epoch 394/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3532.7183
Epoch 395/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3445.5337
Epoch 396/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3695.7170
Epoch 397/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3613.5110
Epoch 398/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3468.6104
Epoch 399/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3463.7615
Epoch 400/500
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4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3650.0085
Epoch 401/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3731.3623
Epoch 402/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3431.4224
Epoch 403/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3700.9255
Epoch 404/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3497.9287
Epoch 405/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3666.8196
Epoch 406/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3664.5974
Epoch 407/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3716.5508
Epoch 408/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3601.4985
Epoch 409/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3406.0740
Epoch 410/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3599.0664
Epoch 411/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3616.6870
Epoch 412/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3700.8440
Epoch 413/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3593.4841
Epoch 414/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3603.2903
Epoch 415/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3427.0139
Epoch 416/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3426.0276
Epoch 417/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3498.4465
Epoch 418/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3407.2537
Epoch 419/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3585.5059
Epoch 420/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3606.3254
Epoch 421/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3434.1121
Epoch 422/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3425.1160
Epoch 423/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3527.1877
Epoch 424/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3420.0227
Epoch 425/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3597.9490
Epoch 426/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3586.9204
Epoch 427/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3462.8303
Epoch 428/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3628.2527
Epoch 429/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3614.9878
Epoch 430/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3508.2495
Epoch 431/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3546.2881
Epoch 432/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3644.9766
Epoch 433/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3596.0020
Epoch 434/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3566.9639
Epoch 435/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3566.3191
Epoch 436/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3641.2190
Epoch 437/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3493.6919
Epoch 438/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3596.1484
Epoch 439/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3431.0552
Epoch 440/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3769.8232
Epoch 441/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3681.7207
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Epoch 442/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3621.2769
Epoch 443/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3625.0840
Epoch 444/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3457.6482
Epoch 445/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3390.5500
Epoch 446/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3546.9133
Epoch 447/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3669.8533
Epoch 448/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3533.9375
Epoch 449/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3490.2947
Epoch 450/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3392.1423
Epoch 451/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3558.8081
Epoch 452/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3566.5601
Epoch 453/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3414.6689
Epoch 454/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3697.1445
Epoch 455/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3679.3684
Epoch 456/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3449.9719
Epoch 457/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3457.8250
Epoch 458/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3532.8232
Epoch 459/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3741.3855
Epoch 460/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3430.9460
Epoch 461/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3713.0288
Epoch 462/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3383.3713
Epoch 463/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3594.3408
Epoch 464/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3491.2532
Epoch 465/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 13ms/step - loss: 3400.2600
Epoch 466/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3360.4033
Epoch 467/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3369.3276
Epoch 468/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3486.7615
Epoch 469/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3643.2195
Epoch 470/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3667.7383
Epoch 471/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3483.6396
Epoch 472/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3817.4968
Epoch 473/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3278.1777
Epoch 474/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3666.5107
Epoch 475/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3512.7146
Epoch 476/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3425.8547
Epoch 477/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3667.4707
Epoch 478/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3402.9075
Epoch 479/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3575.8669
Epoch 480/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3597.7974
Epoch 481/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3645.1619
Epoch 482/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3564.3828
Epoch 483/500
```

```
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3410.9966
Epoch 484/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3389.3645
Epoch 485/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3746.4028
Epoch 486/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3418.7637
Epoch 487/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step - loss: 3426.7507
Epoch 488/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3501.9563
Epoch 489/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3576.9556
Epoch 490/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3598.8433
Epoch 491/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3366.0596
Epoch 492/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3300.2268
Epoch 493/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3499.2441
Epoch 494/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3603.8699
Epoch 495/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3428.2437
Epoch 496/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3550.9141
Epoch 497/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3191.3435
Epoch 498/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3356.8669
Epoch 499/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3345.0784
Epoch 500/500
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - loss: 3525.1396
```

Model: "sequential"

Layer (type)	**Output Shape**	**Param #**
dense (Dense)	(None, 4)	8
dense_1 (Dense)	(None, 4)	20
dense_2 (Dense)	(None, 1)	5

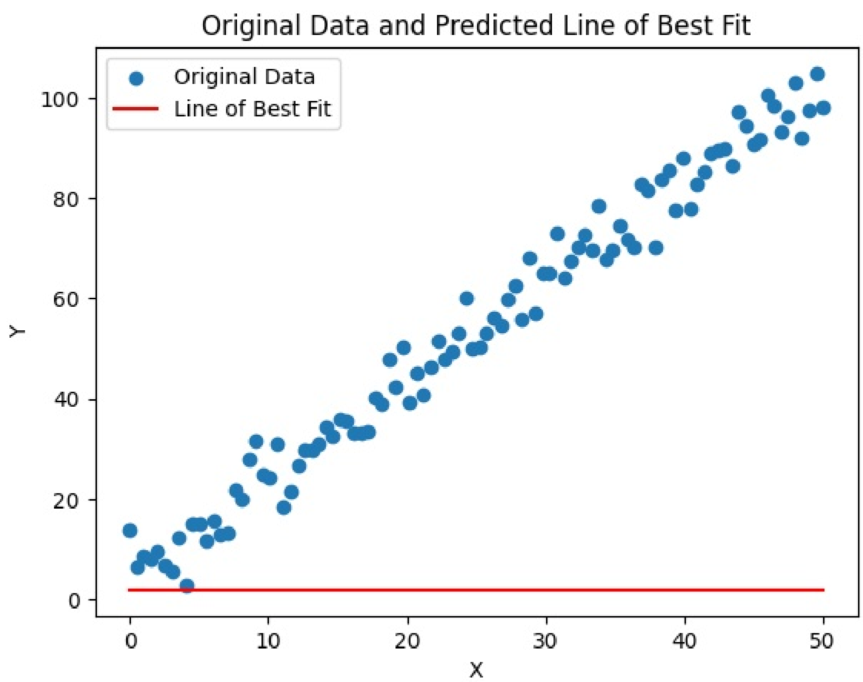
Total params: 101 (408.00 B)

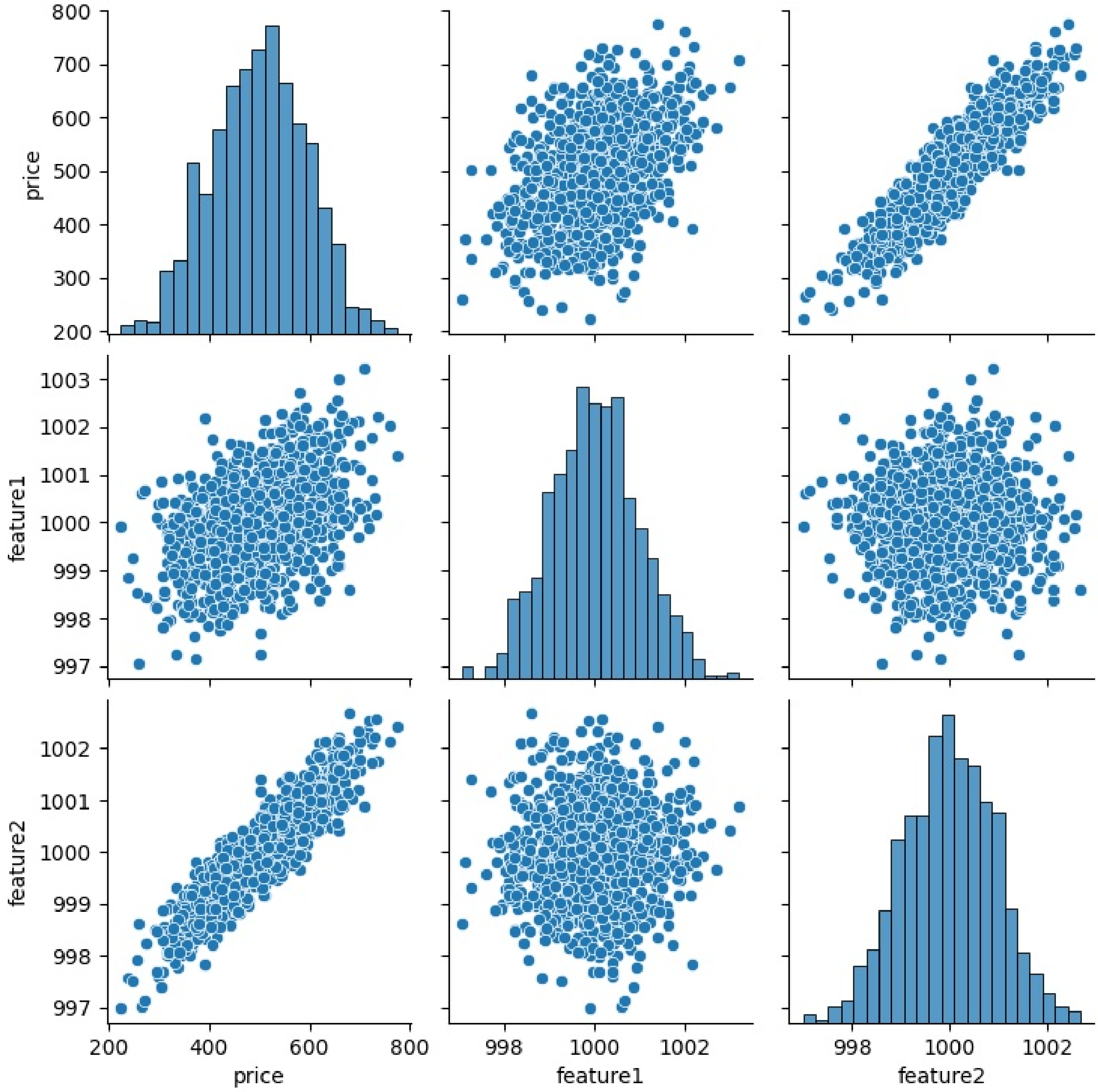
Trainable params: 33 (132.00 B)

Non-trainable params: 0 (0.00 B)

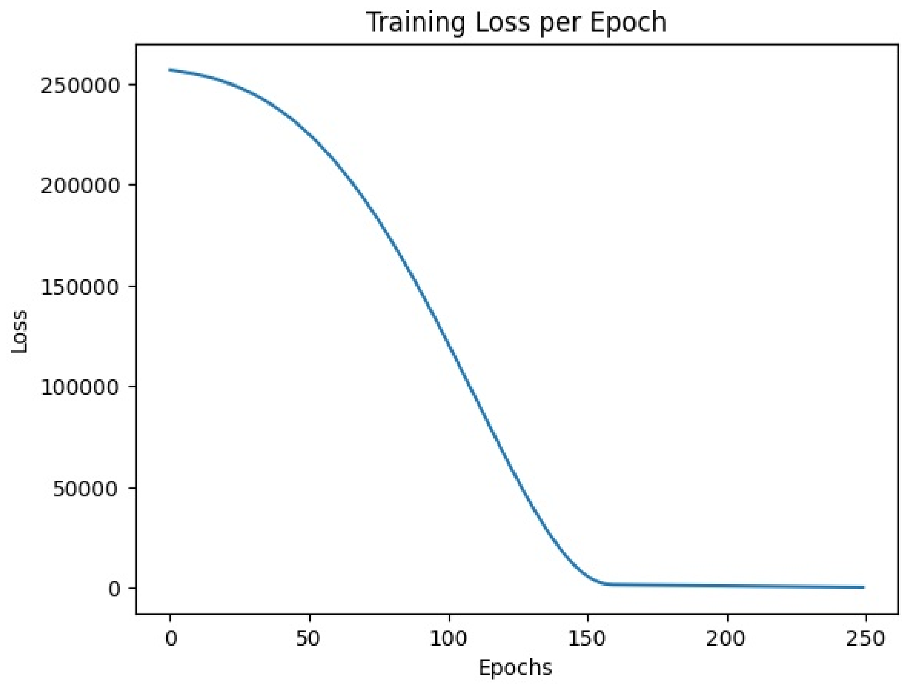
Optimizer params: 68 (276.00 B)

```
32/32 ━━━━━━━━━━━━━━━━━━━━ 0s 3ms/step
4/4 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step
Mean Squared Error: 3508.700145409083
Mean Absolute Error: 51.697276930750064
```






```
c:\Users\mainp\AppData\Local\Programs\Python\Python311\Lib\site-packages\keras\src\layers\core\dense.py:86: User
Warning: Do not pass an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer usin
g an `Input(shape)` object as the first layer in the model instead.
  super().__init__(activity_regularizer=activity_regularizer, **kwargs)
Training Loss: 419.9224548339844
Test Loss: 408.3269958496094
```



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